MIT OpenCourseWare

MIT OpenCourseWare (OCW) is a free and open digital publication of high-quality educational materials organized as courses. Through the internet, MIT OpenCourseWare has opened MIT's curriculum and the course materials created by MIT faculty to a global audience of teachers and learners. In the United States and around the world educators use these materials for teaching and curriculum development, while students and self-learners draw upon the materials for self-study or supplementary use.

As of June 30, 2009, there were 1,926 courses available on OCW, representing virtually the entire undergraduate and graduate curricula in MIT's five schools and 33 academic units. Since the inception of OCW in 2002, we have also republished more than 600 courses with updated materials and new pedagogical approaches. Going forward, OCW will continue to publish about 70 new courses and 130 updates each year.

The overarching goals of OCW are to:

- Publish high-quality, up-to-date MIT course materials
- Increase use of OCW for teaching and learning
- Maximize the benefits of OCW for the MIT community
- Support worldwide Open Educational Resources (OER) and the OCW movement
- Sustain the MIT OCW program

This report is organized according to these overarching goals, with an additional section highlighting AY2009 organization and governance developments.

Publishing High-Quality Course Materials

Course Publication

Course publication is at the heart of the OCW mission. This academic year, we:

- Published 69 new courses, bringing the total published to 1,926
- Updated and refreshed more than 110 previously published courses, bringing the total number of courses updated to more than 600

Faculty participation continues to be strong. We are seeing significantly more faculty interest in publishing new courses than we had anticipated a year ago.

Supplemental Resources

In addition to publishing MIT course materials, OCW undertakes many special projects to produce supplemental resources that enrich the educational content of OCW. Supplemental resources are developed through special collaborations. This year's special projects included the following:

- Abdul Latif Jameel Poverty Action Lab Executive Training: Evaluating Social Programs. This five-day course on evaluating social programs provides a thorough understanding of randomized evaluations and pragmatic step-by-step training for conducting one's own evaluations. While the course focuses on randomized evaluations, many of the topics, such as measuring outcomes and dealing with threats to the validity of an evaluation, are relevant for other methodologies (http://ocw.mit.edu/ans7870/resources/pal/index.htm).
- The Torch or the Firehose: A Guide to Section Teaching. Professor Arthur Mattuck offers both novice and seasoned instructors guidelines on how sections can best serve as a complement to lectures, how to help students become better learners, and how to enjoy their experience as recitation teachers (http://ocw.mit.edu/ans7870/resources/mattuck/index.htm).
- Introduction to MATLAB by Yossi Farjoun. This course, intended for students with no programming experience, provides the foundations of programming in MATLAB®, which is used in many MIT courses. Variables, arrays, conditional statements, loops, functions, and plots are explained. At the end of the course, students should be able to use MATLAB in their own work and be prepared to deepen their MATLAB programming skills and tackle other languages for computing, such as Java, C++, or Python (http://ocw.mit.edu/ans7870/resources/farjoun/index.html).
- Applied Geometric Algebra by László Tisza. OCW published this historic course to commemorate the 100th birthday of physics professor emeritus László Tisza, who began teaching at MIT in 1941. This online publication is a reproduction of the original lecture notes for the course Applied Geometric Algebra taught by Professor Tisza in the spring of 1976 (http://ocw.mit.edu/ans7870/resources/tisza/index.htm).

Highlights for High School

In addition to the regular course publication, OCW also offers Highlights for High School, which was launched in 2007. This program takes advantage of our trove of exceptional teaching resources to better serve high school constituencies. Since its inception, the Highlights for High School portal (http://ocw.mit.edu/OcwWeb/hs/home/home/index.htm) has received approximately 700,000 visits, and it is now receiving 40,000 to 50,000 visits per month.

We are publishing a substantial amount of new content on Highlights for High School and more than doubling the amount of video to over 60 hours of content. Our Highlights for High School publishing queue includes eight additional courses from the MIT Educational Studies Program, including six with full video lectures. Examples are Advanced Introductory Chemistry, Introduction to Cognitive Neuroscience, and Probability. In addition, we will be publishing materials from the Chandra Astrophysics Institute, an extensive summer program in astrophysics for students in grades 9–12. Finally, we will be adding an AP chemistry section that will include portions of video lectures captured from the fall 2008 version of 5.111 Principles of Chemical Science.

