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CONVERSATIONS IN CYBERSPACE

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**Open Educational Resources
Conversations in cyberspace**

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Section 1.

A first forum: presenting the Open Educational Resources (OER) movement

The first forum, lasting six weeks, from late October to early December 2005, was organized to present background information about Open Educational Resources, followed by an examination of the experiences of a number of providers and users of OER, along with several key related issues. The sessions were structured in a 'virtual seminar' format so as to provide a substantial amount of information and promote a focused discussion. Expert discussants were invited to present a number of institutional examples and issues, and to share their experiences with participants. Nearly 500 individuals from 90 countries joined the forum, convening the 'whole world around the table', as one participant noted. Interaction was lively, and email exchanges averaged 100 a week.

Chapter 1

OPEN EDUCATIONAL RESOURCES: AN INTRODUCTORY NOTE

Sally Johnstone

The forum opened with a general reflection on Open Educational Resources. During this first session, the group had an opportunity to discuss the concept, the terminology and the types of projects that have been developed. This overview was intended as background for the presentation and discussion of the specific initiatives and issues that followed.

OER [Open Educational Resources] champions sharing of knowledge worldwide to increase human intellectual capacity. ... UNESCO can encourage the development of OER in education, culture, and religion to enhance mutual understanding for international peace (UNESCO, 2004).

While it is clear that higher education systems and institutions worldwide face unprecedented challenges in meeting the increasing demand for initial and continuing education, it is also clear that there are developments that will increase access, make learning opportunities more flexible and help contain rapidly increasing costs.

As information and communication technologies (ICT) have become more available, those involved in teaching and learning have found that a vast number of resources are available from many sources. However, these resources can be hard to find without a significant amount of searching. Once found, it is hard to know whether they are of high quality. Searching the World Wide Web on a specific topic normally generates too many references – somewhere in the links may be the information sought, but few people have the time to search through them all.

Many university faculty members are using the web in their courses, which means that the amount of course content available in electronic format is growing. Yet, until recently much of this material was locked up behind passwords within proprietary systems. The Open Educational Resources movement aims to break down such barriers and to encourage and enable the sharing of content freely. One can compare the concept of

Open Educational Resources with that of Free and Open Source Software (FOSS). Just as FOSS allows users to modify software as needed, OER allows users to adapt content to suit their own needs. Indeed, academic researchers have long shared their work in scholarly journals, realizing that knowledge in their fields of study will grow more rapidly if scholars are not obliged to duplicate each other's research. OER applies that concept to teaching materials and tools. Through the use of OER, academics worldwide can build on the pedagogy, knowledge and tools created by their colleagues to enhance student learning.

1. OER AND OPEN CONTENT: DEFINITIONS

The term 'Open Educational Resources' was coined in July 2002 at the UNESCO-hosted Forum on the Impact of Open Courseware for Higher Education in Developing Countries. Participants at that forum defined Open Educational Resources as:

The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes (UNESCO, 2002).

OER is a very broad concept. A wide variety of initiatives and online materials can be classified as educational resources: from courses and course components to museum collections, open access journals and reference works. And, over time, the term has come to cover not only content, but also learning and content management software, content development tools, and standards and licensing tools for publishing digital resources. These tools allow users to adapt resources in accordance with their cultural, linguistic, curricular and pedagogical requirements.

This forum will focus on the open provision and use of course elements and materials only – in other words, open content for courses. This still offers scope to explore a wide variety of projects, from initiatives that seek to develop and provide complete learning programmes, to institutions that publish the materials they use in their own teaching (e.g. syllabi, lecture notes, reading lists, assessments), to sites that gather course elements from many different institutions. Other initiatives support the provision and use of open content through, for example, developing software tools or building communities of use. Open content may be a valuable resource, support and catalyst for teachers and learners, but it is not meant to replace institutionally supported open and distance learning. The use of open content does not imply a credential for the user.

2. UNESCO MEETINGS: EXPLORING THE POTENTIAL

The 2002 Forum on the Impact of Open Courseware for Higher Education in Developing Countries included representatives of universities from eleven countries, as well as from international and non-governmental organizations (NGOs). The goal of the forum was to examine the possibilities of, and the issues associated with, ‘open courseware’ (a term that was replaced during the forum with ‘Open Educational Resources’). The delegates concluded that the worldwide success of Open Educational Resources would depend upon a community that could – within minimal technical constraints – access, adapt, translate, use, produce and offer the material. This meeting was supported by the William and Flora Hewlett Foundation, which has made OER a major part of its education programme and has supported a wide range of projects.²

At the 2004 UNESCO Second Global Forum on International Quality Assurance, Accreditation and the Recognition of Qualifications in Higher Education, a full session was devoted to Open Educational Resources. Following the presentations, a working group elaborated the list of OER 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.

The participants in the meeting pointed to a role for UNESCO, as expressed in the quotation at the beginning of this chapter. In addition, they underlined the fact that, although OER have the potential to increase the quality of information and teaching, they also have the potential to contribute to a homogenization of education. OER that is created in only a few countries and disseminated to all the others could constitute a threat to cultural diversity.

3. OER INITIATIVES: SOME DEVELOPMENTS

The OER movement gained considerable visibility in 2001, when Charles Vest, then president of the Massachusetts Institute of Technology (MIT), announced MIT’s intention to put all of its course materials online for anyone to use. This decision resulted in the OpenCourseWare (OCW) project,³

2 <http://www.hewlett.org/Programs/Education/OER/>

3 <http://web.mit.edu/ocw/>

which by October 2005 included over a thousand courses. In addition, open content consortia are being formed in response to MIT OCW, either to widen access to MIT's materials (e.g. China Open Resources for Education⁴), or to develop their own open content projects (e.g. Japan's OCW Alliance⁵).

Several American universities have since followed MIT's example (Johnstone, 2005) but have chosen to focus on specific subject areas to make available as open content (e.g. agricultural engineering, public health, dentistry, instructional technology). While much of the development of open content is coming from universities, there are also initiatives at other levels.

