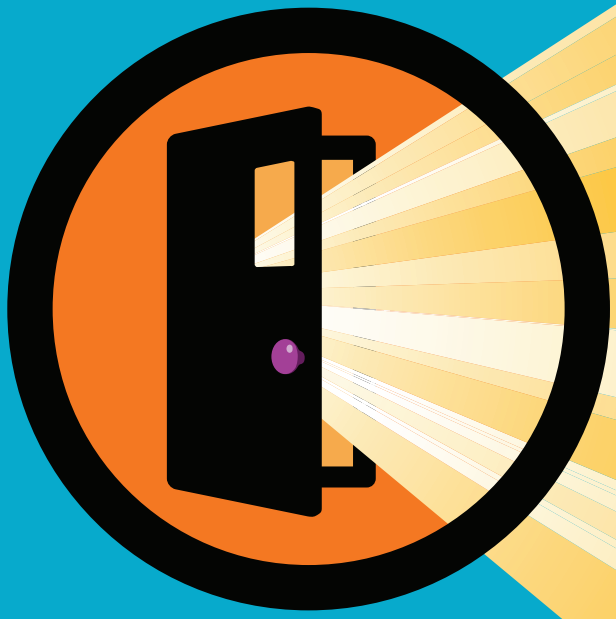

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free to learn

An Open Educational Resources Policy Development Guidebook for Community College Governance Officials

BY HAL PLOTKIN

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Acknowledgements

The author would like to acknowledge those whose help and leadership have been instrumental to the production of this paper. First and foremost are Marshall (Mike) Smith and Catherine (Cathy) Casserly, whose combined vision and tenacity at the William and Flora Hewlett Foundation gave life to the global, fast-growing Open Educational Resources movement. Many years from now, historians will look back at this period as the time when a handful of innovative leaders began to transform education and higher education in particular, from a system that weeded people out to one that lifts people up. The first chapter in that yet to be written history book will be all about Mike and Cathy.

I'm also grateful to the many other inspired and inspiring leaders of the Open Educational Resources movement I have encountered over the years, all of whom share a common sense that ours can and thus must be the first generation that begins to more fully develop all of our shared human capital, not only to be fair to all, but also to maximize our full potential as a human family. The remarkable leaders who occupy the frontlines of this noble and important movement include Hal Abelson, Nicole Allen, Kwasi Asare, Judy Baker, Richard Baraniuk, Martin Bean, Ahrash Bissell, Carl Brown, Steve Carson, Tom Caswell, Karen Cator, Barbara Chow, Lucifer Chu, Susan D'Antoni, Mary Lou Forward, Erhardt Graeff, Cable Green, Melissa Hagemann, Mara Hancock, Barbara Illowsky, Joi Ito, Sally Johnstone, Martha Kanter, Neeru Khosla, W. Joseph King, Vijay Kumar, Larry Lessig, Douglas Levin, Michael Linksvayer, Gary Lopez, Anne Margulies, Gary Matkin, Judy Miner, Lisa Petrides, Carolina Rossini, Richard Rowe, Vikram Savkar, Jim Shelton, Simon Shum, Candice Thiel, Joel Thierstein, Vic Vuchic, Phoenix Wang, David Wiley, and Esther Wojcicki.

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Free to Learn was produced as a result of a grant from The William and Flora Hewlett Foundation. A living version of this document, which you may iteratively improve, can be found at http://wiki.creativecommons.org/Free_to_Learn_Guide

This manuscript was edited by David Kindler (dtkindler.com), who also contributed his original research and reporting. Design by Eileen Wagner of Wagner/Donovan Design (wagnerdonovan.com).

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ABSTRACT

Open Educational Resources (OER) offer higher education governance leaders a cost-efficient method of improving the quality of teaching and learning while at the same time reducing costs imposed on students related to the purchase of expensive commercial textbooks and learning materials. Leading scholars around the world are already participating in the OER movement even without support from most higher education institutions, including community colleges. Higher education governance officials, particularly boards of trustees and senior academic governance leaders, have a tremendous opportunity to harness the advantages of OER for their institutions.

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Introduction

"OER creates an unprecedented opportunity to bring continuously improving, high-quality courses within reach of more community college students, including at schools that might not otherwise be able to offer those courses." *Marshall (Mike) Smith, Visiting Scholar, Carnegie Foundation for the Advancement of Teaching*

Open Educational Resources (OER) are teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits sharing, accessing, repurposing —including for commercial purposes —and collaborating with others. Ripe for future development, OER are already gaining in scope and quality and are supported by an increasingly robust community that includes many of the most distinguished scholars and educators around the globe. Academic policy makers and government officials at all levels, national, state and local, have a unique—and still largely untapped—opportunity to improve learning outcomes, reduce costs, and improve the quality of teaching by making modest additional investments in OER. Doing so will also have significant multiplier effects as the quantity of free, high-quality open learning materials steadily increases and the most relevant materials become easier to find.

A single missing ingredient is preventing the most promising outcomes associated with OER from benefiting a wider audience of students and schools: more active support and leadership from higher education governance officials. Without that leadership involvement the opportunities presented by the still mostly grassroots OER movement will not be effectively harnessed and the OER movement will continue to operate primarily on the periphery of the higher education establishment rather than closer to its core where its impact would be truly transformative.

OER include items such as free textbooks, courses, course materials, streaming audio/video of classroom lectures, tests, software and any other tools, materials or techniques used to transmit knowledge that have an impact on teaching and learning that are freely available for use. But OER are not just free learning materials and resources. OER is also the underlying open, creative, collaborative process itself, one that enables continuous rapid improvements in the quality of both teaching and learning.

"The real promise of OER is not just the free high-quality learning materials and textbooks," says Lisa Petrides, Ph.D., founder of the Institute for the Study of Knowledge Management in Education. "It's the process itself, how the materials are created, used, adapted and improved that creates a whole new set of possibilities."

While OER have been singled out by innovative scholars and some local and national government officials, and possess the potential to support significant improvements in access and success in higher education, remarkably few higher education governance officials are aware of, or are taking institutional advantage of, the usefulness, cost-savings, and quality of these resources. The information and advice in this Guide aims to address that problem and focuses primarily on OER within the context of higher education, and in particular, at community colleges, where their utility is so clearly evident.

The use of OER allows more rapid transfer of high-impact practices in pedagogy while also reducing a growing financial barrier to access in the form of increasingly costly textbooks and other instructional materials, such as password-protected online content. Unlike traditional textbooks, OER are available free online and can be printed, viewed or used on demand. In addition, some innovative newly formed, startup education publishers also release their resources under open licenses that allow for updating, customization, and personalization of content online, making teaching and learning more effective and efficient. Frequently, these resources can be ordered as print-on-demand textbooks or media files, usually at prices far lower than traditional textbooks. OER are particularly useful at educational institutions such as community colleges where students, or the schools themselves, lack the financial resources required to enable the most rapid learning and progress possible.

Early evidence indicates that OER fosters student success. Students who used one of the first high-quality OER ever developed, a math course created by Carnegie Mellon University's Open Learning Initiative, learned more quickly and at much lower costs, according to a carefully conducted double-blind study.[1] In this case, students derived benefit from the inclusion of learning paths that were created by a

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highly skilled team of cognitive scientists in addition to the open nature of the course itself, which brought success within reach of all students at no cost to them.

What's more, rapidly evolving, highly sophisticated collaborative OER production and use methodologies are generating more high-quality OER each day. These materials can be applied to a growing number of courses and course levels. When these materials are further developed and used within an appropriate supportive policy framework they are likely to enable even more rapid and increasingly dramatic, measurable improvements in both the quality and speed of teaching and learning. They also substantially reduce, and in some cases even eliminate entirely, costs for learning materials imposed on students.

The present lack of higher education governance involvement in the OER movement is primarily a generational issue. Despite their many skills and talents, the vast majority of today's higher education governance officials have no experience assisting or supporting the development and use of OER. Typically, many of the most senior officials, including boards of trustees and collegiate foundation development officers, have had little or no exposure to OER, in contrast with their personal involvement in other campus-based activities with which they are more familiar. Despite documented widespread interest among both faculty and students, many senior higher education governance officials may not even know what OER are, or may confuse OER with less useful materials, such as "online textbooks" or, more generally, "stuff you can find on the Internet."

To date, only a handful of higher education boards of trustees, regents and senior academic officers have conducted public hearings, held meetings or offered seminars that focus attention on the institutional opportunities associated with OER, or on how their schools might benefit by participating in the OER movement in a more systematic fashion. This Guide seeks to change that by helping higher education governance officials better understand Open Educational Resources and their benefits to students, faculty and institutions of higher learning. This paper offers an overview of OER, examines the latest developments in the field and explores policy implications for those charged with governing higher education.

Q: What can Higher Education Governance Officials do to take advantage of the tremendous value of OER?

A: The simple answer is to summon the will and enact a governing policy that institutionalizes support for these activities.

1 The Open Learning Initiative: Measuring the Effectiveness of the OLI Statistics Course in Accelerating Student Learning Marsha Lovett, Oded Meyer, and Candace Thille, Carnegie Mellon University, 2008: http://oli.web.cmu.edu/openlearning/files/theinitiative/publications/jime-2008-14.pdf

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A Short History of the OER Movement

If you have not heard of OER before this, you are not alone. The OER movement is only a decade old and has received scant attention in the popular commercial press and media. The movement began in earnest in 2001 after Massachusetts Institute of Technology President Charles Vest announced that MIT would establish a groundbreaking and unprecedented new program, OpenCourseWare, based on a proposal from members of MIT's faculty. The goal of the OpenCourseWare project, Vest explained, was to make all of the learning materials used by MIT's faculty in the school's 1,800 courses available via the Internet where it could be used and repurposed as desired by others without charge.

"OpenCourseWare looks counter-intuitive in a market driven world," Vest observed at the time. "It goes against the grain of current material values. But it really is consistent with what I believe is the best about MIT. It expresses our belief in the way education can be advanced—by constantly widening access to information and by inspiring others to participate."

Inspire others to participate it has. Scholars at more than 250 colleges and universities, a majority of them outside the United States, have joined forces or participated in the OER movement in some manner. In most cases, though, their participation has occurred primarily from the bottom up. Very few educational institutions, particularly in the United States, have devoted meaningful material resources to this effort.

At the same time, hundreds, perhaps thousands of professors, instructors and teachers have already been individually investing in the goal of greater access by rapidly integrating OER into their pedagogy, typically in an ad-hoc fashion and in most cases with little or no support from their parent institutions. Often working after hours without compensation for their efforts, many of the most effective and forward-thinking instructors are already using the Internet, and practices and materials associated with the OER movement, to share lesson plans, course outlines, teaching methods and materials, articles, essays, texts, exams, illustrations, exercises and are even streaming videos of their in-class lectures.

In the process, these instructors have begun to open the doors to higher education wider than ever. They are bringing a diversity of more affordable, high-quality learning experiences within reach of growing numbers of students, many of whom are financially or geographically disadvantaged. In the process, many of these instructors are also discovering new and better ways to teach and cultivate learning as they take a "virtual" look over the shoulders of others who teach the same subjects.

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Why So Little Attention from Higher Education Officials?

Three main factors appear to account for most of the current lack of higher education governance attention to OER: cultural, chronological and systemic.

On the cultural side, OER have not been a part of pre-existing educational practices within the often tradition-bound higher education enterprise; on occasion, the reliance on sound, proven and reliable past practices can sometimes make it difficult for promising new teaching methods to gain momentum. Constrained by past practices, many instructors operate in environments that leave little room for innovations, except at the individual classroom level, and provide even less support for any attempts to expand successful classroom innovations to a larger scale. The brightest and most dazzling teachers can light up a classroom but, unpreserved, that illumination is then usually lost forever, except in the minds and memories of a few fortunate student witnesses.

On the chronological side, it is fair to note that a majority of collegiate board members and senior academic officers holding positions of authority today, those who could lend material support to these activities, assumed those leadership posts well before the relatively recent advent of the opportunities associated with OER. Like many Internet-related skills, knowledge and expertise about OER within higher education institutions today is often inversely proportional to rank. In this case, higher education's foot soldiers, teachers and learners, frequently know much more about OER than the generals who command the system.

