MIT OpenCourseWare

MIT OpenCourseWare (OCW) is the remarkable story of an institution rallying around an ideal and then delivering on the promise of that ideal. It is an ideal that flows from the MIT faculty's passionate belief in the Institute's mission, based on the conviction that the open dissemination of knowledge and information can open new doors to the powerful benefits of education for humanity around the world.

OCW offers free and open access to the educational materials from MIT undergraduate and graduate courses, spanning 33 of MIT's academic disciplines and all five of its Schools—the School of Architecture and Urban Planning, the School of Engineering, the School of Science, the School of Humanities, Arts, and Social Sciences, and the Sloan School of Management—available online at http://ocw.mit.edu/. As of this writing, we are nearing the halfway point of publishing MIT's 1,800-plus courses, with the remainder scheduled between now and 2007.

This unique initiative enables the open sharing of course materials and pedagogy in a way that befits MIT's reputation as a leading institute of world-class teaching and research. Educators are encouraged to use the materials for curriculum development, and self-learners may use the materials for self-study or supplementary use. OCW is true to MIT's mission to advance education and serve the world.

December 2003 marked the close of the pilot phase for OCW, which saw the publication of the initial 32 OCW courses in September 2002 (with an additional 18 in December 2002 to bring the pilot site total to 50 courses) and the major launch of OCW in September 2003 when we published 500 courses. Our third publication cycle in April 2004 released 200 more MIT courses to the public, bringing the total available to 701. The next 200 were being prepared for release in September 2004. The release of the first major evaluation and measurement study of OCW in March 2004 also marked a high point for the OCW organization.

Achievements

The publication of 500 courses in September 2003 marked the culmination of more than two years of intense learning, discovery, and development. Since the public announcement of OCW in April 2001, we saw significant achievements in a variety of areas, which tend to fall into five main categories: establishing and executing an efficient, high-quality publication process; building and sustaining a responsive, professional organization; creating an effective technology infrastructure; communicating information about OCW and capturing feedback; and measuring usage and evaluating the impact of OCW.

Publication Process

Ultimately, OCW is a publication—a web-enabled publication of the MIT faculty's course materials that support an MIT education. OCW is a content-rich website that is 35

gigabytes in size, offering access to 701 courses that contain 11,425 HTML pages, 13,973 unique PDF pages, and 8,805 images—overall, 38,977 total files for use by MIT's global audience. All of this is made available through the generosity of 447 MIT faculty, with many more signed on for future publication cycles.

Publishing 500 courses in September 2003 and 200 more in April 2004 represented a significant technical and publishing achievement for MIT, the first on the way to publishing virtually all of MIT's courses online. Truly a global initiative, the site receives more than 11,000 unique visitors each day from more than 210 countries, territories, and city-states around the world. From October 1, 2003, to June 30, 2004, users viewed almost 30 million pages of OCW materials. Materials have already been translated into at least 10 different languages.

Almost 450 of the MIT faculty's 950 members contributed course materials to the 500 courses published on OCW's site in September. On MIT's campus, faculty have become more aware of what their colleagues teach, while students have welcomed the syllabi and lecture notes available on OCW. Several participating MIT faculty have been recognized by peers at other universities for their OCW course sites, and in some cases this has led to new teaching and research collaborations.

Over the last year, the OCW team of faculty liaisons and department liaisons, who drive the OCW publication process, have focused more on publishing richer, deeper courses. To that end, we have standardized our content requirements for publication of OCW courses. Each course now contains the following (at minimum):

- Course home page
- Planning content (both sections required)
    o Syllabus section (course description, course objectives, prerequisites, summary of major assignments, course format, basis for grade, other general course guidelines)
    o Calendar section (list of topics, key dates, and due dates)
- Subject material content (at least one of below required)
    o Readings section
    o Lecture notes section
    o Recitations section
- Learning activities content (one or more of below)
    o Assignments section
    o Labs section
    o Exams section
    o Projects section
- Related content and resources (one or more of below)
    o Tools section
    o Study materials section
    o Links to outside resources such as websites or hypertextbooks

These standards ensure that we are now consistently publishing rich courses that our users have told us are extremely useful. Participation in OCW and its success is determined by how easy it is for the MIT faculty to participate; therefore, we have made our publication process simple and transparent for faculty—more often than not, asking for no more than 5 to 10 hours of faculty time.