Although MIT's OpenCourseWare is one of the better known and more widely copied models, other important OER projects have taken different approaches, with very different results. The Connexions project⁶ of Rice University in Texas has two components. The Content Commons component offers collaboratively developed material that can be modified for any purpose. The second component comprises FOSS tools to help students, instructors and authors manage the information available in the Content Commons. Faculty from all over the world are contributing to and using the materials in the Content Commons, especially in the areas of engineering and music education.

Another approach is exemplified by Carnegie Mellon University's Open Learning Initiative⁷ (OLI). Developed by cognitive scientists, experts in human-computer interaction and Carnegie Mellon faculty, it aims to offer 'a new paradigm for online education' (Carnegie Mellon, 2005). OLI's complete courses have innovative features such as cognitive tutors, virtual laboratories, group experiments and simulations. These tools allow academics at other universities to develop their own content in this pedagogically rich environment.

The Creative Commons project⁸ seeks to facilitate the development and use of OER by addressing copyright issues. The non-profit organization, developed by lawyers, offers flexible licenses for creative work, with the aim of giving web-content producers other options than the usual 'open to all' or 'open to no one'. Creative Commons hopes to build a layer of reasonable, flexible copyright licenses in the face of increasingly restrictive default rules.

4 <http://www.core.org.cn/en/>

5 <http://www.jocw.jp/sub2.htm>

6 <http://cnx.rice.edu/>

7 <http://www.cmu.edu/oli>

8 <http://www.creativecommons.org>

Among the more notable of the many other current OER projects are:

- Wikipedia:⁹ an online, community-developed and maintained encyclopedia that by October 2005 contained over 2 million entries, in over 100 languages;
- EduTools:¹⁰ supported by the Hewlett Foundation, EduTools provides course management software product reviews and a decision support tool, in addition to course reviews;
- the African Digital Library;¹¹
- the Knowledge Commons;¹²
- the Open Content Alliance:¹³ a collaborative effort of a group of cultural, technology, non-profit and governmental organizations from around the world to build a permanent archive of multilingual digitized text and multimedia content.

The OER world is already a rich one, but there is much more to be done.

4. THE OER MOVEMENT: LOOKING FORWARD

Marshall Smith, director of the Education Program of the William and Flora Hewlett Foundation, offers the following vision for the OER movement:

There is a lot of educational material available on the web, but it is rarely organized in a way that can actually help increase the quality of instruction. Open courseware projects allow a professor anywhere in the world to see exactly how his or her colleagues present a specific body of knowledge to students. This growing set of resources has the potential to increase the quality of teaching worldwide (personal communication, October 2005).

Support for the OER movement is a major component of the Hewlett Foundation's education programme. Indeed, the Foundation has provided support for many of the projects mentioned here. However, sustaining the OER movement will be a complex undertaking, and not all of the issues and variables can be identified in advance.

9 <http://www.wikipedia.org>

10 <http://www.edutools.info>

11 <http://www.africaeducation.org/adl>

12 <http://www.edclicks.com/>

13 <http://www.opencontentalliance.org/>

OER began with a small, deliberately diverse group of institutions exploring and developing resources. As more institutions and more materials from more courses are added to the mix, OER will be able to serve a broader group of learners. The initial providers are contributing course content, but other projects are being developed to create library resources, teaching resources and online communities of learners.

To succeed, OER will require many creative people willing to both contribute and make use of the resources. The OER movement can be viewed as a grand, but achievable, undertaking to share intellectual capital. A decade from now, the pioneer providers and users of OER may hardly recognize the movement. If it is to be effective, OER will need to evolve in order to meet the evolving needs of the higher education community.

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Chapter 2

PROVIDING OER AND RELATED ISSUES: AN INTRODUCTORY NOTE

The second session, lasting two weeks, was organized to present four examples of specific institutional approaches in the provision of OER. Different institutions have followed different lines of development, as represented by the four examples presented below.

A new expert discussant joined the virtual seminar table each day for four days. This made for fast-paced interaction, but discussion of the examples continued throughout the session, according to the interests of the group. Participants were encouraged to contribute information on their own institution's approach if they were developing OER, or to identify other initiatives or references.

During the second week, the focus of the discussion shifted to a consideration of some of the issues related to developing OER, with two discussants raising the key issues of faculty experience and copyright.

1. **OPENCOURSEWARE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY (MIT)**

Anne Margulies

What is MIT OpenCourseWare?

MIT OpenCourseWare¹⁴ (OCW) is a free and open website offering high-quality teaching and learning materials organized as courses. MIT faculty create these materials for their classroom teaching and then offer them for worldwide publication on OCW. For any given course, the materials convey the parameters of the course's subject matter and pedagogy, and ideally represent a substantially complete set of all the materials used in the course.

The purpose of OCW is to advance education by making these materials available to educators, who may draw on them for teaching purposes, and to students and self-learners, who use them to supplement their studies or to enhance their personal knowledge.

14 <http://ocw.mit.edu/>

MIT OCW was initiated in 2001. In September 2002, it published its first 32 courses, which were built ‘manually’ using rudimentary web development technology. By October 2005, OCW had grown into a deep and rich website containing 1,100 courses, with work underway to publish an additional 150 new courses and 100 updates. The goal was to publish materials for virtually all MIT courses (approximately 1,800) by September 2007.

Currently, MIT OCW:

- covers every discipline taught at the Institute and represents all five MIT schools and 33 academic departments, in approximately the same proportion as the total course offerings of these schools and departments;
- contains materials contributed by over 2,200 individuals, including 70 per cent of MIT’s tenured and tenure-track faculty;
- includes video materials for approximately 75 courses, including 16 courses offering complete videos of their entire lecture series;
- is supplemented by dozens of alternate distribution sites making published course materials more accessible internationally (translators now make selected MIT courses available in five languages besides English).

In addition, there are at least 70 independent websites around the world that ‘mirror’ OCW, providing a complete copy of the entire OCW publication to regional or local users where internet access is limited.

OCW has begun to resonate with other institutions that share a commitment to open knowledge. To date, over 100 institutions around the world are adopting the OCW model, including 36 domestic and international institutions offering live, publicly accessible OCW sites. Among them they offer about 700 published courses, to date, in addition to MIT’s 1,100. These courses largely cover complementary disciplines, representing materials from leading institutions known for their work in their respective fields.

Why is MIT doing this?