After these summer updates are complete, we will be ramping down development of Highlights for High School until we secure additional funding for the project.

This year the American Association of School Librarians, a division of the American Library Association, selected Highlights for High School as a Landmark Website on its inaugural list of Best Websites for Teaching and Learning.

Code of Best Practices in Fair Use

A key element of the publication production process is intellectual property clearance. This applies when course materials contain third-party objects such as drawings, charts, and photos. In January 2009 OCW initiated a project, funded by the Hewlett Foundation, to explore the development of community standards among OCW producers regarding the application of fair use under US copyright law in our publishing process. Fair use can contribute to a richer, more complete educational resource, so it is vital to the creators and users of OCW to have a standard set of practices to guide application of fair use.

The OCW Code of Best Practices in Fair Use is modeled on prior codes developed through the Center for Social Media (http://www.centerforsocialmedia.org/resources/fair_use/). A small group of US universities worked with us this spring, with the guidance of experts in copyright law, to develop a code of best practices specifically tailored to courseware made available from US producers under a Creative Commons license. We expect three beneficial outcomes from this project: (1) OCW content will be a more complete educational resource to be used and shared throughout the world; (2) the fair use exception under copyright law will be appropriately strengthened and affirmed in the face of aggressive copyright holders; and (3) the code can be adopted by any other OCW producer in the United States and serve as a model for use by OCW producers internationally. The OCW Code of Best Practices in Fair Use is currently being reviewed by MIT campus stakeholders including the Office of the General Counsel and the MIT Libraries. A panel of impartial, non-MIT attorneys will also review the code prior to its expected release in September. In parallel, the group is seeking endorsements from organizations, such as the OCW Consortium, that have an interest in promoting dissemination of rich educational content.

The committee involved in the code development process included participants from MIT, Notre Dame, Yale, Michigan, the Johns Hopkins Bloomberg School of Public Health, and Tufts, in consultation with staff from the Creative Commons ccLearn group.

Publishing Operations

We are engaged in an MIT systems integration project called DOS (DSpace-OCW-Stellar) that will result in the replacement of the OCW content management publishing infrastructure over the next 12–18 months. This project is being conducted in collaboration with MIT Information Services and Technology and the MIT Libraries. The goal of the project is to integrate three of MIT's key academic content systems, OCW (open publication), Stellar (learning management), and DSpace (digital archive), to make it easier to move educational content and associated metadata among these systems, enabling better support for OCW's publishing workflow as well as the teaching and learning needs of faculty and students. We completed the OCW business requirements

analysis in the spring and are now evaluating the open-source software platform Plone/Zope as OCW's new content management system. We expect to move into the detailed design phase for the system in the early fall.

On another front, we completed the project begun in 2008 to bring video production in-house, resulting in cost savings, greater flexibility, and higher quality video content. We also moved video distribution off of Akamai (the OCW network distribution service provider), achieving substantial cost savings.

