

# Open Educational Resources Advisory Committee (OERAC) Report

November 25, 2019

## Advisory Committee members:

Leslie J. Reynolds, Senior Associate Dean of University Libraries, (Chair)  
Michael Martin, CUSG President of Internal Affairs, (Co-chair) (replaced David Kidd and Troy Fossett)  
Brian Groves, Executive Director, Auxiliary Services – CU Book Store  
Aisha Jackson, Associate Director of the Academic Technology Applications Program, Office of Information Technology  
Michael Klymkowsky, Professor, College of Arts and Sciences  
Chris Koehler, Associate Faculty Director, Space Minor/College of Engineering and Applied Science  
David Mallett, Associate Director of Capital Finance, (replaced Matthew Artley and Luke Anderson)  
Merinda McLure, Associate Professor, University Libraries  
Catherine Knoll Milburn, Senior Instructor and Teaching Professor, Leeds School of Business  
Pramila Patel, ICT Accessibility Program Manager  
Geoffrey Rubinstein, Director of Independent Learning, Continuing Education  
Kirsten Schuchman, Assistant Vice Chancellor for Public Policy and Advocacy  
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## Overview

The costs of textbooks for higher education has, according to U.S. Bureau of Labor Statistics, increased nearly [88% between 2006 and 2016 \(United States Department of Labor 2016\)](#). CU Boulder undergraduate students are advised to budget approximately [\\$1200 per year](#) for books, supplies, and technology (University of Colorado 2019).

In 2017, the Chancellor committed \$1,000,000 to facilitate a transition to more affordable course materials. Provost Russ Moore created a campus committee, now known as the Open Educational Resources Advisory Committee (OERAC), made up of students, staff and faculty, to consider how course materials costs at the University of Colorado Boulder might be reduced for students and how the \$1M invested toward this goal. Provost Moore charged the Open Educational Resources Advisory Committee (OERAC) with:

1. Examining national trends regarding open educational resources (OER);
2. Examining the current use of OER across CU Boulder and making recommendations to increase their use, while respecting faculty rights and responsibilities;
3. Identifying impediments to the adoption of OER and making recommendations regarding best practices for OER adoption;
4. Determining the savings that the average CU Boulder student could achieve if 10, 20, and 50 percent of their textbooks were OER; and
5. Recommending a path to invest the funds committed to further this effort.

For clarity, the OERAC agreed on a shared definition of open educational resources:

*Open educational resources (OER) are any type of educational materials that are in the public domain or introduced with an open license. The nature of these open materials means that anyone can legally and freely retain, reuse, revise, remix and redistribute educational materials. OER range from textbooks to curricula, syllabi, lecture notes, assignments, tests, projects, audio, video and animation (adapted from (UNESCO, n.d.); (Cape Town Open Education Declaration 2017))*

OER can be created by scientific institutions such as NASA, by nonprofit organizations, by university faculty, by K-12 teachers, by learners of all ages, or by commercial companies. OER can be found on the World Wide Web, in dedicated repositories such the [OERCommons](#), and by using search tools such as the [Openly Available Sources Integrated Search \(OASIS\)](#), [Open Textbook Library](#), and the [Mason OER Metafinder](#).

The committee began its work in August 2018. After examining national trends, the OERAC surveyed campus educators in spring 2019 to gauge their current awareness and use of open educational resources, as well as any perceived obstacles to adoption and use. Additionally, a student survey was conducted across all majors on the Boulder campus in fall 2019. These findings inform our recommendations for investing the Chancellor's \$1M commitment.

## **National trends**

Open educational resources are now widely recognized as an alternative to commercial course materials in higher education when educators can identify OER that meet their quality standards, fit their teaching needs, and support their student learning objectives. In October 2018, [SPARC](#) (the Scholarly Publishing and Academic Resources Coalition) reported its work to document that OER are now in use “at more than 4000 institutions, primarily in the U.S. and Canada but also all around the world” and have “saved students, parents, schools and governments at least \$1 billion dollars” to date ([Allen 2018](#)). In September 2019, OpenStax, an open textbook publisher based at Rice University, reported that “almost 3 million students are saving an estimated \$233 million this year by using free textbooks from OpenStax” alone ([Ruth 2019](#)).