Access to high-quality educational materials is too often limited to those who can afford to attend an institution of higher learning or buy published materials outright. Indeed, some educators regard their primary course materials as the ‘crown jewels’ of the instructional programme – the essence of what they offer to students, the products that generate tuition revenues, and the substance of what they publish in textbooks. As a result, they

sometimes treat these materials proprietarily, guarding them from exposure and use except by registered students and paying commercial publishers.

In contrast, a trend towards *open* knowledge and *free* availability of high-quality teaching and learning materials will equalize access. Educators, including those in less-advantaged areas where resources are at a premium, can capitalize on such materials to enhance their courses and improve their teaching, benefiting many students at a time. Individual students and self-learners may take direct advantage of the materials to develop their knowledge and intellect. At MIT most faculty and academic leaders subscribe to the belief that openly publishing the teaching materials used at the Institute will bring people of all backgrounds together and promote mutual understanding. MIT's OpenCourseWare initiative supports the growing movement towards balancing the legitimate interests of intellectual property owners with society's need for open information sharing, learning and debate. The overarching long-term goals of open sharing of courseware are to:

- create a freely accessible body of exemplary course materials for teaching and learning;
- jump-start higher education in less advantaged parts of the world; and, ultimately,
- raise the standard of education generally.

MIT faculty have a passion for teaching and believe that by contributing their course materials freely to the world they will help to advance education around the globe, further the teaching and public service missions of the Institute, and fulfil their own commitment to the advancement and dissemination of knowledge. Building on these ideals, OCW's dual missions are to provide free access to MIT course materials for educators and learners around the world and to extend the reach and impact of MIT OCW and the OpenCourseWare concept.

What is the usage and impact of OCW around the world?

MIT OCW was visited more than 12 million times between October 2003 and October 2005. During that period, average traffic to MIT content grew to over 20,000 visits per day. About two-thirds of this traffic originated outside the United States (MIT, 2005).

Visitors to OCW fit these profiles: educators 15 per cent, students 31 per cent, and self-learners 48 per cent. About 85 per cent of educators say OCW has improved their courses or their teaching. Some 84 per cent of students say OCW has aided their learning. And 91 per cent of all visitors say

2. CONNEXIONS, RICE UNIVERSITY

Richard Baraniuk

Connexions¹⁵ is a unique web-based teaching and learning environment that aims to change the way we develop and use course materials. Connexions is based on a set of intuitions that are shared by a remarkably wide range of academics: that knowledge should be free and open to use and reuse; that collaboration should be easier, not harder; that people should get credit and kudos for contributing to research and education; and that concepts and ideas are linked in unusual and surprising ways.

Connexions: why and when?

The Connexions Project was launched in 1999 in response to my frustrations with the status quo of developing and publishing educational materials, in particular the difficulties related to:

- illustrating the interconnections between ideas and concepts in a curriculum (in spite of research indicating that it is the connections that make much of the education process meaningful),
- engaging students in interactive exploration of concepts,
- building communities and economies of scale for developing and continuously improving educational materials.

As an engineering professor, I was influenced by the burgeoning open source software movement (Linux, for example) and aimed to do a similar thing for books and courses. The key enabling ideas behind Connexions followed immediately from their lead:

- modularize the content (break a course or book into small chunks) so that it can be quickly authored, easily manipulated and updated, pulled into different customized courses, translated into different languages, and so on;
- open up the intellectual property so that anyone worldwide can access, use, and reuse the content.

From the outset, Connexions was intended to be a content project (building a commons of free educational content), a community project (building communities of students, instructors, and authors worldwide), and a software project (building open source tools to help people exploit the commons).

15 <http://cnx.rice.edu>

Connexions: lessons learned and main challenges

We have learned many lessons along the way that have helped us tune the Connexions vision and toolset:

- *Demand*: There is a great demand from around the world for quality educational content, and it continues to accelerate.
- *Impact*: Many authors are realizing that they can make a bigger impact with their educational materials by open access publishing through a system like Connexions.
- *Reuse*: Many course instructors do not merely want to ‘use’ Open Educational Resources, but they also want to customize them to their own context (by modifying them, translating them, etc.). Connexions appears to be an ideal repository for these re-contextualized open resources.
- *Cost and ease*: More and more authors, instructors and institutions in the developing world are using Connexions to house their educational materials, as it requires no local infrastructure.

Many challenges remain, however, including:

- *Tools*: It is critical to ensure that our tools are as easy to use as possible. And there is currently a significant need to make open access tools and content interoperate across different repositories.
- *Intellectual property*: How should we best educate potential authors about open access and the Creative Commons licenses? How can we best mingle content with different open licenses, for example Connexions content with MIT OCW content? What do we do with pre-existing content that does not have an open license?
- *Quality assessment*: How do we best peer review and credential open educational content? (In response, we are developing a system of lenses to enable communities to develop their own customized peer review systems.)
- *Access*: How do we ensure that everyone has access to Connexions’ content, including those with limited or no internet connectivity? (We are working with several book and CD publishers to reach out to these users.)
- *Sustainability*: How will we develop revenue models to sustain Connexions’ free content and open source tools into the future?

- explore economic models for the combination of open access and sustainability.

We are working on a model to effectively transfer scientific knowledge developed in research contexts into online learning practices. Course development has been an iterative process in which we have structured many kinds of feedback loops to determine where applications of theory have worked and where alternatives must be tried. The expectation of educational quality stems from close collaboration, throughout the development of the OLI courses, among cognitive scientists, experts in human–computer interaction, and experienced faculty who have both deep expertise in their respective fields and a strong commitment to excellence in teaching. Out of this collaboration, we have developed courses and principles for effective online course design. The result has been a dual focus that incorporates both product delivery in the form of online courses and research on how to make such courses effective in facilitating learning.

What has been, and is being, done

As of the beginning of the first semester of 2005/06, there were seven subject areas for which there were either full courses or substantial course materials available through the OLI website: causal and statistical reasoning, statistics, economics, logic, biology, chemistry and physics. Additional courses were being added in calculus, French, statics, and research methods.

We have developed an integrated technology to deliver these courses and their many highly interactive features. Those features range from online interactive laboratories in causal and statistical reasoning, biology and chemistry, to multi-user market simulations in economics, to intelligent tutoring system in statistics and physics, to scenario-based learning environments in chemistry.

