Medical Reference Services Quarterly

Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/wmrs20

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Published online: 14 Feb 2014.

To cite this article: Matthew B. Hoy (2014) MOOCs 101: An Introduction to Massive Open Online Courses, Medical Reference Services Quarterly, 33:1, 85-91, DOI: 10.1080/02763869.2014.866490

To link to this article: http://dx.doi.org/10.1080/02763869.2014.866490

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EMERGING TECHNOLOGIES

Matthew B. Hoy and Tara Brigham, Column Editors

MOOCs 101: An Introduction to Massive Open Online Courses

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 Massive Open Online Courses (MOOCs) are a new type of online class that allow anyone, anywhere, to participate via video lectures, computer graded tests, and discussion forums. This article will give a basic overview of what MOOCs are, how they work, and some of their inherent advantages and disadvantages. It will also explore what MOOCs mean for medical education and libraries. A list of MOOC-related resources is also included.

KEYWORDS  Education, Internet, Massive Open Online Courses, MOOCs

INTRODUCTION

One of the promises of the Internet has always been to democratize education, making the accumulated knowledge of mankind available to everyone. Over the last decade, many educational institutions have begun offering courses via the web in a variety of formats. Recently, a new breed of online class has emerged: the Massive Open Online Course (MOOC). MOOCs are online classes that anyone, anywhere can participate in, usually for free. They are made up of short video lectures combined with
computer-graded tests and online forums where participants can discuss the material or get help. MOOCs are open to anyone who wants to register, and classes often have tens of thousands of participants. This article will describe the basic elements of a MOOC and explore what MOOCs might mean for libraries. It will also discuss what effects MOOCs might have on medical education. A list of MOOC related websites is also included.

WHAT IS A MOOC?

MOOCs are a group of online classes that share several key features. The most obvious is that all content is delivered online, either through video, slideshows, discussion boards, or any combination thereof. Courses are usually developed by well-known figures in the field from large research institutions, but in reality anyone can create a MOOC. Participants pay no enrollment fees and there are no restrictions on who may register, although there may be suggested prerequisite knowledge. As McAuley put it, “a MOOC integrates the connectivity of social networking, the facilitation of an acknowledged expert in a field of study, and a collection of freely accessible online resources.”

MOOC topics vary widely. Stanford’s list of MOOCs includes course titles such as “Game Theory,” “Antimicrobial Stewardship,” and “Mobile Health Without Borders.” Harvard and MIT’s joint venture, edX <http://www.edx.org>, offers courses from nearly 30 institutions around the globe, including The Karolinska Institutet, the Australian National University, Rice University, and many others. EdX currently offers around 80 courses, including “Health and Society,” “Jazz Appreciation,” and “Fundamentals of Clinical Trials.” The only real barriers to course topic selection are availability of experts to develop the course and whether the topic can be taught by lecture/discussion. Courses that require hands-on work with materials are inherently unsuited to an online format.

Instead of attending traditional live lectures, students watch prerecorded lecture videos interspersed with quizzes that test comprehension. These frequent knowledge checks make it harder for students to “zone-out” and provide immediate feedback to students, letting them know if they have missed key concepts. Students also participate in online discussion forums where they can get clarification, share their thoughts, and build a sense of community like that found in a traditional classroom. Goodell noted that MOOCs “sometimes supplement discussions with in-person meet-ups and Google Hangouts video web meetings.” Although course-work is completed asynchronously, students are grouped together into cohorts, and classes begin and end at certain dates so that one group of students is learning the material together at the same time. This facilitates meaningful discussion by
ensuring that the forums have a population of students who are working on
the same material at the same time.

Instructors can host their own MOOCs, but typically they are hosted
at a dedicated provider that handles the user registration, content manage-
ment, testing, discussion forums, and other “back-end” services. Instructors
still need to create and upload the course content, but the user management
functions are handled by the MOOC provider.

There are many advantages to the MOOC model for online educa-
tion. The inherent openness and user-friendliness of the format means that
incredible educational resources are available to anyone with the time to
devote to learning. MOOCs offer real opportunity to people without access
to traditional education. However, there are still many issues that remain
unresolved.

MOOCs are often touted as a way of teaching thousands of students at
once, but the reality is that very few students who register for a MOOC com-
plete it. Many never even begin the course after registering. In their review
of the literature on MOOCs, Liyanagunawardena, Adams, and Williams found
that MOOCs have an average completion rate of less than 10%. Even when
students do complete their work, there is no guarantee they have successfully
mastered the material. As Oremus noted, San Jose State University recently
suspended its MOOC project after the majority of the students enrolled in
the courses failed their final exams. Although the idea of free education for
everyone is noble, in practice few students have the perseverance to work
their way through the material without additional motivation.

**MOOCS AND LIBRARIES**

There is no clear answer about how MOOCs will affect libraries. As Becker
put it, “MOOCs raise the questions of how and where library services fit into
the MOOC model.” Libraries and librarians are typically supported by larger
institutions. If these institutions are offering courses to exponentially larger
groups of students from all over the globe, will the library be expected to
provide these students with services? If that is the expectation, how can the
libraries already struggling with reduced budgets meet the needs of these
patrons? Even at reduced service levels, MOOC students could quickly over-
whelm a library. However, if libraries are not asked to participate in a mean-
ingful way to MOOCs, it will only serve to reinforce the idea some students
have that libraries are no longer a necessary part of education.