OER use is also starting to penetrate elementary and secondary education. With support from the National Science Foundation and the Hewlett Foundation, prior research studied tools and methods supporting the uptake of OER in K-12 classrooms. Research suggests that utilizing OER to differentiate curriculum to support diverse students' needs can positively impact learning outcomes, particularly for low socioeconomic status learners (Ye et al. 2015). Research has also identified the significant barriers to adoption and integration associated with individual OER, noting the significant cognitive demands and time required to successfully integrate individual OER into coherent curriculum sequences (Sumner 2010). Recently, there have been new efforts, supported by a mix of public and private funders, to create whole OER curriculum products from the ground up to support the Next Generation Science Standards (NGSS). Two notable efforts are the [OpenSciEd Developers Consortium](#) and the CU Boulder-led [Inquiry Hub Research + Practice Partnership](#). Starting at the middle school level, the [OpenSciEd Developers Consortium](#) aims to create exemplary curriculum that embody the research-based, student-centered learning environments envisioned in the Framework for K-12 Science Education (National Research Council 2012) and the NGSS (Committee on Guidance on Implementing the Next Generation Science Standards et al. 2015). Similarly, Inquiry Hub is focusing on high school science curriculum but taking a different development approach that emphasizes co-design with teachers and administrators through school district partnerships (University of Colorado, n.d.). It is important to note that these projects are not focused on cost savings; rather they are aiming to fundamentally transform science instruction and classroom learning ((Achieve 2017); (Schwarz, Passmore, and Reiser 2017); (Reiser, et al. 2017)) and are using open licensing to support innovative distribution models.

A growing body of research investigates educator and student attitudes towards OER, as well as the efficacy of these materials for student learning. The Open Education Group's ongoing [Review Project](#) at Brigham Young University "provides a summary of all known empirical research on the impacts of OER adoption (including our own)" (Hilton III and Mason n.d.).

[SPARC](#) (the Scholarly Publishing and Academic Resources Coalition) maintains [Connect OER](#), providing information about OER initiatives at institutions of higher education in the U.S. and Canada ("SPARC: Setting the Default to Open in Research and Education" n.d.). Here and elsewhere, U.S. institutions report a spectrum of OER initiatives including OER education and awareness efforts to support educators in exploring OER as alternatives and/or supplements to commercial course materials, as well as institutional grant programs to encourage and support educators in adopting or adapting existing OER, or creating new OER. Recently, the Colorado Department of Higher Education released its [Roadmap to Containing College Costs and Making College Affordable](#), an immediate, actionable plan to "Lower[ing] textbook and course material costs by creating open educational resources (OER) and promoting adoption through the statewide grant programs and initiatives" (Colorado Department of Higher Education 2019).

Alongside OER adoption, adaptation, and creation efforts in higher education, educators are engaged in dialogue about and the practice of open pedagogy. This is reflected in educator-generated resources such as the [Open Pedagogy Notebook](#), where educators may contribute examples and ideas and browse contributions by colleagues. Locally, [an Academic Futures white paper](#) specifically addressed open pedagogy and open educational resources, encouraging a "holistic strategy of integrated literacies, pedagogical foundations, and digital spaces with the potential to transform the student experience" (Sinkinson and McAndrew, n.d.).

A number of U.S. and international communities and conferences also reflect the maturity of the open education movement. Among these are the international [OE Global Conference](#) and the [Open Education Consortium](#), “a non-profit, global, members-based network of open education institutions and organizations”.

## Survey of CU Boulder Educators

CU Boulder educators have adopted and also created OER (including the [PhET Interactive Simulations](#), [Earth Data Science](#), and [LearnChemE](#), for example). In order to learn more about CU Boulder educators’ OER awareness, use, and perspectives the OERAC conducted a survey of all CU Boulder educators in January and February 2019.

### **OER use**

Overall, just over half (53) of survey respondents reported that they have used OER. Every academic unit across the university reported there is some use of OER.

Have you ever used OER by School/College/Division?	Percent
Arts & Sciences (N = 374)	55%
Arts & Humanities (N = 133)	57%
Natural Sciences (N = 168)	55%
Social Sciences (N = 51)	45%
Residential Academic Programs (RAPs) (N = 22)	64%
Business (N = 39)	33%
Continuing Education (N = 53)	58%
CMCI (N = 37)	57%
Education (N = 24)	42%
Engineering (N =96)	55%
Environmental Design (N = 10)	30%
Libraries (N = 29)	69%
Law (N = 12)	50%
Music (N = 19)	21%
<b>OVERALL (N = 700)</b>	<b>53%</b>

When asked how they used OER, the majority of survey respondents indicated that they adopted (58%), or adapted/revise (58%), OER for study or teaching. In relation to creating and sharing OER, 22% of the respondents had created OER, including 9% who had published their OER with a Creative Commons (CC) license, and 11% who had added OER to a repository. Only 2% of respondents indicated that they added comments to a repository regarding the quality of an OER or suggesting ways of using an OER. Since educators could respond by selecting all ways they used OER, the responses do not add up to 100%.