Finally, the initial lack of OER that met the requirements of the Americans with Disabilities Act (ADA) and the Federal Rehabilitation Act (FRA) also slowed down adoption of OER by higher education institutions, in particular, public schools such as community colleges that lacked the resources needed to remedy violations of these laws as required when challenged. This systemic obstacle is being removed, however, thanks to more recent efforts focused on the creation and use of OER that meets the requirements of these laws, which in turn permits the use and continuous improvement of these materials within public educational institutions without fear of costly legal challenges related to the rights of disabled students.

Optimum progress, however, depends on more rapid appreciation of OER-related opportunities by collegiate governance officials. Faculty, students and educational institutions will all benefit by developing a shared understanding of the possibilities and promise associated with OER. That shared knowledge will accelerate adoption and creation of new content.

This Guide strives to encourage and enable collegiate governance officials to more rapidly comprehend and capitalize on this dramatic new opportunity to modernize and improve the educational institutions they govern, to better serve faculty and students, and through them to enhance our society, culture and economy, whose future prospects depend largely on the success of our national educational enterprise.

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Improving the Quality of Teaching and Learning through Resource Sharing and Collaboration

In most cases today, the quality of education, when education is available at all, is usually a function of the particular circumstances and conditions in an individual classroom or school. This has sometimes been called the "silo" model of education because educators and learners are often unaware of, or cut off from, better teaching methods and techniques used elsewhere. If a student is fortunate, she may have access to a school and instructors whose curriculum and teaching methods enable the maximum degree of learning in the shortest possible time. The vast majority of eager learners do not have that opportunity. Many do not have access to excellent teachers or the most current and effective learning materials, including texts, videos, illustrations and practice tools. Some may need extra assistance to learn key concepts.

OER address issues of quality and access and enable continuous improvements in teaching and learning as respected higher education institutions create and share a wide variety of high-quality educational resources free of charge. OER enable teachers and learners to access the best educational resources that are available to meet their specific needs. In the process, a new collaborative model that builds cooperating communities of teachers and learners is augmenting the old "silo" model of education.

By drawing on the work of their peers, instructors who take advantage of OER can provide multiple representations of concepts that present a subject from different perspectives and angles. Because these materials are free, students and self-learners can repeat their exposure to different lessons as many times as needed, including lessons about the same subject offered by different instructors, in order to facilitate a deep understanding of the material. OER tools can also be used to form virtual study groups, which accelerate learning. Tests can be used as assessment devices that point students to specific material, including text, lecture presentations and practice tools that fill identified gaps in their knowledge. OER also give instructors access to materials and teaching methods used by others who teach similar classes, prerequisites and higher-level courses, which supports the more rapid transfer of high-impact teaching methods than would otherwise occur. A single course drawing on OER can contain high-quality learning materials developed by dozens of different educators. Conversely, when courses are open, as at MIT, instructors can reference what students are studying in other classes to reinforce the connections and enhance learning.

Instructors, students and self-learners who use OER can replace "flat" educational experiences, where opportunity is a function of what one instructor or school can offer, with a constantly evolving multidimensional educational process brought to life by dynamic teams of subject area experts. Coupled with the transparency it creates, the growth of the OER movement promises to steadily enhance the quality of teaching and learning over time as the material is updated, improved, built upon and adapted for specific user groups.

"The dramatic expansion of OER has created great new opportunities for improving teaching and learning. By providing access for all and contributing to a global commons, OER holds the promise of equalizing the opportunity for learning across the globe," said Marshall (Mike) Smith, Visiting Scholar, Carnegie Foundation for the Advancement of Teaching.

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Ensuring Quality

There are currently two primary methods employed to ensure the quality of OER. The first replicates traditional academic practices by using a carefully vetted, top-down authoring system in which an institution places educational learning resources that carry its brand into an open format for free use, re-mixing or adaptation by others. In this instance, the institutions are responsible for the quality of the materials. The second methodology relies on the same basic procedures used in the open source software community. In this model, an unlimited number of authors collaborate on the creation of OER. Both of these primary OER production methodologies stimulate new forms of knowledge sharing.

The differences between these two approaches reflect a divergence in philosophy between those who believe a centralized and carefully controlled authoring system ensures quality and others who maintain that quality is best enhanced by an open process that invites contributions from as many people as possible. Those who prefer the branded approach, where an institution guarantees quality, contend there is no practical substitute for reliance on known authorities whose credentials are certified. On the other hand, those who prefer the more open OER production methodology maintain that the best way to ensure quality is to share and spread the responsibility for creating and maintaining quality among a greater number of contributors. Those holding this view often cite open source software programmer Eric Raymond's observation, published in *The Cathedral and the Bazaar*, that "…with enough eyes, all [computer programming] bugs are shallow…" The same can be said of shoddy or uneven scholarship or teaching, which endures and sometimes even thrives only when isolated from outside scrutiny. The healthy contest between these two models of OER production and improvement replicates the current division in the global software industry, where both schools of thought—top down and bottom up—have made valuable contributions.

The benefits provided by OER to faculty and students have been documented in two recent studies conducted by researchers at Tufts University and Utah State University, respectively. Tufts' OpenCourseWare site has been available online since June 2005. The site contains 22 courses from six Tufts schools focusing on the health sciences and international affairs. The most popular course materials, according to download logs, include lectures, readings, lecture handouts and syllabi.

Tufts recently conducted an OCW Intercept Survey, a web-based, pop-up survey instrument, which yielded 641 respondents for an 8.9% response rate. Tufts then sent a follow-up web-based survey instrument to volunteers, generating 42 respondents for a 20.3% response rate yielding 28 unique user profiles. Taken together, these user logs and survey data indicate that among users of the site, over half are self-learners, nearly one-fourth have their doctoral degree and just under 20% cite medicine or health sciences and technology as their primary interest. On average, visitors to the Tufts' site spend more than 30 minutes per visit reading and reviewing course materials. Nearly 40% of users download materials during their sessions. Surveyed site users who were faculty members indicate that Tufts OCW positively affects their teaching practices by providing additional teaching materials, by enabling them to integrate Tufts materials into their courses, by increasing their knowledge levels in certain areas and impact how course materials are developed by emphasizing instructional technology. All told, nearly 300,000 unique users accessed the Tufts OCW website within its first 15 months of operation.

Another recent study on the reaction of faculty members participating in the MIT OpenCourseWare (OCW) project, conducted by Preston Parker at Utah State University, yielded a similarly positive review. Parker used three sources of data for his study: (1) five years' worth of archived emails from the instructors at MIT to the school's OCW project administrators that discussed the benefits they had received by participating in the project, (2) the responses from three previous annual instructor surveys, and (3) interviews with the instructors themselves.

Parker notes in an abstract of his findings, "The results show that there are many tangible benefits to MIT instructors participating in MITOCW. They feel they have more recognition academically because their work is out there to be viewed and used. They feel connections have been made with other instructors that may not have if it were not for MITOCW. The instructors were better able to understand what other colleagues were doing.

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These connections have resulted in better publishing opportunities and grant proposal efforts. Instructors also feel that students who sign up for their classes are more prepared for the course. It is also convenient for the instructors to have the materials available and online for current and past students."

In addition, other studies are currently underway to assess the quality of OER vs. traditional commercial educational materials in terms of learning outcomes and student success. The early data from these studies indicates a clear advantage for certain forms of OER. Data and conclusions from these studies will be integrated into future versions of this paper.

The MIT Dilemma: Too Much Information

MIT's bold decision to release vetted, high-quality learning materials for free public use and repurposing led many scholars at other institutions to similar acts of scholastic generosity. This avalanche of learning materials created one of the OER movement's first major problems: the inability of many potential users of these free learning materials to easily and quickly determine which resources best fit their needs, as well as ensuring that the materials of interest to them could be legally used, reproduced or adapted. As a result, despite the increasingly frequent availability of better, cheaper, more robust and dynamic learning materials, the typical college and university instructor continues to rely today, often with little enthusiasm, on conventional commercial learning materials, including old fashioned textbooks, which do not pose similar adoption hurdles.

A number of related efforts are taking root that are aimed at helping higher education instructors overcome the obstacles to the adoption of OER. These companion efforts include the increasing popularity of the public, standardized suite of intellectual property (IP) licenses and tools developed by the non-profit Creative Commons, which can easily be appended to any printed or online document or media. These human-, lawyer-, and machine-readable IP licenses and tools allow scholars, instructors and authors to mark their creative works with the specific freedoms their creator wants it to carry relative to use by others. As such, scholars, instructors and authors can now share their works on clear terms acceptable to them, which range from giving up all rights to the preservation of commercial exclusivity when desired.

Seeking to increase the utility of these materials, some advocates are now organizing OER into repositories, essentially online OER libraries that are often grouped by subject matter or level of instruction. Several teams of skilled and motivated programmers and academic experts are also developing new tools, including software programs and websites, that can be used to collaboratively create OER, assemble discreet OER chunks or modules into more complete and comprehensive works and to more easily publish, as well as print, OER using interoperable formats that make the material more functional. These efforts include formatting the materials so they can be accessed with a variety of digital devices ranging from computers to cell phones to EBook readers, and/or printed in hard copy for those without access to the Internet.

In just the few short years since MIT got this ball rolling, there has been a flood of activity on the OER supply side, as hundreds of thousands of high-quality learning material items have been placed at the disposal of the public for their free use and repurposing. Making sure that faculty and students derive the maximum potential benefit from the availability of these free, high-quality academic resources, particularly at financially hard-pressed public institutions, is the responsibility of higher education governance officials and policy makers.

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Different Types of OER Meet Different Needs

The wide array of Open Educational Resources is creating an entirely new eco-system for higher education. The free, online digital components of this new eco-system that are already available and in growing use range from individual items such as an annotated diagram of an isosceles triangle to entire courses complete with streaming audio/videos of in-class lectures. There are even entirely new types of courses that rely on advances in the cognitive sciences to create individualized learning paths that can better ensure and measure student comprehension.

Individual OER with little or no interlocking pedagogical structure are often called "learning objects." Learning objects can be used individually, or combined in a variety of ways including creating readers and textbooks. Semi-structured OER learning materials, such as encyclopedia and digitized library collections, are often most useful as reference materials.

Highly structured OER, which include textbooks and even complete courses can be used "as-is", modified to fit particular needs or styles of learning, or serve as a model for course updates or new course creation. Because these resources are free and open, they can be combined, adapted, modified and reconfigured as needed and allowed by Creative Commons licenses. The following examples illustrate the complementary nature and utility of different types of OER, all of which are now readily available on the Internet. The examples are presented in the following order:

- **unstructured OER that focuses on a single topic or idea;**
- **OER with more structure, such as materials grouped by subject area; and**
- **fully structured OER, such as complete courses.**

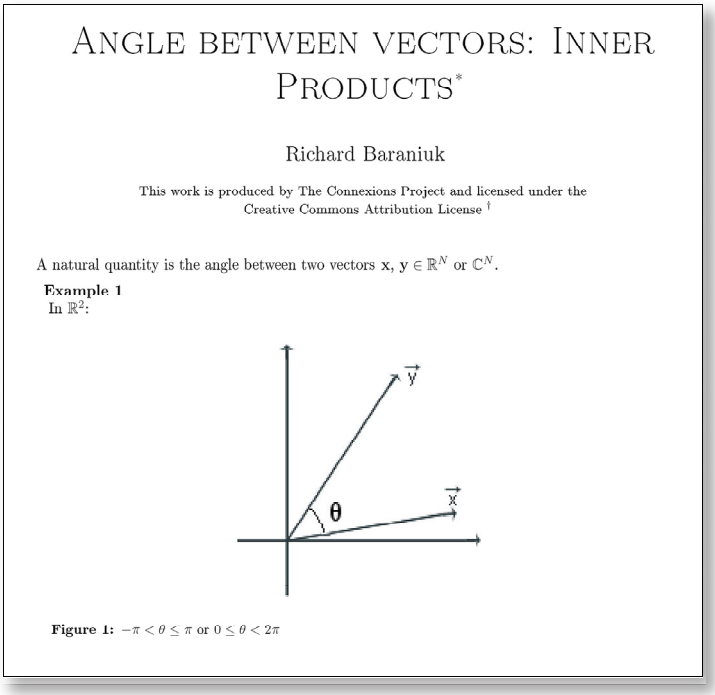
As emerging technologies create new tools and ways of organizing and sharing data, the variety of OER and platforms for delivering them will change as well. Similarly, as students adopt new technologies such as texting, social networking and portable devices, new opportunities for providing OER in familiar formats will develop.