To ensure that the faculty are able to meet the above-stated content standards, we have embarked on a number of activities aimed at capturing content in the classroom and from students. We are:

- Actively seeking strategic video and audio opportunities for publication on the OCW site.
- Engaging students to take notes, which the OCW staff then transcribe, providing a source of information about their own course that many faculty find very valuable.
- Working closely with faculty to secure citations on third-party intellectual property (IP), and then aggressively pursuing free and open publication rights to those copyrighted items (quotes, images, concepts, etc.), or replacing the third-party IP through graphic or image replacement strategies.

In June 2004, we conducted an evaluation of our spring 2004 publication cycle when 200 new courses came online, bringing our total offering to 701 courses. Among the findings of that evaluation were the following:

- Significant numbers of new faculty continue to participate for the first time; currently 46% of tenure-track faculty have published with OCW.
- The percentage of courses published on OCW, which had no prior web presence, increased from 7% in the fall 2003 publication cycle to 29% in the spring 2004 cycle, demonstrating that OCW is providing value back to MIT's faculty.
- Spring 2004 courses are significantly richer because we were able to include most categories of materials more often, and the completeness of most materials included increased (often due to the content strategies outlined above).
- The number of IP objects permissions sought per course increased from 2.4 in the fall 2003 cycle to 4.2 in the spring 2004 cycle; the rate of approval for permission requests increased from 60 to 65%.

In order to increase international access to the faculty's educational materials, OCW has entered into a formal agreement with Universia.net to translate MIT courses into Spanish and Portuguese. Active in 10 countries (Argentina, Brazil, Colombia, Chile, Spain, Mexico, Peru, Portugal, Puerto Rico, and Venezuela), Universia counts more than 700 universities among its members. The 65 OCW courses translated thus far by Universia are hosted on the Universia web portal at http://www.universia.net/, and Universia is committed to expanding its translated OCW course offerings over time. This relationship has the potential to extend OCW's reach to a new non–English-speaking audience, and both organizations will work to evaluate the impact of these translated sites in Latin America.

We have also embarked on a translation partnership with an organization in China called China Open Resources for Education (CORE), a collection of Chinese universities that will be translating OCW materials into Chinese, with the first courses to be published in fall 2004. CORE will also be offering, over time, free and open access to 1,000 courses from Chinese universities. In September 2003, Anne H. Margulies, the executive director of OCW, attended the inaugural CORE conference in Beijing, and in March 2004, Jon Paul Potts and Cecilia d'Oliveira from the OCW staff traveled to China, speaking about OCW and CORE to four universities in the cities of Beijing and Dalian and at the Higher Education Press Conference, sponsored by the Chinese Ministry of Education.

The OpenCourseWare homepage

Organization

Our biggest accomplishments in organization over the course of the last year came in our continued support and growth of the OCW Department Liaison program. The OCW department liaisons (DLs) assist faculty with the development and compilation of teaching materials for use in both classroom teaching and publication on the OCW website. DLs are permanent staff within their respective departments and provide an invaluable service to MIT faculty and to OCW.

The DLs have been instrumental in the success of OCW by fostering relationships with faculty, identifying and addressing potential copyright issues, producing technical illustrations to enrich the course materials, and leveraging their technical expertise in the subject matter to ensure high-quality course sites. We have focused on hiring recent MIT alumni—who have a familiarity with the faculty and their teaching style—to serve as DLs in the departments from which those alumni received their degrees. The DL program is a cornerstone of OCW's long-term sustainability and success. We now have the equivalent of 10.5 DLs firmly in place across all five MIT Schools.

Other organizational accomplishments included the following:

- Established a goal-based performance management system
- Through careful financial management, we stretched the initial OCW pilot phase's 27-month budget to 31 months
- Fostered a values-based culture, built on the belief that our staff should be:
  - Responsive and service-oriented
  - Achievement/results oriented
  - Team players
  - Flexible
  - Committed to the OCW project and MIT

To foster these values, we have held several sessions with Francine Crystal of MIT's Office of Organization and Employment Development, an expert at articulating the importance of human values in the workplace—namely that vision, purpose, reflection, and systems thinking are essential if organizations are to realize their potentials.

