
New Models for Educational Materials

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Access Equals Achievement

We at Cengage are proud to support this booklet on access to education by Inside Higher Ed.

Remember sitting in orientation on your first day of school? Chances are, the dean at your institution looked out over the sea of students and asked each of you to turn to the right and then turn to the left; after which you were offered a bleak prediction: one of the students sitting next to you probably wouldn't make it to graduation. Deans across the country, at all different types of schools, repeat this same routine each year on day one, but this performance is more than just a cliché: about half the higher ed students in the U.S. don't complete. That's a somber statistic, and improving it is what drives educators to do what they do every day.

Here at Cengage, the very same commitment drives our work. We know that access to education doesn't end with simply getting into school; it's imperative that students have access—each and every day—to affordable, high-quality solutions and support systems to keep them in school and help them thrive. That's why we're breaking the mold to provide students with choices that remove obstacles. It's clear one size doesn't fit all, so we offer an array of options, enabling each student to find the most effective learning materials. This dedication to affordability, choice and quality compelled us to launch Cengage Unlimited, a subscription that gives students complete access to our vast library of content and technology—that's 22,000 digital learning products across 675 courses—for one price.

Cengage Unlimited is the result of years of innovations that have evolved over time to ensure every student gets what they need—in whatever format they prefer. Our Inclusive Access model provides institutions with a seamless way to lower the cost of learning materials; meanwhile, for those learners who love print, they can find it—for rent or for purchase, in hardcover or loose leaf. And for those devoted to OER, we offer OpenNow, a dependable way to find well-vetted and highly-effective open resources.

Our simple goal is to offer access in any and every way, making the path to (and through) education as frictionless as possible, propelling more students toward graduation...and we're far from finished. Thank you for joining us on the journey to help learners.



Michael Hansen
CEO
Cengage



Introduction

In the not-so-distant past, educational materials for students meant textbooks and maybe lab equipment for science courses. The big choice for students was "new or used?" Long lines at the campus bookstore meant that a new semester was starting.

In the last decade, colleges have seen a revolution in education materials – changing what they were, how they were bought and sold and the business models of the companies that sold them. The articles in this compilation explore some of the changes – in policies and attitudes – at the classroom, campus and industry levels.

Inside Higher Ed will continue to cover these trends. We welcome your reactions to this booklet and your ideas for future coverage.

--The Editors
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News

A selection of articles by *Inside Higher Ed* reporters

Professors and Provosts on Educational Materials

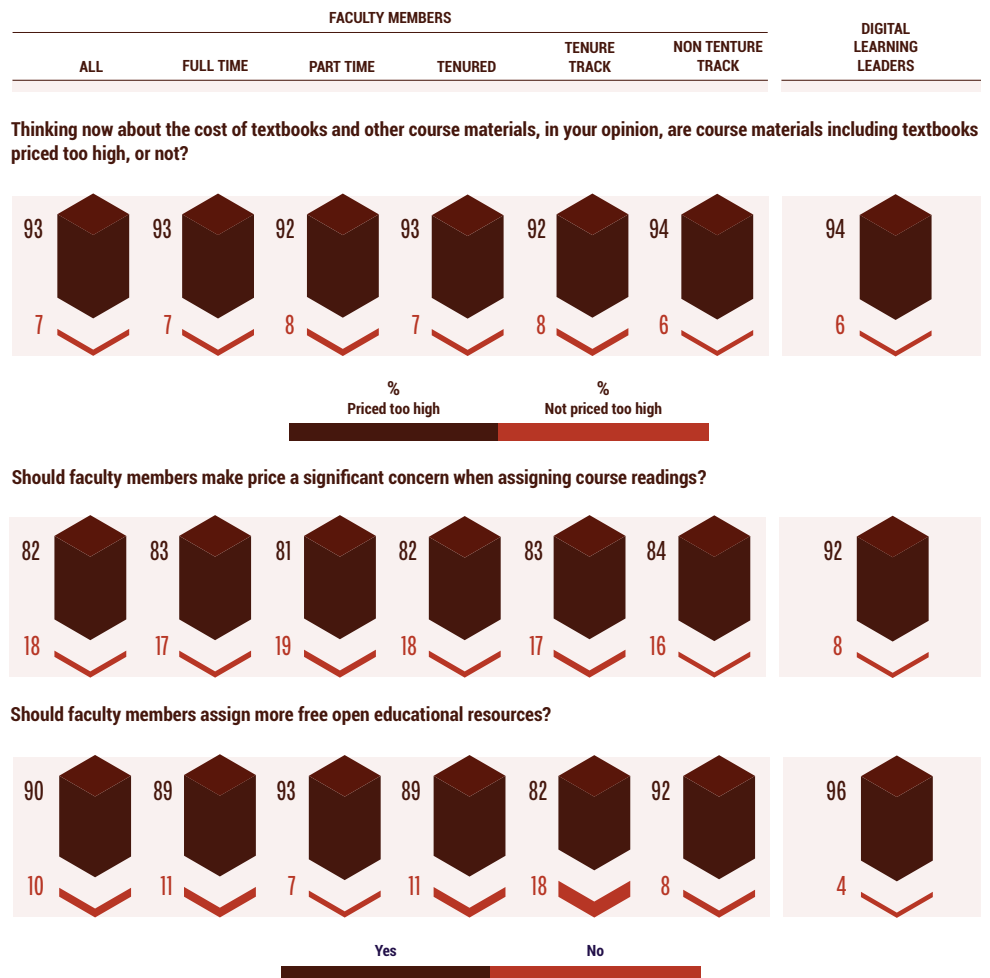
Excerpts from the recent *Inside Higher Ed* / Gallup surveys

Inside Higher Ed conducts annual surveys of faculty members and provosts on key issues, including educational materials and open educational resources. The following are excerpts from articles about the two surveys.

Faculty attitudes:

A third of faculty members said their courses had used digital courseware, software that delivers instructional content that can be customized and adapted to work across different types of learning environments. Seventy percent of those instructors said the courseware they used had “adaptive or personalized learning tools or functionalities.”

Nearly two-thirds of instructors (62 percent) said they were involved in the selection of digital courseware when creating an online or blended class, but most of them appear to be doing so in an ad hoc way.



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Barely a quarter (28 percent) said their institution had a formalized process for evaluating such software, and more said they learn about the effectiveness of such tools from recommendations from colleagues (83 percent) than from any other source, followed by discussions with vendors (52 percent), vendor marketing materials (36 percent) and peer-reviewed academic publications (35 percent).

Faculty respondents overwhelmingly (93 percent) said they believed that course materials were too expensive, that instructors should make price a “significant concern” when assigning course readings (82 percent), and that professors should assign more free open educational resources (90 percent).

Jill Buban, senior director of research and innovation at the Online Learning Consortium, said she was heartened that instructors generally felt like they were able to choose their courseware, rather than it being foisted on them from the “top down.” But more institutions should

probably be creating more formalized processes to ensure that instructors are getting good, accurate information, rather than depending excessively on vendors or the perspectives of individual faculty colleagues.

Provost attitudes:

Increasingly in recent years, colleges have debated whether textbooks are too expensive (many agree) and what to do about it (there is far less consensus).

One issue that angers many students is when professors assign books that they have written, and on which they will earn royalties. Fifty-seven percent of provosts agree that this shouldn't happen. But two-thirds of provosts reported that their colleges permit such arrangements.

Most faculty members, of course, don't write commercial textbooks. But there has been a growing push by many students and some administrators for faculty members to factor in student costs when making choices about educational materials.

Only 35 percent of provosts said that faculty members and institutions should be open to changing choices on materials to save students money, even if the lower-cost options are of lesser quality. The figure was highest in community colleges, where 43 percent of provosts answered that way. At many community colleges, textbook and educational materials make up a larger share of total education costs than is the case at four-year institutions.

When it comes to general education courses, 48 percent of provosts agreed that open education resources are of sufficiently high quality for use there.

In what could be a crucial issue in the years ahead, provosts seem hesitant to take away faculty control on textbook and educational material selection. Asked if the need to help students save money justified some lessening of faculty control over choosing educational materials, 38 percent of provosts agreed, while 41 percent disagreed. ■

Faculty technology survey:

<https://www.insidehighered.com/news/survey/faculty-buy-builds-bit-bit-survey-faculty-attitudes-technology>

Provost survey:

<https://www.insidehighered.com/news/survey/2018-inside-higher-ed-survey-chief-academic-officers>

'Inclusive Access' Takes Off

BY LINDSAY MCKENZIE // NOVEMBER 7, 2017

Hundreds of colleges are signing on to publishers' programs, with apparent savings to students. Some applaud the movement, while others are skeptical.

Major education publishers -- including Pearson, Cengage and McGraw-Hill Education -- report that the number of colleges offering "inclusive-access" programs has grown rapidly in recent years. Where previously students might have been assigned textbooks individually, now many institutions are signing up whole classes of students to automatically receive digital course materials at a discounted rate, rather than purchasing individually. The "inclusive" aspect of the model means that every student has the same materials on the first day of class, with the charge included as part of their tuition.

For publishers with struggling print businesses, the inclusive-access model is a lifeline. Tim Peyton, vice president of strategic partnerships at Pearson, said it was no secret that publishers like Pearson

had made textbooks too expensive and had [seen sales drop](#) as a result. "The print model is really a broken business model for us," he said, adding, "we're thinking about how to move away from print, and move towards digital."

Pearson's inclusive-access business is growing quickly, said Peyton. "Since the beginning of 2016, which is when we launched a repeatable and scalable model around inclusive access, we've signed agreements with over 200 institutions," he said.