Survey respondents most often use OER to supplement existing lessons or coursework (69%), to get new ideas and ideas and inspiration for use in teaching (57%), or to prepare for teaching/training (55%). They use OER less frequently as illustrations of timely contemporary issues in policy (<1%), when creating an interdisciplinary course for a particular subject that isn't normally in a textbook (<1%), or to compare OER to usual teaching materials (10%).

Overall, two thirds of survey respondents reported that they are interested in learning more about OER. Across academic units, proportions of faculty who reported an interest in learning more about OER include Environmental Design and Continuing Education (81-90%); Business and Education (71-74%); CMCI, Arts and Sciences, Engineering and Law (65-67%); and the Libraries and College of Music (55-58%).

***Impediments to adoption***

Survey responses indicate that educators perceive a number of barriers to adopting OER in order to replace commercial textbooks and ancillary materials. These include the perception that high quality, rigorous and accurate OER relevant to a particular course, course sequence, or curriculum are not available, and issues with the availability of open ancillary materials such as online test question banks and interactive materials (commercial publisher versions often accompany commercial textbooks). Respondents most frequently indicated a lack of awareness of OER (52%), not knowing where to find OER (39%), and time and lack of opportunity (22%) as impediments to adopting OER. This suggests that there is a need to increase educators' awareness of tools and assistance (such as the Libraries' OER Leads) they may use to locate and evaluate OER.

Respondents indicated additional concerns about the quality, availability and currency of OER.

<b>Why don't you use Open Educational Resources (OER)? Select all that apply.</b>	<b>N</b>	<b>%</b>
I am not aware of OER	171	52%
I don't know where to find OER.	127	39%
I do not have enough time/opportunities to experiment with using OER.	73	22%
I have concerns about the quality of OER.	46	14%

I have concerns about the availability of OER in my subject area.	38	12%
I have concerns about OER being current or up-to-date.	33	10%
I don't understand copyright and licensing related to OER.	30	9%
I am not solely responsible for selecting my course materials.	24	7%
I have concerns about the availability of ancillary resources (e.g., test banks).	21	6%
I have concerns about the copyright and/or ownership of OER.	21	6%
I prefer commercial options.	13	4%
I think OER are difficult to manage.	12	4%
I must follow certification/regulation requirements that dictate my use of commercial course materials.	0	0%
Other	52	16%

## Potential for Student Cost Savings

According to a survey administered by On Campus Research, a Division of the National Association of College Stores, during academic year 2018-2019 North American graduate and undergraduate students spent an average of \$415 on course materials (National Association of College Stores: On Campus Research 2018).

The average CU Boulder student spends slightly more, at an estimated \$480 on course materials. Potential student savings that could be realized by replacing for-cost course materials with OER are estimated at:

- \$48 savings if 10% of course materials are OER
- \$96 savings if 20% of course materials are OER
- \$240 savings if 50% of course materials are OER

One approach to realizing significant course materials costs savings for CU Boulder students would be to target for transition to OER the highest enrollment classes with the highest course materials costs, in order to achieve the greatest opportunity for savings. Estimated potential savings for students by adopting OER for the top 3 courses are illustrated using the fall semester of 2019 are:

<b>Class (All Sections)</b>	<b>Total Enrollment</b>	<b>Average New Price</b>	<b>Sum of Opportunity</b>
<b>193.B.CHEM.1113</b>	<b>1096</b>	<b>\$179.75</b>	<b>\$197,006.00</b>
<b>193.B.ASEN.2002</b>	<b>550</b>	<b>\$342.25</b>	<b>\$188,237.50</b>
<b>193.B.PHYS.1110</b>	<b>1195</b>	<b>\$146.62</b>	<b>\$175,210.90</b>

## **Survey of CU Boulder Students**

A brief survey was conducted with a small group of students in September 2019. The committee used the CU Space Minor as the sample as students from nearly every major on campus are represented in the Space Minor. The survey was based on similar OER related surveys conducted by universities across the country with a few questions tailored to the committee's interests. Key findings from the survey include:

- 38% of students have not purchased required textbooks because of the cost
- 22% of students that could not afford required textbooks did poorly or failed the course
- 52% of students place the highest value on having a printed book when cost is not a factor
- 49% of students place the highest value on having interactive practice questions when studying
- 67% of students say they want interactive practice questions incorporated in the classroom
- 87% of students surveyed have never heard of OER
- 92% of students expressed varying levels of interest in learning more about OER

## **Recommendations**

The OERAC provides the following guiding principles and recommendations for investing the Chancellor's \$1,000,000 commitment to increasing OER use and reducing student course materials costs.

