

Forum

MOOCs for Development: Trends, Challenges, and Opportunities

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Abstract

The recent rise of massive open online courses (MOOCs) has generated significant media attention for their potential to disrupt the traditional modes of education through ease of access and free or low-cost content delivery. MOOCs offer the potential to enable access to high-quality education to students, even in the most underserved regions of the world. However, much of the excitement surrounding opportunities for MOOCs in non-OECD contexts remains unproven. Challenges with regard to infrastructure, sustainability, and evaluation have disrupted early attempts to expand inclusion for those least educated. Drawing on proceedings from a recent international conference on MOOCs for Development held at the University of Pennsylvania, this report synthesizes trends, challenges, and opportunities within the growing subfield.

Despite the growing popularity of providing alternative modes of education through online platforms, most of the media attention to date has been on how major research universities can create their content for worldwide consumption. The MOOCs for Development (MOOCs4D) International Invitational Conference held at the University of Pennsylvania convened scholars, policy makers, and practitioners from a variety of sectors and nationalities. The meeting sought to challenge mainstream conventions of massive open online courses (MOOCs) by broadening the discussion to consider new frameworks and applications in low- and middle-income countries (LMICs).

Empirical research, as represented through the conference presentations, remains thin. Many claims about MOOCs abound, but much is based on anecdotal evidence limited to Western contexts with little understanding about what MOOCs can appropriately deliver in developing countries (Hyman, 2012; Pappano, 2012). Growing interest has led to an increase in scrutiny of MOOC design and deployment challenges (Means, Toyama, Murphy, & Baki, 2013). Addressing limitations of digital access, cultural relevance, peer engagement, and accreditation are among the major barriers currently faced in diverse global settings (Koutropoulos & Zaharias, 2015; Macleod, Haywood, Woodgate, & Alkhatnai, 2015). However, MOOCs4D have an opportunity to expand inclusion and information flow across state and physical boundaries. This brief report expands on conference proceedings in two ways. First, we offer a synthesis of trends discussed throughout the meetings and substantiated by outside literature.¹ Second, we provide a sense of some challenges to successful expansion of MOOCs within development contexts. A summary conference report detailing each panel, along with presentation videos, is available online at www.moocs4d.org.

The rapid proliferation of MOOCs has generated significant attention for their potential to disrupt traditional modes of education by expanding access and delivering free or low-cost content to millions of learners worldwide (Liyanagunawardena, Adams, & Williams, 2013; Waldrup, 2013). Recent estimates indicate that

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1. Throughout this report, conference participants are identified by their respective panels as a footnote.

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the number of universities and course offerings has grown considerably since 2012, climbing to over 400 institutions hosting more than 2,400 MOOCs in 13 languages (Shah, 2014). However, the possibility for MOOCs to deliver high-quality and contextualized learning content in the most underserved regions of the world is only recently being explored (Bartholet, 2013; Boga & McGreal, 2013; Burgess, 2015; Cutrell et al., 2015; Haggard, 2013; Wildavsky, 2015). MOOCs4D push the discussion toward linguistically diverse content—beyond mere translation—toward what is appropriate and accessible to audiences with low and moderate levels of education.

Early iterations of MOOC-like interventions, even if reliant on more traditional technologies such as radio, were most successful when they incorporated relevant content to address local issues, in local languages, that were responsive to diverse learners (Hinojosa, Isaacs, & Bougroum, 2012; Ho & Thukral, 2009). This same formula applies today. As discussed in the conference opening plenary, the single greatest catalyst for the proliferation of MOOCs is the large and unmet need of educational opportunities for learners of all ages in developing countries. The conference emphasized a range of contexts, but primarily with reference to non-OECD settings where technology investment and use is expanding (Broadband Commission, 2014; IHS Global Insight, 2010; ITU, 2014). The term *learner* was broadly defined across a range of perspectives from primary grade students in government schools to youth and adults in alternative and nonformal education systems (out-of-school and displaced populations, for example).

Expanding Inclusion

The specific goals regarding MOOCs vary widely across the different contexts of LMICs. A prominent focus of the conference was to debate perspectives on the meaning of *expanding inclusion* in the developing world. Increasing linguistic inclusion through mother-tongue literacy learning is one approach that the Molteno Institute of Language and Literacy of South Africa is attempting through the technology-based Bridges to the Future Initiative.² East China Normal University offers an early response to expand access for diverse learners.³ This initiative, MOOCs-Inside Courses (MICs), works with local teachers, who use materials and content produced in the West, but adapt it to the local context to meet the needs of their learners (Li, 2013). Meanwhile, Edraak⁴ and Rwaq⁵ are the first MOOC platforms to offer courses exclusively developed in Arabic.