Scott Virkler, chief product officer at McGraw-Hill Education, said that the publisher had also seen "significant growth" in inclusive access, with its customer base doubling in the last year. Lori Hales, senior vice president of institutional partnerships at Cengage, said that Cengage, too, has seen [rapid expansion](#)



in this space. The publisher currently works with more than 275 institutions and expects its revenue from inclusive access to double this fiscal year, said Hales.

The growth is not only due to new institutions trying inclusive access, but institutions that already offer inclusive access expanding it to more courses, said Hales. Typically, an institution will start with a pilot in one or two courses before scaling up, she explained. Hales said that at Cengage, which has been

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offering inclusive access for around four years, they are now starting to see some institutions going “all in” on the model, and more “seriously considering” the same.

A Win for Publishers, Discounts for Students

The inclusive-access explosion appears to have been precipitated by a 2015 Department of Education [regulation](#), which enabled institutions to include books and supplies in their tuition or fees. Now instead of buying textbooks with credit cards or cash, students can be automatically charged for course materials by the institution when they enroll. To do this, institutions must give students the option to opt out, and they must have deals with publishers to ensure materials are “available to students below competitive market rates.”

Publishers can offer discounts of up to around 70 percent with inclusive access because their customer share is increasing, explained Peyton. Publishers previously lost a lot of revenue from textbooks because many students bought secondhand, rented, pirated or just skipped buying textbooks altogether. Inclusive-access programs have changed that. Now whole classes are automatically signed up and charged when they enroll in a class, with a typical opt-out period of

around two weeks. “In these models, the institution charges every student that enrolls -- that uptick in volume allows us to lower the price,” said Peyton.

Publishers have moved quickly to diversify their inclusive-access offerings in the past few years. All offer digital versions of textbooks, which are often integrated into learning management systems through partner companies such as [Redshelf](#) or [VitalSource](#). In addition, many publishers are also building

ana University-Purdue University at Indianapolis. She said that her institution, which has inclusive-access agreements with more than 25 publishers, had saved students more than \$2 million this semester alone. Morrone said this figure was calculated by taking the retail price of a textbook, subtracting the cost that students paid for the equivalent etextbook and then dividing the cost saving in half to account for the fact that many students would not have bought the book new.

Many other institutions with established inclusive-access programs, such as the [University of California, Davis](#), also say that they have saved students millions of dollars, offering average savings

of 50 to 70 percent off print retail price of equivalent materials.

For faculty members, a key selling point of the inclusive-access model is that students have all the materials they need ready on the first day of class. Robin Anderson, a lecturer in child and family studies at the University of Tennessee at Knoxville, said she was a fan of the inclusive-access model and used it in all her classes. She took part in a pilot two years ago and said that it wasn't difficult to adjust for her or her students. Students like the convenience of the system, said Anderson, and all have access to the



The growth is not only due to new institutions trying inclusive access, but institutions that already offer inclusive access expanding it to more courses.



new digital course materials from scratch and using their own proprietary platforms to distribute them. With enhanced features, however, come enhanced prices. While these materials are still cheaper than the retail price of equivalent print textbooks, the savings are much less impressive than for typical etextbooks.

The Lure for Institutions

Inclusive access is a simple way for institutions to bring down the cost of college attendance, said Anastacia Morrone, professor of educational philosophy and dean of information technology at Indi-

most up-to-date content, instead of some students having different editions of the same textbook.

A key difference between inclusive access

and buying print textbooks is that students effectively lease the content for the duration of their course, rather than owning the material. If students want to download the content to access it beyond the duration of their course, there is often an additional fee. This model also means that students typically only have access to the material where there is Wi-Fi access, which can occasionally cause problems, such as students not being able to complete assigned in-course assessments or reading. Anderson said that problems like this were rare, though.

The Role of Campus Stores

Campus stores are often the ones driving inclusive-access initiatives, as they receive a cut of the sales. While the profit margins are smaller than for print, inclusive access means that the stores receive revenue from a larger number of customers. Donovan Garcia, course materials manager at the University of Mary Washington, said that lower margins were also mitigated by lower overheads. "We're not purchasing books, we're not paying shipping, we're not having to put any time or effort into returning unused books or paying restocking fees," said Garcia.



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Garcia said that he felt inclusive access was a good deal for students. The institution works primarily with Pearson as its inclusive-access provider, as "they have the titles that we thought would work for us," said Garcia. Typical discounts are 60 percent off print price, he said. The inclusive-access materials for one psychology course cost \$86, versus \$245 for the bundled print package sold previously. Garcia said that currently five courses are offering inclusive access, but the institution is looking to expand and is inviting interested faculty to discuss whether the option would work for them.

Shirley Streeter, assistant director of the University of Tennessee at Knoxville's campus store, Volshop, said typical savings at her institution were around 40-45 percent across 105 courses. Knoxville does not yet have any statistics on whether inclusive access has improved student learning outcomes, but Streeter said anecdotally that faculty members felt that students having materials on the first day of class helped them to progress faster. She added that in-house surveys indicated that students like the program, and that almost all instructors

who piloted inclusive access decided to stick with it.

A spokesperson for the National Association of College Stores said that stores are often best placed in the

institution to lead inclusive-access programs because they have established relationships with faculty, publishers and students. The association shared the results of a soon-to-be-published survey of independent college stores, which found that 23 percent of these stores had inclusive-access programs in place for the 2017-18 academic year, and another 32 percent said they were considering it.

Mike Hale, the vice president of education in North America for VitalSource, and Tim Haitaian, the CFO and co-founder of Redshelf, both said that they had seen many more college stores introducing inclusive access in recent years, both noting, however, that they had seen greater growth at independent -- rather than leased -- college stores. Patrick Maloney, president of Barnes and Noble College, said that many leased stores were offering inclusive access through Barnes and Noble College's program First Day. He said that the number of campuses using First Day had doubled since last year, but did not indicate how many campuses this represents.

Inclusive or Exclusive?

Though inclusive access is be-

coming popular, there are some who criticize the model. Nicole Allen, director of open education for the Scholarly Publishing and Academic Resources Coalition, said that she feels the term “inclusive access” is a misnomer. “It’s the opposite of inclusive, because it is premised on publishers controlling when, where and for how long students have access to their materials, and denying access unless they pay for it,” she said.

Though inclusive access ostensibly solves a crisis created by too-expensive textbooks, Allen said the model replicates many of the same structures that led to high prices in the first place, with little real price competition between vendors. She also questioned whether the savings presented by publishers were genuine, since few students buy books new, and those who do often resell them.

An alternative to inclusive access is open educational resources, which Allen’s organization, SPARC, supports. OER has also seen a “tremendous increase” in popularity over the last few years, said Allen. Unlike inclusive access options, OER is completely free. OER texts can also be downloaded, edited and

adapted by instructors in the way that best suits their teaching approach, as there are no copyright restrictions on the materials.

Unrestricted Choices

Rajiv Jhangiani, university teaching fellow at Kwantlen Polytechnic University in British Columbia and open education adviser at [BCcampus](#), an OER initiative in Canada, said that he had concerns that inclusive access limits students’ choice. He said that many students still prefer using print over digital materials when they are offered at the same price. With OER content, institutions are free to adapt and share content without the need to obtain permissions, and print copies can be made cheaply and without restriction, said Jhangiani. In one of Jhangiani’s psychology courses, for example, students can have a professionally bound 400-page copy of their OER course materials made for just \$13, while the rest of the online content is free. An equivalent print textbook might cost \$150, said Jhangiani.

Academic freedom for faculty using inclusive access is also a concern for Jhangiani. “Limiting faculty to one particular publisher or conglomerate of publishers is certainly an issue,” he said.

Joe Wert, professor of political science and Faculty Senate president at Indiana University Southeast, disagreed, however, that academic freedom was a big issue in inclusive access. “I don’t think it’s the case that some faculty are feeling pressured to adopt these materials,” he said. “At least, I haven’t heard any complaints or concerns from faculty along those lines.”

With OER, Jhangiani said, faculty have complete autonomy over their course materials, as everything can be customized. The quality of OER is also improving, he said. “If you look for OER that is low in quality, you will find it, because anyone can produce OER. But just like with commercial resources, many OER resources have strict criteria for what goes into their repositories,” he said.

“Ultimately, it is up to faculty what kind of content is used in their courses,” said Allen, of SPARC. “I do think it is likely that traditionally published content will continue to be used at colleges and universities, although whether or not it is through inclusive access remains to be seen. Textbook publishers have been through many iterations of models for proprietary digital content -- it is hard to know how long any one will last.” ■

<https://www.insidehighered.com/news/2017/11/07/inclusive-access-takes-model-college-textbook-sales>

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A Big Publisher Embraces OER

BY LINDSAY MCKENZIE // OCTOBER 10, 2017

Cengage will offer open educational resources, curated and adapted to include proprietary assessment tools, from \$25 per student for general education courses.

For years, big-time publishers have been skeptical of open educational resources, questioning their quality and durability. But one of those publishers, Cengage, is today announcing a new product line built around OER.

Cengage predicts that the use of OER -- free, adaptable educational course materials -- could triple over the next five years. In [a report](#) published last year, Cengage said that education and technology companies were ready to “embrace the movement” -- adding their own services and technology to create “value-added digital solutions that help institutions use OER to its best advantage.”