Increasing Use of OCW for Teaching and Learning

Users

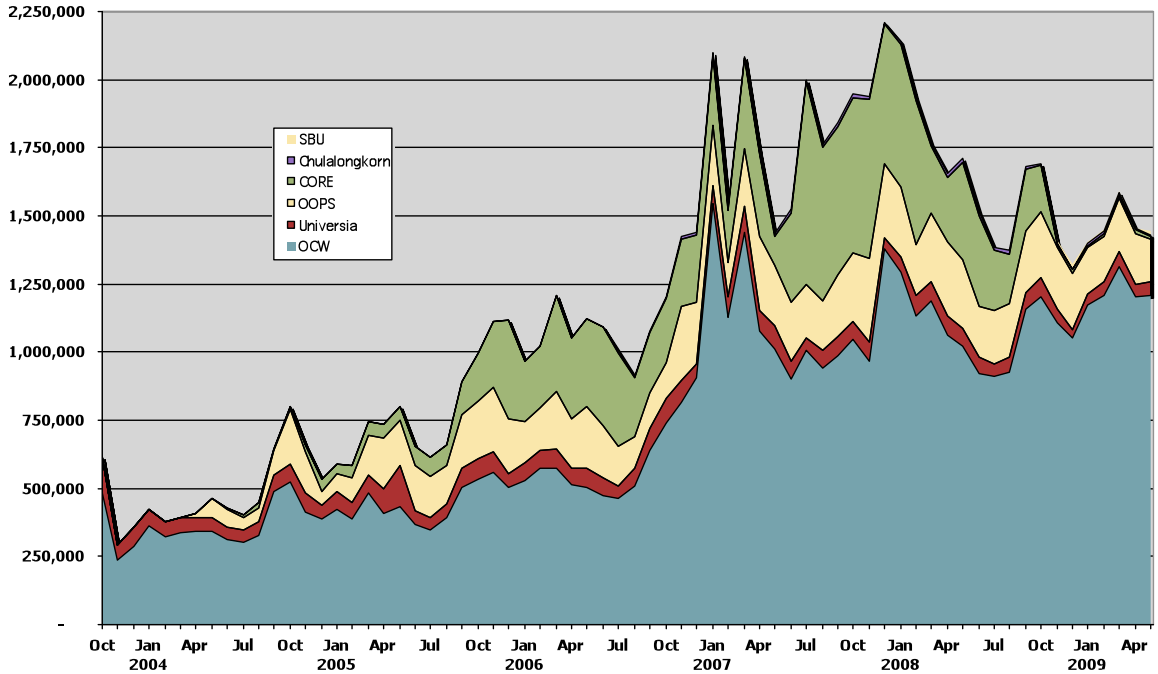
According to the spring 2009 annual survey, OCW is used primarily by educators (9.1 percent), students enrolled in educational programs (42.0 percent), and self-learners (43.2 percent); another 5.6 percent of respondents did not specify their status or classified themselves as "other." About 95 percent of all users indicate that they are partially or fully successful in achieving their purposes in using OCW.

Traffic

Traffic to the OCW website continues to be strong, with more than 1.2 million visits each month to the site since the start of the year. Traffic during the month of June 2009 was 19 percent higher than in June 2008. The top countries of origin for non-US users continue to be China and India.

Visits to the OCW website are only part of the story. Untold numbers of additional users work with MIT content every day:

Figure 1. Web traffic to OCW and OCW translations through June 30, 2009



- There are over 200 mirror sites in African and Asian locations with limited internet access.
- In terms of MIT video materials, there have been over 2.5 million iTunes U downloads and 4.1 million YouTube views since we introduced these options in 2008.
- There are more than 250,000 zip course downloads per month for offline access. Since we began the zip download program in 2006, users have downloaded some 9.2 million zip files of full course content.
- MIT content is available in six languages on other host sites. Our translation affiliate sites have been receiving about 500,000 visits per month.

All told, more than 56 million individuals have visited OCW or our translation sites, and we have delivered over 3.4 billion files ("hits") from the OCW website since its launch.

iTunes U and YouTube continue to grow in importance as alternate distribution channels for OCW content. YouTube is also figuring prominently in our content distribution strategy, intended to reduce the overall operating costs of OCW.

OCW has been continuing the distribution of OCW video content through Videolectures.net, an EU-sponsored video site hosted by the Jozef Stefan Institute in Slovenia. Since we launched the pilot in October, more than 154,000 visits to the MIT OpenCourseWare section of the site have been recorded.

We continue to build the OCW image collection on Flickr, the internet image and video hosting website (see http://flickr.com/photos/mitopencourseware). We currently have more than 1,100 images in the collection.