The following representative but not exhaustive list of OER examples provide a snapshot of the increasing depth, quality and versatility of the free, high-quality OER that are now available.

OER LEARNING OBJECTS

Learning objects are "any digital resource that can be reused to support learning."[2] Examples of learning objects include a definition of a word or concept, an illustration, an interactive diagram, a simulation of a chemistry experiment and a wide array of other online tools and exercises that help students understand a particular point or principle.

Learning objects can be thought of as a set of educational raw materials that can be used in different ways. Instructors can integrate learning objects into curriculum, bundle them into courses or use them in combination with other learning objects to create more complete or comprehensive sets of learning materials. Learning objects also help instructors discover different ways to convey information and teach specific concepts or ideas. Students and self-learners can use learning objects to brush up on a topic, find information in formats that fit their individual learning styles or to verify their comprehension of material.



ANGLE BETWEEN VECTORS: INNER PRODUCTS*

Richard Baraniuk

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A natural quantity is the angle between two vectors $\mathbf{x}, \mathbf{y} \in \mathbb{R}^N$ or $\mathbb{C}^N$.

Example 1
In $\mathbb{R}^2$:

Figure 1: $-\pi < \theta \leq \pi$ or $0 \leq \theta < 2\pi$

LEARNING OBJECT - An example of a learning object contributed by Connexions founder Richard Baraniuk.

Richard Baraniuk, "Angle between vectors: Inner Products," Connexions, July 6, 2004, http://cnx.org/content/m12101/1.1/

2. David A. Wiley and Erin K. Edwards, "Online Self-Organizing Social Systems: The Decentralized Future of Online Learning," *Quarterly Review of Distance Education*, vol. 3, no. 1 (2002): 33–46.

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One of the earliest and best-known examples of a learning object repository is Rice University's Connexions, an online "content commons" which currently contains thousands of small chunks of knowledge. Hundreds of more complete sets of learning materials, ranging from textbooks to complete courses, have been built using these materials.

By creating, building and collaboratively using learning objects, Connexions "conveys the interconnected nature of knowledge across different disciplines, courses and curricula, moving away from a centralized, solitary, publishing and learning process to one based on connecting people into global learning communities that share knowledge," says the site's founder, Rice University Professor of Engineering Richard Baraniuk. As of July 2010, Connexions receives between 1 million and 1.6 million visitors per month from most of the world's countries to its site at cnx.org. The variation depends on the academic month of the year. The majority of visitors are students who find the site through Google and other search engines. Connexions recently announced that all of its content is now available in the EPUB format used by most smart phones and e-readers worldwide.

Other examples of learning object repositories include the Institute for the Study of Knowledge Management's (ISKME) OER Commons, MERLOT, the Maricopa Learning Exchange and the SMETE Digital Library Collection, which is supported by the National Science Foundation.

OER DIGITIZED LIBRARY COLLECTIONS

Digitized Library Collections are another fast-growing form of OER. These collections feature reference and source materials that would typically be found in a library, including books, consumer and trade catalogs, magazines, professional journals and other periodicals, posters, photographs and manuscripts. Instructors can integrate these materials into their courses. Students and instructors alike can also use them for research.

Khan Academy represents a unique type of OER collection, educational tutoring videos. Khan Academy founder, Salman Khan began videotaping math tutoring sessions to help younger relatives with their homework. That effort has grown into a library of more than 1,600 individual videos covering the majority of K-12th grade math. CNN reported in August of 2010 that videos from the Khan Academy library are watched on average 70,000 times per day. Bill Gates has spoken publicly about using Khan's videos to tutor his own children. Khan intends to create what he calls, "the world's first free, world-class virtual school where anyone can learn anything—for free."

Similar undertakings include the Public Library of Science (PLoS), which publishes cutting-edge professional journals in the fields of biology and medicine, and the Library of Congress' Serial and Government Publications Division program, which is digitizing 30 million pages from newspapers covering the period from 1836 to 1922. All of these materials are available for free use and repurposing for educational and other purposes.

TITLE: Women employees performing various jobs from the Women in the Workforce collection

Contributing Institution: The Bancroft Library. University of California, Berkeley

From Calisphere http://www.oac.cdlib.org/ark:/13030/tf1s2006wc/

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OER ENCYCLOPEDIA

Encyclopedias are reference materials that contain authoritative definitions and/or descriptions of a variety of topics, which are usually presented in alphabetical order. Educators, students and self-learners use encyclopedias to conduct research and verify information. The best known and most widely used open encyclopedia, Wikipedia, currently features more than 16 million articles in more than 270 languages (3.4 million in English). The entries in Wikipedia, which are generally but not universally reliable, are created and maintained by teams of volunteer experts who police entries on the site and remove erroneous material in a consensus-driven process. By contrast, the open and free Stanford University Encyclopedia of Philosophy relies on invited subject area experts to create entries, which are then peer-reviewed before being placed online.

OER ONLINE ARCHIVES

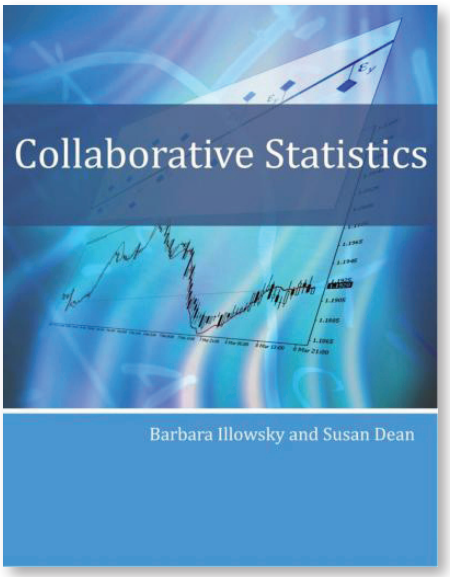
Online archives are collections of material available in a digital format. In most cases, these searchable archives provide no services other than storing and enabling the retrieval of the digitized material, including snapshots of the content on different websites at different times. Online archives are an example of a useful supplement to OER even in cases where they may be owned or controlled by proprietary vendors. Online archives can also include copies of materials that were published by websites that are no longer in operation, as well as digital versions of audio and video recordings. Instructors, students and self-learners use these materials for research purposes and can integrate them into formal or informal educational programs.

The Internet Archive (www.archive.org) presently offers the most complete set of free online archives available. It contains thousands of study guides, course lectures and other academic resources, more than one million texts, audio recordings, live music recordings and tens of thousands of images, including movies, videos and animations as well as a "wayback machine" that displays the contents of websites which have been changed, deleted or which are no longer in operation, many of which carry intellectual property licenses that allow the free use of their content by others. The Alexandria Archive, which focuses primarily on archeology, is an example of a more subject specific OER archive.

OPEN TEXTBOOKS

Open textbooks can be traditional textbooks that have been made available online or new works created by talented faculty who wish to share their knowledge. One of the most successful open textbooks is "Collaborative Statistics" written by Barbara Illowsky, a faculty member at De Anza Community College in Cupertino, California and Susan Dean. In use for more than 15 years, the authors worked with partners to buy the rights from the publisher to make it openly accessible.

The Community College Open Textbook Collaborative, a leading force in the field, describes the requirements of an open text book as: free, or very nearly free; easy to use, get and pass around; editable so instructors can customize content; printable; and accessible so it works with adaptive technologies that serve the needs of disabled students, including those with learning disabilities. The Collaborative website now links to more than 545 open textbooks, as well as peer reviews of nearly 100 of these books, and has obtained accessibility assessments on many.



Collaborative Statistics by Barbara Illowsky, Ph.D., Susan Dean

http://cnx.org/content/col10522/latest/

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OER COURSEWARE

Courseware are instructional materials used to teach a specific course. Examples include lecture notes, texts, reading lists, course assignments, syllabi, study materials, problem sets, exams, illustrations and, in some cases, streaming videos of in-class lectures. The free distribution of courseware enables instructors to see how colleagues in the same discipline structure and teach similar courses.

Instructors exposed to courseware can improve their teaching and learning outcomes by examining the sequence in which material is presented, the resources and techniques used to convey information and the tools used to assess learning outcomes. Courseware gives new teachers a set of educational blueprints they can use to build their own courses and to improve their pedagogy. Students can use courseware to augment their education. Other learners, including workers seeking to keep their skills and knowledge up-to-date, can use courseware to guide their studies.

MIT's pioneering OpenCourseWare (OCW) project was the first major effort by an American academic institution to release courseware as OER. The effort now involves all 32 of the school's academic departments. "Through MITOCW, educators and students everywhere can benefit from the academic activities of our faculty and join a global learning community in which knowledge and ideas are shared openly and freely for the benefit of all," MIT's current President, Susan Hockfield, said in 1996. The site had generated more than 103 million visits by October 2010 with visitors evenly split between students and educators.

More than 250 universities around the world have joined MIT in releasing the courseware used at their schools for free use by others. Participants include Tufts University, Utah State University, Johns Hopkins University School of Public Health, the Universities of Tokyo and Osaka, France's École Polytechnique, and the Beijing Jiaotong, and Nanjing Universities. Most of these participating undergraduate and graduate schools are also members of the OpenCourseWare Consortium, a U.S.-based non-profit corporation that helps member institutions collaborate to maintain, improve and extend the reach of OER.

OER COURSES

Dozens of high-quality, fully-structured, subject-specific courses are currently available as OER. They encompass a wide range of academic levels and disciplines, including advanced placement, community college and undergraduate college level courses in subjects such as biology, statistics and computer programming. Like traditional bricks and mortar education, most OER courses produced to date have been created by a single instructor.

The Monterey Institute for Technology and Education (MITE) is a leading player in the OER movement. MITE provides more than 35 Advanced Placement, pre-collegiate and collegiate level courses in its growing, media-rich National Repository of Online Courses (NROC) and also offers Hippocampus, a free learning resource designed to augment traditional textbooks.

Now working with dozens of high schools and community colleges, MITE offers member institutions access to their cost-saving NROC courses, with membership fees waived for institutions unable to pay. The NROC currently features free, high-quality courses in math, history, physics, geology and environmental science.

OER COURSES WITH EMBEDDED COGNITIVE SCIENCE TECHNIQUES

At Carnegie Mellon University, OER are developed by teams composed of learning scientists, faculty content experts and software engineers in order to make best use of multidisciplinary knowledge for designing effective open learning environments. Carnegie Mellon's Open Learning Initiative (OLI) courses use intelligent tutoring systems, virtual labs, simulations, and frequent opportunities for assessment and feedback to produce the kind of dynamic, flexible, and responsive OER that fosters robust learning. As learners work through the OLI courses, the OLI system collects data about what students are doing and learning. The system uses that data to give immediate feedback and support to the learners. Instructors using the OLI courses can access timely information on where their students are struggling and what their students are learning so that they can use that information in planning their class time. The OLI development teams use the system-generated student performance data to continuously improve the courses.

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Interview with Mary Lou Forward, OpenCourseWare Consortium

The OpenCourseWare Consortium was created in 2005 by MIT and several other open courseware organizations hoping to create a large body of open educational content that would advance education and empower people around the globe. The Consortium now has 250 members worldwide, with 13,000 courses available. MIT is the largest provider, having put all of its courseware online. The majority of open courseware (OCW) comes from other Consortium members who have offered from 10 to 150 courses each, depending on the size of their institution.

Consortium Executive Director Mary Lou Forward explains that the impetus for offering OCW usually comes from one or two educators at an institution who see knowledge sharing as the basis for education. At first, most institutions resist because providing content for free feels like giving away the farm. "Eventually," Forward says, "school leaders begin to see the marketing value and then produce more and more courses, creating a proof of concept within their institution. Once they start, leaders begin to see the benefits."

Forward believes that transparency, as exhibited by sharing coursework, drives trust, which appeals to students who are increasingly attracted to openness. Specialty courses in particular can attract students to institutions with advanced knowledge of a subject.

There are reservations among smaller, non first-tier universities who worry that their materials might look inferior. "These schools have to remember," says Forward, "that review produces better course materials. They need to release their expectation that a course has to be polished and perfect. Perfect is the enemy of sharing, and openness leads to improvement."