In addition to these more complex features, OLI courses include standard online testing that accommodates both frequent comprehension checks for students and tests to be used for performance assessment. The project continues to develop increasingly robust student performance reports so that instructors who are using OLI courses to support their teaching can easily monitor student progress and focus their instruction on those areas that their students need most.

We have conducted, and are in the process of conducting, several studies aimed at describing the nature of student learning and documenting

4. CENTER FOR OPEN AND SUSTAINABLE LEARNING, UTAH STATE UNIVERSITY

David Wiley

I will describe three projects we are undertaking with the Center for Open and Sustainable Learning¹⁷ (COSL), hopefully exposing different provider perspectives with each. Through our projects we are providing content as well as software tools that add value to our content and others.

When and why the initiative was undertaken

After the launch of MIT OpenCourseWare, we became concerned about how much actual learning a student would be able to accomplish using the MIT OCW materials alone, that is, without access to other students. In 2003 we started work on a new piece of software called ‘Open Learning Support’ (OLS) with the goal of enabling what we felt were critical social interactions necessary to support learning with MIT OCW materials.

In 2004 we decided to pilot an OpenCourseWare at Utah State University (USU), based on our belief that access to educational opportunity is a key means to the end of improving quality of life. In talks with MIT OCW, we discovered that they were using a proprietary infrastructure to support their project, which they were not really capable of sharing. Thinking that OpenCourseWare should run on an open platform, we also launched the ‘eduCommons’ project, and – with help and information from MIT OCW – began developing an open source infrastructure, capable of supporting OCW initiatives.

What has been, and is being, done

Our Open Learning Support social software,¹⁸ which allows users to ask and answer questions concerning OCW content, has been integrated with select MIT OCW courses since early 2004. By October 2005, MIT OLS had 1,878 registered users, who had exchanged 450 messages. We have more recently integrated OLS with the Connexions collection at Rice University. OLS is currently being extended with additional features to support interaction in the absence of a teacher or moderator (e.g. a reputation management system).

17 <http://cosl.usu.edu/>

18 <http://mit.ols.usu.edu/>

With eduCommons, the main challenge is balancing the desire to make the OCW production process as easy as possible against the functionality needed to provide a robust platform for managing metadata, rights and publication. This is a usability issue. We have learned that when a course is already being offered online from a learning management system, offering tight integration with the system in question makes this balance easier to maintain. For example, Sakai²²/eduCommons integration is advancing to the point where course content, along with associated metadata (including rights metadata), can be exported from Sakai and imported into eduCommons. Preserving rights metadata across the import/export process means that less personnel time is spent trying to determine the IP cleanliness of any given piece of content.

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22 A community source software development project to design, build and deploy a new collaboration and learning environment for higher education. See <http://www.sakaiproject.org/>.

Chapter 3

USING OER AND RELATED ISSUES: AN INTRODUCTORY NOTE

Having examined institutional experiences in providing OER, the group was invited to turn its attention during the third session to examples of institutions using OER, and to reflect upon some of the attendant issues and concerns.

As in the previous session, the first week was devoted to presentations by four discussants of their experience of using OER in an institutional setting. All four examples outlined in the introductory note were based upon the use of MIT OpenCourseWare. This had the advantage of allowing a comparison between different approaches to using the OER available from a specific institution. But once again, the group was encouraged to identify other initiatives. During the second week, the discussion centred on some of the implications of using OER. Two discussants commented on two specific concerns: learning object repositories to help users find OER, and cultural and linguistic concerns associated with the use of OER from other institutions.

1. UNIVERSITÉ FRANÇAISE D'ÉGYPTE: ADAPTATION OF OER FOR EGYPT

Mohammed-Nabil Sabry

When and why the initiative was undertaken

An initiative to use available Open Educational Resources began in November 2003. The motivation was to empower tertiary education in Egypt to face challenges raised by globalization. There are two main issues to face:

- *Increasing the tertiary completion rate:* New technologies tend to increase the need for tertiary graduates at a rate that greatly exceeds available capacity, both in terms of investment and human resources. The positive impact of a high tertiary completion rate on economic performance and social development as a whole has been proved (Desjardins et al., 2004; Taskforce on Higher Education and Society, 2000). As is the case with many developing countries, the gap between Egypt and developed countries is high. Measures must be taken to increase the offer in tertiary education in order not to lag behind the world's evolving economies.

Course modularity

However good a course may be, the fact that it has been designed for a given university means that it will never fit the needs of another university without some modification. Course modularity – in other words, the breaking down of the course into relatively small and independent educational elements (modules) – is an issue that needs to be addressed both in the design phase (module structuring), as well as in implementation (handling of cross links). This is necessary to keep the adaptation of a module for another course down to a manageable effort. In our case, we had to work with large chunks of material (a whole chapter, and sometimes larger), because otherwise the effort needed would have been huge. Inevitably, each part selected contained some elements outside our scope, while each part disregarded contained some useful elements.

Course adaptability

The most time-consuming tasks in course creation are related to figures, equations and tables. In the absence of the source materials (e.g. in cases where the only resources on offer were PDF files), equations and tables had to be redrawn. Figures also usually need to be redrawn since cutting and pasting from a PDF file results in bad resolution, as well as a large file size. Also, figures usually contain annotations, which must be translated into the target language. The only usable part of a PDF document is the text, which is not very useful for us since we need to translate it.

Course ownership

In some cases, course adaptation has involved extensive modification by our professors. Measures have had to be taken to preserve the intellectual property rights of both the original source (OCW) and the adapting professor. Although this issue has been addressed in the literature, we did not have enough time to make a survey. The decision was taken to:

- structure our courses into modules that are as small as possible, and
- for each module, include a list of the sources used to create it.

We hope that discussions will help us to define a better, hopefully standard, approach.

- facilitate the use of MIT OCW;
- initiate the process of developing African-based communities of practice for ODeL and OER creation; and
- provide research data on access to, and use of, OpenCourseWare in the context of the African institutions involved.

Two institutions in Kenya and Ethiopia were selected to participate in the pilot phase of this project: the University of Nairobi and the University of Addis Ababa.