OCW in the News

We aggressively pursue media opportunities as a means of increasing the visibility and impact of OCW, and as a result OCW is frequently cited in the media. Links to articles about OCW are available via the OCW website at http://web.mit.edu/ocwcom/MITOCW/Media/. Some of the recent articles in which OCW is described include the following:

- "6 Tips for Taking College Courses Free of Charge," *US News & World Report*, June 10, 2009 (http://www.usnews.com/blogs/professors-guide/2009/06/10/6-tips-for-taking-college-courses-free-of-charge.html)
- "Human Anatomy for Everyone!," *Boston Globe*, May 31, 2009, (http://www.boston.com/bostonglobe/magazine/articles/2009/05/31/human_anatomy_for_everyone/?page=1)
- "OpenCourseWare: College Education, without the Student Loans," *Christian Science Monitor*, May 13, 2009 (http://features.csmonitor.com/innovation/2009/05/13/opencourseware-college-education-without-the-student-loans/)
- "Logging On to the Ivy League", *Time Magazine*, April 16, 2009, (http://www.time.com/time/magazine/article/0,9171,1891740,00.html)

Maximizing the Benefits of OCW

OCW contributes to the MIT community by:

- Creating lifelong connections between MIT and our students and alumni
- Catalyzing improvements in teaching and learning at the Institute
- Showcasing the MIT curriculum and the MIT faculty in ways that strengthen the Institute's reputation and promote international engagement

We are very proud that the Class of 2009 chose to designate OCW as the recipient of the senior gift this year in recognition of the value that MIT students find in OCW resources. OCW continues to seek ways to increase its impact at the Institute through work with other departments, labs, and centers. In FY2009, in addition to developing the supplemental resources noted above, including the Jameel Poverty Action Lab materials and others, OCW:

- Collaborated with a number of academic departments to update their "department pages" on OCW in order to better present current curriculum and departmental strengths
- Provided video streaming support for MIT World through OCW's contract with Akamai Technologies. As of the close of FY2009, MIT World was using 50 percent of the contracted bandwidth. MIT World and OCW have agreed that MIT World will begin to pay a portion of the bandwidth costs in FY2010.

OCW also undertook two longer term collaborations with MIT colleagues this year, as described below.

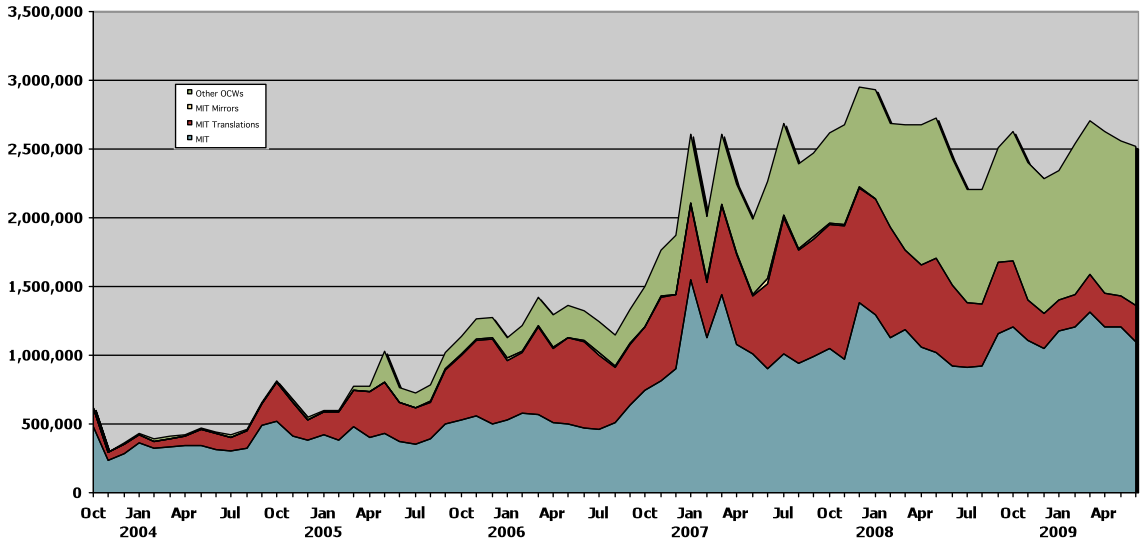
Singapore Proposal

OCW participated in the development of MIT's proposal to the Singapore Department of Education to build a new science and technology university in Singapore. Contract negotiations between MIT and Singapore are in process, so it is not yet clear when work will begin or what the final scope of the project will be. We have proposed OCW involvement in two areas: (1) supporting the faculty teams that will be developing the new curriculum by identifying and repurposing OCW course materials and capturing video to enhance training of Singapore faculty, among other efforts, and (2) training new university staff to prepare courses for open publication on their own OCW.