Technology

At its core, OCW is best understood as a web-enabled publishing initiative; thus, OCW would not be possible without technology. And it would not have been possible to publish the educational materials from 500 MIT courses in September 2003 without the strong technology platform developed by MIT and our technology partner, Sapient Corporation of Cambridge, that supports everything we do. Technology is vital to everything we do, from planning to publishing. The tools we are using include the following:

- In planning/data collection: Filemaker Pro, Windows file server, Excel/Project

- In desktop content authoring tools: Adobe Acrobat/Distiller, Latex tools, Adobe Photoshop
- In publication: Microsoft Content Management Server 2002, Unix/Apache web servers
- In content distribution: Akamai Worldwide Distribution Network, Lucene Search Engine, NetRaker for user surveys, Akamai and NetIQ reporting

Thus, from planning to production, OCW is an organization that relies on technology, and one that is using technology in new ways to meet the publishing deadlines of OCW and the teaching goals of MIT's faculty.

- Our core production system is a customized version of Microsoft CMS 2002, one of the largest such systems, if not the largest, ever implemented at a university.
- We have had to custom develop a variety of applications to support our production process.
- In order to distribute MIT OCW's content around the world, we have developed a very complex, customized technical environment, partnering with Akamai Technologies to distribute the delivery of OCW course materials across Akamai's global content distribution network, to improve the end user's experience in terms of performance, maximize availability of the site, and to reduce the amount of internet infrastructure we require to maintain a global web presence for the OCW site.

Moving forward, we are developing cutting-edge ways to maximize the potential benefits of OCW to our users and ensure that we are presenting the MIT faculty's materials in a way that reflects the quality of their work.

- We are evolving our metadata and search capabilities to ensure that OCW course materials are as searchable as possible.
- We are developing new standards for conversion of educational content into digital formats.
- We are experimenting with innovative ways to integrate video into our publication.
- We are partnering with the Utah State University to develop technology to support self-managed learning communities.

All of this work will help ensure that OCW's content is as accessible as possible to all users—those using Microsoft or Unix, on a cable modem connection or a dialup connection, sighted or visually impaired, and so forth. No doubt there will be other areas where we innovate with our technology that will benefit other institutions considering implementing their own "opencourseware" projects. The hope is that by sharing our key technological decisions, the technology itself, and our lessons learned, we will enable less-expensive implementations of opencourseware on other campuses.

Communications

One of the biggest challenges we face as an organization is communications. We are focused on sharing the good news of OCW with the MIT community, fostering positive feelings about OCW among the faculty and leadership of the Institute. At the same time, we must let the world know that MIT's course materials are available through OCW and drive traffic to the site.

Through the work of our communications manager, Jon Paul Potts, we garnered more than 150 media impressions about OCW, many of them publicizing the fact that MIT had delivered on the promise of OCW with the publication of 500 unique courses in September 2003. Much of this coverage came as a part of an overall media blitz in late September 2003 that saw electronic news releases go out to more than 650 media outlets around the globe. This was just a small part of a continued extensive communications effort over the last year, which can be summarized as follows:

- Major news articles in both traditional and online media, including the following:
  - *Wired Magazine* (August 27, 2003)
  - *Globe & Mail* in Toronto, Canada (September 4, 2003)
  - *BBC News Worldwide* (September 9, 2003)
  - *La Razón* in Madrid, Spain (September 30, 2003)
  - *Hindustan Times* in Mumbai, India (October 11, 2003, and January 13, 2004)
  - *U.S. News & World Report* (October 13, 2003)
  - *Estado* in Sao Paulo, Brazil (October 27, 2003)
  - *Daily Yomiuri* in Tokyo (November 10, 2003)
  - *Economic Times of India* (December 29, 2003 and January 13, 2004)
  - *China Times* in Taipei, Taiwan (June 7, 2004)
- Publication of an essay, "Why MIT Decided to Give Away All Its Course Materials via the Internet," by MIT President Charles M. Vest, in a special issue of *The Chronicle of Higher Education Review* on January 30, 2004
- Delivery of more than 50 presentations to various audiences on the MIT campus, ranging from the MIT Corporation Executive Committee on January 8, 2004 to the annual MIT Learning International Networks Consortium Symposium on March 23, 2004; Independent Activities Period on January 22, 2004; MIT Council on Educational Technology on April 12, 2004; and to a variety of alumni audiences
- Continuous and regular outreach to the MIT community through such publications as *MIT Technology Review, Tech Talk, The Tech,* and the *MIT Faculty Newsletter*
- Appearances at several key educational conferences, including EDUCAUSE 2003 in November 2003 in Anaheim, CA; the Western Cooperative on Educational Technology Conference in San Diego, CA in November 2003; EDUCAUSE Mid-Atlantic Regional Conference in January 2004 in Baltimore; Higher Education Press Conference in Beijing, China, in March 2004; UNESCO Forum on the Impact of Open Courseware for Higher Education in Developing Countries in Paris in June 2004

- Growth of The MIT OpenCourseWare Update monthly email newsletter to 23,000 worldwide subscribers

The BBC News is among the more than 150 traditional and online media sources that have given coverage to OpenCourseWare over the course of the last year.