The most explosive growth in OCW adoption has been outside of the United States. In Africa, for instance, most countries have only a few large universities and some technical colleges. OCW allows higher education systems to offer educational outreach opportunities designed to credential knowledge gained, rather than successful completion of a series of courses and processes. Free and widely available OCW materials make it possible to give a much larger group of citizens access to learning without the need to expand facilities. Universities can offer targeted tutoring and a system of assessment to demonstrate that off campus students meet university standards.

OCW allows universities in Africa to assemble knowledge inexpensively and efficiently and allow great numbers of citizens to access it. The community college mandate is very similar. Community colleges often serve those students without a tradition of higher education, older students, or those interested in professions not offered at 4-year institution. Forward believes that the same concepts apply. "You don't have to expand actual physical facilities to expand your enrollment and reach."

"Similarly, the community college focus on teaching and not research means that a lot of cool stuff comes out of them," says Forward. "OER can enable more innovation in teaching by creating a cost effective way for faculty to tap into other people's design and thinking about courses. Faculty do not have to take a sabbatical just to write curriculum. They can design a course in a month and then offer it. OER is a very good way for a community college to expand its offerings."

Forward sees an important role for community colleges as innovators, if a few issues can be addressed. "Faculty need to even more fully embrace OER as a vehicle for improving their teaching, and not think of it as cheating or slacking," she says. "We also need to get to the place where teachers actually get extra credit for developing and improving curriculum."

The other big issue is keeping up with students. "Social networking fads may come and go, but students are not going to stop hacking and pulling information they want from wherever they can find it," says Forward. "Institutions who recognize this and respond will become the most attractive to the best students because they are in tune and represent the future. OCW is one clear signal to students that a school is moving ahead and not trapped in old textbooks and old ways of teaching."

OpenCourseWare Consortium
http://www.ocwconsortium.org/

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Together with community colleges, OLI has launched a new collaborative model of evidence-based OER development and evaluation. The Community College Open Learning Initiative (CC-OLI) brings together teams of faculty subject matter experts from multiple community colleges across the country with OLI to develop, adapt and evaluate four key gatekeeper courses. The target is to increase successful completion rates in the classes using the CC-OLI courses by 25%.

Carnegie Mellon's Open Learning Initiative courses cannot be used in all situations, particularly in public schools where the original version may not meet the requirements of the Americans with Disabilities Act. The OLI team is currently focused on updating the learning environments to comply with ADA requirements. Nevertheless, they do provide an outstanding model of the way OER could positively transform and improve teaching and learning.

In most cases, full courses released as OER are complete, standalone products with a specific set of pre-defined learning outcomes. Many institutions of higher education can make better use of these courses today as a way to augment or replace the most common large-lecture format classes. Likewise, students and self-learners can use these courses to deepen or reinforce their knowledge of specific subjects.

ONLINE TOOLS SUPPORT AND EMPOWER THE OER COMMUNITY

In addition to the different types of OER content listed above, there is also a growing set of online tools that are making it easier than ever to find, use, create and distribute OER. These tools can be divided into three categories: Intellectual Property Management, Open Learning Management Systems, and Distribution and Dissemination Services, which include tools that support the development of OER communities.

Intellectual Property Management. Concerns about intellectual property (IP) issues related to copyright were and remain one of the most significant obstacles facing the OER community. Many potential users of OER are reluctant to do so because they fear they may be making unauthorized uses of material that may be copyrighted owned or controlled by others. The mere fact that materials can be found on the Internet does not ensure that they can be used legally or at no cost.

Fortunately, those problems are being very effectively addressed thanks to increasingly popular online tools that streamline the management of IP issues in an OER-friendly way. The most important such tool is developed by Creative Commons, a non-profit organization based in San Francisco, California, which has also created a global network of affiliate organizations to ensure tool validity and adoption worldwide. The Creative Commons website offers a menu of IP licenses that can be electronically appended to intellectual properties free of charge. Creators of intellectual properties such as learning objects, courses, courseware, or lectures can select the IP licensing terms they want to apply to their works from a list on the Creative Commons website, which then generates the requested machine-readable IP license.

At present, the most commonly used Creative Commons licenses grant permission in advance to enable others to use their materials free of charge for at least non-commercial purposes, to adapt the materials as desired, and to provide written credit to the original creators of the materials. Creative Commons licenses have been affixed to hundreds of millions of web pages and other documents. As use of Creative Commons licenses grows, doubts about which learning materials can be legally used and under what terms are rapidly subsiding.

Open Learning Management Systems. Open Learning Management Systems (OLMSs) are a derivative of what are sometimes called Course Management Systems (CMSs) or Virtual Learning Environments (VLEs). These software products typically include systems for publishing, organizing and displaying learning materials online. These systems standardize the presentation of digital or electronic educational materials and streamline the process of creating online or distance learning courses. They provide a ready structure to organize and continually improve OER that is independent of any commercial software vendor.

There are several commercial course management systems currently available. None of these systems has proven to be an ideal match for the requirements of the OER community, which benefits from the maximum degree of flexibility and customizability at the lowest possible cost.

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Nature Publishing Group's Science OER

An important, though rarely discussed, barrier to uptake of OER by colleges is the perception by potential adopters of the unclear provenance of many openly available learning objects. Administrators and faculty who trust the track record of well-known textbook publishing brands can be hesitant to build curriculum around collections of material that are not directly vetted by a clearly designated presiding organization or institution.

Nature Publishing Group, publishers of the highly regarded *Nature* magazine, decided in 2009 to make a sustained effort to overcome this barrier in life and physical science disciplines by publishing its own OER, called Scitable (www.nature.com/scitable). Scitable, which launched with courseware in genetics and is at present expanding across other life and physical sciences, was developed by staff editors at Nature Publishing Group, working in concert with Editorial Boards drawn from teaching and research faculty from a range of U.S. colleges and universities and a carefully vetted team of peer reviewers, scientific writers, illustrators, and media specialists.

Scitable's content, though not currently available under a Creative Commons license, is distributed at no cost to all end users. Costs of development and distribution of the content through the robust Scitable website are partially covered by Nature Publishing Group, as an organizational commitment to the mission of democratizing access to science education, and partially by a number of corporate underwriters, including prominent U.S-based biopharma and technology companies.

As a result of the structured design approach and rigorous peer-review process used in development of the content, as well as the immediate credibility that the association with *Nature* brought to the initiative, Scitable's teaching and learning materials have been highly regarded by science faculty since its launch. More than 15,000 faculty members are currently registered as steady users of the genetics library, with as many as 1,000 using the resources in their courses largely or wholly in place of traditional textbooks. More than 150,000 students download the learning materials in any given month.

The early success of this program highlights the potentially transformative impact that could result from the involvement of major commercial publishers in the OER movement. Although per unit margins for printed versions may decline under this model, volume could explode in a much larger global market.

Scitable by nature EDUCATION

www.nature.com/scitable

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Higher education governance officials who are responsible for approving financial contracts with commercial course management vendors are well advised to seek administrative guidance on possible non-commercial alternatives. Both the community source SAKAI project, the open source Moodle project, and ETUDES, which stands for "Easy to Use Distance Education Software," are providing increasing numbers of higher education institutions with more useful course management systems without the added costs of commercial software.

Distribution and Dissemination. Recently, there has been dramatic progress in developing new online tools that help potential users locate the specific OER that best meets their individual needs. These efforts are still in their formative stages. Nonetheless, some of these "OER-finding" tools are already more useful than general interest search tools. OER-specific search tools have been designed to reduce or eliminate extraneous or irrelevant material, allowing quicker access to learning materials.

Two efforts deserve special mention when it comes to locating OER appropriate for undergraduate work, and particularly community college students: OERcommons.org and Connexions.

OERcommons enables users to find high quality, prescreened OER based on individual search criteria. OERcommons.org has created a single stop location on the Internet where users can search for OER, share evaluations and recommendations about what they find and monitor the availability and use of OER within their specific grade level or subject discipline. The site uses techniques associated with "social networking" to form and nurture peer groups whose shared experiences increase the utility of the site and accelerate learning.

Connexions has an extensive and easily searchable database of small chunks of knowledge, called "modules," and hundreds of complete sets of learning materials including open textbooks and complete courses built using these and other open materials.

Other related efforts include online repositories and portals that contain OER include MERLOT, the Open Content Alliance, DiscoverEd, the Development Gateway Foundation's OER Topic Page and the eGranary Digital Library Project, which brings digital resources to remote communities that lack Internet connections.

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Interview with OER Pioneer: Catherine Casserly

Cathy Casserly has supported and helped to guide the field of Open Educational Resources since its inception. As director of the Open Educational Resources Initiative at The William and Flora Hewlett Foundation, she guided more than $100 million in support to increasing the efficiency and effectiveness of knowledge sharing worldwide. She has been instrumental in encouraging many fledgling organizations in the sector, and sits on the boards of Startl and Creative Commons. Casserly is currently Vice President, Innovation and Open Networks | Senior Partner at the Carnegie Foundation for the Advancement of Teaching where she is working on a new developmental mathematics pathway for community colleges and leading Carnegie's involvement in OER.

Q: How would you describe the current state of the Open Educational Resources field?
A: It is amazing how the OER field has grown from an experiment to a worldwide movement in just over a decade. What once seemed like an absurd idea to many—freely sharing knowledge so that others can reuse, repurpose and redistribute it—is beginning to seem intuitive to larger numbers of people and institutions.

We are in a transitional stage between the point when early adopters made their commitment to OER and when we accomplish acceptance by what Everett Rogers referred to as the "early majority." In the next several years, it is easy to imagine OER making that full transition from a movement on the fringe to a sector fully embraced by the educational mainstream.

There is good evidence that this transition is well underway. While initially seeded by The William and Flora Hewlett Foundation, the field is now supported by many, including The Bill & Melinda Gates Foundation, Open Society Institute, Shuttleworth Foundation, Wikimedia Foundation, UNESCO and the U.S. Department of Education. Education Secretary Duncan and President Obama are now speaking about the value of OER in relation to their initiatives on increasing college graduation rates. The field of OER is clearly going to be a significant component of the educational future.

Q: What challenges does the OER movement face in completing that transition and becoming more widespread and mainstream?
A: There are several significant challenges ahead. First, the field must learn how to balance the rapidly growing organic system that encourages the free flow of information with the norms of accountability and quality required for widespread adoption and institutional acceptance. There are issues related to supplying content to meet increasing demand. For now, increasing access to existing mainstream content is a short-term solution, but in the long term, the capacity to create new OER content must increase.

Policy can accelerate or impede the adoption, and creation, of OER. We have seen recent success by OER advocates in encouraging the use of open licenses for all publicly funded material. There must also be some policy shift to create incentives for faculty and teachers to contribute openly–licensed courses and materials. With respect to research, a better understanding and demonstration of how OER improves the efficacy of teaching and learning is needed to advance adoption and use.

Lastly, the field needs greater understanding of the revenue generating models that can be built around OER while ensuring the widest distribution without impeding quality. Moving to scale will require collaboration with commercial educational content providers and college bookstore managers, as well as with public and private funding sources that can support maintenance and updating of these resources and supporting technologies.

Q: What are some of the promising developments on the horizon?
A: While there are too many to mention, it is hard to ignore the attention that the Federal government is beginning to pay to OER and its role in advancing college graduation rates. Several states have also made huge moves that point toward the future. One example is the recent policy decision by the Washington State Board for Community & Technical Colleges requiring open licensing on all publicly funded materials. There is also significant work going on in California to provide K-12 open source textbooks that is exciting because of the level of support from the Governor.

The most encouraging news is not related to any single initiative, but the way thousands of smaller initiatives like NextGen Learning, 20 Million Minds, Peer 2 Peer University (P2PU) and Khan Academy are springing up to organize, reuse, repurpose and develop new content. In the true nature of OER, the spirit of innovation and desire to share knowledge is distributed across the country and throughout the world.

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Open Course Library

The community college general education curriculum is remarkably similar across institutions, states and even countries. There also appears to be a high degree of correlation as to which are the most highly enrolled courses. These similarities beg the question of why there is not a shared and constantly improving curriculum openly available to all community colleges.

The organizers of the Open Course Library believe that there should be and are actively working across state and international lines to build one.

