

How OCW was transformed from a leap of faith to a functional enterprise that serves learners all over the world and brings benefits back to MIT.

MIT OpenCourseWare

How It Began



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On April 4, 2016, the Massachusetts Institute of Technology celebrated the 15th anniversary of the launch of MIT OpenCourseWare (OCW). On that date in 2001, President Charles Vest announced that the institute would make course material from virtually all undergraduate and graduate courses “accessible to anyone anywhere in the world, through our OpenCourseWare initiative” (Vest 2004). The decision defied the dot-com trend in academia at the time and garnered a front-page story in the *New York Times* (Goldberg 2001).

Today, MIT OCW offers high-quality educational materials from more than 2,200 MIT courses—virtually the entire MIT graduate and undergraduate curriculum, spanning all five MIT schools and 33 academic units. And nearly 1.5 million people from every corner of the globe visit the OCW site (ocw.mit.edu) each month (figure 1), making it one of the largest online educational sites in the world.

But 15 years ago, OCW was “just an idea—an informed leap of faith that it would be the right thing to do and that it would advance education” (Lerman 2004). OCW had a humble beginning in a small faculty committee formed in the summer of 2000 to develop a proposal for financially sustainable online course dissemination. The idea of giving away the course material was not even remotely part of the group’s charge.

What happened that led the committee, at the very last moment before the report deadline, to advocate for openness, and how this idea took on

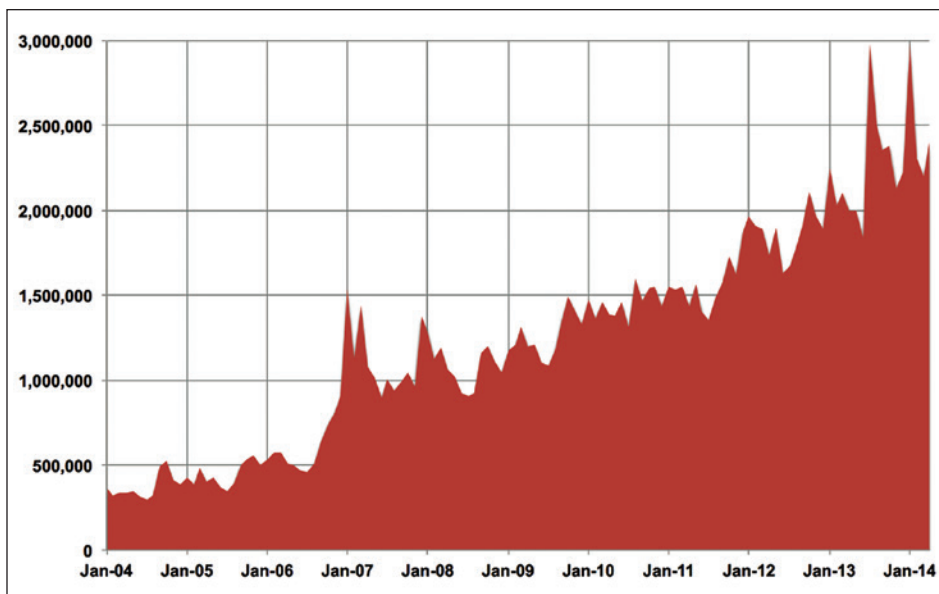


FIGURE 1 Monthly visits to the MIT OpenCourseWare (OCW) website, January 2004–April 2014. Reprinted with permission from Klopfer et al. (2014).

a life beyond anyone’s wildest imagination, is a study in how an academic institution can tap the talents of its faculty, delve into its values, and exercise academic leadership to forge an innovation that, in tandem with the technological and societal forces of the time, takes on global significance.

The result is that OCW has redefined the relationship between an academic institution and the society it serves, bringing the two closer together with benefits to both.

Why Openly Share Teaching Materials?