Evaluation

Through OCW, MIT makes the faculty's core teaching materials openly available for anyone anywhere in the world with access to the internet, and we have found that in this early phase, the project is helping those it was designed to help—educators, enrolled students, and self-learners around the world—by providing them a high-quality publication of MIT's core teaching materials. In the last year, we developed a substantial evaluation program that uses a variety of tools to measure that success, including traditional surveys, interviews, online intercept surveys, and advanced web analytics. The combination of these methods helped us to achieve both breadth and depth in the evaluation, and early data confirmed our hypotheses of how people will use the website. During a two-week period—from November 6 to 19, 2003—we intercepted 21,500 site users with an electronic, pop-up survey, and 1,220 users took the time to complete our survey. Early data and analysis from that survey focused on helping us understand specifics in three areas of user behavior: *access, use,* and *impact*.

- *Access.* OCW materials are meant to be accessible to users across geographies using various web browsers, accessing the internet through high- and low-bandwidth connections. OCW intends that every user encounter a reliable technical infrastructure and has technical access to the full range of content on the site. Our evaluation findings have revealed that
  - *OCW traffic volume is high and there is a core of repeat users.* The site received more than 728,000 visits between October 1 and November 30, 2003—an average of almost 12,000 visits per day for that time period (and we continue to average about 11,000 visits per day). There is a solid core of repeat users—around 25% of daily visits for the month of November were by returning users. Over 95% of OCW users plan to return to the site in the future. Almost 10% of users report daily use of the site; a further 25% at least weekly use. Over 40% of users report more than 10 previous visits to the site.
  - *OCW has attracted international attention, with over half the site traffic coming from outside North America.* Some 45% of users to OCW come from North America (United States and Canada). Western Europe is the second most common point of origin (19%), while East Asia is third with 18%.
  - *The site is accessed extensively by users in all three academic roles: educator, student, and self-learner.* Numerically, self-learners predominate, representing almost 52% of users with an average of over 6,000 daily visits. Students represent approximately 31% of users, or an average of over 3,600 daily visits. Educators represent over 13%, an average of around 1,550 visits per day.

OpenCourseWare Site Traffic Profile, by Region

Rank	Region	Estimated daily visitors	% of OCW traffic	% of total internet users
1	North America	5,352	45.4	29.6
2	Western Europe	2,234	19.0	26.2
3	East Asia	2,153	18.3	28.3
4	Latin America	693	5.9	5.0
5	Eastern Europe	465	3.9	2.0
6	South Asia	301	2.5	2.6
7	Middle East and North Africa	187	1.6	2.1
8	Central Asia	165	1.4	1.2
9	Pacific	163	1.4	1.9
10	Sub-Saharan Africa	53	0.4	0.9
11	Caribbean	19	0.2	0.2
	Total	**11,785**	**100.0**	**100.0**

Source: Akamai and Sitewise.

- *Use.* Educators, students, and self-learners around the world are free to use OCW content for noncommercial educational purposes. By the terms of the OCW Creative Commons license, users may adopt course materials as-is or adapt them to their own needs by editing, translating, adding material, and incorporating them into their own materials.
  - *Users are largely confirming hypothesized scenarios of use for OCW.* Educators most frequently use the site for planning, developing, or improving and teaching courses or classes (44%) and secondarily to enhance their personal knowledge (25%). Students most frequently use the site to find subject matter and materials for use in conjunction with a course they were currently taking (43%) and secondarily to enhance their personal knowledge (39%). Self-learners overwhelmingly use the site to enhance personal knowledge (80%).
  - *OCW users are largely satisfied with the quality of content on the OCW site.* For the course materials published on OCW, users express high levels of satisfaction (greater than 92%) with their overall quality.
- *Impact.* Once people access and use OCW, the question becomes: What difference does it make? The heart of this evaluation is to understand and measure the various effects OCW has on its audiences of educators and learners. We wish to know how individuals' teaching and learning experiences change (if at all) through the use of the site. We also want to understand what broader effects OCW may have.