With [OpenNow](#), Cengage is sending its clearest signal yet that it is serious about OER. Taking OER materials freely available online from sites such as [OpenStax](#), Cengage has added its own assessments, content and tech-

nology to the materials, which will be delivered through an “intuitive, outcomes-based” platform that can be integrated into students’ learning management systems. Focusing on general education, OpenNow has launched with courses in psychology, American government and sociology, and more courses in science, economics and the humanities will be available this fall.

The “open” in OER is [commonly understood](#) to mean that content should be openly licensed. Accord-

ingly, Cengage says that all written content in the OpenNow platform, including assessments and some materials that were previously under a Cengage copyright, will be registered under an open CC-BY license so that institutions can adapt and customize the content to meet their own needs.

Though the course content is ready to use “out of the box,” Cengage said that it can offer instructional design team services if desired. The OpenNow platform,



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and all its content, complies with Americans With Disabilities Act regulations.

Cheryl Costantini, vice president of content strategy for Cengage, said that the content in the OpenNow platform would be “available for anyone to use for free outside of our solution.” But for those who want to use the OpenNow platform, fees start at \$25 per student per course. “The \$25 is for the delivery of content that’s aligned to assessment and learning objectives, the additional assessments and videos we either curated or created, and the outcomes-based platform with personalization and analytics,” said Costantini.

The \$25 price point is in line with prices charged by [Lumen Learning](#), which has also developed proprietary OER courseware, and which could be a potential competitor for Cengage. Though obviously more expensive than finding OER content and providing it to students for free, Cengage said that the \$25 price point was still affordable and would ensure access to high-quality materials. The average price point for Cengage’s other digital course-materials products is \$80. Many general education courses have historically required the purchase of books that can easily top \$100.

Asked why Cengage was choosing to move into the OER space now, Michael Hansen, Cengage CEO, said



We’ve seen other publishers dipping their toes in, but this seems as if it is central to Cengage’s strategy.



meet the needs of a changing market. “We respect that some of our customers want to use OER, and it has the potential to change the learning experience,” said Hansen. “OER offers pedagogical flexibility -- instructors can change it, remix it, improve it -- and students can actively contribute to it. This can make learning more engaging and effective. Giving our customers this flexibility, while providing students value, is a positive thing for everyone,” he said.

“Instructors aren’t just looking for affordable content; they want the ownership that comes with OER. But it takes time to find and vet OER content that is current and accurate,” added Costantini. She said that a pilot launched last year by Cengage, which blended OER and proprietary content, had taught the team a lot about working with OER. “We learned how to maintain and sustain this content. And we learned how to improve it and then give it back to the community,” she said.

Richard Baraniuk, the founder of OpenStax -- a nonprofit provider of free, peer-reviewed OER textbooks, which is based at Rice Universi-

ty -- said he supported publishers and companies taking OpenStax content and adapting it. “We actually feel great about it; OpenStax is 100 percent oriented toward helping stu-

dents, so we’re in favor of any product or service that improves student learning and saves students money,” said Baraniuk. Asked if he minded companies making money from OpenStax content, Baraniuk said he didn’t have a problem with companies charging for content they had added value to. He noted that while OpenStax does have several relationships with companies and publishers that provide OpenStax with a revenue stream, there are no legal restrictions on companies wishing to take OER content and build on it.

Phil Hill, the co-publisher of the blog [e-Literate](#) and a partner at [MindWires Consulting](#), said he was not surprised by Cengage’s OER announcement. “If you’ve been paying attention, you’ll know that Cengage has been saying for at least a year that they wanted to get into this space,” he said. Hill says he was surprised, however, at how aggressively Cengage seemed to be promoting OER with this announcement. “We’ve seen other publishers dipping their toes in, but this seems as if it is central to Cengage’s strategy.” He noted that the announcement could cause other publishers

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to accelerate their OER strategies. "The movement is not going away," he said.

While previously OER might have been viewed as a threat to publishers who set high textbook prices, Hill said he thought there had been a shift in publishers' opinion of OER "from threat to opportunity." He noted that many problems faced by traditional publishers -- how to reduce prices, how to enable customers to customize content, how to ensure students have their materials on the first day of class -- were problems that OER can solve. "So why not use OER to solve them?" he asked.

And indeed other major publishers -- such as [Macmillan Learning](#), [Pearson](#) and [McGraw Hill](#) -- have been talking about the benefits of using OER, offering help in doing so

or adding business lines focused on OER.

Hill noted that the timing of the Cengage announcement -- just before the annual Open Education Conference in Anaheim, Calif. -- was interesting. "I think this is going to cause a lot of heads to spin in the OER community," said Hill. "There are some who are antipublisher through and through, and others who don't mind who provides OER, as long as they are following open principles and providing cheaper curriculum to students. It's going to be really interesting to see what the receptivity to this news is at the conference."

Nicole Allen, director of Open Education at the Scholarly Publishing and Academic Resources Coalition, which supports the adoption of OER on campus, agreed that Cengage's

announcement signaled a shift in thinking of big publishers towards OER. "The traditional publishing industry has done a complete 180 on OER," said Allen. While she said it was great that publishers were "getting with the program," she said it was important for consumers to keep asking questions.

"It's one thing to brand something as open, and another thing for it to actually be open," Allen said. "As OER has gained momentum, more and more companies want to attach themselves to the idea of being open. But for each product that's launch-ed, we need to keep asking questions. Is it really open, or is it just being branded as open? Open is not just a set of attributes, it's a set of values and practices that make education better." ■

<https://www.insidehighered.com/news/2017/10/10/cengage-offers-new-oer-based-product-general-education-courses>

A Guide to Good OER Stewardship

BY LINDSAY MCKENZIE // MARCH 5, 2018

Concerned about commercial publishers profiting from open educational resources, a group of advocates wants organizations and individuals that benefit from OER to think about giving back.

Interest in open educational resources -- freely accessible and openly licensed learning materials -- is booming. But while OER's growing popularity with faculty members has delighted supporters, it has also attracted the attention of commercial publishers. Macmillan Learning, Cengage, Pearson and McGraw-Hill have all recently introduced products that incorporate open educational resources into platforms that also include proprietary material.

The development of these products has sparked concern among some OER advocates, who question whether OER that you pay to access is really still open. But publishers say they are adding value by making it easy for faculty members to adopt OER, by helping them find the best content and enhancing it with supplementary materials such as homework and exam questions.

The question of "what makes a good actor or not" in OER is one that Lisa Petrides, founder and CEO of the Institute for the Study of



Knowledge Management in Education, has addressed in a new guide for OER stewardship. ISKME is the organization behind the OER Commons, a public OER library.

The CARE Framework, published today, is co-written by Petrides; Douglas Levin, founder and president of the consultancy firm EdTech Strategies; and C. Edward Watson, chief information officer at the Association of American Colleges and Universities.

The purpose of the framework is to articulate how individuals and organizations that use OER can help the movement grow in a way that is sustainable and "consistent with the community's values."

The CARE Framework encourages good OER stewards to:

- "Contribute" via financial or in-kind contributions to "advance the awareness, improvement, and distribution of OER."
- "Attribute" by making sure that those who create or remix OER are "properly and clearly credited" for their contributions.
- "Release" by ensuring that OER can be shared and used outside the platform in which it was created or delivered.
- "Empower" by striving to make OER meet the needs of all learners, and supporting the participation of diverse voices in OER creation and adoption.

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Watson, one of the authors of the framework, said he hoped these tenets would ensure “the future health and ecology of the OER ecosystem.” Though there are many definitions of OER, Watson said he felt it was “time for an update” that explicitly addressed stewardship, given how quickly OER seems to be becoming part of the mainstream.

The framework isn't a pledge that people can sign up to endorse, said Petrides, but it is something she hopes people will accept as a “set of norms” by which OER users can “hold each other to account.” In the future, Petrides hopes to develop a set of best practices based on the framework, but for now she wants to start a discussion.

Taking an OER textbook, changing the design and then selling it (as Petrides said she has seen some publishers do) is not an example of good OER stewardship, said Petrides. “The license says you can do it, but what has been given back?” she asked.

Though critical of how some publishers are using OER, Petrides says that publishers are “by no means excluded” from the CARE Framework. “We would encourage them to follow the framework,” she said. Petrides wants individuals and organizations that use OER to “sow, as well as harvest.”

Publishers Macmillan Learning and Cengage said they were eager to support the principles laid out in the framework.

Renee Altier, vice president of

institutional strategy at Macmillan Learning, said the publisher is already striving to adhere to the “principles and values of the open education community” with its new Intellus Open Courses OER product, but noted she would like to engage with the authors of the framework to see if there are ways the publisher could improve.

Cheryl Costantini, vice president of content strategy at Cengage, said it too is working to support the OER community by contributing products “that offer pedagogical flexibility and value, in accordance with the CARE Framework,” she said.

David Wiley, chief academic officer at Lumen Learning, a company that provides OER resources and tools, said the CARE Framework does a good job of explaining “how not to be a free rider.”

But Wiley worries the framework could be off-putting to faculty members who are new to OER and not ready to create their own content. “Is it really a problem if someone wants to use OER in their classroom but not become a full-fledged ‘steward of OER’? I certainly don't think so.”

Wiley said that he thinks Lumen Learning, which enhances OER textbooks with personalized learning tools, is already “doing very well” in each area of the CARE Framework, though he acknowledged “there's always room to do better.”

Richard Baraniuk, founder and director of OpenStax, a nonprofit that creates openly licensed, peer-

reviewed textbooks, said that a framework to help guide organizations and individuals on “how to keep the benefits of OER available for the long term” is a good idea. In particular, Baraniuk said he would like to see creators of OER credited in a way that is “ethical and collegial,” adding that “simply burying an attribution link at the bottom of a webpage isn't enough.”