Another issue facing libraries serving MOOC students is licensing of
resources and copyright. Since MOOCs comprise students who are globally
distributed and who may or may not be enrolled at a university, access to
licensed resources cannot be guaranteed for every student. If MOOC instruc-
tors have questions regarding access to licensed materials or copyright
questions in general, librarians will need to be aware of the broad reach and large audience of these courses. In a recent issue brief, the Association of Research Libraries noted that “campus counsel at one library has advised that fair use is not an option in the context of MOOCs” and that “content owners are asking extraordinarily high prices or refusing to license for MOOC teaching, citing the for-profit nature of the platforms as well as the unprecedented scale.”

Yet another problem facing libraries serving MOOC students is one of recreating work already done in institutional course management software. Wright summed up the issue nicely: “The work done by librarians within their university’s course management system, such as embedding lesson plans or offering an ‘Ask a Librarian’ feature, would not easily transfer to outside MOOC platforms.”

Despite these issues, libraries cannot afford to be left out of the discussion about MOOCs. At a recent meeting, OCLC Research and the University of Pennsylvania Libraries developed a list of “Next Steps” for libraries to be proactively involved with MOOCs. Their advice was to get involved early and offer support and services in ways that libraries always have. Students and faculty will continue to look to libraries to provide materials for courses, no matter where they take place. Institutions will still expect libraries to manage resources wisely and provide service, even if those services go outside the traditional boundaries of the institution.

MOOCS AND MEDICINE

Although many universities are rushing to join the MOOC world, it appears that medical schools are being more cautious. Harder notes that “to date, no medical school or pre-med program seems to have offered academic credit for a MOOC.” Prober and Heath make an excellent case for a “flipped classroom,” where students watch lectures outside of class and use class time for more engaged learning, noting significant improvement in test scores, attendance in class, and student course reviews. But that engaged learning portion of their plan is missing from the MOOC model, and it is doubtful that discussion forums are a suitable replacement. As Davies says, “lecture style didactics—or ‘content delivery,’ in the parlance of the web—are just one small piece of the overall learning experience in medicine.” Only so much can be taught via lecture. Medicine is as much about relating to patients as it is memorizing material, and teaching those relationship skills with video lectures and discussion forums would be very difficult.

One area of medicine that may be radically affected by MOOCs is Continuing Medical Education. CME is a requirement for most physicians, and the idea of being able to participate in online courses at their convenience is bound to be appealing. Industry funding of CME activities is in a
steep decline, and fewer physicians have the budget to travel.\textsuperscript{15} Harder noted that Coursera now offers two courses that can be counted as CME, “as long as students seeking CME pay a modest fee and submit to an optional process for identity verification.”\textsuperscript{12} As budgets continue to tighten, MOOCs could be a replacement for in-person CME courses.

Another area of medicine that MOOCs may radically change is patient education. Volandes et al. noted that assigning patients to watch online videos prior to their appointments with physicians would allow for more of the patient encounter to be spent clarifying their questions and making decisions rather than lecturing.\textsuperscript{16} They also noted that creating MOOCs for patient education materials would have the benefit of standardizing what patients are being taught, removing variation among providers. Another advantage to creating MOOCs for patient education is that they might provide a built-in support community. If confidentiality could be ensured, well-moderated discussion forums could allow patients to find support from others in their peer group. MOOCs could also provide a useful method for updating patients about ongoing research and delivering reminders.

CONCLUSION

MOOCs have the potential to bring education to millions who otherwise would not have access. The combination of short video lectures, frequent comprehension testing, and active participation in an online community can be an effective learning tool for some students, but the registration-to-completion ratio is likely to remain low. Librarians should be aware of this technology and consider participating in a MOOC to better understand how they work. Although MOOC technology is not yet widespread within medicine, it could prove useful for medical education.

MOOC RESOURCES

- Coursera \textlangle http://www.coursera.org\textrangle is a for-profit company that partners with universities. Coursera provides hosting and user services, partner institutions provide the content, and profits are divided. Profits come from selling verifiable certificates of completion and transcripts for certain courses. Costs for this service average about 50 dollars per course.
- Udacity \textlangle http://www.udacity.com\textrangle is a for-profit company that works directly with instructors. Udacity’s courses are focused on computer science. Course material is developed by academics, but produced and presented by Udacity staff, giving it a polished and uniform style. Profits are earned by charging for certificates of completion.
• edX [http://www.edx.org] is a non-profit collaboration between Harvard and MIT. The site currently offers around 80 courses from more than 25 universities, many of them outside the United States. EdX plans to open source their platform and use data from their courses to study how students learn.

• Kahn Academy [https://www.khanacademy.org] is a MOOC-like site aimed at middle and high-school students. It covers basic topics in math, science, art, and computer programming. Users earn virtual badges for completing tasks. Courses are all free.

• Udemy [https://www.udemy.com/] offers MOOCs on a wide variety of topics from academics and business to music production and game design. Course costs range from free to hundreds of dollars.

REFERENCES


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