



Dramatically Bringing Down the Cost of Education with OER

How Open Education Resources Unlock the Door to Free Learning

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Introduction

We are in the midst of a revolution in education. For the first time in human history we have the tools to enable everyone to attain all the education they desire. And best of all this education is available at almost no cost.

The key to this sea change in learning is open education resources, or OER. OER are educational materials produced by one party that are licensed to be used free of charge by others. OER come in many forms—from curriculum to homework assignment to textbooks. And OER exist for all levels of education, from kindergarten through college.

OER are starting to hit the public consciousness in the form of initiatives like the [Khan Academy](#), MIT [OpenCourseware](#), and Washington's [Open Course Library](#). At the end of January, California lawmakers proposed legislation that would create a digital library of free college textbooks that could save the state's college students millions of dollars each year in education costs.

OER are already being used by learners for self study, by teachers to enhance classroom learning, and by education providers to bring down the cost of instruction. Clearly, open education resources hold some of the answers to maintaining the quality of learning material while significantly reducing the cost of education.

With this brief we seek to provide a substantive understanding of OER and at the same time inform the emerging public debate over their use in public education. It's clear to us that OER must be part of the broader conversation concerning spiraling education costs and the need to make education more accessible and affordable at all levels.

Finally we provide key suggestions for how policymakers can best structure the use of OER. Most immediately, we urge federal, state, and local governments and educational institutions to adopt a simple public policy: “All publicly funded resources are openly licensed resources.”

OER and you

Open educational resources are educational materials—textbooks, research articles, videos, assessments, simulations—that are either licensed under an open copyright license—for example, [Creative Commons](#)—or in the public domain. In both cases you have free (no-cost) access to the OER and free (no-cost) permission to engage in the “4R” activities when using them, including:

- Revise: adapt and improve the OER so it better meets your needs
- Reuse: use the original or your new version of the OER in a wide range of contexts
- Remix: combine or “mashup” the OER with other OER to produce new materials
- Redistribute: make copies and share the original OER or your new version with others

Education at its core is sharing

Education is first and foremost an enterprise of sharing. In fact, sharing is the sole means by which education is effected. If a teacher is not sharing what he or she knows with students, there is no education happening. Those educators who share the most thoroughly with the greatest proportion of their students are the ones we deem most successful. Sharing is a foundation of OER—whether it be the mentored problem-solving approach of Khan Academy or the recent artificial-intelligence class offered free-of-charge online by Stanford professors Sebastian Thrun and Peter Norvig to more than 58,000 students around the world. The goal is to reach as many as possible with quality content.

Leveraging the Internet

The Internet is frequently compared to the printing press, which in turn is frequently compared to the process of writing books by hand. Today the cost of having a 250-page book transcribed by hand is about \$250. The cost of printing that same book with a print-on-demand service is about \$5. The cost of copying an online version of that same book is about \$0.0008. The cost of shipping either the handwritten or printed book is about \$5. The cost of distributing an electronic copy of the book over the Internet, however, is approximately \$0.0007.

Education is a matter of sharing and the open educational resources approach is designed specifically to enable extremely efficient and affordable sharing.

Clearly, the Internet has empowered us to copy and share with efficiency never before known or imagined. Long before the Internet was invented, however, copyright law began regulating these two activities (copying and sharing). Consequently, the Internet was born at a severe disadvantage—preexisting law prevents us from realizing its full potential. And since the invention of the Internet, copyright law has been “strengthened” to further hinder the full exploitation of the Internet’s copying and sharing capabilities.

While existing laws, business models, and outdated educational practices make it difficult for teachers and learners to leverage the full power of the Internet to access high-quality, affordable learning materials, OER can be freely copied and shared (and revised and remixed) without breaking the law.

Recent news coverage of the battle over the Stop Online Piracy Act, or SOPA, demonstrates that leveraging the Internet to public benefit raises complex questions over how individuals who create new content can be appropriately compensated. To be sure, individuals producing content that can be reproduced digitally must have their rights protected. Yet in the case of education—in which many faculty receive public research and practice grants to support their work—so much of the development of content in form of curricula and even in some cases, textbooks, is paid for by taxpayers, we must take care to ensure these resources are available to all.

Presenting the \$5 textbook

According to the nonprofit U.S. Public Interest Research Group, college textbook prices have increased at nearly four times the rate of inflation for all finished goods since 1994. College students spend an average of \$900 per year on textbooks—26 percent of the cost of tuition at a public, four-year university. And this has occurred while tuition and fees at universities have ballooned 130 percent during the same period and middle-class incomes have stagnated.