MIT Energy Initiative

OCW continues to explore synergies with the MIT Energy Initiative. Earlier this year we created special course indexes to showcase MIT's energy courses as a collection of related materials across academic departments. In addition, we developed a scoping document and several use cases outlining how OCW could be used to showcase and disseminate the unique energy curriculum being developed at MIT and are discussing a joint proposal with MIT's energy education chairs.

Figure 2. Overall OCW movement traffic



Data for other OCWs (green area) are incomplete. Not all OCW institutions are equipped to track and report their site traffic.

Supporting OER and the OCW Movement

OCW's principal focus in the area of worldwide OER is its support of the OpenCourseWare Consortium (OCWC). OCWC (http://www.ocwconsortium.org/) is a collaboration among over 200 domestic and international institutions that have banded together to advance education and empower people worldwide through OpenCourseWare. The goals of the consortium are to:

- Extend the reach and impact of OCW by encouraging the adoption and adaptation of open educational materials around the world
- Foster the development of additional OCW projects
- Ensure the long-term sustainability of OCW projects by identifying ways to improve effectiveness and reduce costs

Originally a development effort led by MIT OCW, the consortium became an independent 501(c)3 organization on July 9, 2008. Currently there are about 200 official members and another 50 organizations participating in consortium activities. Across all OCWC institutions (including MIT), there are now over 9,000 courses available, drawing a combined 2.5 million visits per month. MIT OCW staff member Steve Carson currently serves as president of the consortium.

OCWC recently hired a new executive director, Mary Lou Forward. In March, the board of the William and Flora Hewlett Foundation approved a grant of $1.5 million over three years to support the general operating costs of the consortium.

Sustaining the MIT OCW Program

OCW expenses for FY2009 totaled $3.5 million, significantly below our budget of $4.1 million. We achieved this through a combination of permanent cost-cutting measures

including eliminating open positions, using free hosting services, and taking video production work in-house. Given these reductions, we have also been able to reduce our expense budget for FY2010 to $3.6 million, a 10 percent decrease from the FY2009 budget. In FY2010, MIT general funds will support 44 percent of OCW operations, OCW reserve funds will provide 48 percent, and we estimate other sources of revenue will provide 8 percent to 10 percent of our support.

As of July 1, we have just over $5.1 million remaining in OCW reserve funds. We anticipate further declines in MIT support in FY2011 and FY2012, reflecting financial exigencies in the MIT budget. We currently project that OCW reserves will run out in FY2012 unless we are able to effect significant changes in our funding model. Our challenge is to offset the loss of grant funds (the principal source of OCW reserves) with substantial increases in revenues such as small gifts, endowments, corporate sponsorships, and alternative sources of revenue. We are aggressively pursuing each of these areas, as outlined below.

Individual Donations

In FY2009, we increased small gift fundraising by more than 50 percent to just over $145,000 through aggressive use of our email newsletter list and several carefully planned online campaigns. In addition, we were honored to be the beneficiary of the 2009 senior class gift, which includes a $25,000 matching gift from alumnus Martin Tang to be paid out in FY2010. Separately, we are developing a program that will allow donors to be recognized on the website for annual or endowment support of courses, departments, and schools. This program will initially be targeted primarily at alumni, and we hope to roll it out in the fall.

Major Donations

OCW worked with the MIT Resource Development Office to recruit a full-time leadership giving officer to support major gift fundraising for OCW and the MIT Libraries. This individual will be focused on donors who have the potential to make gifts of $100,000 or more. As of this writing, a candidate has accepted the position and is expected to begin work in September.