Expanding inclusion through the use of MOOCs also involves addressing issues of access and equity. One misconception about MOOCs is the often-claimed belief that because MOOC content is free to users, such platforms have the potential to democratize education across differences by gender, ethnicity, and economic class (Chamberlin & Parish, 2011). Even if provided at no cost, the ancillary cost of forgone opportunity elsewhere can be a significant barrier for students globally (Daniel, 2012).

Data from both OECD and developing countries have found that MOOC users are disproportionately well-educated, young, and male (Christensen et al., 2013; Emanuel, 2013). The gender gap is also prevalent among MOOC content developers (Straumsheim, 2013). So that MOOCs can reach a wider group of learners, providers and instructors must be conscious of the specific barriers that prevent certain populations from gaining access (level of education, digital literacy, linguistic constraints, gender, etc.).

One such initiative focuses on collaborations across national boundaries. Réseau d'excellence des sciences de l'ingénieur de la Francophonie (RESCIF) aims to promote technological innovation across its network of 14 universities from Africa, North America, Asia, Europe, and the Middle East.⁶ At the nexus of this initiative is the aim of implementing a large-scale partnership in Africa through public-private collaborations that will enable optimal use of the MOOCs platform.

Libraries in developing countries can also play a role in expanding access to information. Several initiatives are working to reduce knowledge gaps by providing free and reduced-cost access to information resources

2. Molteno website: <http://www.molteno.co.za/our-programmes>; Panel D: *Expanding Inclusion*

3. Panel D: *Expanding Inclusion*

4. Edraak website: <https://www.edraak.org>

5. Rwaq website: <http://www.rwaq.org>

6. RESCIF website: <http://www.rescif.net/en>; Panel E: *Building Global Capacity in Digital Information Resources*

such as online journals and books.⁷ As shown in the efforts of many of these organizations and networks, a variety of projects in diverse settings around the world are beginning to make significant strides in understanding and using online learning.

Infrastructure

Challenges to successful MOOC expansion within development contexts was a resounding theme throughout the conference. Perhaps most broadly considered, the rhetoric of how MOOCs can “overcome inequality” in terms of access and quality of higher education needs to be reconsidered in a number of ways. We now know that MOOCs are primarily available to those already most educated. How will we reach those least educated?

Concerns regarding the relevance of content offered, languages of instruction, diversity of learning needs, and cultural differences in pedagogy are pervasive (Fini, 2009; Haggard, 2013; Koutropoulos & Zaharias, 2015). However, the paucity of sufficient telecommunication infrastructure outside of urban settings is perhaps the most tangible challenge of MOOCs4D (Adomi & Kpangban, 2010). While recent accounts predict a steady climb in Internet penetration worldwide, an estimated 4 billion people are still offline, 90% of whom are from the developing world (ITU, 2014).

Understanding the contextual and socioeconomic breakdown behind such global trends is important. Disaggregated data illustrating equality in access with regard to gender, cultural, and linguistic minorities are still not widely available. However, estimates point to a more pronounced gender gap in non-OECD countries (ITU, 2013). When broken down by connectivity speed, differences in access to high-speed “broadband” Internet persist among developing countries (ITU, 2014).⁸ Therefore, alternative approaches to MOOC content that rely on more advanced data transfer must take into account the lower bandwidth networks more prevalent in LMICs. Lightweight web apps, such as that presented by Khan Academy Lite, are being developed to provide core content (videos and exercises) offline from a local server.⁹ Similarly, other platforms such as biNu are already delivering learning content to feature phones over cellular networks through a digital compression technology.¹⁰

The prevalence of mobile devices in developing countries presents a unique opportunity for MOOCs4D. Estimates indicate that almost seven billion people worldwide will have access to mobile-cellular subscriptions by 2015, with the majority of subscribers residing in developing countries (ITU, 2014). With such an overwhelming penetration, it is imperative that developers harness the ubiquity of cellphones and other mobile devices when considering a MOOCs4D design.¹¹

Promoting a socially interactive experience can have a profound impact on learning by encouraging persistence and motivation (Fini, 2009). To this end, Future Learn of the UK’s Open University is shaping its MOOCs to promote small group conversations to facilitate peer learning through content on mobile platforms.¹² Mobile devices deployed by Future Learn offer the advantage of incorporating built-in analytics to measure how learners use the software and provide the MOOC moderators with critical performance monitoring data. A recent experiment in India showed how student facilitators could complement video content, resulting in an overall improvement in exam scores relative to a control group (Cutrell et al., 2015).

