

Expanding the reach of health sciences education and empowering others: the OpenCourseWare initiative at Tufts University

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Abstract

OpenCourseWare (OCW) represents an innovative and cost-effective opportunity for institutions to take a more active role in strengthening health sciences education worldwide. OCW content can provide a supplement to curricula available in resource-rich settings, as well as provide much of the basic content critical to teaching and research in resource-limited health education environments. Educational institutions worldwide have the opportunity to explore how OCW and other open tools and materials can supplement efforts to build health education capacity to address global shortages of healthcare workers. Tufts University has worked to leverage open, digital resources to support medical education since 1994 with the creation of the Tufts University Sciences Knowledgebase (TUSK). This experience has yielded vital lessons for institutions interested in OCW, including: effectively motivating faculty participation; managing the inherent complexity of open publishing of health sciences content due to its rapidly evolving nature and reliance on copyrighted materials; generating support through internal and external communication throughout the process; and creating institutional systems that ensure the long-term sustainability of OCW initiatives.

Introduction

OpenCourseWare (OCW) comprises “free and open digital publication of high quality educational materials, organized as courses,” capitalizing on the Internet’s potential to minimize obstacles (e.g., borders and geographic distance) to the free exchange of knowledge and new ideas (OpenCourseWare Consortium 2007). Unlike distance learning programs that charge tuition and limit participation, OCW offers unlimited access to course materials to anyone with an internet connection (Atkins et al. 2007). Educators from around the world can augment their syllabi; students can enhance their coursework or pursue self study; and the general public can browse through the curricula at leading universities and benefit from reading lists and lectures.

When considering the impact of OCW on medical education internationally, it is important to note that OCW, as a source of course content, represents only one component of health sciences education. In practice, medical education requires a complex blend of educational materials, experiential learning, and human interaction within a school structure. The significance of OCW in a resource-rich setting is likely to differ greatly from a resource-limited environment – the former may view OCW primarily as a welcome supplement to existing strong curricula, whereas the latter may view OCW as filling critical gaps in core content (Keats 2003). As we face a global health crisis rooted in an international shortage of healthcare workers and an aging population burdened with acute and chronic diseases exacerbated by climate change and conflict (Garrett 2007; Gostin 2007), Tufts has embraced OCW as an

Practice points

- Developing high-quality OCW content for the health sciences is an inherently complex and faculty-intensive process due to the content’s density, rapidly evolving and specialized nature, and heavy reliance on newly published third-party materials.
- Making high-quality content available in resource-limited environments can have a significant impact on faculty and learners by leveraging invaluable faculty time, filling critical gaps in basic curriculum content, and allowing for local customization.
- Recruiting faculty contributors for voluntary OCW initiatives requires tapping into altruistic drivers and providing reinforcement through ongoing communication and engagement with the broader “open” community.
- Institutionalizing OCW initiatives into the normal workflow, budget, and infrastructure of the hosting organization is key to enabling their long-term sustainability.
- Revolutionizing global access to quality health sciences education requires institutions to rethink their role in education and examine the opportunities and obligations presented by participating in increasingly open learning systems.

open model for mobilizing faculty across nations to leverage their expertise to build a shared educational infrastructure and learning network. This paper outlines the development of OCW at Tufts University, explores the impact of openly

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sharing doctoral-level medical and other health sciences content, and summarizes the associated lessons for institutions interested in participating in OCW.

Background

Tufts OCW should be considered within the broader context of the Open Education Resources (OER) movement. OER can include open content, tools, or infrastructure (OECD 2007). Tufts has been engaging in OER work for more than a decade, with the majority of efforts related to the development of the Tufts University Sciences Knowledgebase (TUSK) (Albright et al. 1999; Metz et al. 2001; Lee et al. 2003.). TUSK is an integrated digital repository and curriculum knowledge management and delivery system used by Tufts' four health sciences schools, and other health sciences institutions in India, Tanzania, Uganda, Kenya, and the United States. The TUSK infrastructure, developed largely from open source software, can be utilized by any institution to create, import, manage, search, and customize fully integrated curricula, and was Tufts' first major step toward developing open resources to help meet global needs in medical education. Many of Tufts' faculty have been teaching and conducting field research in the developing world over the past decade, and the TUSK system is increasingly being used to support their work.