Shortly after the announcement, a faculty member told me, “The day MIT announced OCW was the proudest day of my career at MIT.” This sentiment was shared across the institute and led to a vast majority (about 75 percent) of tenured and tenure-track faculty contributing their teaching material to OCW (Abelson et al. 2012).

It is not surprising that the idea of openness resonated with the MIT faculty—sharing knowledge is a core value of the institute, as articulated in the MIT mission statement¹:

The Institute is committed to generating, disseminating, and preserving knowledge, and to working with others to bring this knowledge to bear on the world’s great challenges.

¹ Available at <http://web.mit.edu/facts/mission.html>.

MIT traditionally fulfilled this mission largely through basic research. Now OCW also substantially supports the mission.

The committee that proposed OCW explored a number of possibilities. Having failed to come up with financially viable and exciting elearning options for MIT to pursue, the members reached deep into the school’s core values and hit on the idea of opening up the institute’s teaching materials.

When I chaired the MIT OpenCourseWare Faculty Advisory Committee (FAC;

2010–2013), I was often asked why MIT decided to give away its teaching material. I came back to something that Charles Vest said:

When you share money, it disappears; but when you share knowledge, it increases.

This captures the essence of OpenCourseWare and celebrates the principle of openness that is at the core of MIT’s mission.

A Case Study in Decision Making

Faculty Group Origins

The MIT Council on Educational Technology (MIT-CET) was created in 1999, largely through the initiative of Provost Robert Brown, “to provide strategic guidance and oversight of MIT efforts to develop an infrastructure and initiatives for the application of technology to education.”² It was cochaired by Brown and Hal Abelson, professor of computer science and engineering.

MITCET selected McKinsey and Company to assist in identifying potential online educational projects for MIT and to conduct interviews on campus to gauge the community’s reaction to them. The work took three months.

Meanwhile, new online educational enterprises were being announced: UNext (a collaboration of Stanford,

² “Provost announces formation of council on educational technology,” *MIT News*, September 29, 1999. Available at <http://web.mit.edu/newsoffice/1999/council-0929.html>.

the University of Chicago, Columbia, and Carnegie Mellon), Pensare (a partnership of Harvard Business School and UPenn's Wharton School), Caliber Learning (Georgetown, University of Southern California, Wharton, and Johns Hopkins), the Princeton-Oxford-Stanford-Yale "POSY" Alliance for Lifelong Learning, Columbia's Fathom Knowledge Network, and eCornell (Abelson 2008).

Reflecting the excitement of the time, the MITCET-McKinsey report (unpublished) recommended that MIT undertake a study to launch "Knowledge Updates," minicourses based on MIT's strength in cutting-edge science and technology. In April 2000 Provost Brown created the Life-Long Learning Study Group, led by Associate Dean of Engineering Dick Yue, with the charge of formulating a plan for Knowledge Updates, with up to \$2 million in startup investment to launch an enterprise that should be financially self-sustaining within two years (Abelson 2008).

Evolution of an Idea

The group pursued the Knowledge Updates project with the genuine hope of creating a successful enterprise. But there were questions: Would the venture divert resources from MIT's core mission? Would it dilute MIT's brand? Would it be financially sustainable? These and other questions came to a head in the group's final meeting in October 2000 (Lerman and Miyagawa 2002).

Early Challenges

Extensive analysis indicated that the Knowledge Updates proposal seemed doable, but the enterprise struck the group as lacking in the kind of excitement one would expect of an MIT initiative. Moreover, the group's financial projection from the most realistic of several business models showed the enterprise reaching a break-even point a few years into the operation, and after that essentially remaining in that state. It lacked the "hockey stick" spectacular growth of a successful venture.

Also, the basic nature of the product to be offered was in question: while the committee assumed that the updates would be hours or even weeks and months long, alumni survey responses indicated that some preferred 30-minute "mini" updates, a format that the committee did not feel entirely comfortable with.

Despite these uncertainties, the committee included in its final report an extensive discussion of Knowledge Updates accompanied by analysis and numerous attachments.