Sustainability

With an emphasis on expanding access, a natural question is whether MOOCs can offer sustainable learning solutions. Aggregators (such as Coursera, Udacity, etc.), elite universities, and other for-profit providers have

7. For example, *Research4Life* (<http://www.research4life.org>), *The Essential Electronic Agricultural Library at Cornell University* (<http://www.teeal.org>), and *AGORA of the UN* (<http://www.fao.org/agorafen/>); Panel E: *Building Global Capacity in Digital Information Resources*

8. ITU and OECD have defined broadband as a capacity of at least 256 kbps (*Broadband Commission, 2014*).

9. KA Lite website: <https://learningequality.org/ka-lite/>; Panel F: *Overcoming Digital Infrastructure Constraints*

10. biNu website: <http://www.binu.com>

11. For relevant examples from Rwanda, see EdX/Facebook collaboration, *SocialEDU*: <http://internet.org/press/introducing-socialedu>

12. Future Learn website: <https://www.futurelearn.com>; *Plenary Session 3: The MOOCs Challenge*

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led most aspects of MOOC development to the present (Gaebel, 2014). However, these providers have been limited in their ability to supply localized content to specific populations (Baggaley, 2014). By contrast, local providers that could design relevant content may be limited in their ability to produce, house, and sustain major MOOC platforms. Interventions that do offer localized literacy content (i.e., Yoza Cellphone Stories¹³ and FunDza Literacy Trust¹⁴) provide insights into contextualized digital content, but little has been attempted with a more comprehensive digital curriculum.

During the Economics of MOOCs panel, no single business model was adopted as the most viable solution. A Coursera representative suggested the idea of value creation as a necessary component for success in developing countries.¹⁵ Given constraints on resources and economic opportunity, value creation would have to overcome the opportunity costs to learners and production costs to local institutions (Ng, 2014). An OECD panelist noted a number business models for offsetting costs, including public-private funding collaborations, targeted advertising by collecting personal user data, and professional training by organizations.¹⁶ An approach for students included a “freemium” model, e.g., Coursera’s signature track, whereby the course is offered at no cost, but premium services are charged a fee, such as a certificate of completion (Dellarocas & Van Alstyne, 2013). While the question remains as to whether any of these models can work in developing countries, panelists concluded that an appropriate solution must be linked to relevant skills for the workplace or sufficient incentive for the sponsor.

Sustainability is closely linked with systematic policy initiatives, alongside teacher commitment and support (UNESCO, 2014). Several LMIC countries are experimenting with national policies for creating an inclusive learning environment in a digital era (UNESCO, 2014). Malaysia is attempting to provide every school with broadband access through the 1BestariNet initiative.¹⁷ The One Laptop per Child (OLPC) project is working with ministries of education in a number of countries to deploy connected laptops to children across all primary schools.¹⁸ The South African government is collaborating with the private and nonprofit sectors to narrow the digital divide through the Broadband 4 All initiative.¹⁹ The multistakeholder initiative in Zambia, called iSchool, provides a comprehensive approach to digital learning directed toward teachers, students, and home.²⁰ These interventions all share a similar “design-solution” incorporating policy commitment and end-user support to enhance buy-in and sustainability (Murphy, Castillo, Zahra, & Wagner, 2014).

Evaluation and Accreditation

Central to each of the opportunities mentioned earlier is the discussion of performance monitoring and evaluation within MOOCs. Critics point to a breakdown in formative assessment of typical platforms whereby evaluation is overly reliant on multiple-choice quizzes or left to unstructured peer assessment (Suen, 2014). Alternative approaches for online evaluation include automatic essay scoring (AES) or calibrated peer review (CPR; Balfour, 2013). Each method has its set of challenges, which are compounded by diverse learning backgrounds and unique cultural contexts that limit the quality of assessment. Essentially, if uptake and adoption of MOOCs4D is the goal, then existing country assessments and MOOC content should be aligned in a way that can demonstrate that learning the content actually had an impact.