According to Cable Green, Director of eLearning & Open Education for the Washington State Board for Community & Technical Colleges, "We were trying to figure out how our system could join the global open education movement with a substantive project. We ended up partnering with the Bill and Melinda Gates Foundation and the Washington State Legislature to build a modular and openly licensed (Creative Commons CC BY license) general education curriculum. We are starting with an initial 44 courses which we plan to have ready fall 2011, and then to add an additional 37 for a total of 81 courses in the library," added Green. "If our primary goal as a public higher education community is to provide a quality education for the largest number of learners, then we are going to have to take advantage of OER and move away from a 'not invented here' mindset to a 'proudly borrowed from' point of view."

The open course library project caught the attention of multiple states and countries who offer the same highest enrolled general curriculum. A consortium of international post-secondary institutions is currently collecting enrollments from systems, states, and countries to determine its top common, highest enrolled 50 courses. They will be mapping that list against all existing open textbooks and open courseware to identify gaps in coverage.

Green explains, "We are building a matrix that shows, for example, the millions of global enrollments in Psychology 101, and links to all of the Psychology 101 open textbooks and open courseware. Where there are gaps in the open courseware / textbook matrix (e.g., we collectively can't find a high quality "Psychology 101" textbook), we will collectively submit a grant for private and/or public funding to create and maintain the needed content and openly license it so anyone can use and modify it freely."

"There is a big incentive for state legislatures, who regularly spend millions on student financial aid that is used to purchase expensive textbooks, to invest in creating openly licensed textbooks and curriculum that students can use for free and that other colleges will constantly add to and improve," continues Green.

"The most important thing about OER isn't that it is less costly, though it is, but that it encourages and gives educators legal permission to take content and make it better," says Green. "That is how we can actually achieve continuous improvement in the quality and currency of instructional materials, student achievement, and meet the increasing global demand for a post-secondary education."

Open Course Library Wiki: http://opencourselibrary.wikispaces.com

Open Course Library Social Networking: http://opencourselibrary.ning.com

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Moving OER into the Educational Mainstream: Challenges and Opportunities

The initial progress in creating OER content has generated a large pool of accessible high-quality learning materials and successfully demonstrated new models of knowledge sharing. Two major challenges and opportunities remain. The first revolves around the need to sustain the ongoing production and release of OER by the instructors and institutions currently producing these materials, as well as encouraging similar contributions by others. This may involve building and improving tools that make the OER production process more efficient, and developing strategies that encourage the wider educational community to participate.

The second is accelerating adaptations of OER for specific applications and groups of learners. To achieve widespread adoption, OER materials must continue becoming more useful in a greater variety of educational contexts. Progress in both of these areas is essential in order to move OER into the mainstream of the global education system. Advances here will encourage the creation of additional high-quality OER content, which will stimulate more use and still greater demand.

Despite dramatic recent progress, the production and use of OER is still not recognized as integral to the operations of most educational institutions, including many with active OER programs. Instead, scholars at a handful of academic institutions have created the majority of the certifiably high-quality OER that presently exists, relying on substantial outside philanthropic support.

In a similar vein, only a tiny fraction of scholars, teachers and instructors in the United States and elsewhere currently receive any incentives, compensation or tangible rewards from the schools that employ them to produce, adapt, use or improve OER. In fact, faculty participation in the promising new world of OER can in some cases limit their ability to obtain institutional recognition or promotions linked to more traditional activities valued in promotion and tenure review processes, such as commercial publication of their work.

Nonetheless, educators who produce OER typically do so to make a positive difference in the world or to create learning materials for their own purposes, which they then share. Often, instructors use their own time, resources, technology and equipment. This type of faculty dedication and service to students should be honored and rewarded by the institutions where it occurs or, at a minimum, be considered in faculty tenure and promotion on the same basis as participation in more traditional for-profit publishing pursuits. Unfortunately, at most higher education institutions selfless work by faculty members who produce OER is more typically ignored by the deans and department heads that should, for the greater good, be rewarding and encouraging this work.

The OER movement will not reach the critical mass required to achieve its full potential without increased support from existing educational institutions, including through conventional budgeting and collegiate philanthropic channels. The governance policy in support of OER enacted by the Foothill-De Anza Community College District Governing Board of Trustees, which appears later in this document, is one model for addressing this need.

Incentives that encourage faculty to develop and share OER adaptations would also be useful. That may include providing faculty release time for their production, positive consideration of these activities during tenure review and promotion processes, and the cultivation of institutional cultures that elevate the professional stature of contributors to the OER movement.

Institutional support would be especially beneficial in developing digitized collections of academic materials whose copyrights have expired, including textbooks, the creation of more interactive learning tools and increased support for the creation and release of additional multimedia learning resources including, most notably, videos of in-class lectures, presentations and demonstrations. Early evidence indicates that video is a highly preferred OER delivery method. The OER field would benefit greatly from the creation of additional raw video material (i.e. authoritative footage) as well as related recommendation engines and more robust techniques for archiving, retrieval and the affordable and cost-efficient distribution of high bandwidth video files without degradation as use increases.

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Interview with Judy Baker Ph.D., Community College Consortium for Open Educational Resources

"Failing to support faculty who are developing innovative teaching and using innovative content ensures that nothing but traditional methods will flourish. In a cost-conscious and rapidly changing educational environment, failing to embrace low-cost open content and support innovative teaching is the surest path to obsolescence." *Dr. Judy Baker, Dean of Foothill College Global Access*

The Community College Consortium for Open Educational Resources (CCCOER) was created at Foothill-De Anza Community College District to develop and promote the use of OER in community college courses. It is as a joint effort with the OER Center for California, and the League for Innovation in the Community College.

CCCOER has grown both domestically and internationally since its founding in 2007, with more than 200 community colleges as members. With grants from The William and Flora Hewlett Foundation, the CCCOER launched the Community College Open Textbook Collaborative a year later to identify and inspire the use of peer-reviewed, accessible, and culturally-relevant open textbooks targeted for use by community college students and faculty.

Working together to raise awareness of alternatives to expensive, commercially developed and published textbooks on campus, CCCOER and the Collaborative are developing and disseminating sustainable models to promote creation and use of open textbooks within a robust web-based participatory learning community of pioneering faculty, students, and academic partners. The Collaborative website now links to more than 545 open textbooks as well as peer reviews of nearly 100 of these books, and has obtained accessibility assessments on many.

Dr. Judy Baker, Dean of Foothill College Global Access, is well aware of the opportunities for increasing adoption of OER, as well as the areas where improvement is needed. She is excited about how open licensing for educational content provides a means for people to share, remix and improve the content, and for faculty to take greater control over localizing the content and making it relevant. In her words, "OER and open textbooks are a catalyst for faculty to regain ownership over the curriculum they teach."

Regaining this control and providing fresh educational experiences is critical to the future of community colleges, Baker believes. "In the same way that newspapers and the music industry slumbered while the times changed, the community college world is faced with a direct challenge," says Baker. "At a time when you can just download the instruction that you want, why do students need an expensive college experience when all they need is the content?"

In tough financial times, this dynamic becomes more severe. "Many students can't afford the luxury of college and textbooks," continues Baker. Institutions that recognize this can create a less-costly student experience by using free OER known as open textbooks. In just one community college course, CCCOER estimates that open textbooks save De Anza College students more than $70,000 in textbook costs each quarter. "Community colleges that advocate for lowering the cost to students for textbooks are increasing access to higher education," she adds.

The Higher Education Opportunity Act has also made an impact. Campus bookstores are now required to publish the price and ISBN number for all textbooks for courses. This disclosure creates knowledge of actual textbook costs. Once students learn costs of textbooks for a course, they can choose a particular professor based on the actual cost of taking their class. "We are developing a good relationship with campus bookstore managers. They are actively trying to get in front of OER, instead of being like newspapers and becoming the victims," Baker adds. "They know that less expensive and free course materials are coming and they are looking to participate in that transition rather than disappear."

(Cont. pg. 20)

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(Cont. from pg. 19)

There are challenges. Since institutions do not save anything, the price incentive is most attractive to students. Teachers can be reluctant to change from a publisher's textbook, not only because they are convinced it is best for their students, but also because textbooks are the easiest option and because every change requires extra labor and, what's more, they'll no longer receive a free instructor copy.

The biggest threat to the widespread adoption of OER, however, might actually be faculty promotion committees. "The people who serve on those committees are entrenched in using standard textbooks," says Baker. "They are judging new faculty who are using innovative content and concluding that they aren't doing it right because they are doing it differently." According to Baker, Boards of Higher Education need to take a stand in support of OER and taking risks in faculty tenure decisions.

"Failing to support faculty who are developing innovative teaching and using innovative content ensures that nothing but traditional methods will flourish," concludes Baker. "In a cost-conscious and rapidly changing educational environment, failing to embrace low-cost open content and support innovative teaching is the surest path to obsolescence."

Community College Consortium on Open Educational Resources - http://oerconsortium.org/

Community College Open Textbook Collaborative – http://collegeopentextbooks.org

Open Educational Resources Center for California – http://grou.ps/oercenter

There is also an ongoing need to test, develop and refine new types of public and private partnerships between the OER community and commercial entities in the area of content creation that enable both groups to achieve their goals while respecting their differing requirements in terms of openness and profitability. An early example currently in development by a commercial firm involves the creation of an advertiser-supported search tool for OER video. Likewise, an innovative and fast-growing new academic publisher, Flat World Knowledge, Inc., is experimenting with hybrid approaches that make learning materials available free online and charge for printed versions while sharing revenues with authors more generously than previous industry practices.

The OER movement also needs better, more timely and cost-efficient methods to convey information about quality and course-level applicability to end-users of OER, including derivative OER. These methods may include recommendation engines, search systems augmented with quality-related components, open learner and educator surveys, automated quality assessment tools, certifications by discipline-specific professional societies and organizations, new types of OER-oriented social networking systems and other strategies yet to be identified. At the same time, there is also a need to further develop, refine and streamline the two primary methods of creating OER—top-down and bottom-up—to better ensure the quality of the materials and increase the pace of their production.

The two most common methods of ensuring the quality of OER mentioned previously have ardent champions. One, epitomized by MIT's OpenCourseWare and Carnegie Mellon University's Open Learning Initiative, relies on a centralized system that puts control and responsibility for the quality of the materials in the hands of known academic experts. Rice University's Connexions project and the open, online encyclopedia Wikipedia demonstrate the other primary method of ensuring quality, which involves the creation of self-regulating, volunteer contributors who are responsible for the quality and reliability of the content.

Both of these approaches have advantages and disadvantages. The bottom-up, grassroots method of ensuring the quality of OER is typically less costly and produces material more quickly, but quality can be random and inconsistent. The top-down centralized model produces material that is generally of

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very high quality but does so more slowly and at considerably higher cost. Over time, the best results are likely to be produced in the fast-evolving continuum that draws on the strengths of each of these models.

Professional and learned societies and subject-specific scholarly organizations may also have an important role to play in assessing and certifying the quality of OER in the future. Currently, a handful of professional societies, including the National Science Teachers Association, are beginning to take on this role. As the production and use of OER continues to grow it seems likely the materials will have an impact on developments within individual fields of study that may compel more of these organizations to get involved. Developing strategies that more swiftly integrate professional and learned societies and subject-specific scholarly organizations into OER quality control procedures is another area where progress can be made. This is also true for groups involved in monitoring and maintaining the quality of instruction in community colleges.

Open Licensing in Washington State

The Washington State Board for Community & Technical Colleges (SBCTC) recently adopted an open licensing policy for all of the competitive grants they administer.

The policy states, "All digital software, educational resources and knowledge produced through competitive grants, offered through and/or managed by the SBCTC, will carry a Creative Commons Attribution License." This policy will allow Washington community colleges to realize the educational impact from the substantial investments the state, the federal government, and foundations have made (and will continue to make) in digital educational resources.

According to Cable Green, Director of eLearning & Open Education for SBCTC, "Our new open policy is a direct result of a strategic technology planning process begun several years ago to get all 34 Washington community and technical colleges on common technology platforms." When Open Educational Resources (OER) and open licensing came up as part of that conversation, it made perfect sense. "We looked at the global OER movement and said: we can share our digital content on our shared technology platforms. Further, we will cultivate the culture and practice of using and contributing to open educational resources."