- o *OCW users overwhelmingly are finding that OCW has, or will have, significant positive impact on both teaching and learning activities.* Over 80% of all users report either positive impact or extremely positive impact, 18% report moderate or some positive impact, and less than 2% report no positive impact. Over 95% of all users report an intention to return to OCW in the future. Almost 93% agree that they will recommend OCW to someone else.
- o *Educators plan to reuse OCW materials in their teaching activities.* Over 97% of OCW users who identified themselves as educators expressed satisfaction with the quality of the course materials published in OCW. Over 47% have reused MIT OCW materials (or plan to), and 41% may reuse materials in the future.

In sorting through this early data, we tied every element of the evaluation back to MIT's educational mission and OCW's role in advancing it. This model allows us to differentiate results by educational role of the user (educator, student, self-learner) by educational and sociogeographic context, as well as by other dimensions, and all of the data collection methods and instruments we use were designed to support our understanding of access, use, and impact.

In measuring long-term success, we find that the challenge for MIT and for educational institutions across our society lies in the second half of OCW's organizational mission: Will other like-minded institutions begin to publish their educational materials freely and openly online? The hope is that one day, by sharing MIT's course materials, along with our experience thus far in developing the OCW publication process, we will inspire other institutions to openly share their course materials, creating a worldwide web of knowledge that will benefit humanity. To that end, in March 2004, we launched a methodology—or "Opencourseware How To"—website (available at http://ocw.mit.edu/OcwWeb/HowTo/index.htm) that explains in detail how we publish MIT courses. This site includes lessons learned, downloadable templates and easy-to-use tools, reducing the potential cost and learning curve for other institutions interested in following MIT's lead.

Awards

In the course of the last year, OCW has won several awards, recognizing the vision of the OCW initiative, the MIT faculty's content, and the OCW's site design and usability:

- *Computerworld Laureate.* On June 4, 2004, OCW was named top Education and Academia IT implementation, recognizing MIT OCW's vision and leadership (nominated by Bill Gates).
- *Webby Awards.* On April 20, 2004, OCW was nominated for the leading international honor for the world's best websites.
- *InfoWorld 100.* On November 10, 2003, with Sapient Corporation, OCW was recognized for its content management system, the underlying technology that enables the publication of 701 courses.
- *Massachusetts Interactive Media Conference (MIMC).* On October 21, OCW won two awards, one honoring OCW as the best educational website among the entries

from New England higher education institutions, and the second for overall best user experience out of all 3,000 entries in the MIMC contest.

- *Microsoft Certified Partners Award.* On October 15, 2003, with Sapient Corporation, OCW was recognized for its content management system, the underlying technology that enables the publication of 701 courses.

Finances and Funding

The pilot phase of OCW, which began July 1, 2001, ran through September 30, 2003. Funding for this pilot phase came from the William and Flora Hewlett Foundation ($5.5M), the Andrew W. Mellon Foundation ($5.5M), and MIT ($1M). But thanks to prudent fiscal management, we were able to carry $2M of that $12M over into 2004.

For FY2004, we spent $7.3M. Of this amount, approximately $800K came from MIT, $2M was carried over from the pilot phase of OCW, and the rest came from the Hewlett and Mellon Foundations. A proposal for Phase II funding was submitted to the foundations in October 2003, and we are currently working with the Office of Resource Development on seeking long-term, sustainable funding sources for the OCW project.

Personnel Information

Appointments in the last year, as of June 30, 2004, include the following: office administrator Elouise Evee; Farnaz Haghseta, promoted from OCW faculty liaison to the position of OCW external outreach liaison; and several department liaisons were hired, including Dan Bersak (SHASS), Alice Cox (HST/Chem/Bio), Nikolaos Deonas (Math/Physics), Chris Gouldstone (Aero/Astro), Keith McCluskey (Arch/DUSP/MAS), Curtis Newton (Engineering), Matthew Palmer (Sloan), and Yunpeng Wang (EAPS).

Anne Margulies
Executive Director

More information about OpenCourseWare can be found on the web at http://ocw.mit.edu/.