“We're at a pivotal point in higher education where OER has become mainstream, yet there aren't established norms that ensure a sustainable OER movement. To ensure that the entire community benefits from OER for years to come, a framework like CARE should be taken seriously,” said Baraniuk.

Nicole Allen, director of open education at SPARC, a coalition that supports open policies and practices in education and research, said that the CARE Framework was a good starting point for a “really important conversation that the OER community needs to have.”

“It's important for new actors to understand that there are a whole set of values behind OER, beyond free content,” she said. Allen said she was pleased that the framework had addressed the inclusive nature of OER with the “Empower” tenet. “Open education is intrinsically linked with the idea of inclusivity and equity,” she said. “It's about removing barriers and making sure that everyone has the opportunity to participate.” ■

<https://www.insidehighered.com/digital-learning/article/2018/03/05/advocates-develop-framework-stewardship-open-educational>

OER Adoptions on the Rise

LINDSAY MCKENZIE // DECEMBER 19, 2017

The number of faculty members choosing open educational resources over traditional textbooks has nearly doubled in the last year, but awareness over all remains low.

More and more instructors are choosing open educational resources over traditional textbooks, a survey of more than 2,700 faculty members reveals.

The “Opening the Textbook” [survey](#), published by the Babson Survey Research Group today, reports that the number of faculty members at two- and four-year institutions using OER as textbooks has nearly doubled in the last year -- from 5 percent in 2015-16 to 9 percent in 2016-17.

Awareness of OER -- openly licensed and freely accessible teaching and learning materials -- has also increased. Twenty-nine percent of faculty described themselves as “aware” or “very aware” of OER this year, up from 25 percent last year and 20 percent the year before. The proportion that reported they had never heard of OER fell from 66 percent in 2014-15 to 56 percent this year.

But while increases in adoption and awareness have been significant, Jeff Seaman, co-director of the Babson Survey Re-



OpenStax's OER textbooks

search Group, points out that over all, awareness of OER is still low. He noted that many faculty members also continue to report significant barriers to wider adoption of OER, particularly finding and evaluating the quality of materials.

Fifty percent of respondents to the survey said it was too difficult to find the materials they need, and 47 percent said there were not enough resources available for their subject. These issues have been reported as the top barriers to wider adoption of OER for the past three years. Just under 30 percent of

respondents said they were concerned OER materials might not be updated, and around the same proportion reported concerns that OER would not be high quality.

Raising Awareness

Nicole Allen, the director of open education for SPARC, a coalition that supports open policies and practices in education and research, said that over all the results in the survey were promising for OER. “New options are always judged against what has come before,” she said. “OER is new, and any innovation is going to face an uphill bat-

tle. Change doesn't happen overnight."

Allen said it was not surprising that faculty members would report that OER is hard to find compared with more established offerings

from commercial publishers. "A sales rep isn't going to call or mail you the latest OER offering," she said. Allen predicted that librarians would play an increasingly important role in helping faculty members find and evaluate OER content.

Asked why more people hadn't heard of OER, David Wiley, chief academic officer of Lumen Learning, a company that provides OER resources and tools, said that many faculty members were incentivized to publish research rather than adopt pedagogical innovations like OER. "At institutions where faculty are promoted and tenured primarily on their teaching, awareness and adoption of OER seems to be moving faster," he said.

He agreed with Allen that the results of the survey were positive for OER. "More faculty state that they will definitely use OER in the next three years (7 percent) than those who say they are definitely not interested in using OER over the same period (6 percent). The remainder are still persuadable," he said, adding, "these trends all seem to be pointing in the right direction."

OER and Open Licensing

OER materials such as text, me-



At institutions where faculty are promoted and tenured primarily on their teaching, awareness and adoption of OER seems to be moving faster.



dia and other digital assets are openly licensed, meaning that they can be freely shared and modified. OER advocates argue that open licensing offers a big advantage over using copyrighted commercial materials, as instructors are free to customize the content. While the survey found awareness of Creative Commons licensing is increasing, with 47 percent of faculty reporting they are "aware" or "very aware" of the term (up from 38 percent last year), Allen and Wiley acknowledge there is still some way to go to increase understanding of this issue. However, both said they were pleased at the speed at which awareness of OER and Creative Commons licensing is increasing.

Seaman suggested that some faculty members might be using OER textbooks or materials without realizing that they are free to modify the materials. Some 16 percent of faculty members who had assigned digital textbooks to their students said that they did not know how the material was licensed. One anonymous faculty member quoted in the survey remarked, "I may have used OER, but don't know them by that name."

Lynn Nagle, an instructor in education and psychology at Penn State Altoona, said that she believed it was likely some faculty could be using OER content without realizing.

Nagle started using Barnes & Noble Education's OER courseware in fall 2016 and said she found charts and materials included in the courseware, which she had seen before but had not realized were OER. Nagle said she appreciated that Barnes & Noble had "prepackaged" this content, removing any ambiguity and saving her valuable time in finding OER resources, which she described as "a bit obscure."

[Barnes & Noble Education](#), like other companies such as [Cengage](#) and [Knewton](#), has started offering curated OER through its proprietary platform for a per-student fee. Though these offerings are typically cheaper than buying an equivalent commercial textbook, they have been criticized by some OER advocates who say that all OER materials should be accessed for free.

OER Versus Commercial

Cost was found in the survey to be a key driving factor for faculty members when selecting course materials. Faculty members reported that their required textbooks cost an average of \$97, with just 22 percent saying that they were "very satisfied" with the cost. Just over a third of faculty reported that 90

New Models for Educational Materials

percent or more of their students had purchased the required textbook, and 87 percent of faculty reported that cost was “important” or “very important” when making their selection.

Among faculty members who recently chose a new textbook for a large-enrollment introductory-level course, 16.5 percent said they had adopted a textbook from [OpenStax](#), a leading nonprofit provider of OER course materials. Last year, the rate of adoption of OpenStax textbooks was 10.8 percent. The survey suggests that faculty members are now choosing OpenStax textbooks for large-enrollment introductory courses at roughly the same rate as commercial textbooks.

Faculty who did not select an OpenStax textbook for their introductory-level course reported

“With this unprecedented growth, we have a responsibility to take the next step to improve learning, while continuing to increase access for all and preserving choice for faculty.”

an average cost of \$125 for commercial textbooks, whereas those who had selected an OpenStax text reported an average cost of \$31. While print copies of OpenStax textbooks can be ordered for a fee, like most OER, the content can be accessed digitally for free.

The survey noted that adoption of OpenStax textbooks in these courses was primarily among faculty who reported a greater willingness to move away from traditional teaching styles and a higher appreciation for digital materials. “It is unclear if faculty with more traditional approaches, or greater reliance on associated materials, will follow in

also highlighted the need to develop more supplemental materials to attract more faculty members to OER. OpenStax already provides simple PowerPoint slides and test banks, but has also launched OpenStax Hubs as a forum for faculty members to develop and publish additional resources, a resource he expects will “flourish.”

“We’ve crossed the threshold into mainstream,” said Baraniuk, but this doesn’t mean that OpenStax will rest on its laurels. “With this unprecedented growth, we have a responsibility to take the next step to improve learning, while continuing to increase access for all and preserving choice for faculty.” ■

the same numbers,” the survey said.

Richard Baraniuk, founder and director of OpenStax, said that it was clear that OER providers need to make discoverability a priority. He

<https://www.insidehighered.com/news/2017/12/19/more-faculty-members-are-using-oer-survey-finds>



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OER and Affordable –Textbook Labeling Gains Ground

BY MARK LIEBERMAN // DECEMBER 6, 2017

Institutions in several states are now required to label courses with OER and affordable materials. Proponents cheer the move toward transparency, though some challenges remain.

Four states -- California, Oregon, Texas and Washington -- have in recent years passed legislation requiring institutions to add labels in course schedules and online registration systems for courses that use free textbooks or open educational resources (OER). Scattered institutions outside those four states have begun this process as well.

The recently or soon-to-be enacted laws differ in the strength of their requirements; Texas, for instance, established standards for private institutions as well as public ones, and California is requiring labels only for courses that use free content, without a specific requirement for highlighting OER. Proponents of such changes argue that more labeling promotes transparency and gives students with financial constraints easier access to courses that won't require exorbitant textbook fees.

	Gorge Open	This icon signifies courses using alternative textbooks and resources instead of new editions of publisher's textbooks. These instructors either develop original materials or access freely available resources. This helps decrease the burden of textbook costs to students and provides an engaging learning experience.
	Low-Go	This icon signifies courses using used or low-cost textbooks under \$50. These instructors use low-cost books and resources to decrease the burden of textbook costs to students while still providing an engaging learning experience.

COURTESY OF JOHN SCHOPPERT

The courseware label used at Columbia Gorge Community College

Some observers are more critical of the impulse to label courses, though, and implementation issues remain as the practice grows more widespread. Creating a labeling process requires contributions from multiple constituencies on campus, and some faculty members believe the system puts courses with required textbooks at an unfair disadvantage.

Organic Origins

According to Nicole Allen, director of open education for the Scholarly Publishing and Academic Resources Coalition, OER labeling is a natural outgrowth of existing price disclosure practices. In the mid-2000s, for instance, several states passed legislation requiring institutions to mark textbook costs in the course catalog. Now that that practice is

fairly common, “it’s a natural extension to think about how [we can] improve the transparency of students in terms of what kinds of materials are in courses,” Allen said.