What has been, and is being, done

Setting up mirror sites

MIT OCW provided external hard drives, pre-loaded with the MIT OCW site, which included text, multimedia and other enhanced interactive content. MIT OCW also provided software to log and track use of the material.

Sensitization workshops

The AVU facilitated and actively participated in the preparation and implementation of sensitization workshops at the selected institutions. Students from MIT-AITI, an innovative programme started by MIT students to integrate computers and internet technology into the education of students in African schools, were sent by MIT OCW to conduct part of the workshop as a component of their 2005 summer programme. The AVU and MIT-AITI students conducted site visits in order to:

- conduct sensitization workshops for faculty and/or students on MIT OCW material,
- install and configure the mirror sites and train site technical staff,
- provide ongoing technical assistance as needed.

Learning support materials

MIT OCW agreed to work with publishers to collect donated textbooks and learning materials. These were to be made available to the University of Nairobi and Addis Ababa University for selected courses in information and communication technologies (ICT), a discipline that has been identified as having the highest demand in sub-Saharan Africa.

- To increase buy-in of the OCW material, the mirror site should be configured so that it is flexible, and so that the web template can be edited in its entirety to match the institution's theme and house styles. We suggest that an easy-to-edit site template be developed for the OCW mirror, and/or a quick guide to changing the look and feel of the mirror site.
- To keep up the momentum of use, localized sensitization of the installed OCW mirror site should be maintained through the constant use of marketing material such as brochures, posters and leaflets.

The scale and scope of existing OER, and the enormous amount of information already available, presents a considerable challenge to those who stand to gain the most from them – learners and educators in the developing world. However, running headlong into the relatively untested OER realm serves neither the learner nor the educator. They risk being submerged by digitized information that may have little or no defined meaning or purpose. As a result of the MIT OCW pilot (and our involvement in the other initiatives listed earlier), the AVU believes that it is necessary to configure a conceptual framework, or OER Architecture, within which information and meaning converge to meet the higher educational demands of those in Africa.

The promise of OER resides not only in the digitized information itself, but also in its effective use and the methodological approaches and mechanisms that manage and ascribe meaning to it. The AVU believes that these challenges are best met through a collaborative partnership that incorporates the four main elements of the OER process: creation, organization, dissemination and utilization of OER. The current development of the AVU OER Architecture seeks to engage OER partners in a strategic combination of these elements that will lead to the development of a dynamic, rational and comprehensive Open Education Resource strategy for African higher educational institutions.

3. UNIVERSIA: TRANSLATION OF OER

Pedro Aranzadi

Universia.net was created by its founding partners to provide leadership in the development of the information society in Hispanic university education. The consortium was founded in Spain in 2000, with the support of Grupo Santander and the commitment of 31 universities, the Spanish Principals Conference and the Higher Council for Scientific Research. The Spanish

in the OCW catalogue were available on the Universia OCW portal.²⁴ The portal also offers information about OCW in Spanish and Portuguese, translated versions of MIT's monthly OCW newsletter, information about Creative Commons licenses, and an online discussion forum for Spanish-speaking OCW users.

For Universia, participation in the OCW initiative underlines its own commitment to the internet as a vehicle for open knowledge through access to free and open materials. Universia seeks to increase the reach, accessibility and impact of MIT OCW, by providing millions of users in Latin American countries with materials translated into their own language.

4. CHINA OPEN RESOURCES FOR EDUCATION: TRANSLATION OF OER

Derrick Tate

When and why the initiative was undertaken

China Open Resources for Education²⁵ (CORE) was established in October 2003, and the programme was initiated in April 2004. China Open Resources for Education is a consortium of universities that began with 26 International Engineering Technology (IET) Educational Foundation member universities and 44 China Radio and TV universities. As of 2005, it had a membership of 100 universities, through which it could reach out to 5 million students.

Higher education has become more internationalized and has been moving towards increased open sharing of educational resources. Inspired by these developments and having received generous support from MIT, the William and Flora Hewlett Foundation and the IET Foundation, Fun-Den Wang, a Chinese-American Professor Emeritus of the Colorado School of Mines, brought together representatives from MIT, the Hewlett Foundation and the 26 IET Educational Foundation member universities (which include Peking University and Tsinghua University), with the presidents of 67 distance education pilot universities, and administrators from 44 China Radio and TV universities. On the basis of this forum, CORE was founded to promote the development of open sharing of educational resources in China.

CORE was formed to upgrade the content and delivery of higher educational services in China, and to make available to other countries the

24 <http://mit.ocw.universia.net/>

25 <http://www.core.org.cn/en/index.htm>

bilingual volunteers with expertise in the subject areas being translated. Experts from CORE's discipline and subject committees supervise translation quality and, if necessary, adjust courses to reflect actual user needs and respond to feedback. Chinese universities will also contribute quality open courseware, and CORE will translate these courses into English or other user languages. As of October 2005, 450 quality Chinese courses were available – in Chinese – through CORE's website.

- *Launching CORE's website:* CORE's website is the only platform in China that accommodates the open-sharing needs of Chinese universities. Currently, universities can access open courseware and other important information on the site. In the near future, CORE member universities will be able to access live lectures by academics in other countries, contribute quality open courseware, and access lists of faculty who wish to engage in international exchange. As of 2005, CORE's website was receiving an average of 7,000 visitors per day.

Main challenges and lessons learned from the experience to date

There are three major outcomes which CORE wishes to achieve. The first is the selection of relevant OCW, educational and scholarly material for its programmes. The second is the translation and quality assurance of these selected materials. The third is the actual use of that translated OCW in teaching and research. CORE will have achieved its objectives when quality courseware is translated and used in teaching and research.

The obstacles to accomplishing these objectives include the reluctance of universities to use course material not generated within that institution, the difficulties of translating and ensuring the quality of the translations, and the inertia that must be overcome in getting professors to change to new and better course materials.

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Chapter 4

DISCUSSION HIGHLIGHTS

Paul Albright

As the forum drew to a close, the rapporteur was faced with the formidable challenge of synthesizing six weeks of fast-paced and thought-provoking discussion. The resulting report captures as much as possible the to and fro of the interaction among the participants. Furthermore, it highlights the main threads of the discussions over the course of the sessions, and identifies a number of the issues that would continue as a leitmotif throughout the ongoing interaction of the international Community of Interest on OER that was coming into being.