OpenCourseWare, as a subset of open content within OER, was launched by the Massachusetts Institute of Technology (MIT) in 1999 as an initiative with the goals of providing free, searchable access to MIT's course material for the general public and expanding the reach of the OCW concept (Carson 2004). In 2002, UNESCO organized the "Forum on the Impact of Open Courseware for Higher Education in Developing Countries," which was attended by representatives of universities from both developed and developing countries (UNESCO 2002). At this conference, the term "open education resource" was more clearly defined as "the open provision of educational resources, enabled by information and communication technologies, for consultation, use, and adaptation by a community of users for non-commercial purposes" (Huyen 2005).

When Tufts was invited to join MIT in its OpenCourseWare initiative in 2004, the institution's expertise in the health sciences and international policy complemented MIT's strengths in engineering and science, and Tufts' track record of creating an extensive body of digital materials and tools to support healthcare education made Tufts a ready partner. Tufts OCW launched in June 2005 as a University-wide initiative, with six courses from three of its four health sciences schools. At the time of this writing, Tufts' OCW site now houses 38 courses, including nearly half of the School of Medicine's didactic curriculum.

Tufts' partnership with MIT and other early participants in the OCW movement has evolved into the OpenCourseWare Consortium (OCWC), an organization with more than 100 member universities and associated institutions dedicated to advancing education and empowering learners through OCW. Expanding our existing OER work into OCW has allowed Tufts to add high-quality health sciences content to the global OCW inventory. This "match" between open sharing and

the values of the institution was critical to gaining support from administrators and faculty for the OCW initiative, which soon became a highly visible embodiment of those values.

Tufts OCW goals and usage

Two goals have been central to the Tufts OCW project: (1) to share Tufts' rich content globally, particularly in the health sciences, with learners and teachers in ways that encourage development of locally relevant and customized resources, and (2) to measure the impact of the initiative in a systematic way. Assessing the use of OCW resources and understanding its impact within the Tufts community and beyond was an important principle of the initial program design. The success of the OCW project needed to be measured not just by the number of courses produced, but rather by defining all meaningful metrics for success. Experts from the Tufts' Office of Institutional Research and Evaluation have been active members of the Tufts OCW Steering Committee and the Tufts OCW working group through every phase of the project. From the program's pilot phase, a longitudinal data collection protocol was established as a key component of the project to capture critical information that would facilitate the evaluation of the impact and usability of Tufts OCW. The evaluation plan was designed to continually assess the initiative's success in achieving its objectives through an intercept survey, web analytics, and analysis of the qualitative feedback provided by the users, contributing faculty members, and OCW staff. This information has been routinely analysed and summarized to allow for continuous monitoring, process changes, and ongoing development of the site.

Usage of the Tufts OCW site has grown steadily since its initial release. Evaluators have examined the characteristics of users, their reasons for visiting the website, and their evaluations of the initiative. To date, the typical user profile is highly educated (holding a doctoral degree, 25%; master's degree, 30%; or bachelor's degree, 26%); primarily interested in graduate-level medical or health sciences education; and either affiliated with an educational institution as a student (20%) or faculty (over 20%), or identified as a self-learner (over 50%). The majority of users (60%) are from the United States, with greatest international representation from Asia and Western Europe. Students cite use of materials to complement courses in which they are currently enrolled, or to enhance personal knowledge. Faculty access the website to develop or plan a curriculum, prepare to teach a specific class, or learn about a subject matter to enhance learning or research. The remaining users are "self-learners" who report visiting the site to enhance personal knowledge or to maintain currency in their professional fields.