OER labeling allows students to make more informed decisions about the cost of their education, and offers transparency to students with limited financial means, Allen says.

Columbia Gorge Community College, in Oregon, was among the first institutions to begin labeling OER courses in registration materials, according to Allen. The idea for the change, according to John Schoppert, the institution’s director of library services, came from a 2014 open education conference at which one of the presenters put an OER icon on the conference program. Schoppert undertook the project, which took “a couple months,” with the institution’s bookstore manager.

“Students have told me coming into the library that they really appreciate that information being in the schedule,” Schoppert said.

Due to some technical challenges, the labels haven’t yet reached the online registration system, but they’re in the course catalog and on printed PDFs of registration offerings. Implementation into the online system is in the works, Schoppert said.

At Tidewater Community College,

“It’s a natural extension to think about how [we can] improve the transparency of students in terms of what kinds of materials are in courses.”

in Virginia -- another early adopter -- labeling became a part of the culture in 2013, at the same time the institution started offering its z-degree program and z-courses, in which students pay zero dollars for textbooks thanks to OER replacing 100 percent of the published course content.

“We don’t have to go in and guess which courses and which sections are z-courses,” said Linda Williams, professor of business administrator at Tidewater’s Chesapeake campus, and the institution’s faculty lead on the labeling project. Labeling also distinguishes student success data between z-courses and regular courses in the institution’s back-end system, Williams said. As a result, comparisons are easier to make, and reveal that students in z-courses persist at a rate 6 percent higher than do students in traditional courses. Williams has also observed early evidence that students in z-courses take slightly more credits per semester -- possibly because they have money left over from their textbook savings.

Washington State, meanwhile, has undergone a trial-and-error process since its law was implemented in 2016, according to Boyoung

Chae, policy associate for the state board’s elearning and open education department. The State Board for Community and Technical Colleges found that its initial “Open Educational Resources” label caused confusion among students and instructors, who didn’t know what the phrase meant or how it was being applied, prompting a statewide survey later that year.

The survey helped the state board clarify the meaning of OER for those using the registration service. It also revealed a need for labeling other types of affordable materials that don’t fall under the OER banner, according to Chae. The state board distributed another survey this fall to gauge students’ “threshold of what is considered low cost for course materials,” Chae said. More than 6,000 students have already participated in the survey, which will conclude later this month.

Implementation Challenges

College bookstores typically manage textbook and course material adoption, which puts them in an important position as coordinator for OER labeling, according to Richard Hershman, vice president of government affairs at the National Association of College Stores. Stores typically solicit information from faculty members through submission forms to make distinctions

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on registration materials.

But the process isn't always that clean, according to Hershman. For instance, label definitions can vary: Does the course require OER only, or a mix of OER and non-OER? Are the courses zero cost or simply affordable compared with typical textbook fees? What constitutes "affordable" and "low cost"?

Because registration typically opens half a year before the semester begins at most institutions, instructors sometimes change their mind about course materials in the intervening time. Publishers can change prices over that period as well. And in some cases, adjunct instructors aren't assigned to courses until a few weeks before the semester, which means their courses might not have been accurately labeled up to that point.

The process can also be more time-consuming at quarter-based institutions, where version changes of textbooks and other materials need to be updated more frequently than at institutions with semester-based schedules.

The prospect of undertaking a

massive labeling process can be intimidating for bookstores, Hershman said.

"They're already heavily burdened. Some have cut back on staff, some have outsourced the course material delivery," Hershman said. "Some of the resources, they don't have as many as they had in the past. It's a question of who's going to assume that role."

The association's underlying concern, according to Hershman, is "making sure that whatever information [is] being provided to students is accurate."

Jeff Seaman, co-director of the Babson Survey Research Group, which surveys faculty members about various technology issues, including the spread of OER, has already heard from faculty members who support these efforts. The one caveat he's observed thus far, though, is that broad awareness of OER, among faculty members and administrators, isn't yet widespread.

Some faculty members have reportedly expressed concern that OER labeling will put courses with-

out OER materials at a disadvantage in the registration process. Williams, on the other hand, said this issue hasn't come up on her campus. She thinks students' course decisions would factor in textbook costs just as much even without labels.

"Literally I have never heard a faculty member approach me or anyone on the team who felt like the fact that these OER courses existed in any way impacted in a negative way their enrollment in their courses," Williams said.

Textbook publishers have largely stayed out of this debate, supporting transparency and acknowledging the concerns over the cost of materials, according to Marisa Bluestone, a spokesperson for the Association of American Publishers.

Observers agree that more course labeling is in the future, even as debates over proper implementation continue.

"Whether this happens through legislative mandates or campuses being transparent, I think we are likely to see more of this," Allen said. ■

<https://www.insidehighered.com/digital-learning/article/2017/12/06/states-mandate-oer-and-affordable-textbook-labeling-challenges>

How Technology Enhances Literature Learning

BY MARK LIEBERMAN // JANUARY 31, 2018

Contrary to reputation, literature classrooms are full of technology possibilities.

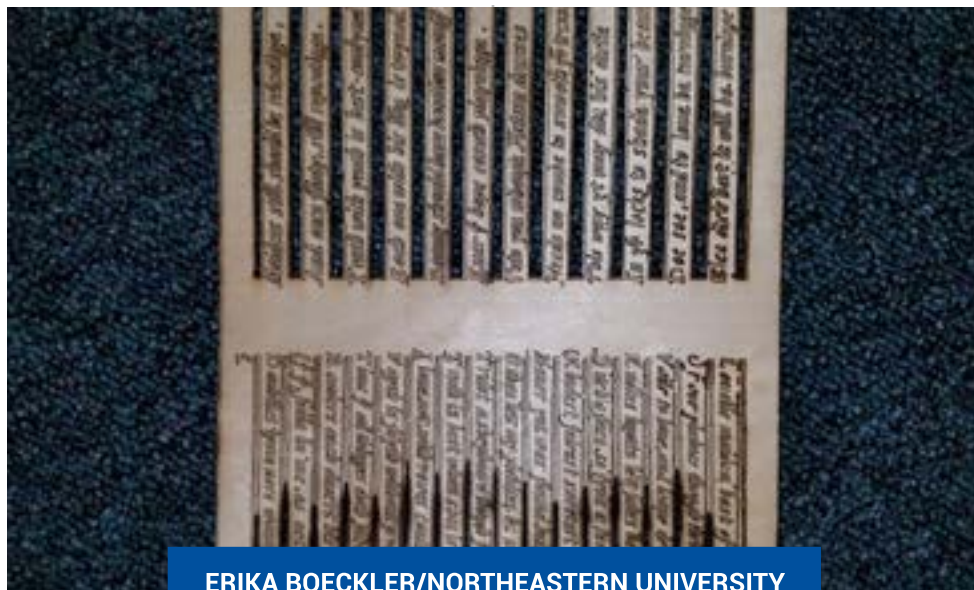
Technology comes up in virtually every discussion about the modern classroom experience. "Inside Digital Learning" wants to show you how it's being applied on the ground.

In our new series, "How Technology Enhances [fill-in-the-blank] Learning," we'll explore innovative uses of digital tools in a given discipline. This time: literature.

Creating Objects to Illuminate Words

Aaron Santesso, a professor of literature at Georgia Institute of Technology, wanted students to think about "the connections between design, production and communication within an aesthetic and historical context." He also hoped to help students break out from established rules of composition and production.

During a course on 17th-century literature he taught last year, Santesso asked students to use lasers -- specifically a device called a Trotec Speedy 300 Laser Cutter -- to create replicas of medallions that



Graduate student Jonathan Fitzgerald in Erika Boeckler's literature courses at Northeastern used 3-D printing to create physical versions of 17th-century poems.

were used during that time period as mass communication devices, celebrating military victories and commencing political careers.

The project offered students the opportunity to incorporate text into the produced object, to reflect on the nature of digital word processing as it differs from more

painstaking forms of letter creation and to work within an established framework of limitations (the size of the object, etc.).

In other classes, 3-D printing can challenge students in similar ways. Erika Boeckler, assistant professor of English at Northeastern University, spurred one of her graduate

students, Jonathan Fitzgerald, to create physical representations of pattern poems. The goal, Boeckler said during a panel earlier this month at the Modern Language Association meeting in New York, is to help students grasp tricky concepts like textual materiality.

The process involved a succession of programs: [SketchUp](#) for drafting the image, [MeshLab](#) for creating a 3-D framework, [Processing](#) for turning the image into a height map and Adobe Photoshop and Illustrator for modifying and creating final images. Fitzgerald said during the MLA panel that the “fits and starts” he experienced helped him understand the poem’s function as much as the final products.

Connecting to a Wider Audience

For generations, students have bemoaned that the hard work that goes into writing essays is for naught, because the final products reach an audience of one.

Nancy Comorau, associate professor of English at Ohio Wesleyan University, asked her students to write a reading guide -- now avail-

able online -- in a particular subject area of interest, such as black British music or queer literary culture. In addition to assembling writing materials and writing for a broad array of readers, students got a basic education in web design and layout.

“I’ve been very happy with the work they’ve done, but the positive I hadn’t quite anticipated was the pride they’d display in their work,” Comorau told “Inside Digital Learning.” “We’ve met during the final exam period to hold a ‘launch party’ for their new site, and they’ve really enjoyed showing off what they’ve built and talking about the choices they made.”