1. AN INTRODUCTION TO OPEN EDUCATIONAL RESOURCES AND OPEN COURSE CONTENT: THE IMPORTANCE AND BENEFITS OF OER

The OER movement is breaking down barriers that have blocked access to academic content. Until recently, most electronic course content was locked up behind passwords within proprietary systems, noted the forum's initial discussant, Sally Johnstone. OER represents a major step towards sharing teaching materials, methods and tools, just as academics have long shared their work in scholarly journals. The result is to augment teaching resources while expanding knowledge opportunities for learners and faculty members.

Throughout the forum, a forthright exchange of views stimulated thought and generated ideas that could advance the cause of OER. Participants stressed the importance of providing open, accessible and superior higher education content for a global community of teachers and scholars, students and lifelong learners. Whether OER is categorized as 'open access' or 'free content', it promotes autonomy and self-reliance within the learning community. Without the constraints of time or geography, education has the potential to combat economic, social and cultural obstacles. Through independent, self-determined learning and open academic content, the individual is able to grow intellectually beyond previous personal, institutional or local boundaries. Other benefits range from developing valuable work skills to engaging in life-enriching, lifelong learning.

Although students and independent learners can and do use MIT OCW, a major goal of the project is to make MIT's teaching material available to other educators so that they can draw on it for their own teaching, use it as a curriculum and course planning tool, or be inspired by it to initiate their own open content initiatives.

Utah State University is one of the institutions to have adopted the MIT course publication model, although OCW is just one component of the University's OER activities. Its Center for Open and Sustainable Learning (COSL) has developed a social software tool – Open Learning Support – to support learner communities using OCW, and also an OCW development tool, eduCommons.

The other two institutions have developed very different models. Rice University's Connexions project attempts to bring the three strands of content, communities and software together in one intuitive and dynamic teaching and learning environment. Unlike the MIT model, Connexions is not a static institutional publishing initiative; anybody, anywhere in the world, is free to contribute course materials, and the modular content structure is designed to promote re-mixing and reuse in different contexts.

Carnegie Mellon's Open Learning Initiative (OLI) represents yet another approach. Carnegie Mellon set out to develop online learning environments with rich media support. The result is courses that are highly interactive and stand on their own, without need for classroom teaching, practical lab work in the case of science subjects, instructor mediation or external evaluation. OLI is more explicitly learner oriented than the other models; indeed the project can be seen as a testing ground for exploring how best to use available technologies to improve learning outcomes.

During the discussion, forum participants made helpful comments and described other OER developments with which they were familiar.

It was clear through the dialogue that a number of challenges confront those who develop and make available education resources for sharing. There are challenges that are specific, such as:

- finding suitable technologies to convey OER in a feasible, useable, effective and economically viable way;
- devising a compatible infrastructure so that there is ready transferability between the provider and the user;
- collaborating to develop models and new approaches that are educationally relevant and in an appropriate context for the user;
- fashioning OER that can be scaled up or down to adequately meet education requirements.

of OER, many emphasized the need to explain and promote the institutional benefits, and to provide incentives for faculty members to become actively involved.

Benefits and barriers within the institution

A major test for providers is to gain (and sustain) support for the development of OER within their own institutions. All four presenters stressed that for an OER initiative to succeed in the long term it must have support from both the academic staff and the administration. More importantly, OER must be perceived to be of value within the institution itself. Although MIT OCW was principally intended for an external audience, a significant amount of site traffic comes from within MIT itself. Students, for example, use OCW to preview and review courses, and prepare for exams. At Carnegie Mellon, students go one step further and take OLI courses for credit. The feedback they provide informs the further development of the online environment and even informs classroom instruction; the system tracks how the students learn and highlights areas where instructors should target their efforts.

The forum was reminded that the four provider cases discussed are all exceptional in the support they have received from their university communities. While a number of institutions may have committed to the development of OER, there have also been situations – as some participants described – where institutional support and encouragement were less forthcoming. Cost-conscious, risk-averse institutions are not eager to make course materials available without reimbursement or controls. The economic reality may be that they cannot afford to invest significant amounts of time and money in giving away their resources for free. In addition, if content is available free of charge, there is a risk that it will be seen as being of low quality, a belief (however erroneous) that does little to advance the OER cause within the academic community.

The impact of the growing commercialization of higher education – as contrasted with the openness of OER – generated considerable debate. There appears to be a growing tension between the ‘ethical push’ to promote open access to knowledge and the need for university managers to maximize income from their key assets. How can OER fit into this increasingly commercial, financially and intellectually competitive framework for higher education?

Cost reduction was identified as an ongoing challenge for institutions involved in OER development. For the MIT-type course publication model, solving intellectual property and copyright issues has proved to be one of the most costly stages of the process, in terms of both time and resources.

when Carnegie Mellon students use the courses as part of their programme of study, their actions are logged and the information fed to the instructor. The rationale is to gain insight into learning methods and identify areas where additional student support might be required.

Several participants indicated plans to undertake further studies on the user experience of OER, and to experiment with new support mechanisms, such as virtual cohorts of learners.

Standards, quality assurance and accreditation

Should OER be subject to the formal (or even informal) quality assurance and accreditation processes that prevail in traditional higher education settings? If so, how would that be achieved? Would accreditation constrain the development and the use of open content for the delivery of higher education?

Some participants contended that there would be more confidence in and acceptance of OER if assessments were made for quality assurance, perhaps using internationally established standards applied by a global accrediting body. Another approach could be for university consortia (rather than international governance) to set and maintain quality standards. It was argued that it is in the self-interest of content providers to respond to accreditation, certification and quality concerns so as to establish their offerings as standards in the field and as sources of customization for OER users.

Quality assurance is perhaps of greatest concern to the users of ‘grass-roots’ OER initiatives – open collections that welcome content from anyone who wishes to contribute (e.g. Rice University’s Connexions and many learning object repositories). Many such initiatives have adopted peer review and reputation management systems, to give users a guide to the quality of the materials on offer. Measuring quality, however, is far from straightforward; ‘high quality’ materials in one context may not be considered ‘high quality’ in another. Connexions has addressed this issue by developing ‘lenses’ through which materials can be viewed. A user – be it an individual, an institution or an organization – sets up their own review process, then selects the modules and courses that meet their quality standards. When Connexions is accessed through that user’s lens (or portal), only the materials they deem ‘high quality’ may be viewed.