Corporate Sponsorship

We have been reassessing our corporate sponsorship program, which has thus far proven ineffective in attracting corporate gifts. After consultation with the President's Office, Controller's Office, General Counsel's Office, and staff of *Technology Review*, we are exploring a more aggressive approach for corporate solicitations through underwriting opportunities similar to those offered by National Public Radio. We are currently evaluating the potential revenue, infrastructure requirements, and faculty acceptance of such an approach. We hope to roll out changes to the website in September that will be needed to support an underwriting program. The initial focus will be internal appeals to support OCW fundraising, newsletter subscription, and other MIT initiatives.

Revenue Generation

To date, our only revenue generator has been the Amazon referral program, launched two years ago. In FY2009, this program brought in over $36,000, more than double the FY2008 revenue. We believe that revenue generation—on a much larger scale—is key to the long-term financial sustainability of OCW. Accordingly, we convened a group of senior faculty and administrators for a series of meetings in the spring to help us think more concretely about revenue enhancement opportunities for OCW. The final report of the committee details three broad categories of revenue enhancement options: (1) positioning OCW as a platform to support broader MIT initiatives such as the Singapore and Energy Initiative projects discussed above; (2) offering premium services on top of OCW content, such as question and answer services and exam grading, for a user subscription fee; and (3) offering certificates to recognize achievement based on OCW content. We will be reviewing these approaches with members of our Faculty Advisory Committee and External Advisory Board. In late summer and early fall, we will be working with Bain & Company on a pro bono basis to evaluate these ideas in more detail.

Organization and Governance

As of FY2009, OCW reported to associate provost Philip Khoury. Cecilia d'Oliveira, formerly the acting executive director, was appointed permanent executive director.

OCW Faculty Advisory Committee

The Faculty Advisory Committee is an internal oversight group that advises on OCW policy, sustainability, and relations with the MIT faculty and with academic departments. Committee members in AY2009 included Harold Abelson, Alex H. Chan, Eric Klopfer, Vijay Kumar, Steven Lerman (chair), Stuart Madnick, Haynes Miller, Shigeru Miyagawa, Hazel Sive, Ann Wolpert, and Dick Yue.

External Advisory Board

The OCW External Advisory Board advises MIT's president and provost on key questions concerning future directions and the sustainability of OCW. The board keeps current on OCW activities via communications from the president. It meets annually on campus, with additional telephone and electronic interaction during the year.

We have taken steps to formalize the role descriptions and redefine the terms of membership for our External Advisory Board members in recent months. We are in the process of recruiting a number of new board members and are particularly interested in adding international and/or fundraising expertise to the board.

Members of the Advisory Board as of the end of AY2009 were:

> Bruce Alberts, professor, Department of Biochemistry and Biophysics, University of California, San Francisco; cochair, InterAcademy Council; and president-elect, American Society for Cell Biology
>
> John Seely Brown, chief innovation officer, 12 Entrepreneuring, and former chief scientist, Xerox

Sheryl Handler, chief executive officer, Ab Initio Inc., and MIT alumna

Susan Hockfield (chair), MIT president

Kim Jones, president and managing director for the United Kingdom and Ireland, Sun Microsystems Ltd.

William Kaiser, partner, Greylock Partners, and MIT alumnus

Frannie Léautier, managing partner, the Fezembat Group

Steven Lerman, MIT professor; chair, OCW Faculty Advisory Committee; and MIT alumnus

Sam Pitroda, chairman, India Knowledge Commission, and chairman and chief executive officer, World-Tel Limited

L. Rafael Reif, MIT provost

Peter Smith, senior vice president for academic strategies and development, Kaplan Higher Education

Matthew J. Szulik, chairman, chief executive officer, and president, Red Hat

Maria Thomas, vice president and general manager, National Public Radio Digital Media

Charles M. Vest, president, National Academy of Engineering, and president emeritus, MIT

Cecilia d'Oliveira
Executive Director

More information about OpenCourseWare is available at http://ocw.mit.edu/.