

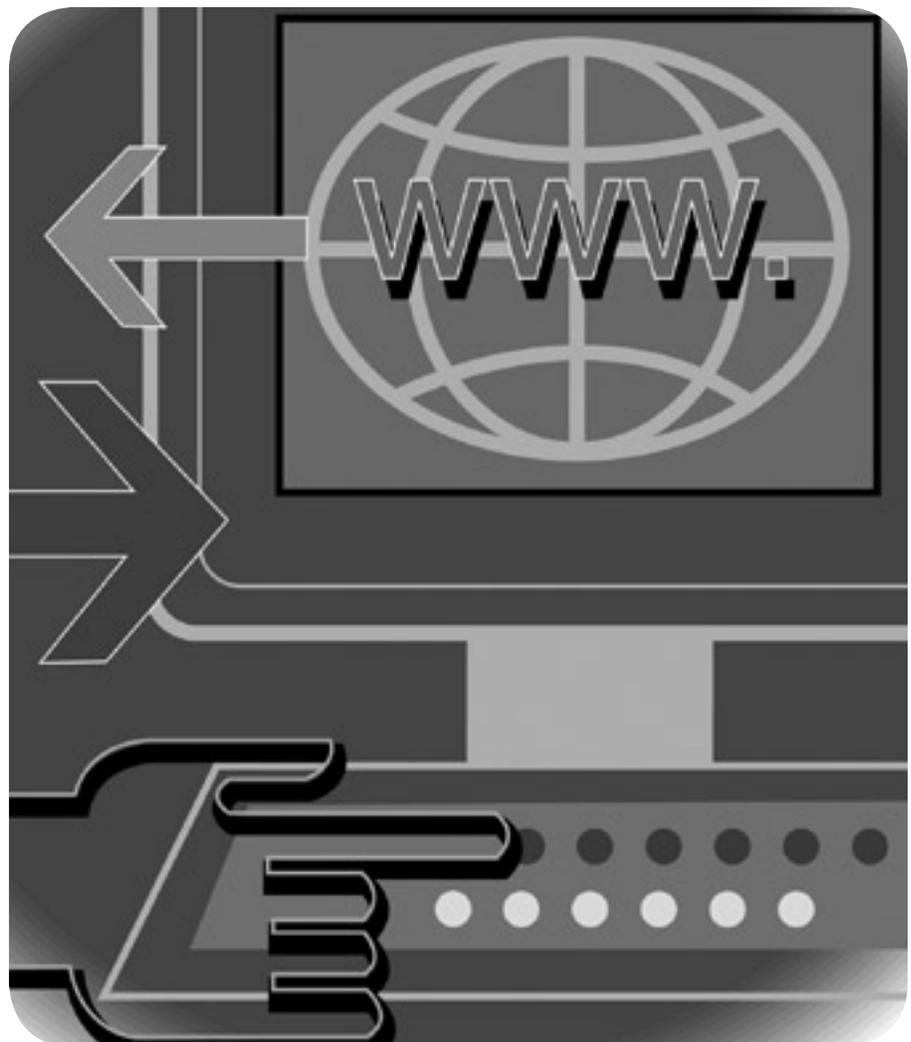
Open Educational Resources Serve the World

Sharing educational resources over the Internet provides multiple benefits, from academic collaboration to economic development

By **Sally M. Johnstone**

When MIT first announced the OpenCourseWare (OCW) project in the spring of 2001, many people hoped similar projects would proliferate, allowing instructors in less-developed countries to access timely materials to support their teaching—materials that would otherwise never be available to them. This is happening, as part of a quickly spreading, more general zeitgeist. Worldwide movements like open source software exemplify this concept. Many issues remain to be explored, but a number of serendipitous events in the past few years have resulted in an unprecedented sharing of academic resources over the Internet.

A major reason for sharing resources created for local communities is individuals' desire to make a difference in the lives of those less fortunate. Other reasons relate to institutional goals and benefits. In a traditional campus setting, for example, few faculty members see their colleagues' syllabi, much less their teaching materials. Thanks to the OCW initiative, faculty members from different schools at MIT are realizing the overlap in the topics they cover. By just reviewing the OCW content from their desktops, they can see how someone in a different discipline approaches the same material. This capability makes for a richer experience for students and professors and is generating new, cross-departmental collaborations. Another benefit of opening up course materials comes when more people around the world see the quality of the academic



culture on that campus. They can only join that campus culture by applying for admission to the college or university. This openness raises the general awareness of the institution's academic offerings and stature around the world.