Lessons learned

The past two years of Tufts' OCW site development have yielded lessons that may be useful to other institutions considering joining the OCW initiative, particularly in the area of health sciences. Specific lessons arose from dealing with issues related to startup, faculty recruitment, copyright and content, and communications.

Infrastructure, staffing, and financial support

With more than a decade to mature into a comprehensive curriculum management and delivery system using metadata-tagged XML-based content and multimedia content, TUSK provided a sound technical platform upon which to build OCW. Even though the initial Tufts OCW effort required creating a parallel system, tools to move content from TUSK to OCW, and an open, copyright-cleared subset of existing materials, using the TUSK platform with fully digitized materials allowed the OCW project to become established much more efficiently. While current courses presented on Tufts OCW represent only some of what is available internally on TUSK, the remaining core content is being systematically converted into the OCW format by TUSK staff. Funding and staff time were also critical inputs to a successful start-up, as well as considerable external funding (see acknowledgements).

Faculty recruitment and involvement are essential for building OCW content. In an environment where faculty participation in OCW is entirely voluntary, it was important to understand faculty motivations for contributing. The drivers were largely altruistic with participants citing their desire to share knowledge with areas of the world with limited resources, to contribute to their disciplines (see also Johnstone 2005), and to increase the reputation of the institution. Raising awareness of the OCW activity internally was important, as was the support of key faculty and administrators, including the deans, provost, and president. Senior members of the OCW team have met regularly with academic deans of each of Tufts' schools and have attended faculty meetings to present the OCW initiative and answer questions. Identifying faculty concerns early in the process and taking proactive steps to address those concerns must be an institutional priority for universities building OCW sites.

Specific faculty concerns regarding Tufts' OCW initiative were identified through a study conducted by Tufts' Office of Institutional Research and Evaluation to solicit faculty opinions and reactions throughout the pilot phase of the initiative. Although the overall results demonstrated that faculty had positive experiences and recognized the value of OCW to both the institution and the wider community, some faculty initially had questions about having to exclude much copyrighted materials that added substantial value to their original course. Some felt that the relative bareness of the initial OCW course (compared with the richness of the internal TUSK materials) made the course seem rudimentary and could devalue their reputations. Other concerns included the time commitment required, loss of control over materials, possible violation of privacy by users attempting to contact them, and effect on their academic credentials and promotion.

The results of follow-up interviews conducted in the fall of 2005 revealed that these concerns had faded. Only one faculty member reported being contacted by an OCW user, and it was a positive interaction. Faculty members had adjusted to their materials being openly available. Despite some initial skepticism about the value of the project to the University and to users, the faculty participating in the

follow-up interviews clearly recognized the merit of the initiative. Although the interviews were conducted early in the launch of Tufts OCW, faculty members already understood the connection of the project to the University's mission to extend its reach internationally and to foster contributions to civil society.

Several lessons based on this feedback were helpful in later interactions with contributing faculty. OCW staff has learned to provide regular communication about the project, its goals, and the project's connection to the broader international OCW community. The initial orientation to the project and on-going communication about the project's progress as courses are being added addresses concerns that materials were being well-handled. Regular communication about the project to the broader Tufts community, including statistics verifying global use with highly positive user feedback, emphasizes faculty members' roles within a growing "open" community and helps foster cross-disciplinary connections between faculty that reinforces altruistic motivations. Winning the support of leaders within the faculty and administration and sharing specific steps taken to address issues such as faculty time and copyright questions are important to launching a successful process.

Copyright and content complexity issues

While there are few technical issues involved in converting the courses developed within TUSK for OCW, one major barrier to rapid publication is the labor required to verify compliance with copyright law. United States copyright law includes a fair use provision. Fair use means that if certain criteria are met, copyrighted materials may be used without prior permission. These provisions include examining the nature and amount of material used, as well as its commercial impact. Since health sciences faculty members commonly and legitimately include extensive copyrighted material in their lectures and textbook-sized syllabi within the Tufts environment, a judgment must be made about copyright infringement for each piece of third-party content used before publication externally through OCW. These page-by-page and image-by-image reviews by faculty and staff are painstaking and time consuming (up to 150 hours per course), and must be taken into account both when planning staffing and workflow, and setting realistic targets of the number of courses that can be published within a given timeframe.

