A roadmap for offering MOOC from an LMIC institution

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\textbf{ABSTRACT}

MOOCs are massive open online courses that are globally accessible, free of charge. Given their cost-free and open accessibility, it is surprising that only a few institutions have offered MOOCs from low- and middle-income countries (LMICs). Pakistan recently made this short list of LMICs as the first two MOOCs were launched from the country, in 2014 and 2016. Drawing from that experience, the organizers of that course present a roadmap for LMIC institutions for developing a MOOC, focusing especially on the technological and pedagogical limitations that an LMIC institution might find deterring.

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\section*{Introduction}

A massive open online course (MOOC) usually refers to an online, non-degree course that offers open, global, and free of charge enrollment (Esposito 2012; Freitas, Morgan, and Gibson 2015; Sandeen 2013; St Clair et al. 2015; Suen 2014). These courses are currently being offered from leading institutions, predominantly in the west (Bayne 2015; Mulder and Janssen 2013; Waldrop 2013). Given their cost-free and open accessibility, the value of such courses for developing countries is indisputable. However, probably owing to pedagogical and technological constraints, there are few institutions offering MOOCs from low- and middle-income countries (LMICs) (Wilson and Gruzd 2014). In 2014, Pakistan made this short list of LMICs as the first MOOC was launched from the country. This was a three-week long, hands-on MOOC on Bioinformatics of Drug Design (http://www.aku.edu/aboutaku/events/Pages/Drug-Discovery.aspx). In 2016, a second MOOC, ‘Fundamentals of Molecular and Cell Biology’, was launched from the same platform. Drawing from the experience, in this paper the organizers/facilitators of that course present a roadmap for LMIC institutions for developing a MOOC, focusing especially on the technological and pedagogical barriers that an LMIC institution might need to address when developing a MOOC from its platform.

\section*{Comfort-zone challenge}

When planning a MOOC, not only will the faculty have to review their approach to teaching but on an institutional level, teaching philosophy must be realigned to cater to a global audience with an unknown and undefined demography (Kellogg 2013). For an institution, becoming a presence in this manner on the World Wide Web has its pros and cons. While on one hand this provides an opportunity for global exposure, on the other, it opens an institution to worldwide quality evaluation...
and criticism. When we were in the phase of developing our MOOC, there was a serious concern to maintain high quality both with respect to the content and the delivery of the course. We were worried that our course participants, underestimating our MOOC because it originated from an LMIC, might have doubts regarding the competency of the facilitators or the currency of the course content. An institution that selects students from a predefined population of applicants knows the students it is admitting and therefore feels in control; that comfort-zone is challenged when the unlimited exposure from a MOOC gives way to global evaluation and criticism. While these fears are valid, they might deter LMIC institutions from taking their curricula online. These concerns can be managed, however, by a relentless scrutiny of the course content and of the quality of delivery.

**Quality control**

Before the start of the course, our institution put together a team of experts in e-learning, instructional design, computer skills, and audiovisual and information technology. Months before the course was launched on the World Wide Web, we ran it through several cycles of evaluation, checking for the effectiveness of the pedagogical approach, user-friendliness, visual appeal of the website, etc. The evaluation was done by a diverse group, comprising discipline experts, computer and information technologists, and experts from disciplines other than that in which the MOOC was offered. It is always a good idea to include at least one student in the team of evaluators to take advantage of this critically important perspective. Before the launch, it is necessary to ensure that all the text on the course website is repeatedly proofed for errors, that videos and pictures examined for sharpness and resolution, and that all weblinks on the course site work as expected. One must also make sure that any copyrighted material (text, pictures from the Web, etc.) that is being used for the course has been granted approval by the copyright owners.

**Training of faculty**

An institution that is planning to embark on e-learning must put together a plan to train its faculty in the development of online courses. The training approach should explicitly support faculty in transitioning from the traditional philosophies of classroom teaching to a mind-set that is needed for online teaching. It is equally important to train instructors in the skills they will need to construct a MOOC. The faculty training initiative should include hands-on workshops in various tools that will be needed to prepare effective, informative, visually appealing presentations. Tools for preparing and administering online videos, pictorials, quizzes, assignments, assessment will have to be introduced to the faculty in hands-on sessions. To help the faculty in getting into the ‘MOOC mind-set’, they might be encouraged to enroll in a MOOC of their choice as a participant. Another way to help the faculty attain comfort level with online mode of teaching is to conduct most of their training online using various forms of communications, including interactive video calls, online forums, and live chatting, etc. These strategies are necessary for the ‘immersion’ of the faculty into an online environment, helping them to intuitively rethink and align their teaching approach with the principles of e-learning.