A Shift in Thinking

Midway into the October meeting, the committee's interest shifted to offering the teaching material for free. Yue laid out the plausible business models, reviewed pros and cons, and concluded that a business venture was possible, although the prospect was less than exciting. Then, reminding the group of an idea that had been informally mentioned earlier without much conviction, he suggested an alternative proposal to consider: to simply give away the teaching material instead of charging for it. Some committee members asked, "Is it OK to do that, and would anyone care if MIT did?"

At the same time, we were aware that MIT faculty members had already put up their own teaching materials on the Web. When asked why they did so, they said, without exception, that they were experimenting to see whether putting teaching material on the Web could improve their courses. They weren't getting any compensation, and they were sacrificing their research time to do it. We felt it would be highly questionable for MIT to take the teaching materials produced by these faculty members who are committed to teaching excellence and turn them into a for-profit business. The idea of giving them away to anyone, anywhere, was appealing because it would give global expression to MIT faculty members' commitment to excellence in teaching.

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OCW Is Born

Once the committee members overcame the shift from thinking about creating a for-profit business enterprise to the idea of making materials and information freely available, they quickly embraced the idea as the right thing for MIT to do and came up with the term *OpenCourseWare*, drawing both the name and inspiration from an earlier MIT effort, open source software.

In October 2000 the Life-Long Learning Study Group presented its report to the MIT Academic Council.³ The report contained a treasure trove of data gleaned from interviews with 50 external organizations engaged in elearning (to understand the online education landscape), responses to an extensive survey sent to 2,500 alumni (deemed potential clients for Knowledge Updates), interviews with 60 MIT faculty members who had already put their teaching materials on the Web, and a series of elaborate business models, all done in collaboration with a team from the consulting firm Booz Allen Hamilton.

The report included—“almost as an afterthought” (Abelson 2008)—the following suggestion, fundamentally defying MITCET’s original charge to the group⁴:

A revolutionary notion of OpenCourseware@MIT could radically alter the entire lifelong learning and distance learning field and MIT’s role in it and should be seriously considered.

Faculty governance was at the heart of decision making that moved the initiative forward, and academic leadership played an equally important role.

Guiding Principles and Institutional Leadership

The committee agreed on a principle that became a cornerstone of OCW: all materials offered should be cleared of copyright so that users can freely use them to learn and to teach. When Harvard law professor Larry Lessig and his colleagues launched the Creative Commons in 2001 to furnish licenses for appropriate use of copyrighted material free of charge, MIT OCW adopted this mechanism for virtually all its materials.

The principle of faculty governance was central to the planning phase of OCW. Chancellor Larry Bacow

³ The Academic Council consists of the institute’s senior leadership and the chair of the faculty.

⁴ Lifelong Learning Study, Summer 2000. Report to the MIT Academic Council Deans’ Committee, October 17, 2000 (unpublished).

told the OCW planning group that MIT could not announce the initiative without extensive discussion within the community. The group met with representatives of 33 departments and major administrative units. Although most voiced support, some raised concerns, such as the risk that OCW could devalue MIT’s reputation by putting up low-quality material (Abelson 2008). The culmination of these discussions was a presentation at the February 2001 faculty meeting, at the end of which President Vest spoke with conviction about OCW. The Record of the Faculty Meeting⁵ states that, noting the trend toward commercialism in higher education,

MIT could be a disruptive force by demonstrating the importance of giving information away. Vest noted that in the 1960s and ’70s MIT had a big impact on education, not only from textbooks that were published by the faculty but also from the course notes, problem sets, and other materials our graduates took to other institutions where they used them in their teaching. OCW, he stated, gives us another chance to make such an impact.