World Interest

In December 2001, the Western Cooperative for Educational Telecommunications (WCET) managed a forum for the William and Flora Hewlett Foundation to explore the implications of OCW

for intellectual property, academe, and the developing world. At that forum, a delegate from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) helped the other delegates understand the extensive work already under way on electronic copyright issues for developing countries. By late 2002, UNESCO's leadership in this area resulted in the free access to electronic versions of British medical journals by researchers and practitioners in countries with very low per-capita income. When Creative Commons (<http://www.creativecommons.org>) announced its online licensing system, it was embraced by UNESCO, whose communication networks helped that project become known and used throughout the developing world.

In the summer of 2002, UNESCO convened the Forum on the Impact of Open Courseware for Higher Education in Developing Countries. MIT's OCW project was represented, along with projects from other U.S. universities. Individuals from universities in developing nations joined in the discussions. Out of that forum came the term Open Educational Resources (OER). At UNESCO's 2004 Second Global Forum on International Quality Assurance, Accreditation, and the Recognition of Qualifications in Higher Education, a delegate explained, "Open Educational Resources champions the sharing of knowledge worldwide to increase human intellectual capacity."

By 2004 OER was defined to include:

- Learning resources—courseware, content modules, learning objects, learner-support and assessment tools, online learning communities
- Resources to support teachers—tools for teachers and support materials to enable them to create, adapt, and use OER, as well as training materials for teachers and other teaching tools
- Resources to assure the quality of education and educational practices

Despite the wealth of materials, OER is not a degree-awarding strategy—no one has suggested that OER take the place of institutionally supported open and distance learning. It was thought

of more as a means of sharing unique and interesting resources potentially of value to others who would not otherwise have access to them. When done correctly, distance learning projects require extensive administrative and academic student support. OER does not, although the initial development of the technological infrastructure to support such projects requires multiple IT resources. Instead, OER involves sharing those academic resources that an institution chooses not to market and for which it chooses not to offer academic and administrative support to students. It makes possible worldwide use of electronic resources created to serve local students.

Connexions

In 2000, Richard Baraniuk and his colleagues at Rice University began the development of a project called Connexions (<http://cnx.rice.edu>), which has been well received by faculty throughout the world, according to comments offered at workshops I've given in various countries and the site's wide international use. Baraniuk began the project in an effort to overcome the dearth of up-to-date teaching materials in his field of engineering. Since that time, Connexions has grown into a substantial collection of free scholarly materials and a powerful set of free software tools that allow

- Authors to publish and collaborate.
- Instructors to rapidly build and share courses.
- Learners to explore links among concepts, courses, and disciplines.

Connexions' Content Commons contains small "knowledge chunks" called modules that connect into courses. These materials are covered under a Creative Commons' open license, so anyone can take them, adapt them to meet their needs, and contribute them back to the Connexions' Commons. This resource is open to any educator or student.

While originally built for higher education applications, Connexion materials now include a growing number of secondary-school modules for teachers. The vast majority of the material is in

English, although there are versions of several engineering modules in Chinese, Thai, and Japanese. In addition, communities are developing around the subject areas. Using Open Learning Support (see below) for their administration, self-managed communities include the International Community in Digital Signal Processing; Electrical and Computer Engineering; Bioinformatics; Botany/Biodiversity; and Music. These communities allow students or faculty members to have discussions around the specific uses of the content as well as the content itself.

Open Learning Support

These self-managed communities are also part of the OER movement. David Wiley and his colleagues at Utah State University created and also support self-managed community software, which they call Open Learning Support (OLS). OLS is a free, open resource that provides space on the Internet where people can connect to discuss topics, share information, debate, and so on. OLS is already linked to 2,200 modules in the Connexions collection and provides discussion services for MIT's OCW initiative. Its most important feature is its self-management.

When a faculty member or a whole institution gets involved in an OER project, the focus is not to support the people using the materials posted. Rather, they focus their time and effort on creation and maintenance of those materials. When someone needs support, self-managed communities are the primary option for linking with others around the world having similar interests. While the original creator of the materials may, or may not, be part of that community, its participants can still serve as a resource on the topic.