Putting Thoughts Into Action

Digital tools can help students see more traditional learning materials in a new light, as in a course on literature by undocumented immigrants taught by Allison Fagan, associate professor of English at James Madison University in Virginia. Students there often don’t have a well-defined sense of the dynamics at play at the U.S.-Mexico border, and Fagan wanted them to gain a deeper un-

derstanding of the assigned books.

During previous iterations of the course, students used Google Earth to map character journeys. But the tool proved clunky and convoluted. Esri’s Story Maps tool was a better fit, Fagan said, and students used it to make more sophisticated arguments about the impact of a character’s location on their experience. The semester-long project also involved conducting background research into historical events and placing them on the same map, to illustrate the connections between reality and fiction.

By the end of the course, five or six students out of 20 said they had read the book five or six times to ensure they were familiar with nuances that became part of their projects. Fagan said some students struggled at first to adjust to the experimental nature of the assignment, but by the end, they were itching to complete more sophisticated tasks than the program would allow. In future semesters, Fagan might team up with an instructor from a more tech-oriented discipline to capitalize on the students’ interest in digging deeper. ■

<https://www.insidehighered.com/digital-learning/article/2018/01/31/technology-tools-work-literature-classrooms>

When Students Teach Students

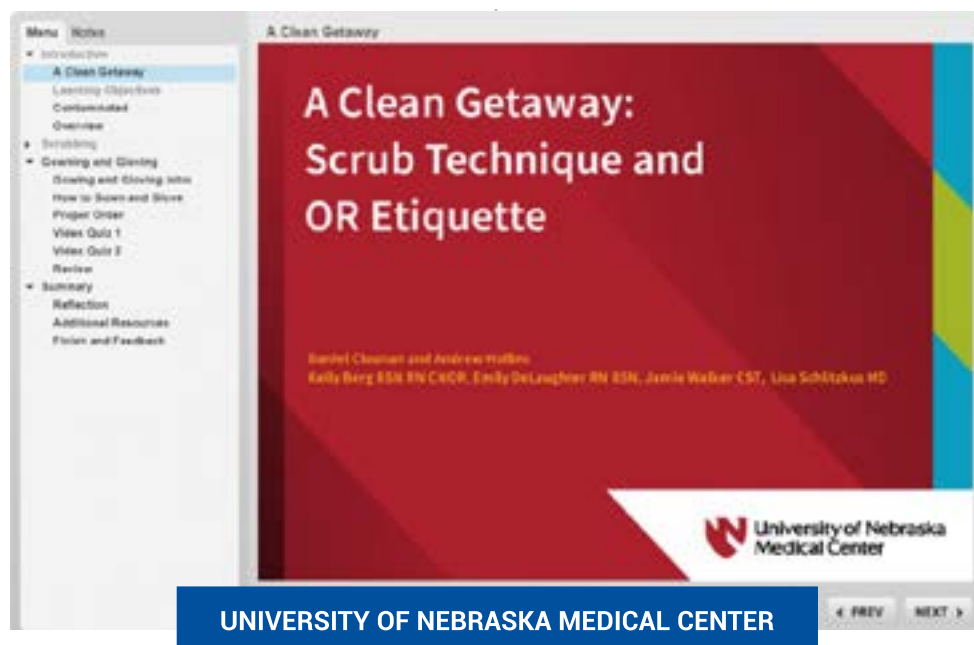
BY MARK LIEBERMAN // JANUARY 24, 2018

Students take the lead on creating elearning modules used in classrooms at a Nebraska medical institution -- and faculty members say the content helps them appeal to students more directly.

Alternative forms of teaching and learning are generally geared toward increasing students' enthusiasm and capacity for absorbing the material. The University of Nebraska Medical Center thinks it's found a way to further that goal: directly involving students in the creation of learning materials.

The institution's E-Learning Program pairs students interested in creating online modules with faculty mentors and instructional designers who guide them through the process. A faculty-only stab at the initiative began in 2013, but eventually it refocused on students, putting them in control of material that ends up in their courses and online as constantly available resources.

"The idea is that some students learn differently," said Linda Sobeski, clinical assistant professor in the institution's College of Pharmacy. "If we can offer them options for learning in different ways, that enhances the student learning experience."



The opening slide of an elearning module created by two UNMC students.

Early Rumbblings

The idea for the initiative first occurred to Dele Davies, the institution's senior vice chancellor for academic affairs, in 2013 during a visit to campus from Richi Desai, a former Khan Academy executive, who discussed his view that students exhibit stronger outcomes when

they're involved in creating course material themselves.

That notion struck Davies as appealing but ambitious. He decided to start a new program with more modest aims: recruiting a couple of faculty members to create a handful of online modules to supplement their courses. The first cohort for

that program was successful and quickly spawned a second. After each cohort, Davies and his team learned more about what works and what doesn't in online

modules -- how much audio to add, when transcripts are essential, how to keep branding consistent among disparate units.

By that point, the program was humming along, but Davies saw a need for evolution. Faculty members said modules took 100 hours or more to create. "Even though we were getting excellent feedback about the actual modules, only a few key people wanted to do it," Davies said.

That's when Davies came back around to the idea of utilizing students. The program's third cohort consisted entirely of students, who were given free rein to create modules in subject areas of their interest. What came back were resources useful for many students that nonetheless strayed considerably from the curriculum.

On the fourth cohort, Davies reached what he sees as a happy medium: students and faculty members team up to create modules, with the former taking an active, or even leading, role.

"[Students] love it," Davies said. "They all felt it helps them understand the work that it takes in teaching, what it takes to create the content." Faculty members, mean-



Even though we were getting excellent feedback about the actual modules, only a few key people wanted to do it.



while, get to work one on one with passionate students and create modules that serve them well in future semesters.

Typical modules last 20 minutes or less and include interactive elements. Key components include learning objectives, new content, quiz questions with instant feedback, and an option to review materials at the end. The narrow subject of each module means that students can pick and choose the ones they really care about, rather than having to wade through dense material they don't need. Many modules fall within the field of anatomy, but they span relevant subject matter across all the institution's colleges and institutes.

The program started with a few early adopters and spread through a model Davies calls "diffusion of innovation" -- success led to positive feelings among participants, who recommended it to their colleagues. Recruiting students worked similarly, particularly with the promise of a \$1,000 stipend that funds the project and compensates them for their labor.

No Small Feat

Just as faculty members experienced challenges when embarking

on new technological pursuits, students had mixed success early on. Some were surprised at how much work was required, even for a relatively simple slice of con-

tent.

"The ones who were really successful made plans over Thanksgiving and Christmas to put in a significant amount of time in that period," said Peggy Moore, UNMC's director of elearning.

Daniel Cloonan, a fourth-year student pursuing a career in general surgery, was inspired to create a [module](#) after experiencing one too many "awkward situations" during his introduction to real operating rooms. Cloonan hadn't yet been formally taught the process of donning gloves, scrubbing in, touching certain things and avoiding others -- but he felt these skills were important to know before students start real-world internships.

After teaming up with a fellow student and submitting an application, Cloonan recruited a faculty mentor who secured his group access to an official operating room for filming.

"We're trying to make it very conversational. Students watching it are being led by someone, literally myself, who's been through these embarrassing moments," Cloonan said. "Every mistake you see in the module is a mistake I made in real life."

Shooting took a day and a half, and editing took a week. The entire process from idea to execution took approximately seven months.

If he could do it again, Cloonan thinks there are parts of the video that might have been more effective as a hands-on lesson. But the experience gave him valuable curriculum-development skills that could be useful if he applies to work in places that value “learner-based development,” he said.

Why Faculty Wanted In

For faculty members like Sobeski, the E-Learning Program offered an opportunity to improve course material while developing closer bonds with standout students.

Sobeski recruited two of her pharmacy care students to create a module in fall 2015 explaining how to take a patient’s medical history. Together they created an outline for the project, and the students came up with language describing the justification for the learning module and its place in the curriculum.

“How to do something like interview a patient is difficult to explain in words. It’s much easier if they could see it,” Sobeski said. “I had tried several times before to look on the internet for sample videos of patient medication history interviews, and I couldn’t find anything that I liked.”

The finished module seemed to reach students better than the “regular old dry didactic lecture” it re-

placed, Sobeski said. Students were able to explain it on a level other students could understand, whereas Sobeski thinks she sometimes skipped steps that were obvious to her but not to a novice.

In some cases, one elearning module experience prompted many more. Tanya Custer and Kim Michael teamed up with a student to create a module geared toward distance students in anatomy courses. The pair went on to create 53 more modules, even securing funding for their own instructional designer. Their original idea was for a couple of dozen modules, but Custer and Michael quickly realized that modules with narrower focus tend to be more successful than attempts to cram an entire subject into one lesson.

“It’s probably something Tanya and I would never have gotten into if the university would have put a call out for it,” Michael said.

Why It Works

Modules are accessible on the institution’s public e-gallery page and in the learning management system. Some modules appear as mandatory assignments within courses, while others simply exist to serve students who need them on the spot.

The institution anecdotally reports that students respond well to the availability of the modules. It’s taken steps to seek more concrete data on that issue, now requiring

participants in the program to meet with an evaluator to design an outcomes assessment for each new module. Eventually, Davies hopes, the institution will know how much time people spend on modules, where students are clicking within them and which aspects cause the most difficulties.

Student participation in the course development process seems like a minefield for intellectual property debate, but the institution insists it’s clear-cut: the university owns the module, though instructors can request to use it royalty-free if they move to a different institution.