Thus, while faculty governance was at the heart of decision making that moved the initiative forward, academic leadership played an equally important role, and MIT was blessed with strong and open-minded leaders. The role of President Vest was obviously critical. Others who played a key role in guiding OCW went on to leadership positions at major universities. Provost Brown, who shepherded the discussion from the outset, became president of Boston University in 2005. Rafael Reif, who took over as provost after Brown and continued to nurture OCW, became the 17th president of MIT in 2012. Chancellor Bacow, who called for the extensive discussions to get as many on board as possible, became president of Tufts University in 2001.

Off and Running: Funding, Staffing, and Sustainability

Funding

Of course, giving away the course material for free does not mean that there is no cost to set it up and operate. Fortunately, Vest’s overture to William Bowen, president of the Mellon Foundation, was met with enthusiasm. Bowen in turn contacted Paul Brest, president of the Hewlett Foundation, and the two foundations agreed to fund OCW. Ira Fuchs, the Mellon Foundation

⁵ MIT Record of the Faculty Meeting of February 21, 2001. Online at <https://web.mit.edu/dept/libdata/libdepts/d/archives/facmin/010221/010221.html>.

program officer for the grant, said that the foundation “really bought into the ambitious and unique nature” of OCW (Walsh 2011, p. 62). Without this generous funding, OCW would not have seen the light of day.

Staffing and Implementation

Once the grant proposal to Mellon and Hewlett (coauthored by Brown, Abelson, and Faculty Chair Steve Lerman) was approved and an initial \$11.5 million awarded, Anne Margulies, former CIO of Harvard, was hired in May 2002 as OCW executive director. Her first task was to create a 50-course pilot by September of that year (Walsh 2011). She recalls, “All eyes were on us. There were lots of skeptics, but the overwhelming majority were excited.”⁶

Margulies participated in the 2002 UNESCO Forum on the Impact of Open Courseware for Higher Education in Developing Countries, held in Paris. Many university presidents and rectors from developing countries were in attendance, and their message was “Thank you, MIT.”

It was at the Paris forum that the term *open educational resources* (OERs) was coined for “free tools and content...that can include full courses, textbooks, streaming videos, exams, software, and any other materials or techniques supporting learning” (Walsh 2011, p. 43; also see Griffiths and Maron in this issue). The Hewlett Foundation set up an OER division and appointed Catherine Casserly to head it; she went on to play a major role in OERs around the world.

In addition to creating a 50-course pilot in her first four months, Margulies had to complete the posting of 500 courses by October of 2003. This deadline, imposed by the funders, had to be met before delivery of the balance of funding. To the credit of Margulies and her team, which at the peak numbered 50 full-time employees and outside consultants (Walsh 2011), the deadline was met and Hewlett and Mellon awarded the remaining \$16 million, which made it possible to complete the OCW posting of 1,800 courses by 2007.⁷

Margulies left in 2007 to become assistant secretary for information technology and CIO for the Commonwealth of Massachusetts. Cecilia d’Oliveira, who had been the director of technology for OCW, took over and has ably shepherded OCW ever since (see d’Oliveira and Lazarus in this issue).

Sustainability

There remain questions about how to sustain OCW financially. MIT currently covers about half the cost of the \$4 million annual budget. Besides the original funding from Hewlett and Mellon, OCW has received generous support from the Ab Initio Corporation, the Stanton Foundation, MathWorks, Accenture, Telmex, and others. It also receives approximately \$350,000 annually in small donations from thousands of users around the world (Abelson et al. 2012). As grant reserves deplete, MIT and OCW must find ways to sustain the initiative.

Beyond the financial challenge, OCW now shares the stage with MOOCs (massive open online courses).⁸ To seek opportunities and address the challenges, the OCW executive director works closely with the OCW advisory committee, composed of faculty members, students, and administrators.

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Impacts at MIT

OCW has significant and beneficial impacts on campus at MIT. Students use OCW resources such as problem sets and exams for study and practice. Freshmen report that they checked out the school by looking at OCW before deciding to apply. Because faculty have easy access to the course material that their students use in other courses, OCW serves as a broad communication channel among faculty. And alumni access OCW materials to pursue lifelong learning.