An important aspect of these communities is their ability to self-police. If someone posts an inappropriate message, a member of the community can press the "panic button," which signals a network manager (a member of Wiley's community-support team). If the manager determines the posting was inappropriate, the person can be electronically banned from the community. If

the community is an active one and a new member comes in after several hundred postings, a mechanism lets the new member avoid having to read them all to get to the most informative ones. When a very good comment or resource is mentioned in a posting, other members of the community can register “votes” for it, thereby leaving signposts for people who come along later.

Open Learning Initiative

Carnegie Mellon University takes a different approach to OER. The university’s Open Learning Initiative (OLI) developed from a collaboration among cognitive scientists, experts in human computer interaction, and seasoned faculty who had both a deep expertise in their respective fields and a strong commitment to excellence in teaching. The OLI project has developed full courses that are being broadly disseminated at no cost to individual students and at low cost to institutions. These courses include instructional design elements grounded in cognitive theory, formative evaluation for students and faculty, and iterative course improvement based on feedback from the users. OLI courses include a number of innovative online instructional components, such as cognitive tutors, virtual laboratories, group experiments, and simulations.

As the courses are delivered, OLI researchers conduct a variety of studies to examine the effectiveness and usability of various educational innovations. The research results are used not only to improve the courses themselves but also to contribute to a growing understanding of effective practices in online learning environments.

A primary objective of the OLI project is building a community of use for the courses, which is expected to play an important role in ongoing course development and improvement. The courses, developed in a modular fashion, allow faculty members either to deliver the full courses as designed or to modify the content and sequence to fit the needs of their students and their curricular and course goals. OLI project staff conduct free workshops during the summer for teachers and faculty. The first courses



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developed through OLI are introductory, intended to replace large lecture format courses in Biology, Causal Reasoning, Chemistry, Economics, Logic, Physics, and Statistics.

Growth of OCW Projects

MIT’s original goals for the OCW project were to provide free, searchable access to MIT’s course materials for educators, students, and self-learners around the world and to extend the reach and impact of the “open courseware” concept. Users from more than 215 countries, territories, and city-states around the world have visited MIT OCW and its set of 1,100 course materials. Ann Margulies, executive director of OCW, and her colleagues at MIT have been collecting comments from faculty and students all over the world. Of the comments posted on the Web site, many are worth reading to get a sense of the personal impact of this project (<http://ocw.mit.edu/>).

The OCW staff members are also continuing to work with the Hewlett Foundation to encourage more universities and colleges to open their resources to the world. The China Open Resources for Education (CORE) organization, formed three years ago, already boasts

as members Peking, Tsinghua, Beijing Jiaotong, Dalian, Central South, Xi’an Jiaotong, Central Radio and TV, Sichuan, Zhejiang, and Beijing National Universities. In addition to providing a mirror site for MIT, CORE members are translating some of the MIT courses and posting their own courses to the Web (<http://www.core.org.cn>).

On May 13, 2005, the presidents of six top universities in Japan—Keio University, Kyoto University, Osaka University, Tokyo Institute of Technology, the University of Tokyo, and Waseda University—announced the formation of the Japan OCW Collaboration Group (<http://www.jocw.jp>). The universities are creating course materials compatible with MIT’s project.

In Vietnam, the Fulbright Economics Teaching Program OpenCourseWare project is a resource for people working or studying in policy-related fields to increase their knowledge and explore new approaches to learning and curriculum development. Instructors are encouraged to adopt the curricular materials for use in their own courses, and students are using the materials to guide independent study (<http://www.fetp.edu.vn/fetpocwV.fcm>).

Universias is a consortium of more than 720 colleges and universities in Latin America, Spain, and Portugal that have translated about 75 MIT OCW courses into Spanish and Portuguese. These courses are being widely used.

In the United States, Utah State University opened its USU OCW pilot program in February 2005 with eight courses from six disciplines. Utah State is a land-grant university with a mission for outreach. The university also has strong agricultural programs, which could be of great value to developing countries. Consequently, among the first sets of course materials put on the Web are Biochemical Engineering, Irrigation Conveyance and Control Systems, Sprinkle and Trickle Irrigation, and Soil-Based Hazardous Waste Management (http://ocw.usu.edu/Index/index_html/ECIndexPage_view).