Other institutions have expressed interest in partnering with Nebraska on the program, or at least sharing its fruits, according to Davies. UNMC is in the early stages of developing a [partnership](#) with George Washington University and the Mayo Clinic to develop an e-module on interprofessional education for use as a shared resource on all three campuses, Davies said.

Sobeski sees the elearning program as an important step in giving medical students the teaching skills they may find useful later in life.

“We’re health-care professionals who educate, but we love being in that environment and making that contribution to health care by developing the practitioners of the future,” Sobeski said. “Any time that we can develop a learner in a unique way is good.” ■

<https://www.insidehighered.com/digital-learning/article/2018/01/24/nebraska-medical-school-puts-students-charge-creating-elearning>

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Integrating Technology, Homework Help and Calculus

BY MARK LIEBERMAN // FEBRUARY 28, 2018

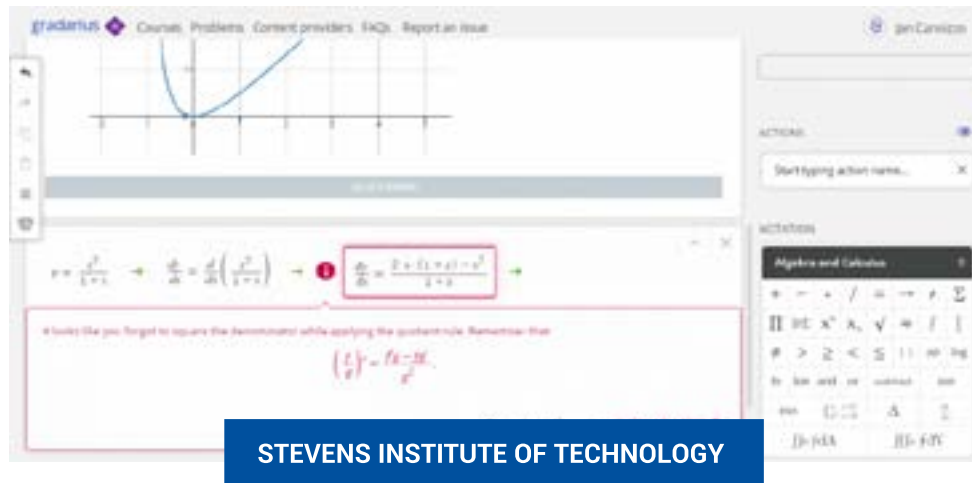
Stevens Institute of Technology in New Jersey developed software that has replaced written homework -- and textbooks -- in the institution's calculus courses. Developers see the tool as a model for technology-enhanced learning.

A few years ago, math instructors at Stevens Institute of Technology noticed their calculus students consistently struggling with the basics once they reached upper-level courses -- or, in some cases, they were failing their introductory courses and abandoning math altogether.

The crux of the problem, it seemed, was that students at the New Jersey institution struggled most while doing homework, away from the instructor or anyone else who could help.

"People could do well in calculus but learn nothing," said Alexei Miasnikov, professor and director of the department of mathematical sciences at Stevens.

After several years of tireless software development, along came Gradarius -- a tool developed at



STEVENS INSTITUTE OF TECHNOLOGY

Screenshot of the Gradarius platforms

Stevens that has replaced written homework assignments and even textbooks in all of the institution's face-to-face Calculus 1 and 2 courses. Gradarius offers automatic, real-time feedback, guidance and encouragement as students show their work.

Other institutions -- Pennsylvania State University, Arizona State University and Hunter College among them -- have started using the tool, and it's drawn positive feedback from students after some initial kinks were worked out. Miasnikov said he's glad to have created the

new tool but now realizes the enormity of the task he gave himself.

"If I had known how difficult this is, I would have never started doing it," Miasnikov said. "There were a lot of headaches."

Long Road to Success

Development of Gradarius began in 2010, when Miasnikov and his team determined that software in the area of math homework help was mostly limited to lower-level disciplines like algebra and geometry.

Using investments from family and friends as well as volunteer hours, developers fused computational algebra research and algorithms with adaptive learning techniques. This advanced combination of technology is currently patent pending, and it aims to take the place of a "seasoned tutor," Miasnikov said. The name comes from Latin for "progressing step by step."

One of the biggest hurdles to overcome was creating a program that acknowledged the myriad approaches students could take to a single calculus problem. Accounting for those variables took several years and quite a few episodes of trial and error, Miasnikov said.

"We were very experienced in building software systems for various symbolic and algebraic computations, but to make one which can be used in classrooms and at home by thousands of students brings absolutely different requirements," said Miasnikov, who cultivated his skills in software development with substantial National Science Foun-

ation grants earlier in his Stevens career.

The technology also connects students to instructors even when they're not in the same room. Instructors can view students' step-by-step processes and the false starts and confusion points that led them to their solution.

The software wasn't an instant hit with students. When Jan Cannizzo, teaching assistant professor in the department of mathematical sciences, introduced the tool in his class a couple years ago as a replacement for a few homework assignments, students balked at the lack of introductory or training materials to get them acquainted with the software, and they struggled to navigate the clunky user interface.

"We had a lot of criticism from the students. It was really an impetus for us to change the software and keep working on it," Cannizzo said. "It's much, much better than it was then."

Instructors also learned the software through "trial by fire," Cannizzo said. Once he got comfortable with it, he created a hybrid version of his course that combined traditional writing assignments with Gradarius homework. As students grew more accustomed to Gradarius, Cannizzo phased out written homework altogether, followed by the textbook.

Positive Impact

In addition to difficulties with offering in-depth grades and comments on written calculus homework, Cannizzo often found that students simply skipped assign-

ments or submitted "shoddy work." Gradarius holds them accountable.

It also helps Cannizzo and fellow instructors focus on substantive material during lectures. Now they're not as focused on basic problem solving; Gradarius takes care of that for them.

"It was part of our mission to not make calculus just this dry, rote memorization type of subject," Cannizzo said. "We have found time to focus more on concepts during lectures."

Miasnikov believes Stevens students' struggles with calculus were rooted in a K-12 emphasis on "cumbersome procedures that allow one to get the answer to some very particular standard questions." He hopes Gradarius will help students overcome that lackluster training.

Future plans for the software include incorporating more instruction via text, images and links, and to bring the tool to online courses that would require "a minimum amount of human instructor supervision." One idea for that course is a two- to three-week calculus refresher that students who need help with the basics can take right before or during a more advanced calculus course -- particularly useful for transfer students who might have had different material in previous math courses, Cannizzo said.

"I personally am concerned a bit about losing the human element of instruction," Cannizzo said. "It's not like we intend these online courses to replace curriculum. They're really supplementary." ■

<https://www.insidehighered.com/digital-learning/article/2018/02/28/calculus-homework-tool-helps-students-learn-mistakes-while>

Views

A selection of essays and op-eds

Students' Vital Role in OER

BY CHRISTINA HENDRICKS // DECEMBER 13, 2017

Through creating and spreading open educational resources, students learn more and make an impact on the world, writes Christina Hendricks.

When I first started learning about open education and open educational resources about five years ago, I knew OERs were different than other educational resources in that they have an [open license](#), but I thought of them as similar in the sense of being created by instructors in educational institutions. But it's clear to me now that students also have a valuable role to play in creating and revising OERs, as well as in promoting open education more widely.

An open education movement with students is much more effective than without, and creating and revising OERs can be a valuable way for students to learn and to have their work make a larger impact than just earning them a grade.

Asking students to contribute educational resources that are made publicly available and openly licensed is a way to avoid what David Wiley, chief academic officer of [Lumen Learning](#), calls "[disposable assignments](#)": assignments that are marked for a grade and otherwise add no value to the world. Student work in many courses can be very useful to other students in a course, to community groups and to the wider public.

Wikipedia projects are one way for instructors to involve students in OER creation or revision while contributing to a widely used public resource. As one student put it in a quote on the [Wiki Education Foundation website](#), "There is much gratification in leaving your person-



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al mark on something that will help others to learn."

In addition, writing for Wikipedia can help students gain important digital and information literacies, such as learning how to find and

cite reliable sources and how to write for a nonspecialist audience. At the University of British Columbia in Vancouver, in Canada, students are editing Wikipedia in courses ranging from [food, nutrition and health](#) to [Canadian literature](#)

and [human ecology](#). The Wiki Education Foundation provides [many useful resources](#) for those wanting to incorporate Wikipedia assignments into their courses.

Students can also provide valuable contributions to open textbooks -- textbooks that are openly licensed and provided at no or low cost (printed versions usually have a nominal cost). It might seem that only upper-level students would be able to do so well, but that need not necessarily be the case. As Plymouth State University professor [Robin DeRosa](#) puts it, "Students are the perfect people to help create textbooks, since they are the most keenly tuned in to what other students will need in order to engage with the material in meaningful ways."

One of the books DeRosa created with students is [The Open Anthology of Earlier American Literature](#), in which students gathered public-domain texts, wrote introductions and created discussion questions and assignments to accompany them.

“ Students are not only interested in saving money; many are also excited about the opportunity for student work to have more of an impact by being made publicly available, reusable and revisable by others. ”

One of the examples in a newly published "[A Guide to Making Open Textbooks With Students](#)" from the Rebus Foundation features students adding new chapters to The Open Anthology of Earlier American Literature, while in another example student lab instructors for a course in economics revised and added new content to an open [microeconomics textbook from OpenStax](#).

The [Open Logic Project](#), an international collaboration of people contributing to an open textbook in logic, includes a number of [graduate and undergraduate students](#), and students also contribute to the open textbooks in the Libretxts collection, including those in [chemistry](#), [mathematics](#) and [humanities](#).