"It became clear that our highest enrolled courses were not our, or anybody else's, competitive advantage," continued Green. "Most community and technical colleges teach the same high enrollment courses. Instead, we decided to find ways to share our most common courses within our system and with the world, so we are not spending precious resources recreating the wheel."

"Our system's success was to adopt a new policy that will make a big difference, and to make that change structural," notes Green. "Our new open policy will simply become part of our boilerplate grant template. By opening up digital educational materials created with public and private dollars, we are making the most of those investments. And because openly licensed content can be reviewed and modified by others, open resources have the potential to get better over time."

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OPEN EDUCATIONAL RESOURCES CASE STUDY:

The Foothill-De Anza Community College District

When the Governing Board of Trustees at Foothill-De Anza Community College District (FHDA) began actively pursuing the enactment of a formal OER policy in the spring of 2004, their first official step was to invite faculty and staff involvement in the development of the policy. Aware of likely concerns among faculty and the limited understanding of OER and its potential impact in the classroom, supporters took steps to answer basic questions and to stimulate an open and welcoming conversation on the topic.

To address concerns among faculty, faculty groups were repeatedly reassured that they would not lose rights to their publications and that using OER was optional. The new policy that was eventually developed strongly encourages the adoption of OER to increase access to education for all students, but does not mandate its use. (Please see Q&A with Former Foothill-De Anza Chancellor Dr. Martha J. Kanter on page 23 for a more complete description of this particular policy development process.)

This combination of openness to new ideas and administrative willingness to address concerns as frequently and immediately as they arose led to a policy that was universally endorsed by faculty, staff and student groups prior to its approval by the board in late 2005. The Policy on Public Domain Learning Materials, the first of its kind in the nation, provided the foundation for much of the related progress and activity that has followed, including FHDA's now system-wide national leadership of the OER movement with community colleges.

FHDA's policy instructs senior college administrators to look for ways to encourage faculty members to organize and use open content in place of commercial textbooks. The policy leaves the specifics about implementation strategies in the hands of academic administrators, but requires annual progress reports be made to FHDA's board.

The package of incentives and related programs to accomplish the objectives outlined by this policy continue to evolve, but they already include professional development time for faculty so they can find, organize or prepare OER, awards and recognition for the best sets of open learning materials, and tutorials that help faculty members identify useful openly licensed resources in their fields.

The overall goal of FHDA's policy was to foster the cultivation of open learning materials suitable for use by community college students: materials that could continue to evolve and whose existence created collaborations between instructors who teach the same subjects. One expectation was that as these materials matured, the quality of teaching and learning would improve and fewer students would be held back because they could not afford to pay for necessary instructional materials or textbooks. Likewise, FHDA also worked to ensure that professors and academic leaders who organized these materials got the credit and recognition they deserved for being skillful stewards of the best and most useful sets of open learning materials in their fields.

Editors Note about use of the term "public domain:"
The following materials demonstrate how the governing board at one community college district successfully engaged its campus community in the OER movement. Some of the language in the following section is outdated as it reflects the dominant terminology regarding free and openly available materials at the time these documents were produced during this particular policy development process, which began informally in 2003, with the development of a frequently-asked-questions (FAQ) document (see page 26). The field has subsequently moved away from the term "public domain" in favor of terms such as "open," "openly-licensed" and "OER." "Public domain" refers more narrowly to materials which have no copyright restrictions. Within the OER space there are now numerous ways that materials can be made freely available, with the use of standardized Creative Commons intellectual property licenses now the predominant such mechanism.

HOW DID FOOTHILL-DE ANZA TAKE A LEAD IN OER?

Step 1 Board of Trustees Indicated Interest
Step 2 Administrator's Surveyed Faculty
Step 3 Faculty Concerns and Champions Identified
Step 4. Board Policy Negotiated with Faculty
Step 5 Board Enacts Policy with Full Faculty Support
Step 6 Quality of Teaching and Learning Improves as Costs to Students Shrink

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ONE POLICY MAKER'S PERSPECTIVE

Conversation with Dr. Martha J. Kanter Chancellor of the Foothill-De Anza Community College District (2003 to 2009).

At Foothill-De Anza, Dr. Martha J. Kanter, and her colleague, Dr. Judy Miner, then Vice President of Instruction at De-Anza College worked closely with the 7-member Board of Trustees, which includes two student members, to develop Board Policy 6141: Public Domain Learning Materials. Board Policy 6141 was the first community college board policy in the nation to promote the creation and use of Open Educational Resources. The Policy statement was unanimously approved by Foothill-De Anza's Board of Trustees, with full faculty support, on December 6, 2004.

THIS Q&A DESCRIBES THE DEVELOPMENT AND PASSAGE OF THAT POLICY.

Question:
How did you react when your board of trustees passed its policy supporting the use of Open Educational Resources (OER)?

Answer:
I was thrilled to acknowledge unanimous board approval to mark the passage of the first community college OER policy in the United States. Our goal was to develop a policy that would inspire our faculty and staff to create and use open educational resources to benefit community college students, the 44,000 students served at Foothill College and De Anza College as well as thousands of others across California and our nation. I remembered that, more than a decade earlier, when I was a young college president in the early 1990s, De Anza prepared a proposal submitted to a foundation to leverage cable television as an open educational resource for delivering college classes worldwide to help students learn English as a Second Language. This was before the Internet—the dark ages! We didn't call it OER back then. We couldn't get funding for it. But it was the same basic idea—to use technology to encourage the creativity of our faculty in new ways to increase student learning and success. As a result, how could I not put my energies into realizing the potential of such a policy?

Question:
You urged your board not to immediately adopt the policy on public domain learning materials which they were considering at the suggestion of one interested trustee. Instead, you asked the board to delay that process for a few months while you used something you called an "inquiry-based research strategy" to refine and improve the policy before it was finally approved with support from all campus constituencies. How did that work?

Answer:
The way we applied inquiry-based research in this case was by asking our institutional research director Bob Barr and his staff at our colleges to help us engage our faculty on the subject. They designed the first "public domain survey" that was distributed to our full and part-time faculty in order to gauge faculty interest in and knowledge about OER. We wanted to know if we could begin with a cadre of faculty who were already highly engaged, what the barriers were and how they viewed creating and/or using OER in their classes. We also wanted to assess if any were already using or producing OER and to initiate a broad campus-wide discussion. It was also a way for us to identify the champions, the early adopters—the faculty leaders who were interested in such a policy and its implementation.

Question:
Was there anything that surprised you in the results of that survey?

Answer:
Oh, yes. Two things. First, the large number of faculty who were already using or who had already developed OER was a big surprise. The numbers were much higher than expected. One hundred and nineteen faculty returned our survey. We learned that 80% were interested in using OER in their classes and 31% were already doing so. We identified faculty across many academic disciplines (e.g., math, language arts, visual arts, history, chemistry, etc.) that were already using or had already developed OER materials for their students. Second, the concern for quality was evident.

The survey also reported that many faculty thought it would be difficult to organize good high-quality public domain learning materials in their fields, but it was clear that many were interested and wanted to learn more. Our goal was to

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discuss the findings widely and begin a public conversation about how to create and use sustainable OER academic resources for our students. We also wanted to investigate ways to incorporate the discussion of OER into professional growth opportunities for faculty and staff.

Question:
Measuring and then making public the level of faculty interest in OER helped get the policy passed. Did you learn anything else from that process?

Answer:
We learned that faculty were very interested in understanding the growing field of OER and how they could appropriately use it for teaching and learning. They raised concerns about quality, ownership, and related intellectual property issues as well as ways to locate OER content in their disciplines.

We learned that pathways to creating and using OER are not easily available; there wasn't much information about training or reliable OER repositories and experts. We uncovered a great deal of interest and that was encouraging. That's why we decided to create some clear pathways for faculty and staff. For example, Foothill College's dean of Global Access, Dr. Judy Baker, created an "open" (free) professional development course to help faculty learn about, find and use OER.

We must encourage and support faculty to explore and use OER for their classes. Toward this end, we prepared a state budget change proposal to support OER development and use, and asked one of our distinguished state legislators, Assembly Member Ira Ruskin, to author what became Assembly Bill 2261 for this purpose.

Question:
There has been no real faculty opposition to the policy on public domain learning materials at Foothill-De Anza. To what do you attribute that?

Answer:
We were very clear to stress that faculty determine what learning materials they wanted to use and that they were invited to participate. We were not interested in coercing faculty; we explicitly used the word "encourage" in our board policy. As a result, we were working collaboratively with our academic senates and our faculty union to ensure that the creation and use of OER is complimentary with the traditional rights and responsibilities of our faculty in determining the best content and pedagogies for our students.

Our inquiry-based research approach helped us identify how we could support faculty in ways that would be welcomed by them. Our goal was to identify and help the champions, just as we did in every other academic area that was important, not to expect that everyone becomes a champion, but to find those who had that interest, those who might already be using OER, and support them as leads in their departments, divisions, campus wide and at the state and national level as some of them are now doing.

Question:
What advice would you give to chancellors and college presidents who might be interested in generating support for public domain learning materials and open educational resources at their schools?

Answer:
The starting point is the faculty, supported by excited, web-enabled deans and vice presidents. You really have to engage your faculty and find ways to get the OER discussion started. You will find faculty leaders right away. Let them loose to share what they know. Support them to have the conversations, review the draft policies and procedures, share OER sites and curriculum, attend conferences and engage in OER professional development through sabbaticals, growth awards and other available resources. You really have to reach out to your faculty to bring this type of policy to your board of trustees. Learning materials are inherently a faculty issue so it is all about identifying the faculty leaders who want to increase quality and reduce the cost of a college education for their students.

We did two surveys: the 2006 survey of Foothill and De Anza faculty; and a 2007 survey of more than 1,000 faculty from California and selected community colleges in the United States. The findings from both surveys were similar, though in the 2007 survey, more than 90% were interested in creating and using OER in their classes. This can probably be attributed to prominent media attention to the textbook crisis, the leadership of the William and Flora Hewlett Foundation in promoting OER nationally and internationally, and more informed faculty leaders available to discuss its merits and pitfalls.

OER is clearly an area of great faculty interest and excitement. It's about what is happening in their classrooms,

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"OER is clearly an area of great faculty interest and excitement. It's about what is happening in their classrooms, in their courses, with their students. Senior community college administrators have a great opportunity to open the door to this conversation and then to help the faculty champions move the conversation to action." *Dr. Martha J. Kanter Chancellor of the Foothill-De Anza Community College District (2003 to 2009)*

in their courses, with their students. Senior community college administrators have a great opportunity to open the door to this conversation and then to help the faculty champions move the conversation to action.

Question:
What advice would you give to other boards of trustees that want to adopt policies that support public domain learning materials and open educational resources?

Answer:
Having an OER policy is very important. However, you can't create the policy without faculty support. You need the faculty buy-in up-front. Getting a discussion started about the policy is one great way to begin. That's how we started at Foothill-De Anza—with college and district-wide discussions about the policy, what it meant, why it was being proposed and whom it might affect. That discussion led to our faculty survey and to the collaboration responsible for the final language in the policy, which everyone supported. Our faculty senate and union leaders were invited to work on the wording with us as we progressed.

Community college trustees have a responsibility to lead in developing policies for their districts. To do this, they must work through the administrators and faculty, to respect the various roles, but to keep pushing for results. Change never comes easily. You have to be focused and consistent. But as one of my heroes, Eleanor Roosevelt, once said, "The future belongs to those who believe in the beauty of their dreams."

MODEL BOARD POLICY ENACTED DECEMBER 2005
*Foothill-De Anza Community College District Policy on Public Domain Learning Materials**

The Foothill-De Anza Community College District encourages the creation, use, and ongoing maintenance of public domain-based learning materials in accordance with established curriculum standards for educational purposes of the district.*

The goals of this policy are to provide students with high quality learning materials that reside in the public domain to augment and/or replace costly textbooks, to create sustainable academic resources for students, faculty and staff, and to provide opportunities for professional growth of district employees involved in these activities.

The Chancellor will provide periodic reports, not less than annually, to the Board that detail the progress made toward accomplishing the goals delineated by this policy.