The Johns Hopkins Bloomberg School of Public Health (JHSPH) in Baltimore, Maryland, is a worldwide authority on

public health that has pioneered new research and shared its knowledge and expertise in the field for many years, educating tomorrow's scientists and practitioners. JHSPH has joined the OER movement by creating an OCW project with eight courses on the Web, including Understanding Cost-Effectiveness Analysis in Health Care, Family Planning Policies and Programs, and Problem Solving for Immunization Programs. The JHSPH program offers a great example of the type of knowledge valuable to all human beings.

In 2004, a community college-level project was developed out of Foothill-DeAnza Community Colleges District in California. The concept behind the Sharing of Free Intellectual Assets (SOFIA) project is that many teachers and students in various parts of the world are ready to take advantage of Web-based materials but need more basic skills than those offered by MIT or Carnegie Mellon University. It will be interesting to see how the international community receives this project.

Reactions to OER

There are many, many OER projects and materials on the Web, but it is hard to find them all. One rich site is the University of North Carolina, Chapel Hill's project Ibiblio (<http://www.ibiblio.org/about.html>). Another is the Internet Archive (<http://www.internetarchive.org>). The William and Flora Hewlett Foundation has helped finance projects like the Open Library Collections at Harvard University, the National Repository of On-line Courses at the Monterey Institute for Technology and Education, the American West Collection at the University of California, and EduTools, which includes a growing number of sections devoted to independent information and analysis of online products and tools for educators. In addition, major broadcasting services, like the British Broadcasting Corporation and Public Broadcasting Service, are making parts of their inventories available online. Library collections are opening up to online availability in the United States, the United Kingdom, and France.

Using Open Educational Resources

People at institutions in developing countries report facing a number of issues in using Open Educational Resources. First is getting access to a high-speed Internet connection. Once that problem is solved, the various types of resources can be quite useful.

The biggest difficulties reported thus far come when a professor tries to use one of the courses in the OCW projects in his or her own classes. Unless the OCW product is organized in modules that the professor can mix in different

combinations, matching the full set of course materials to the institution's differing curriculum rarely works. Consequently, the materials seem most useful as supplements for courses and as self-guided learning tools for teachers.

The Connexions project offers one solution to the curriculum-matching problem, but doesn't offer anywhere near the richness of the resources available in the OCW projects. As new projects develop, the project designers should keep these limitations in mind.

There are concerns about all this educational material suddenly being available to everyone, however. In the first conversations about OER projects, representatives of developing countries raised the issue of American Imperialism. There is no simple answer to this charge, except to point to other countries getting involved. The real vision for OER is the sharing in all directions of resources and approaches to teaching, not just North to South. When universities in Brazil put their medical journals online a few years ago, the number of citations by non-Portuguese speakers rose dramatically. The managers of the Commonwealth of Learning's project to develop a virtual university of small nations are considering using an OER approach to any electronic courses developed within the project (<http://www.col.org>). Conversations are on-going with regard to the development of a multi-nation African History course, so each contributing country can tell its own story. Such an OER course could provide a unique source of organized information for faculty in North America and Europe teaching African history.

No single concept or project can possibly solve all the problematic issues afflicting people all over the world, but increasing educational options can help

people help themselves. The United Nations is working toward Education for All (EFA) by 2015. The Dakar Framework for Action (UNESCO, 2000) supporting this goal states,

Education is a fundamental human right. It is the key to sustainable development and peace and stability within and among countries, and thus an indispensable means for effective participation in the societies and economies of the twenty-first century, which are affected by rapid globalization. Achieving EFA goals should be postponed no longer. The basic learning needs of all can and must be met as a matter of urgency.

The OER defined at the beginning of this article represents those resources needed most to achieve Education for All in the next 10 years. It is time for those of us creating high-quality online educational resources for local use to open them to our fellows around the world. If you want to stay abreast of the multinational conversations on this topic, go to <http://www.unesco.org/iiep/virtualuniversity/> and have your name added to their mailing list.

Sally M. Johnstone (sjohnstone@wcet.info) is Executive Director of WCET (Western Cooperative for Educational Telecommunications) in Boulder, Colorado.