### ***Guiding Principles***

1. Maximize savings for students
2. Improve retention and completion
3. Improve student learning outcomes and engagement, with a view towards improving equity in learning experiences and outcomes
4. Build capacity around valuing and using OER
5. Sustainability
6. Student-centered pedagogical innovation
7. Contributing to the broader open education ecosystem

## **Recommendations**

Each recommendation addresses a guiding principle(s), indicated in parentheses.

### Grants/Incentives for Moving from Awareness to Transformation: \$950,000

These grants are intended to address educator identified impediments of awareness, time, quality, availability, ancillary materials, and currency. We recommend creating an ecosystem of OER adoption grants and awareness incentives that is flexible to funding the best proposals.

- **Large grants** of between \$100K and \$250K to support campus educators (individuals, teams, departments) in the creation of OER for use in high impact and/or high enrollment courses at CU Boulder. Preference should be given to projects which will reduce comparatively high course materials costs and that will result in concrete, sustainable outcomes. (1,2,3,4,5,6)
- **Medium grants** of between \$50K and \$100K to support campus educators (individuals, teams, departments) in the creation, adaptation, or adoption of OER for use at CU Boulder. Preference should be given to projects which will reduce course materials costs; result in concrete, sustainable outcomes; and serve as exemplars for other CU Boulder educators to adopt, adapt, or create OER (1,2,3,4,5,6)
- **Small grants** of up to \$50K to support campus educators (individuals, teams, departments) in the creation, adaptation, or adoption of OER for use at CU Boulder (1,2,3,4,5,6)
- **Mini grants** of between \$1K and \$25K to support educators in updating or renewing OER they adapted or created for use at CU Boulder. (1,5)
- **Incentives** of between \$250 and \$1000 per educator, for CU Boulder educator participation in OER awareness and education programming. (1,2,3,4,5,6)

### Building Campus Faculty and Administrator Awareness: \$20,000

- Develop a campus policy on OER to signify support from University leadership, and create a safe and supportive environment for faculty to explore the potential of OER. (4,5)
- Leverage the Center for Teaching and Learning and Libraries OER Leads to engage CU Boulder educators in professional development supporting OER awareness, adoption, adaptation, and creation. For example, host events for department chairs and high enrollment course instructors to introduce OER, provide examples of OER adoption, adaptation, and creation at CU Boulder, and set frameworks, expectations and incentives for engagement with OER adoption. (2,4,5,6)

### Memberships and Tools: \$30,000

- Evaluate becoming contributing members of open education communities currently in use by campus members or likely to be leveraged, such as the [Open Textbook Network](#) (\$5K annual institutional membership) or [OpenStax Partnership](#) (\$20K; currently free to apply through a grant from the Hewlett Foundation) or Driving OER Sustainability for Student Success ([DOERS 3](#)) Collaborative. (1,4,5,7)
- Identify and evaluate campus subscription to platforms for developing and disseminating open educational resources and open ancillary materials and that are currently in use by campus members or likely to be leveraged, such as [Pressbooks](#)



- (\$14K), [MERLOT](#) (\$6.5K) or [LibreTexts](#). (1,4,5,7)
- Survey incentives: \$2,235 of the Chancellor's commitment was encumbered in 2019 to encourage educator response to the survey distributed by the OERAC in spring 2019. The OERAC recommends repeating the survey in 2021 and considering additional surveys, such as of students. \$5K would fund future survey incentives. (4)

### Additional Recommendations and Vision for the Future of Open Pedagogy

Many of the ideas generated by the OERAC are exciting but beyond the scope of the committee's charge. The committee recommends that:

- The Provost charge a standing committee to implement the above recommendations and to support continuing OER efforts and activity on campus.
- University leadership develop a longer-term commitment to sustained investment in OER at CU Boulder and a business model for sustaining accomplishments such as locally-created OER supporting CU Boulder courses.
- Ensure that grants to support OER adoption, adaptation, or creation require attention to measuring and reporting outcomes and impact (such as in student learning and retention and through methods such as incorporating related questions into FCQs).
- Develop a program to recognize (such as through one-time funds or continuing budget) departments that achieve and/or sustain significant OER integration in their curricula
- Explore the feasibility and desirability of supporting departments in programmatic efforts to create zero-textbook-cost course series, minor/majors, certificates, or degrees ("Z-degree"). Community colleges, including specifically the Colorado Community College System, are leading the way.