**Please see the note on page 22 regarding the use of the term "public domain."*

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FAQs

This FAQ (frequently asked questions) was originally developed by a board member at Foothill-De Anza Community College in 2003 to address faculty questions and concerns at the beginning of the process that led to the 2005 enactment of Foothill-De Anza's groundbreaking governance policy in support of what are now known as "open educational resources." It has been updated and modified slightly from its original form.

While prepared specifically for FHDA's effort to develop a policy, this FAQ offers helpful responses to easily anticipated questions.

What is "Public Domain"?

"Public domain" is a legal phrase that describes intellectual works that are not subject to intellectual property rights. The dawn of the Internet has made it much easier to discover, archive, combine and re-purpose this material. Public domain material includes hundreds of thousands of works whose copyrights have expired or not been renewed, including books, articles, maps, scientific papers, films, plays, songs, etc. Many of literature's best-known works are in the public domain, as are many of the most significant early scientific papers and manuscripts.

For a variety of reasons, authors of intellectual property are also increasingly making their works available to the public free of charge using standardized intellectual property licenses produced by Creative Commons or by placing them directly into the public domain. The best known example of this trend may be the OpenCourseWare program initiated by MIT President Charles Vest that encouraged MIT faculty members to license the material they use in their classes so it can be used by the public at no cost. This includes textbooks and/or their equivalents in some cases, as well as streaming audio/video of class lectures in others. The amount of such academic materials available online has recently exploded, with more being added each day.

What are public domain-based learning materials?

"Public Domain-Based Learning Materials" include materials derived from existing public domain resources. Examples include an introductory geometry textbook, a basic physics textbook, chemistry textbook, and anthologies of great literature, philosophy, dramatic, and/or any other artistic works that are not subject to intellectual property rights. Public domain-based learning materials may or may not also contain other supporting materials, such as related tests, other learning assessment tools and study guides.

What are the permissible uses of public domain materials?

The permissible uses of public domain and openly-licensed materials vary. Public domain materials may be used as desired. As noted above, in some cases the original owners of openly licensed materials have imposed restrictions that permit free personal use but do not allow any commercial uses. In other instances, such as with materials whose copyrights have expired or where commercial rights have been voluntarily given up, there are no restrictions on the reuse and repurposing of the materials.

Many of these innovative educators and authors are using free, standardized intellectual property licenses provided by Creative Commons. These materials are not in the public domain. Instead, the licenses provided by Creative Commons, which are electronically attached to each document, establish the ownership of those materials and enable their authors to define the conditions under which they can be used by others. One of the goals of Creative Commons is to create a commons of intellectual property that is available for everyone to use under pre-defined conditions.

What is Creative Commons?

Creative Commons (http://creativecommons.org) is a 501(c)(3) nonprofit corporation dedicated to making it easier for people to share and build upon the work of others, consistent with the rules of copyright. CC provides free licenses and other legal tools to mark creative work with the freedom the creator wants it to carry. CC licenses are expressed in three different formats. The first is a human-readable deed that simplifies the terms of each license into a few universal icons and non-technical language. The second is the lawyer-readable terms of the license itself, which have been vetted by a global team of legal experts. The final layer is the machine-readable code that enables search and discovery.

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What is the role of faculty in deciding how or when to use or develop public-domain or Creative Commons-licensed learning materials?
Decisions about publishing and textbook selection are and must remain, fundamentally, choices of the faculty. A university or community college district can provide encouragement, training, support and incentives that help faculty members continue to implement whatever learning methodologies they deem best suited to their particular situation. Once successful programs are in place that facilitate the development and use of public domain and Creative Commons-licensed learning materials faculty will gain an additional set of options.

What is the primary goal of this proposed new policy? Is it to reduce the costs of textbooks? To get faculty members to organize freely available public domain materials for use in their classes? To create incentives for faculty to place their own publications into the public domain? To encourage faculty use of Creative Commons licenses? To improve the quality of teaching and learning? Or to encourage new ways of publishing and sharing scholarly work?
All of the above. One overall goal and motivation of this new policy, however, is to reduce the costs of textbooks while maintaining high academic standards. Not every faculty member will want to participate in this activity, nor will every faculty member want to do so in the exact same way. The goal is to create a flexible policy along with a variety of options that will serve the needs of any faculty member who wants to help create or use a new generation of high-quality, low-cost learning materials. Repurposing existing public domain or Creative Commons licensed material is one excellent new way to accomplish this objective, but it is not the only way.

How can the use of public domain and Creative Commons licensed materials reduce the costs imposed on students and at the same time create a new revenue stream for faculty members and for our district?
There are many ways that this could be accomplished. A faculty member or group of faculty members could, for example, make a new public domain-based textbook available online for free use while offering a different printer ready file (one that is formatted properly for printing) for sale at a modest cost, say $5 to $15 a copy. Imagine how many students and schools around the world might be interested in a current, up-to-date high quality college level text in your discipline that costs under $15. Volume sales of these materials to students around the world could generate considerable sums as this new model begins to compete with current proprietary textbook publishing methods.

What sort of incentives do you envision creating for faculty members who might be interested in developing or maintaining public domain-based learning materials as substitutes for costly textbooks?
The Board of Trustees sets policies and goals for our district and usually does not address the specific methods that are used to achieve those goals. That's one reason the participation of faculty members at this stage is so essential. Once our Board of Trustees approves this policy, the Chancellor and her staff will consult with district faculty and staff to develop the specific incentive and support programs needed to accomplish this objective. These incentives might, for example, include sabbatical study to develop public domain materials, reassigned time, grant support or stipend support for involved faculty, technical support in locating, developing and maintaining public domain-based and Creative Commons-licensed online materials, marketing support for those materials once assembled, and any other business services that may be needed. Additional suggestions for workable incentives are welcome and solicited.

How will any revenues derived from the publication of public domain and Creative Commons licensed learning materials be divided between the faculty authors and the district?
In most early cases, faculty members are voluntarily forgoing royalties in the interest of achieving the widest possible circulation of the materials. It's also possible the district may act as a publisher or, alternatively, it may enter into an agreement with a third party to provide those services. In some cases, the district and faculty may need to work out suitable revenue-sharing arrangements that take into account the faculty member's ownership of their own intellectual property while also acknowledging the district's role in supporting the creation, maintenance and distribution of these works. Models to sustain these efforts are needed, along with pilot projects.

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What benefits will a faculty member receive in exchange for sharing — with the district — royalty rights to any public domain or Creative Commons-licensed materials they may organize or produce?
The answer to this question will have to be negotiated over time to the satisfaction of the faculty. Presently, however, no work-for-hire arrangements are contemplated. Faculty will retain full ownership rights over any Creative Commons licensed materials they may produce. Potentially, and if desired, faculty members could enter into annual or multi-year scholarly publishing contracts with the District in exchange for what we hope will be a growing menu of enabling services designed to support the production and distribution of high-quality public domain and Creative Commons-licensed academic learning materials. Faculty members are always free to pursue other publishing avenues. This policy is designed to give faculty members one new option, not take away or preclude any options they currently enjoy.

What happens if a faculty member does not want to participate in the creation or use of public domain-based learning materials?
Absolutely nothing. On the other hand, one way faculty members will distinguish themselves in the future is by becoming known as a steward of the best set of public domain and/or Creative Commons-licensed learning materials in their discipline. As such, faculty members who participate will create new opportunities for their own professional advancement and development and enhance their academic reputations. Faculty members are under no obligation to take advantage of this opportunity.

Will faculty members need to know a lot about technology or computer programming to participate?
No. Ideally, as we proceed, our district will seek or locate the funding it needs to develop technical support services so that interested and involved faculty members can devote their primary attention to the task of identifying and organizing public domain-based materials that are suitable for their subject areas.

Do all academic disciplines lend themselves equally to the production of new public domain or Creative Commons-licensed learning materials?
No. In some disciplines (economics comes to mind) generating useful public domain learning materials will be more difficult than in other areas where there is already a greater abundance of available public domain and Creative Commons licensed resources, such as in the hard sciences (math, chemistry, physics), language arts and creative arts. There is no academic discipline, however, where motivated faculty members would be unable to make a significant new contribution to their fields by organizing and maintaining currently existing public domain and Creative Commons-licensed materials.

What if standard textbooks are really the best materials that can be used to teach my class? What if I am convinced that my students' best interests would not be served by relying on public domain or Creative Commons-licensed materials?
Faculty members should make whatever decisions they feel are in the best interests of their students. One factor that many instructors consider is the cost of the materials they require their students to purchase, which can determine how accessible their class is to the diverse groups served by a community college. At a minimum, it is reasonable to hope that all faculty members will be interested in reviewing current information about the public domain and Creative Commons-based materials available for use in their classes and that this information will be considered when making textbook and learning material selections.

If the movement toward the creation of new public domain and Creative Commons-based learning materials constitutes a new "revolution" in higher education—won't everyone soon be doing it? If so, why should the Foothill-De Anza Community College District bother to get involved? What will make our effort in this area succeed?
Revolutions don't happen all by themselves. They are led. The Foothill-De Anza Community College District has long been a leader in developing new ways to bring high-quality educational opportunities to ever-larger and more diverse segments of our population. This proposed new policy continues that tradition. Like some other previous innovative efforts, it may fail—in which case much will be learned.

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Additionally, scholars at other higher education institutions may, in the end, win the competition to create the best new sets of public domain or Creative Commons-based learning materials suitable for community college students—and create the best new set of support services and conditions that lead to their creation. Either way, though, local residents will benefit directly from any steps our district takes that hasten the development of more affordable, high-quality learning materials. The Foothill-De Anza Community College District's proximity to Silicon Valley also provides significant advantages that make the successful development of next-generation learning materials more likely here than in many other areas.

How will this project get started?
The Board will rely on the Chancellor and her staff to develop a program in consultation with the Academic Senate that advances these goals, which may include a test or pilot effort that involves the most interested faculty members.

Can faculty members at Foothill or De Anza work in teams or with colleagues at other institutions to create these materials (i.e., shared authorship)?
That certainly is one option.

What are the goals in terms of the final cost to end users (that is, students) for these materials?
One overall goal is to reduce the costs currently imposed on students by required textbook purchases. Given the potential economies of scale, it's conceivable that substantial revenues could be generated by high quality, low-cost printable textbook substitutes. Personally, I would expect to see free access to these materials online and the cost per printed volume limited to $15 or less.

Is this an appropriate way to be spending the district's resources during a time of very tight budgets?
In recent months, interest among policy makers and the general public in public domain and Creative Commons-based learning materials has been exploding, in large measure, precisely because of tight education budgets. Many members of the public are asking hard questions about whether public institutions of higher education are using the resources at their disposal in the most efficient ways possible to serve the public interest. That includes taking advantage of new opportunities created by recent advances in technology. One of the ways the Foothill-De Anza Community College District has traditionally won support from the local community is by pioneering new ways to make higher education more accessible and affordable. By enacting a new policy to create incentives for the faculty to use and produce public domain and Creative Commons-based learning materials we will be containing that tradition.

Where will the district come up with the money to do this?
Many leading foundations are now focusing on this area. Top foundation leaders recognize the opportunity they have to fund the creation of a new set of affordable educational resources as a smart long-term investment. Generally speaking, programs of this sort are often preferred over efforts that meet a one-time need. As such, funding to create public domain and Creative Commons-based learning materials is growing rapidly, with most of that money going to the groups, organizations and institutions that are leading the way. Precise funding mechanisms remain to be determined, but the district is likely to pursue a combination of public, private and philanthropic support.

What can I do as a faculty member at Foothill or De Anza to help get this policy enacted?
You can offer your support by suggesting any changes or ideas that may be useful. District trustees will also be more inclined to move forward with this idea once it has received the formal support of the Academic Senate on both campuses.

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Passing a Pro-OER Board Level Policy: Initiating the Higher Education Governance Conversation

The tremendous promise of Open Educational Resources for advancing the mission of higher education is clear. Innovation in teaching and learning based on the use of OER seems certain. The desire of students to seek knowledge from the most accessible and open sources and the most convenient technologies is being demonstrated daily. What actions do higher education governance officials need to take in order to capitalize on these dynamics, safeguard the quality of the education they provide, and preserve the relevance and vitality of their institutions?

The simple answer is to summon the will and enact a governing policy that institutionalizes support for these activities. Despite the many advantages offered by OER, just a handful of colleges and universities in the United States currently have formal policies or programs in place that take advantage of this new opportunity. In short, there is a huge gap between what is and what is possible. This policy gap gives collegiate and university governing boards a unique opportunity to enhance both the reputations and the competitiveness of their schools.