It was hoped that OCW would benefit teaching on campus, and there is anecdotal evidence that it does. Before a course goes up on OCW, the materials are placed on the staging server, where the posting faculty member can view all other courses. Margulies has observed that a number of faculty members have looked at these other courses and seen features they wanted to

⁶ Author interview with Margulies on March 7, 2016.

⁷ This was the original target, and was celebrated at the time (<https://www.youtube.com/watch?v=tbQ-FeoEvTI>).

⁸ Differences between OCW and MOOCs are outlined in Abelson et al. (2012).

incorporate into their own course. And Steve Carson, who served as the OCW communications officer for many years, noticed a lag from the time faculty members agree to contribute material to when they actually submit it. He guessed that as faculty realized their material would be viewed by the world, not just their students, they spent more time developing and polishing their course content.

MIT has also benefitted from the attention it has received. Hundreds of media outlets from around the world have featured OCW. For example, *Wired* (Diamond 2003) reported that, before OCW,

no institution of higher learning had ever proposed anything as revolutionary, or as daunting.... MIT earned the distinction as the only university forward-thinking enough to open-source itself.

There are more than 1,000 independently translated versions of MIT OCW courses available in 10 languages other than English.

International Impacts

International Users of MIT OCW

There are now over 2,200 courses on OCW. There are also more than 1,000 independently translated versions of MIT OCW courses available in 10 languages other than English: Arabic, Chinese (simple and classical), Farsi, French, Japanese, Korean, Portuguese, Spanish, Thai, and Turkish. For users in developing regions of the world such as sub-Saharan Africa where Internet access is cost prohibitive, unreliable, or nonexistent, OCW helps to bridge the “digital divide” through its mirror site program on external drives, and there are more than 350 of these sites.

Over 200 million people from virtually every country in the world have accessed these resources. Many (42 percent) are students at other institutions, both college and precollege, and others are “self-learners” looking to enrich their professional and personal lives (43 percent).

As an example of self-learners, Jean-Ronel Noel and Alex Georges from Haiti wanted to develop solar panels for their country but needed guidance in electrical

engineering. They found it through OCW. Noel told the OCW staff,

I was able to use OCW to learn the principles of integrated circuits. It was much better than any other information I found on the Internet.

Their company, Enersa, has made solar-powered LED lighting available in almost 60 Haitian towns and remote villages (d'Oliveira et al. 2010).

Teachers account for 9 percent of those who access OCW, and have described a variety of ways in which they incorporate OCW material into their classes (d'Oliveira et al. 2010). For example, Triatno Yudo Harjoko, head of the Architecture Department at the University of Indonesia, said that to redesign the curriculum he and his colleagues turned to MIT OCW as an immense comparative database (d'Oliveira et al. 2010):

We try to understand how the courses are formulated and what the expected outcomes are. This gives us an important perspective on the learning process.

OCW at International Universities

To give some examples of successful OCW sites from around the world, Delft University of Technology in the Netherlands offers undergraduate and graduate courses in energy, environment, health, water, and infrastructure and mobility, under a Creative Commons International License.

From the beginning much of the interest in OCW was in non-English-speaking countries (Walsh 2011). For example, in 2005 six of the top universities in Japan formed the Japan OCW Consortium, and many have been among the most active OCW members outside of MIT and contributed innovations to the community.

The University of Tokyo OCW started in 2005 and now has 1,406 courses posted. Led by Takeo Fujiwara, a professor of engineering, a unique feature of the UTokyo OCW is that the courses are virtually all video-based with a complete transcription of each video lecture made available, and a search engine has been developed to enable searches of both text and video. Similar to MIT, UTokyo OCW clears copyright consistent with Creative Commons.

Kyoto University OCW also started in 2005, and as of 2015 had 660 OCW courses, most of them with video lectures. The courses are taught in Japanese, English, or, in a few cases, French. Led by Naoko Tosa, a professor of media art, KU OCW posted videos on YouTube before MIT OCW hit on that solution.