Other Student OER Projects

Students are working on many other kinds of OERs as well. At the University of Edinburgh, a group of undergraduate [students revised existing OERs](#) to add materials on LGBTQ health for the medical education curriculum. Graduate and undergraduate students at the UBC

Vancouver are writing [open case studies](#) that can be used in educational or other contexts. The UBC Vancouver [geography department has a website](#) showcasing student research projects on environment and sustainability issues,

including case studies, infographics and projects in geographic information science.

In addition, [eCampusOntario](#) (Canada) has recently established [a student experience design lab](#), in which students work on projects such as a platform for students and faculty to create virtual reality experiences and a repository of student work done in courses -- all of the outputs of this lab will be openly licensed.

Furthermore, the University of Calgary in Alberta, Canada, has developed [a program to support OER adoption](#) in which undergraduate students work to locate OERs that align with a number of courses at the university, and graduate students provide reviews of those OERs. Along somewhat similar lines, students at the University of Edinburgh in Scotland are working as [open content curators](#) "whose role is to repurpose materials created by staff and students around the university to ensure they can be released under open license and

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shared in places where they can be found and re-used.”

Student Advocacy

Promoting open resources is a natural fit for student advocacy, given concerns about the rising cost of higher education. But students are not only interested in saving money; many are also excited about the opportunity for student work to have more of an impact by being made publicly available, reusable and revisable by others. I have found in my own work that student advocacy is crucial, as students often have powerful voices when speaking to campus administrators and government leaders.

The [#textbookbroke campaign on Twitter](#) and other social media, often organized by student governments, features images of students showing how much they spent on



The #textbookbroke campaign on Twitter and other social media, often organized by student governments, features images of students showing how much they spent on textbooks.



textbooks for a term in order to reveal how expensive textbooks are. In British Columbia, student leaders from Simon Fraser University, UBC Vancouver and UBC Okanagan launched #textbookbrokebc in 2015. The student association at the University of Saskatchewan in Canada has taken a somewhat different road to support OER adoption: last year the association provided certificates of innovation for instructors who use OERs.

Student support for OER adoption and creation can have wider impacts on university policies and practices. In Scotland, [the Edin-](#)

burgh University Student Association's advocacy provided an important impetus for the development of [an OER policy at the university](#) that “encourages staff and students to use, create and publish OERs.” At the UBC Vancouver, student government leaders worked to get language into an important guide to promotion and tenure for faculty in the teaching stream at UBC. Faculty in that stream must engage in “educational leadership,” and the new language in the tenure and promotion guide clarifies that [contributions to OER can be counted as one way to show educational leadership](#).

I can no longer imagine being an effective open educator without working closely with students, and I hope this article has provided inspiration for others to do so, too! ■

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Bio

Christina Hendricks is a professor of teaching in philosophy and deputy academic director of the Centre for Teaching, Learning and Technology at the University of British Columbia in Vancouver. Other examples of student contributions to open education can be found in this [blog post](#).

<https://www.insidehighered.com/digital-learning/views/2017/12/13/students-have-vital-role-creating-and-spreading-oer>

OER: Bigger Than Affordability

BY ROBIN DEROSA // NOVEMBER 1, 2017

Open education resources can catalyze a much-needed national conversation about what we mean by “public” higher education, Robin DeRosa writes.

Learning about [Creative Commons licenses](#) was a game changer for me. I'd been teaching undergraduates for almost two decades when I first heard [Cable Green](#) speak about how [open educational resources](#) can allow for easier sharing and collaboration around educational materials. I sensed that a seismic shift was going to happen in my pedagogy, but it's taken me a few years to see OER's even larger potential for my work.

When my students and I developed [The Open Anthology of Earlier American Literature](#) in order to replace a commercial anthology of public-domain literature, the idea was pretty basic: save students about \$86 a pop and share the work so other students and faculty could use and improve the book. When the anthology took off and students and [scholars started to revise and add to it](#), and my own class began to develop [nondisposable assignments](#) that added texture and context to the literature in the collec-

tion, I realized that [the cost-saving aspect of OER is only the beginning of their benefits](#).

But part of my excitement about the power of OER is tempered by my sense that we are dabbling in the trees while the forest is on fire. By now, most people involved with OER know the truly shocking [statistics about textbook costs](#) and how [they adversely affect student success](#). The more I learned about textbook costs, though, the less I cared about them, in particular. In other words, I started to see them as just one of the prohibitive ancillary expenses that students face as they try to fund their college educations.

From there, it was just a short hop to realize that for me, OER is a larger social justice issue, foundationally related to the question of who should have access to knowledge, knowledge creation and education. That led me to this question: [How can we reframe OER advocacy in a larger landscape of social justice?](#) Because so much of my thinking



The Open Anthology of Earlier American Literature

has been helpfully inflected by my collaborator [Rajiv Jhangiani](#), who lives and teaches in Canada, I have also realized how contextualized the answers to that question are, and should be.

I began considering the larger role of open in a social justice agenda targeted at public higher education in the United States, where

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I live and teach. First, I looked to [Sara Goldrick-Rab's research](#) on how the hidden costs of attending college make college graduation an unattainable goal for such a large portion of our nation's population. If 50 to 80 percent of the total sticker price of college is coming from non-tuition costs, as she demonstrates, we need to confront the complete set of material conditions that constrain students.

Not only can OER drive down the real cost of college, but thinking about textbook costs can propel faculty, in particular, to think about how course and program design can be adapted to make access -- more broadly writ -- a priority. [Is food insecurity on the radar of your chemistry department?](#) If OER is appealing because they can help make knowledge more accessible, then we must care about the myriad issues -- from child care to transportation -- that prevent our potential students from even coming to our classrooms in the first place.

In addition, if we care about OER from a social justice and access perspective, then we will also care about the aspects of open that can (inadvertently) reinscribe or augment inequities. Do your students have access to broadband at home so they can easily get into their online textbooks? Do they have laptops, unlimited mobile data plans, digital literacy skills to navigate involved technologies?

Is our new OER built with universal design in mind, or does it replicate commercial textbooks that

need to be retrofitted for individual learners with disabilities? When we design open and connected learning assignments, are we using commercial platforms that mine and monetize our students' data without their knowledge or consent? My thinking here is informed by [Chris Gillard's illuminating work on "digital redlining"](#) and the problematic ways technology can invade privacy, reduce agency and augment the inequalities it purports to alleviate.

As I focused in my own academic program on driving down the real cost of college and critically considering how we could -- and couldn't -- use technology to increase access to learning, I started to feel that open was changing the nature of my identity as a teacher and scholar. I wanted to understand more about how the work I was doing intersected and sometimes clashed with the national and institutional contexts within which I was working.

[Tressie McMillan Cottom points out](#) that we now think of college as an individual good, rather than a collective good that benefits society, which helps explain the credentializing craze that encourages learners to gird themselves against a rough labor market by accumulating certificates and degrees. Calling this "lower ed," McMillan Cottom links the recent rise of for-profit colleges to our growing national aversion to public responses to labor market crises. [Christopher Newfield explores this from inside public institutions](#), looking at the "devolutionary cycle" that occurs when

our public universities (and their leaders, in particular) retreat from articulations of the public good and instead subsidize sponsored research, hike tuition and contract with private vendors to offset the co-occurring divestments by state governments.

In effect, both McMillan Cottom and Newfield are concerned with the increasing privatization of the terrain of higher education in the U.S., which is happening not only with the burgeoning for-profit college industry, but also with the increasingly privatized revenue streams and conceptual strategies that public colleges and universities (mistakenly) believe will help them make ends meet.

As someone who teaches at a regional public university, I confront the diction of austerity and panic every day in daily institutional operations and in the push to innovate to address our challenges. But we can't save public higher education by privatizing it, despite our current national frenzy to do just that.

My blossoming hope is that we can use some of the tools and rhetoric of open to build a public response to the crisis in American public higher education. OER can help us conceive of how the public can generate the materials it needs to support its education, and can help us center access as a key component of any equitable learning environment. Open-access publishing can help our public institutions share research and information with the public, which would then set a

logical premise for restoring state allocations and federal funding. Open pedagogies that empower learners to contribute to the shape of knowledge can assure that the labor markets they graduate into are responsive to their vision for the future of our societies.

I value the diversity of ways that people define “open,” but for me in my context as a public university professor in a country where the system seems to be privatizing rapidly, I am most interested to see how the concepts around working



If we care about OER from a social justice and access perspective, then we will also care about the aspects of open that can (inadvertently) reinscribe or augment inequities.



open can help us find a way to talk about the value -- in particular the nonmarket social value -- of public higher education, and imagine a sustainable future for our public institutions. This might mean exploring the distinctions between a knowledge [commons](#) and a public education system, and it would cer-

tainly mean becoming more concrete and coherent with all of our terms. There is no panacea in this, but one of Newfield's main premises is that we in public higher education have failed to articulate the value of public in our rush to embrace a private market approach to generating revenues. I am starting to see open not only as a pedagogical tool and way to make college more affordable, but also as a rhetorical strategy for catalyzing a much-needed national conversation about what we mean by “public” higher education. ■

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Bio

Robin DeRosa is professor and director of interdisciplinary studies at Plymouth State University, part of the University System of New Hampshire. You can read more about her work at her website or follow her on Twitter @actualham.

<https://www.insidehighered.com/digital-learning/views/2017/11/01/oer-catalyst-national-conversation-about-public-higher-education>

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