The initial remarkably promising development of OER has taken place with very little support from the higher education policy makers who have formal responsibility for overseeing most colleges and universities in the United States. Higher education policy leaders, boards, chancellors and presidents are typically preoccupied with more traditional academic governance concerns, including the ever-present need for institutional fundraising. The distinguished scholars who are leading the OER movement universally agree they will accomplish much more when increased numbers of higher education policy makers understand and recognize the importance of OER and take the steps necessary to provide more direct and sustained support to faculty who wish to participate in the OER movement, including through established collegiate philanthropic campaigns, few if any of which have ever focused on OER despite its clear relationship to academic success.

Role of Community Colleges

Community Colleges in the United States serve approximately 7 million students each year. Typically, these colleges feature common course offerings. They also face unique challenges related to their need to serve higher education's most diverse student population. As such, these institutions are uniquely positioned among institutions of higher education to both take advantage of OER opportunities and to become pioneers in teaching through the creative use of OER. With growing national interest in increasing access to higher education, there are enormous opportunities for community colleges that expand their reach. Incorporating OER courseware is a relatively inexpensive way for a community college to increase the number of its offerings, continuously improve course offerings, collaborate with other educational institutions at low cost, and enter new educational arenas.

In times of economic hardships, developing a reputation for affordability through the widespread adoption of free and inexpensive OER could also be a tremendous market advantage. In addition, community colleges who commit to supporting and incentivizing the creation of new OER will establish themselves as leaders among their peers and spread their brand name across the educational landscape.

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Conclusion

"The future belongs to those who believe in the beauty of their dreams." *Eleanor Roosevelt*

The OER movement has come a long way in a very short time. Rather quickly, it has developed an impressive and useful collection of free high-quality educational content and supporting open source tools that are beginning to break down longstanding barriers to the access of knowledge around the world. All this has been accomplished in less than a decade with a relatively small amount of financial support, far less than the average large city in the United States spends on education in a single year. Nonetheless, the success and sustainability of the OER movement is by no means assured. Fundamental challenges remain.

The long-term prospect of viability for the OER movement remains where it has always been: firmly in the hands of the education community itself. If OER are integrated into the mainstream of the global education system through the application of supportive higher education governance policies, the movement will continue to grow in ways that create an ever-improving set of high-quality learning resources freely available to all.

On the other hand, this promising young movement could die on the vine if it fails to meet the needs of its intended users in a practical manner. Either way, the outcome will have a profound impact on education, opportunity and the global economy for decades to come. It is difficult to think of any other field that would benefit more in the years ahead from the concerted efforts of enlightened and altruistic educators and governance officials who want to give the next generation the best possible chance to achieve its full potential.

A few short years ago, when Nelson Mandela observed that "education is the most powerful weapon you can use to change the world," he could not possibly have imagined that humanity would soon be in the position to create and build an entirely new, free set of high-quality educational resources that could rapidly be brought within reach of most of the planet. The only remaining question is which institutions will step forward to drive delivery of this promise and, in so doing, distinguish themselves by taking the door that limits access to educational opportunity off its hinges once and for all. Expanding the freedom to learn is the best possible protection of freedom itself.

Hal Plotkin is the former president of the Foothill-De Anza Community College District Governing Board of Trustees.

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An Introduction to Open Educational References

Open Educational Resources come in many shapes and sizes. This partial list of sources introduces the scope of OER and the organizations cultivating its increasingly vital role in opening higher education up to the greatest number of people worldwide.

LEARNING OBJECTS

Learning objects are educational raw materials of varying degrees of complexity that can be used combined with other learning objects to create more complete or comprehensive sets of learning materials.

• Connexions
Run by Rice University, Connexions describes itself as "a place to view and share educational material made of small knowledge chunks called modules that can be organized as courses, books, reports, etc." All content is now available for download as the EPUB file used by most smart phones and e-readers worldwide. http://cnx.org/

• OER Commons
ISKME created OER Commons to build a knowledge base around the use and reuse of open educational resources (OER). As a network for teaching and learning materials, the web site allows social bookmarking, tagging, rating, and reviewing of more than 24,000 items from 120 content providers. http://www.oercommons.org/

• MERLOT
Multimedia Educational Resources for Learning and Online Teaching (MERLOT) is a project of California State University and offers peer reviewed online teaching and learning materials.
http://www.merlot.org/merlot/index.htm

• Maricopa Learning Exchange
A site run by Maricopa Community Colleges for their students, the Learning Exchange offers "ideas, examples, and resources that support student learning."
http://www.mcli.dist.maricopa.edu/mlx/

• SMETE Digital Library Collection
The SMETE collection focuses on resources in applied science and math, engineering, computer science/ information and technology.
http://www.smete.org/smete/

• Open Content Alliance
A collaborative effort building an archive of multilingual digitized text and multimedia material.
http://www.opencontentalliance.org/

• eGranary Digital Library Project
Called the "Internet in a Box," the project provides millions of digital educational resources to institutions lacking adequate Internet access.
http://www.widernet.org/egranary/

DIGITIZED LIBRARY COLLECTIONS RESOURCES

Digitized Library Collections feature reference and source materials that would typically be found in a library that instructors can integrate into their courses.

• Khan Academy
A library of more than 1,600 video tutorials covering most of the K-12 math curriculum and an increasing number of other subjects.
http://www.khanacademy.org/

• Public Library of Science
PLOS is run by a non-profit organization of scientists and physicians working to make the world's medical and scientific literature open and accessible.
http://www.plos.org/

• Library of Congress Newspaper and Current Periodical Reading Room
Chronicling America is a project of the National Digital Newspaper Program, which is a partnership between the National Endowment for the Humanities (NEH) and the Library of Congress (LC). Their website provides access to information about historic newspapers and select digitized newspaper pages.
http://chroniclingamerica.loc.gov/about/

(c) ketabton.com: The Digital Library

OER ENCYCLOPEDIA

OER encyclopedias can be open and edited by volunteers such as Wikipedia, or invited subject area experts such as Stanford's Plato.

• Wikipedia
Wikipedia is the undisputed champion of user-driven collaborative encyclopedias with, according to their website, nearly 78 million visitors monthly, and more than 91,000 active contributors working on more than 16,000,000 articles in more than 270 languages.
www.wikipedia.org

• Encyclopedia of Life
The Encyclopedia of Life aims to become an online reference and database on all 1.9 million species currently known to science with the goal of building a better understanding of life on Earth.
http://www.eol.org/

• Stanford University Encyclopedia of Philosophy
This encyclopedia has both editorial and advisory boards ensuring quality of submissions, potentially qualifying it as a scholarly dynamic reference work.
http://plato.stanford.edu/

OER ONLINE ARCHIVE

Online archives are collections of digital materials. The Internet Archive may be the most extensive, hosting movies, text, audio and a collection of websites.

• Internet Archive
www.archive.org

• The Alexandria Archive Institute
The Alexandria Archive Institutes has created a free, open access resource for the electronic publication of primary field research from archaeology and related disciplines.
www.alexandriaarchive.org

OPEN TEXTBOOKS

Open textbooks are either traditional textbooks that have been made available online or new works created for sharing.

• Community College Open Textbook Collaborative
The CCOTC site has links to more than 545 open textbooks and the open textbook community.
http://collegeopentextbooks.org/

• WikiEducator
WikiEducator has links to free and open textbook sources.
http://wikieducator.org/Free_Textbooks

• On the Horizon – 20 Million Minds
A new initiative promises the professional production of 25 open textbooks, specifically targeting the highest enrolled community college courses. Funded by 20 Million Minds and Maxfield Foundation, the project aims to produce complete textbooks with the same supplemental content as commercially available texts, including teacher editions, assessments and study guides. All content will carry a Creative Commons CC-BY license and be released on an online platform allowing remixing down to individual sentences, as well as print on demand services. Organizers expect the first five textbooks focusing on STEM to be available in early 2012.

OER COURSES

• MITE - National Repository of Online Courses (NROC)
The Monterey Institute for Technology and Education (MITE) is another leading player in the OER movement. Its NROC is a growing library of online course content assessed to meet standards for scholarship, instructional value, and presentational impact.
http://www.montereyinstitute.org/nroc/nroc.html

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OER COURSEWARE

Courseware are instructional materials used to teach a specific course including lecture notes, texts, reading lists, course assignments, syllabi, study materials, problem sets, exams, illustrations and streaming videos of in-class lectures.

• **MIT OpenCourseWare**
MIT OpenCourseWare is the web-based publication of the content of 2000 MIT courses.
http://ocw.mit.edu/index.htm

• **Open Courseware Consortium**
The Open Courseware Consortium is a collaborative effort of more than 250 universities around the world.
http://www.ocwconsortium.org/

• **Open Learning Initiative**
Carnegie Mellon University's Open Learning Initiative courses are more highly developed cognitively-informed courses featuring intuitive tools custom developed for each topic.
http://oli.web.cmu.edu/openlearning/index.php

A similar new CMU initiative specifically for community colleges.
http://oli.web.cmu.edu/openlearning/initiative/research/158

• **National Repository of Online Courses**
The National Repository of Online Courses (NROC) is a library of online course content targeting students and faculty in higher education, high school and Advanced Placement.
http://www.montereyinstitute.org/nroc/

• **Hippocampus**
A project of the Monterey Institute of Technology, Hippocampus provides high-quality multimedia content for high school and college students on general education topics.
http://www.hippocampus.org/

ON THE HORIZON

• **Next Generation Learning**
A new initiative being supported by the Gates and Hewlett Foundations and involving EDUCAUSE, The League for Innovation in the Community Colleges, The International Association for K-12 Online Learning, and the Council of Chief State School Officers (CCSSO) is "seeking to dramatically improve college readiness and college completion in the U.S. through the applied use of technology and digital media."

The Next Generation Learning initiative is focusing on both secondary and post-secondary education and seeking to utilize Open Core Courseware, Web 2.0 approaches, blended learning and learning analytics to "transform learning in America."
http://nextgenlearning.com/

ONLINE TOOLS THAT SUPPORT AND EMPOWER THE OER COMMUNITY

A variety of tools is making it easier than ever to find, use, create and distribute OER

INTELLECTUAL PROPERTY MANAGEMENT

• **Creative Commons**
The Creative Commons website offers a menu of standard IP licenses that offer creators options about how their materials can be used by others. These IP licenses can be electronically appended to intellectual properties free of charge.
http://creativecommons.org/

OPEN LEARNING MANAGEMENT SYSTEMS

• **SAKAI**
SAKAI is an open-source collaboration and courseware management platform that allows institutions to modify the software to meet their own needs.
http://sakaiproject.org/

• **ETUDES**
Based on SAKAI, ETUDES offers turn-key, fully-managed course and learning management solutions and an array or training and support options for higher education institutions

(c) ketabton.com: The Digital Library

• **MOODLE**
Moodle is a free software package used to create online courses and teaching websites.
http://moodle.org/

DISTRIBUTION AND DISSEMINATION
Several OER-specific search tools have been designed to reduce or eliminate extraneous or irrelevant material, allowing quicker access to learning materials.

• **OER Commons**
OERcommons enables users to find high quality, prescreened OER based on individual search criteria.
http://www.oercommons.org/

• **DiscoverEd**
DiscoverEd is a prototype search engine developed by Creative Commons which utilizes distributed curation and structured data to improve search and discovery for educational resources on the web.
http://discovered.labs.creativecommons.org/

HYBRID COMMERCIAL/OER PARTNERSHIPS
A new type of OER being offered by commercial enterprises extends commercial content to include OER produced as stand-alone or supplemental content.

• **Scitable**
Nature Publishing Group, publishers of the highly regarded Nature magazine, decided in 2009 to make a sustained effort to overcome questions about the reliability of free materials found on the Internet in life and physical science disciplines by publishing its own OER, called Scitable.
www.nature.com/scitable

• **Flat World Knowledge**
Flat World Knowledge, Inc. is experimenting with hybrid approaches that make learning materials available free online while charging for printed versions and sharing revenues more generously with authors than previous industry practices.
http://www.flatworldknowledge.com/

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http://wiki.creativecommons.org/Free_to_Learn_Guide

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