To minimize copyright problems, Tufts staff found it critical to educate faculty early in the course creation process about utilizing resources in the public domain wherever possible. Tufts' librarians have played a key role in educating faculty about copyright issues and helping to identify open alternatives to copyrighted sources. Staff members are responsible for contacting copyright owners for permission to use material, helping to locate open materials, and assisting faculty in developing their own materials. Despite staff help, faculty can still feel overburdened by the sheer volume of lecture and syllabi material that must be reviewed. Faculty in the process of new course creation are now coached on the benefits of using open resources, the importance of having full citations

imbedded in course materials, and the advantages of collaboration with professional librarians to identify such resources early in the process.

The OCW courses are made available under a Creative Commons public license (for more information on Creative Commons, see Ellaway and Martin in this edition of *Medical Teacher*). Certain restrictions dealing with the use of the University name in connection with materials and exemptions that would require the user to seek permission to use certain third-party materials are noted in the policy statement on the website. Faculty members at Tufts own the copyright to their courses, and earlier reservations about ownership after open publishing have essentially disappeared. Faculty who have contributed courses thus far have not expressed any reluctance to grant Tufts University use of course materials as OCW.

Communication

Limited global awareness of OCW has precluded widespread use, particularly within the health sciences community. Despite this fact, the University is optimistic that knowledge will spread over time. While Tufts' external promotion of OCW has been modest, the site continues to receive traffic via Google, the OCWC, the OER Commons, and other search engines. Participation in these organizations is a valuable tool for universities to increase the visibility of their OCW sites.

The global language barrier across OCW sites is minimized in human medical sciences where English is the international language for research and most education. The language limitation for using other OCW materials world-wide seems likely to improve. Groups in Spain and Asia, for example, have begun the process of translating some courses from participating OCW institutions into local languages including Spanish and both simplified and traditional Chinese. To date, eighteen Tufts courses have been partially translated into Chinese. Concerns about the accuracy of the translations have been mitigated by the ability of users to view the original and translated versions simultaneously via a split screen. However, as the network of institutions and individuals that are broadening the accessibility of OCW grows, the OCW initiative will have to rely on some systematic quality control mechanisms if it is to achieve its goals fully.

Sustainability

Tufts OCW remains an important component of the University's broader efforts in OER, reinforcing Tufts' commitment to share its assets with the wider world. The University is developing long-term strategies to ensure that its full range of OER efforts is sustainable. The sustainability of open resources is tied not only to an institutional "culture fit" but also to identifying stable funding sources that allow for continued development and maintenance, as well as technical and content support once initial grant funding ends (Downes 2007). To address this, Tufts is slowly incorporating its range of OER initiatives into the normal workflow, function, and budget of the institution, while continuing to seek outside funding for related research and development of new projects.

Next steps

The participation of health sciences educators in the OER movement presents the opportunity to shape how information is generated, used, and shared for the benefit of future generations of healthcare workers, particularly those in the developing world. National and international groups are developing best practices and open standards that are essential for exchanging content and tools effectively across cultures and technical platforms. Quality control, particularly for health sciences content due to its rapidly evolving and highly complex nature, creates the opportunity for leading experts in their fields to unite and form international "editorial boards" to ensure the accuracy of a core subset of open content that any school could confidently use to create a locally customized core curriculum. Expanding the impact of OCW for health sciences education will require the development of innovative tools such as semantic searching and competency-based learning and assessment tools that are linked to content. We are in a new era where the blurring of formal and informal learning, and the blurring of teacher and learner (OECD 2007), will compel institutions to reassess their role in education and examine the opportunities provided by participating in an increasingly open model of learning for international health sciences education. Tufts is eager to contribute to this progressively interconnected global community and to the inevitable debates about how best to harness the power of open learning for the empowerment of all.

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