The cost of textbooks is a significant factor in the cost of higher education growing beyond the reach of more individuals each year. OER present a custom-tailored solution to this problem. Higher education textbook publishers like Flat World Knowledge publish OER textbooks that students can use for free online or purchase in print for less than \$40 (compared to a typical \$175 textbook). Utah recently demonstrated that high school science textbooks based on OER can be aggregated, printed, *and* delivered to thousands of students for a little more than \$5 per book.

Continuous quest for resource improvement

For as long as there have been teachers, teachers have been “supplementing around” problems with textbooks. When teachers can’t find a single textbook that meets their needs, it

Open educational resources allow the full power of the Internet to be brought to bear on education. OER allow exactly what the Internet enables: seamless sharing of educational resources with the world.

Open educational resources provide an immediate, proven way to make education significantly more affordable and accessible for students.

is not uncommon for them to assign two or more textbooks, intending to use only parts of each. Because copyright-protected learning materials are not easily (or legally) revised and remixed, it is unthinkable that teachers might simply start taking books apart in order to assemble exactly what they want and exactly what their students need. As a result, teachers and students are constantly “making do” with suboptimal materials.

The standard process by which a teacher can legally improve a book from a traditional publisher is to submit errata, a list of errors with corrections, and wait 12-to-18 months to see if those changes make it into the next edition. The odds are high, however, that those changes won’t see the light of day since improvements suggested at the local level don’t necessarily translate globally—an example that speaks more clearly to a particular set of students may actually muddy things for students on the other side of the world. Under current copyright law, teachers are essentially powerless to legally improve the materials used in their classroom.

The BOGO conundrum

The “Buy One, Get One” promotion has become a fixture in American marketing. Implied in the special offer is the promise that when you buy one item, like a pizza or t-shirt, you’ll get a second one free. There is, however, a more literal way of interpreting the phrase: When you buy something you should actually get what you paid for.

Imagine paying in advance for a week’s vacation in a cabin by a beautiful lake, only to be charged a second time upon your arrival. You would never stand for such an outrage. Yet that is the situation that state and federal governments often are in when it comes to the purchase of education materials. Taxpayers frequently fund the development of curriculum materials and research through grants made by the National Science Foundation; the Departments of Labor, Education, and Energy; and other government entities. State or federal governments commission the creation of these materials using taxpayer dollars. In other words, when the NSF gives a grant to a university to produce an engineering curriculum, you and I have already paid for it. Why should we be expected to pay a second time before we’re granted access to the thing we’ve paid for once?

What’s worse, if every school district in your state pays to license the curriculum, you’ve now paid for it many times over as each state contains hundreds, if not thousands, of school systems.

Next steps and recommendations

OER gives us the previously unimaginable opportunity to use technology to maintain the quality of instructional materials while significantly cutting educational costs. We

OER provide teachers with free and legal permissions to engage in continuous quality-improvement processes like incremental adaptation and revision, enabling teachers to take ownership and control over their courses and textbooks in a manner not previously possible.

now have the tools to literally enable everyone in the world to attain all the education they desire. More amazingly, the marginal cost of doing so is close to \$0.

It will require, however, that we share the educational resources we produce and that we spend our limited public resources wisely. It will require educators to openly license and share their educational resources and be willing to use others' OER. The academic culture from elementary to higher education must change from "not invented here" to "proudly borrowed from there."

We need to help policy leaders understand the affordability and flexibility of the digital world, and how public investments in educational resources, data, research, and science must be openly licensed and shared for the public to get its full return on investment. Finally, all governments—national, state, county, and local—along with educational institutions must adopt a simple public policy: "Publicly funded resources are openly licensed resources." This means that if public investment helps create an educational resource, then that content is published under an open license.

Because we know how to do this, and it is all but free to do so, we have a moral obligation and ethical responsibility to act.

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NOTE: The ideas in this paper are expanded and discussed at greater depth in "Why Openness in Education?", a chapter in *Game Changers: Education and Information Technologies*, a book published by EDUCAUSE that will be released in summer 2012. The book also includes examples of open educational resources in use in higher education.



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Every taxpayer has a reasonable expectation of access to curriculum materials and research products whose creation their tax dollars supported. All taxpayer-funded educational and research materials should be OER.