Adaptations of OCW

In 2004 the MIT OCW leadership began to speak with other institutions about adopting OCW. At the University of California, Irvine the OCW site, led by Larry Cooperman and Gary Matkin, hosts the California Subject Examination for Teachers—Preparation Resources, open chemistry, public health, and technology transfer and entrepreneurship as well as TED/TEDx talks given by UCI faculty members and researchers.

The OCW Consortium was formed in February 2005 with the goal of extending the reach and impact of OCW by encouraging its adoption around the world (Walsh 2011). The consortium changed its name in 2014 to the Open Education Consortium (www.oeconsortium.org) and now boasts 266 members from 48 countries. Moreover, the movement has expanded beyond universities to community colleges, free online textbooks (see, e.g., OpenStax, <https://www.openstax-college.org/books>), and free and open medical resources (e.g., Boston Children's Hospital Open Pediatrics, <http://openpediatrics.org>).

Concluding Remarks

OCW was transformed from an informed leap of faith to a functional enterprise that serves learners all over the world and returns benefits to MIT. It is a “bold creation” (Bowen, foreword to Walsh 2011) that changed the equation for elearning from the obsession with commercialism of the dot-com era to a demonstration of the enormous value in freely sharing knowledge produced by an academic institution. The 1.5 million people who access OCW every month illustrate the demand for high-quality teaching materials among students, self-learners, and educators.

Time will tell if OCW will be sustained largely in its present form, or if new technologies and societal forces will drive its mission beyond the vision of the committee that proposed it back in 2000.

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References

- Abelson H. 2008. The creation of OpenCourseWare at MIT. *Journal of Science Education and Technology* 17(2):164–174.
- Abelson H, Miyagawa S, Yue D. 2012. MIT's ongoing commitment to OpenCourseWare. *MIT Faculty Newsletter*, Vol. XXIV No. 4, March/April. Available at <http://web.mit.edu/fnl/volume/244/fnl244.pdf>.
- Diamond D. 2003. MIT everywhere. *Wired*, September 1. Online at www.wired.com/2003/09/mit-2/.
- d'Oliveira C, Carson S, James K, Lazarus J. 2010. MIT OpenCourseWare: Unlocking knowledge, empowering minds. *Science* 329(5991):525–526. Available at <http://science.sciencemag.org/content/329/5991/525.full>.
- Goldberg C. 2001. Auditing classes at MIT, on the web and free. *New York Times*, April 4.
- Klopfert E, Miller H, Willcox K. 2014. OCW educator: Sharing the how as well as the what of MIT education. *MIT Faculty Newsletter* XXVI(5), May/June. Available at <http://web.mit.edu/fnl/volume/265/fnl265.pdf>.
- Lerman S. 2004. OpenCourseWare update: Beyond the anecdotes. *MIT Faculty Newsletter*, Vol. XVI No. 5, April/May. Available at <http://web.mit.edu/fnl/vol/165/lerman.htm>.
- Lerman SR, Miyagawa S. 2002. Open Course Ware: A case study in institutional decision making. *Academe* 88(5):23–27. Available at <http://web.mit.edu/miyagawa/www/pdfs/Academe%20Sept-Oct%202002.pdf>.
- Vest CM. 2004. Why MIT decided to give away all its course materials via the Internet. *Chronicle of Higher Education*, online edition, January 30. Available at http://web.mit.edu/ocwcom/MITOCW/Media/Chronicle_013004_MITOCW.pdf.
- Walsh T. 2011. *Unlocking the Gates: How and Why Leading Universities Are Opening Up Access to Their Courses* (see chapter “Free and Comprehensive: MIT's OpenCourseWare”). Princeton University Press. Available at www.sr.ithaka.org/wp-content/uploads/2015/08/UNLOCKING_the_GATES_text-only.pdf.