It is clear that these issues of standards, quality assurance and accreditation will grow in significance as the OER movement becomes more established, and as the volume of content, and the number and range of users increase.

to produce exemplary OER, at the risk of excluding potential contributors, or to welcome all contributions and focus on creating a ‘critical mass’ of OER? Ultimately, where one thinks the bar should be set depends on the particular OER philosophy one ascribes to – OER as course publication or OER as distance education.

Providers, working with interested institutions and academics already involved with OER, can help to enhance staff awareness of the benefits, practical aspects and potential complications of OER development. Two major approaches were advanced to attract more faculty members onto ‘this visionary OER bandwagon’ and to show the way for enhanced quality of the OER offerings in the long term:

- collaboration and joint content development among academics, and
- incentives for faculty members to contribute high-quality material to the worldwide body of OER.

Joint content development

While there are examples of collaboration among academics in developing joint content (see, for example, the digital signal processing curriculum in Connexions), the largest proportion of existing OER materials originate with an individual faculty member. Increasing the pool of available expertise and resources would lead to the production of better teaching and learning materials.

One approach would be to create ‘communities of scholars’ in each specific discipline, with the members collaborating to develop and share their scholarship. This should lead to higher-quality OER, since faculty members would be sensitive about meeting the academic norms of their discipline. If OER materials are going to be judged by their peers, the developers are likely to devote more time and effort to producing a quality output. Making institutions and academics aware that a large audience around the world is scrutinizing these products helps to create an internal quality control.

‘Authorship, attribution and authority are the cornerstone of scholarly communities’, noted one participant. ‘The key to moving to “open” content online is to ensure these norms are respected and preserved’.

Incentives for faculty members

Very few institutions have implemented incentive programmes for instructors to either produce or use OER, mainly due to institutional reluctance and a deeply entrenched academic culture. In part, this may be related to mounting

Many academics incorporate copyrighted third-party content in their teaching materials – a practice permissible under educational ‘fair use’ guidelines in some countries. Penalties for contravening these guidelines – for instance, by making such content available to the general public on the internet – can be strictly enforced. Faced with this risk, many institutions have preferred to restrict access by locking away course materials behind firewalls and in password-protected pages, rather than devoting scarce time and resources to creating ‘clean’ versions, free of copyrighted elements. Institutions may also be reluctant to see the creative and scholarly work of their own staff made available without due compensation for the costs involved. Some believe institutions are less willing to share knowledge than the scholars who create it and who wish to work in an open academic community.

One faculty member in the forum stated the academic staff perspective directly: ‘We as faculty are not afraid of others using our material in their academic work, but we are profoundly afraid of someone taking our work and claiming it as their own, and perhaps even copyrighting it ... themselves’. Another participant argued that, rather than focusing on copyright infringement, a more helpful approach for faculty members offering OER might be to enforce good behaviour through promoting scholarly values and norms. In practice, an academic may not have the means to pursue someone through the law, and if someone is found to be appropriating another’s material, the academic community is more likely to react against the breaking of the scholarly norms of attribution and respect for authorship than the infringement of copyright law.

The intellectual property rights of open content creators do need to be protected, however. Default copyright law is too restrictive, and customized open licenses remain a complex and expensive option. Creative Commons was developed to provide an alternative. This non-profit organization offers a number of different intellectual property licenses, with a range of restrictions to use, designed to facilitate the open use of knowledge and creative works.

For the creators, it provides some assurance that their work will be acknowledged by anyone using the open resources they have created. For users, it provides a degree of assurance that they can draw upon open educational resources without fearing subsequent litigation about copyright as long as they adhere to the terms of the license.

Lawrence Lessig described Creative Commons licenses, which are used worldwide in increasing numbers, as ‘legal tools to further enable the collaborative process in education, and elsewhere, that the technical tools

developing modules and adapting them to new situations. Volunteers were perceived as valuable in this regard to help transform content into relevant educational resources and to be trainers and online facilitators.

Creating such an environment of collaboration and volunteerism are just two of the challenges that face OER users. Others include language differences, cultural barriers, local relevance of materials, access concerns, and the availability of adequate technical resources (infrastructure).

Access issues and infrastructure

Open Educational Resources need to be accessible to those who need or want them. Lack of an adequate information and communication technology (ICT) infrastructure is, especially in less developed countries, an obstacle to the dissemination and use of all OER, and especially those that offer more than just basic textual content. There is a need to collaborate to make virtual environments more accessible to underserved groups.

As one provider put it: ‘There is a trade-off between using the latest technologies that provide rich virtual environments, simulations and robust feedback that we believe will deliver a more effective learning environment but that require high bandwidth and limiting the environment to low bandwidth forms of delivery (text).’

The challenge is to build effective OER in areas where bandwidth and technology are limited. Some expressed the view that a low technological threshold encourages materials from all cultures, leading to new OER that is richer and more diverse. In the longer term, however, advocates of OER must address the political, economic, and technical problems that hamper the distribution of sufficient bandwidth, and not be content with downgrading educational offerings to their most basic levels.

Some technical difficulties are being overcome in developing countries. More teachers, students, professionals and others are able to access OER and adapt it effectively for their local circumstances. For example, the AVU established pilot OCW ‘mirror sites’ (i.e. local server storage) at institutions in Kenya and Ethiopia to widen access in areas where low bandwidth would make it difficult to fully utilize the MIT website. These mirror sites can be updated remotely. In some parts of the developing world, the challenge has shifted from obtaining the essential technology to managing the array of available educational resources so that they are of maximum benefit to young scholars.

It was pointed out that whereas African academics are using and producing educational materials, in many cases these remain inaccessible to new users, partly because of poor infrastructure, but also because of a lack

and another set of different people can create “personal collections” that get shared’, noted Gerry Hanley of MERLOT. ‘Everyone does a little bit, and, collectively, you can create a rich teaching/learning resource’. Such an unfettered community-building technique is not without its difficulties, however, since content variations may abound. Once again, repositories look to original contributors, peer reviewers and the user community to keep online catalogues updated, fresh and vibrant.