**Course design**

If the course is being designed with an LMIC audience in mind then, being mindful of the limited computer literacy in LMICs (Farid et al. 2015; Liyanagunawardena, Williams, and Adams 2013; Marcial et al. 2015), the course design and delivery will have to be participant-friendly. Participants who feel overwhelmed by course load are likely to drop out soon after enrollment (Liyanagunawardena, Williams, and Adams 2013). The workload for per session, per week, and for the whole course should be determined and apportioned considering a participant who is a full-time employee, student or parent, and is enrolled in the course simply to enrich him/herself with supplemental knowledge.
and/or skills. To keep the audience interested and attentive, the duration of course videos or lectures should be kept short or divided into short digestible segments. Quizzes and/or assignments should be doable in a reasonable time-period. It is important to realize that in most LMICs, one cannot take for granted a 24-hour consistent supply of electricity, a robust and high-speed internet connection, or ready computer accessibility (Farid et al. 2015; Liyanagunawardena, Williams, and Adams 2013; Marcial et al. 2015). And the MOOC design will have to accommodate those limitations. The course schedule, deadlines for task completion, and timelines for assignment submission will need to be flexible as much as possible. It is advisable to recommend a timeline but not to impose it, or penalize those who are unable to follow it. It is important that all course material should be easily downloadable. This will allow the participant to save the course content on their computer as and when the electricity supply and/or internet connection allows, and then go through the material at his/her leisure.

Anticipating an audience with a diverse background, the way around the webpages, videos, tasks, and assignments, should be explained with easy-to-follow, step-by-step instructions. The videos should be kept at a minimal length – ours were around 10 minutes each. It is important to bear in mind that, unlike a face-to-face lecture, the videos need not repeat the content for emphasis or clarity, since the audience can always go back and replay the videos as needed. If the time required to view each video and to attempt each quiz/assignment is clearly spelled out, it will help the participants to plan accordingly without getting frustrated by surprises. On a weekly basis, the participants should be allowed to self-assess their progress and, if needed, review the previous week’s content before moving forward. It is important to keep all self-assessment tasks and assignments optional; if a participant does not feel the need for it, s/he should not feel obligated to complete a task. Aspects of flexibility and freedom are incorporated in a MOOC not only to accommodate the technological limitations but also to allow the participants a sense of control on the level of their participation, and to also entrust them with the responsibility of self-learning.

**Summary Box 1: Considerations for Faculty and Institution offering MOOC**

- Faculty as well as institutions will need to become comfortable with the global exposure a MOOC entails.
- Training of faculty is essential to help them transition from a classroom teaching to an e-learning mind-set.
- MOOC facilitators will also need training in the technical tools they will need to design their MOOC.
- The institution will need to put together a team of experts and technological facilities needed for developing a MOOC.
- To ascertain its high quality, the online course must go through repeated cycles of internal proofing by a diverse group of evaluators.

**Catering to the audience**

By design, MOOC participants are not selected according to particular criteria, nor should this fact be a source of concern. Moreover, participants are free to review a MOOC and then conveniently drop out if s/he does not find the material interesting, useful, or easy to follow. With this in mind, it is a good idea to spell out, on the introductory page of the course website, the minimal prerequisites that a participant should have to understand the material covered in the course and the course’s expected outcomes. Keeping that in mind, the minimum prerequisite level of knowledge for the potential enrollees, the course content needs to be selected carefully so that the majority of the audience can follow it easily. For those having difficulty with the material, useful weblinks and/or reading material may be recommended. For the participants who are relatively uncomfortable in a cyber-environment, it is particularly important that the course website is user-friendly, and has an intuitive, easy-to-navigate design. The website layout should be aesthetically pleasing, with a color palette that is lively, cheerful, and pleasing to the eye.

Since an online environment suffers from limitation of interaction, it is important to create a forum on the course website to allow the participants to interact with each other and with the facilitators (Sharif and Magrill 2015). This is an effective way to facilitate learning by creating a social,
interactive environment on the course website (Sharif and Magrill 2015). Once a week, a live chat or video session may be scheduled for the participants who need to interact with the facilitators.

Opening a MOOC to a global audience will necessitate that the medium of instruction should be a widely understood language, such as English (Anzai and Akahori 2015). If it is expected that the course will be accessed by an audience that communicates in languages other than English, the videos and lectures may be embedded with audio tracks/subtitles in multiple languages. Another important consideration is to stay culturally sensitive and refrain from using objectionable language or content. The attitude and attire of the presenters should be considered accordingly, as well.