Performance monitoring also implies interim evaluation well before completion examinations. Within this domain, social media and other information and communication technologies (ICTs) can offer effective ways to motivate peer-to-peer performance monitoring that is integral in many current MOOCs (Raftree & Bachan, 2013). Chat rooms and discussion boards have been prominent components in promoting synchronous and asynchronous collaboration in digitally robust environments. However, mobile devices can provide a more appropriate approach for a variety of engagement and monitoring purposes in low-infrastructure

13. Yoza Cellphone Stories website: <http://www.yoza.mobi>

14. FunDza website: <http://www.fundza.co.za>

15. Panel A: Economics of MOOCs

16. Panel A: Economics of MOOCs

17. 1BestariNet website: <http://1bestarinet.net>

18. OLPC country overviews website: <http://laptop.org/en/children/countries/index.shtml>

19. Broadband 4 All website: <http://www.broadband4all.co.za>

20. iSchool website: <http://ischool.zm>

contexts.²¹ The University of South Africa (UNISA) currently has a pilot MOOC in writing English that uses mobile phones to encourage interaction between lecturers and off-site students.²²

Accreditation is another challenge for MOOCs4D. As organizations develop culturally appropriate content, they struggle to transfer knowledge gained into a marketable certification (Daniel, 2012). More and better collaboration with education ministries and private corporations is needed to align standards. Initiatives from University of the People²³ and Kepler²⁴ provide insight into the sustainability design of tuition-free, accredited online universities. Recent research helps clarify how and why learners interact with this type of technology (Koutropoulos & Zacharias, 2015; Macleod et al., 2015). However, if these challenges are not addressed, MOOCs may lead to greater divides between learners in rich and poor communities.

Opportunities

Despite limited evidence to date of student retention among more developed country contexts (Baggaley, 2013; Naidu, 2013; Perna et al., 2014; Zutshi, O'Hare, & Rodafinos, 2013), conference discussions revealed untapped opportunities for MOOCs in developing countries that can address learning inequities to improve economic, health, and social outcomes.

For instance, Makarere University in South Africa has developed an online program to improve production on dairy farms. The World Bank is working with countries in sub-Saharan Africa to pilot ICT programs for students seeking market-relevant technology skills.²⁵ East China Normal University presented another initiative to provide education access to Chinese migrant workers through a network of multimedia learning centers (Li & Levin, 2012).²⁶ Directed at displaced populations, InZone strives to meet the needs of learners in emergency contexts by developing a MOOC-based course for refugee students.²⁷ Elsewhere, the HP Life initiative and the Education Development Center shared their work on creating a practical training and mentoring program for aspiring LMIC entrepreneurs.²⁸

In the field of global health, worker shortages, poorly resourced clinics, and limited access to health information represent persistent challenges for many of the world's health systems. The Health Informatics and Telemedicine Capacity Building Program of the Botswana-UPenn Partnership develops and scales technology-enhanced medical education projects to offset the huge demand for improved health care services throughout Botswana.²⁹ Johns Hopkins University is using MOOCs to increase scientific literacy and build public health awareness to address the need for improved immunization as a global health priority.³⁰ However, as a result of a limited implementation period, evidence from conference presentations relied heavily on opportunities rather than results and on outputs rather than outcomes.

Conclusions

The MOOCs for Development Conference was designed to launch a conversation and debate on the future of MOOCs and digital learning in the developing world. This report synthesizes some of the trends, challenges, and opportunities discussed. One major consensus was the need to focus more directly on local utilizations of MOOCs that take into account the diversity of learners and learning contexts in these regions.

21. See Wagner's (2014) landscape review of the use of mobiles for learning in LMICs.

22. UNISA Institute for Online Distance Learning website: <http://www.unisa.ac.za/default.asp?Cmd=ViewContent&ContentID=130>; Panel F: Overcoming Digital Infrastructure Constraints

23. University of the People website: <http://uopeople.edu>

24. Kepler website: <http://kepler.org>

25. The New Economy Skills for Africa Program—ICT: <http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTEDUCATION/0,,contentMDK:22335863~menuPK:617610~pagePK:148956~piPK:216618~theSitePK:282386,00.html>

26. Panel D: Expanding Inclusion

27. InZone website: <http://linzone.fti.unige.ch/index.php?module=content&type=user&func=view&pid=39>; Panel D: Expanding Inclusion

28. HP Life website: <http://www.life-global.org/en/LEARN-ONLINE/HP-Life-e-Learning>; Panel H: Global Health

29. Botswana-UPenn Partnership website: <http://www.med.upenn.edu/botswana/>; Panel H: Global Health

30. Johns Hopkins Course website: <http://www.jhsph.edu/courses/course/223.705/81/2014/20440/>; Panel H: Global Health

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New evidence on MOOCs will continue to bring about changes in the way 21st-century education is thought about and implemented. MOOCs have a distinct advantage in their ability to scale and provide education to many more individuals, including those in developing countries. Clearly, decreasing costs and increasing prevalence of ICTs worldwide offer a tremendous opportunity for experimentation in expanding education quality. MOOCs for development will be at the center of these exciting and challenging opportunities. ■

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