Forum participants contrasted the learning object repository approach with the structured course-based approach that has been traditional in higher education. While there are advantages and disadvantages to each, the course publication method tends to be more static than the adaptable learning repository approach.

Language and cultural barriers

Open Educational Resources are cultural objects as much as educational ones, in that they give users ‘an insight into culture-specific methods and approaches to teaching and learning’ – a practical exposure to the way that courses are ‘done’ in another country or by another instructor. Language is clearly intertwined with culture in this dynamic. At present, English-language content dominates OER provision – content that tends to be based on Western learning theory. This limits the relevance and accessibility of OER materials in non-English, non-Western settings. There is a risk that language barriers and cultural differences could consign less developed countries to the role of OER ‘consumers’ of – rather than contributors to – the expansion of knowledge.

To illustrate, several discussants indicated that faculty members at their institutions expressed reservations about content produced by a foreign institution. According to Peter Bateman, ‘while most were clearly appreciative of being able to access such a wealth of resources so easily now, some African academics expressed a resentment of these “imported” materials, asking “Why can’t we produce these materials here?”’ There was some concern that institutions in developing countries would become dependent on externally generated content, rather than the content serving as a catalyst for the production of new, local OER. Some of this tension may be resolved through progress in moving towards collaborative development models.

The conditions under which OER are created, the languages used, and the teaching methodologies employed result in products that are grounded in and specific to the culture and educational norms of their developers. This may be remote from the understandings of other cultures and lead to (1) dysfunctional education, and (2) a reduced potential for developing

Multilingual platforms and dynamic collaborative environments, in which multiple users can come together to create and edit material, are undoubtedly desirable. However, they pose particular problems for translators: if material is constantly changing and a stable version is not available, how can a translator, first, keep track of the changes and, second, decide at what point a new translation becomes necessary? While acknowledging this difficulty, it was suggested that the provider-user communities, aided by volunteer translators, could track changes or respond to user requests.

It was suggested that a modular approach to content development could facilitate local adaptability and reusability, although several participants noted that this might be too unstructured for some users. The translation of materials was generally reported to take place at the individual modular level, as this enables the ongoing modification of material to be incorporated as the translation is being prepared.

Several participants appealed for a shift away from the ‘top-down’ approach to OER content creation. Rather than attempting to create OER that can function in every context (and risking that it be useful in none), the emphasis should be on developing material that meets a particular instructional need in at least one context. The idea would then be to enable other institutions to adapt these materials to meet their specific institutional and local needs. ‘User’ institutions could take responsibility for adapting those courses that are locally relevant and meet market demands.

It was suggested that the translation of OER into users’ mother tongues could also prevent the loss of languages now threatened with extinction. A cautionary note in this discussion of language and culture, however, was that students most likely need new languages to thrive in a global society. ‘In a world that is becoming more and more global, adopting a localized approach to knowledge and learning will ultimately reduce opportunities for those who do not access ... language other than the mother tongue’, argued one participant. ‘This will definitely widen the gap between the haves and have-nots’.

Some advocated a balanced approach as more productive in the long run. They acknowledged the necessity of translating OER, but argued that it should be matched with new-language training, and improved teaching skills and teaching materials. The teacher is the key here – making use of information in a foreign language, adapting it to native tongues, cultures, and contexts, and then conveying it to others. On a practical level, it was suggested that few people will learn a new language if it is only needed to acquire more knowledge, whereas they may do so if it offers the chance to improve their livelihood or quality of life.

dominate. The support of instructional designers would allow authors to become more active in OER production and to adapt content to meet their specific individual and institutional needs. On a related note, partnerships between countries could promote capacity building and training of local staff in OER production and use.

The forum was advised of one such collaboration: an initiative of the Commonwealth of Learning to foster OER development among 22 small states of the Commonwealth.²⁸ The Virtual University for Small States of the Commonwealth is designed to build a network that will allow states with limited resources and technology to develop a capacity for online and distance learning. OER will be developed in areas of shared need, including life skills, business and management, and professional development in education.

As the forum was underway, the William and Flora Hewlett Foundation, which supported this IIEP forum, made announcements at the World Summit on the Information Society (Tunis, Tunisia, November 2005) concerning new initiatives to connect the world's citizens to high-quality educational materials on a free basis. The Development Gateway Foundation's Open Educational Resources portal 'aims to equalize access to education and help people in developing countries improve their chances for a better life' (William and Flora Hewlett Foundation, 2005). The Foundation also announced that it would provide funding to train teachers in sub-Saharan Africa with open content resources in literacy, numeracy, science, and life and health skills. The project will be led by the AVU and the UK Open University.

7. PROMOTING THE OER MOVEMENT

The objective of the IIEP forum was to increase awareness of current developments and the future potential of Open Educational Resources. By the conclusion of the forum it also had acted as a catalyst for stimulating collaboration among individuals, institutions and organizations interested in refining and intensifying the OER movement. A desire to assemble communities of common interest and purpose was a clear outcome from the six weeks of intense and productive email dialogue. To this end, various suggestions were advanced, including:

- creation of a broad-based international community on the expanded development and use of OER;

28 In this context 'small states' were defined as having fewer than 4 million people.

8. NEXT STEPS

The immediate next step is to form an international Community of Interest to support ongoing information sharing and an exploration of the most important issues related to the provision and use of open course content, as identified during and at the conclusion of the forum.

A second forum will be held in late 2006 to share and discuss the draft report of a study on OER in tertiary education from the Centre for Educational Research and Innovation (CERI) of the Organisation for Economic Co-operation and Development (OECD).²⁹ The purpose of the study is to map the scale and scope of current OER initiatives, and to address four questions, concerning:

- the development of OER initiatives;
- the development of sustainable cost/benefit models;
- intellectual property rights; and
- improving access to, and the usefulness of, OER.

Following that forum, it is anticipated that an international Community of Practice will be formed to link practitioners from around the world to work together, and to continue sharing information and experience.

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²⁹ This study is also supported by the William and Flora Hewlett Foundation. For more information see Section 3 of this volume.