Formal registration before the launch of the course and evaluation/feedback at the end is advisable (Doherty, Harbutt, and Sharma 2015). Participants can be registered directly through email or by using one of the several options available online; we used the Google registration tool. At the end of the course, it is important to obtain feedback from the course participants regarding their level of satisfaction with various aspects of the MOOC (Griesbaum 2014). This information is always helpful in improving the subsequent online courses that an institution may be planning to develop in the future. Online tools, such as those available on Moodle or others such as SurveyMonkey, are useful for constructing and administering feedback surveys.

**Technological considerations**

For developing a MOOC, technological requirements might appear daunting for an LMIC institution (Farid et al. 2015; Liyanagunawardena 2012; Liyanagunawardena, Adams, and Williams 2013; Liyanagunawardena, Williams, and Adams 2013; Marcial et al. 2015). However, the truth is that although certain technological considerations may be unique for online courses, for the most part, an information technology and design package that a university utilizes for its everyday routine would include everything that may be needed for developing a MOOC. This includes the usual designing/editing hardware and software that may already be in place in an academic setting. For developing lectures, a slide-making software such as Microsoft PowerPoint is sufficient. For additional features that are desirable for an online course, software tools, such as Camstudio, will add further flair by making the lecturer part of their presentation. Aside from the software required to develop presentations and videos, tools will be needed to design tasks and quizzes. Course design and management software, such as Moodle and Hotpotatoes, are useful in designing interactive learning activities.

For a MOOC, it is highly desirable that all the lectures and presentations are adaptable to commonly used software, and are easily uploadable/downloadable to and from the Web. To prepare web-friendly lecture videos the institution should consider, if this has not already been done, establishing an audiovisual department with trained experts and requisite equipment. In addition to experts who are trained in filming and editing, equipment such as camera, microphones, and lights will be needed. A studio for recording indoors and special equipment for outdoor shooting is also recommended. Software tools, such as Windows Moviemaker, will also be needed for editing and blending the videos, controlling sound quality, and adding graphics, etc.

**Reaching out to the audience**

There are several options when it comes to choosing a platform for launching an online course. The most convenient choice would be one of the already established and well-known platforms, such as Coursera and edX (Jordan 2014). By associating one’s course with an already established platform one reaps the benefits that come from using a streamlined product that has been tested and debugged over the years. Additionally, when the course is launched from a well-known platform, publicity for the course is not a major concern. The already established following of that platform will present a ready pool of prospective participants as well as vehicles for spreading the course information through word of mouth.
In our case, it was less complicated to launch the course from our own university’s platform, using the learning management software Moodle for design and packaging the course. While launching the course from our own institution’s website also gave us a sense of ownership of the course, on the flipside, the course enrollment suffered from limited publicity. Despite this limitation, however, we still managed to enroll over 200 participants. In case an institution opts to use its own website for launching a MOOC, strategies will have to be considered to publicize the course. In addition to sending mass emails to prospective participants/institutions and advertising the information on the institutional website, print media, including posters, flyers, and letters may be utilized. Using printed matter is particularly important in an LMIC setting since, as we experienced, the majority of LMIC institutions do not have a way to electronically receive and/or circulate course announcements to their faculty and/or students. If possible, the course announcement may also be broadcast on local radio and television channels.

Summary Box 2: Considerations for offering a MOOC from an LMIC
- Course design should allow for inconsistent electricity supply, and internet and computer access.
- Course content, assignments, quizzes, etc. should come with clearly defined instructions, and timeline, needed to complete each task.
- Easy to navigate course website, with an eye-pleasing color palette.
- All course videos should be short and downloadable.
- Maximum flexibility of time should be allowed to the participant with no imposition to complete course-related tasks by fixed deadlines.
- Course website should include a forum for the participants to interact with each other and with course facilitators.

Concluding remarks
Developing a MOOC may seem a daunting task for an LMIC institution. However, as we have tried to explain in this article, most of those fears are unfounded. As discussed above, many of the concerns of an institution stem from inhibitions associated with an LMIC status. Once those inhibitions are rationalized, pedagogical and technological constraints are not insurmountable. The key is to put together a team of MOOC trainers who are passionate about distance learning, are creative, and have a sense of adventure. After that it is all about efficient planning, motivating the faculty about offering a MOOC, and finding creative ways around deterring barriers.

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No potential conflict of interest was reported by the authors.

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