## **Bibliography**

- Achieve. 2017. "Primary Evaluation of Essential Criteria (PEEC) for Next Generation Science Standards Instructional Materials Design."  
<https://www.nextgenscience.org/sites/default/files/PEEC%20Version%201.0.pdf>.
- Allen, Nicole. 2018. "\$1 Billion in Savings through Open Educational Resources." *SPARC* (blog). October 12, 2018. <https://sparcopen.org/news/2018/1-billion-in-savings-through-open-educational-resources/>.
- Cape Town Open Education Declaration. 2017. "Cape Town Open Education Declaration 10th Anniversary." March 2017. <https://www.capetowndeclaration.org/cpt10/>.
- CCCS News. 2019. "Open Educational Resources Initiative Gains Momentum in Colorado." June 6, 2019. <https://www.cccs.edu/cccs-news/open-educational-resources-initiative-gains-momentum-in-colorado/>.
- Colorado Department of Higher Education. 2019. "The Roadmap to Containing College Costs and Making College Affordable."  
<https://highered.colorado.gov/Publications/Reports/Roadmap-to-Containing-College-Costs-and-Making-College-Affordable.pdf>.
- Committee on Guidance on Implementing the Next Generation Science Standards, Board on Science Education, Division of Behavioral and Social Sciences and Education, and

- National Research Council. 2015. *Guide to Implementing the Next Generation Science Standards*. Washington, DC: The National Academies Press.  
<https://www.nap.edu/read/18802/chapter/1>.
- Hilton III, John, and Stacie Mason. n.d. "The Review Project." Accessed September 24, 2019.  
<https://openedgroup.org/review>.
- National Association of College Stores: On Campus Research. 2018. "Attitudes & Behaviors toward Course Materials: Student Spending on Course Materials." National Association of College Stores.  
[http://www.nacs.org/portals/nacs/uploaded\\_documents/pdf/pr/btc/OCR-394-07-19\\_SW\\_Infographic\\_MediaRelease.pdf](http://www.nacs.org/portals/nacs/uploaded_documents/pdf/pr/btc/OCR-394-07-19_SW_Infographic_MediaRelease.pdf).
- National Research Council. 2012. "A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas." Washington, D.C.: National Research Council.
- Reiser, B.J., L. Brody, M. Novak, K. Tipton, and L.M. Sutherland Adams. 2017. "Asking Questions." In *Helping Students Make Sense of the World through next Generation Science and Engineering Practices*, edited by Schwarz, C.V., Passmore, C., and Reiser, B.J., 87–134. Arlington, VA: NSTA.
- Ruth, David. 2019. "More than Half of All Colleges and 2.94 Million Students Using Free OpenStax Textbooks This Year." *OpenStax* (blog). September 11, 2019.  
<https://openstax.org/press/more-half-all-colleges-and-294-million-students-using-free-openstax-textbooks-year>.
- Schwarz, C.V., C. Passmore, and B.J. Reiser. 2017. "Moving beyond 'knowing about' Science to Making Sense of the World." In *Helping Students Make Sense of the World Using next Generation Science and Engineering Practices*, 3–21. Washington, DC: NSTA.
- Sinkinson, Caroline, and Amanda McAndrew. n.d. "Opening Classrooms: Literacies & Spaces." University of Colorado Academic Futures.  
[https://www.colorado.edu/academicfutures/sites/default/files/attached-files/sinkinson\\_and\\_mcandrew.pdf](https://www.colorado.edu/academicfutures/sites/default/files/attached-files/sinkinson_and_mcandrew.pdf).
- "SPARC: Setting the Default to Open in Research and Education." n.d. SPARC. Accessed September 24, 2019. <https://sparcopen.org/>.
- Sumner, T. 2010. "Customizing Science Instruction with Educational Digital Libraries." In *Proceedings of the 10th ACM/IEEE-CS Joint Conference on Digital Libraries*, 4. Surfer's Paradise, Brisbane, Australia.
- UNESCO. n.d. "Open Educational Resources." <https://en.unesco.org/themes/building-knowledge-societies/oer>.
- University of Colorado. n.d. "InquiryHub: Research-Based Curricula Supporting Next Generation Science." <https://www.colorado.edu/program/inquiryhub/>.
- University of Colorado, Office of Financial Aid. 2019. "Example Financial Aid Budget." 2019.  
<https://www.colorado.edu/financialaid/cost/example-aid>.
- Ye, L., M. Recker, A. Walker, H. Leary, and M. Yuan. 2015. "Expanding Approaches for Understanding Impact: Integrating Technology, Curriculum, and Open Educational Resources in Science Education." *Educational Technology Research and Development* 63 (3): 355–80.