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Adoption of open educational resources in California colleges and universities

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Abstract: The California Open Educational Resources Council (CAOERC) was formed in 2014 to find solutions to reduce the cost of college textbooks without impacting quality. Comprised of faculty from California's three public higher education systems, the CAOERC conducted a field study of 16 faculty using OER materials to discover practical knowledge about the challenges of adopting OER textbooks. The quality of the OER textbooks received positive reviews. The faculty also reported being more engaged with their teaching. The faculty felt that availability of OER support materials was a challenge to implementing OER. The following article presents the results of the CAOERC's study.

Keywords: open educational resources; OERs; textbook adoption; OER research; California; university; open textbooks; open access textbooks; public domain textbooks.

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Biographical notes: Ruth A. Guthrie is a Professor of Information Systems from the California State University, Pomona. She has been the author of over 30 articles about software development, project management and women in computing.

Katherine D. Harris is a Professor of English from the San Jose State University. During the time of this research, she was the Chair of the CAOERC. Her work ranges from pedagogical articles on using digital tools in the classroom to traditional scholarship on a 'popular' literary form in 19th-century England.

Peter Krapp is a Professor and Chair of Film and Media Studies at the UC Irvine, where he is also a member of the Departments of Informatics and of Music, and served as chair of the Academic Senate. His research interests include digital culture and media history, secret communications and cultural memory, as well as the history and theory of gadgets, games, and simulations. He is the author of *Deja Vu: Aberrations of Cultural Memory* (2004) and of *Noise Channels: Glitch and Error in Digital Culture* (2011), among other publications.

1 Introduction

The rise in college textbook prices has a negative impact on educational affordability, retention of students, and student success. Since 1977, the price of college textbooks has increased 1,041%, triple the rate of US inflation (Popken, 2015). Survey data shows that 65% of students opt-out of purchasing a textbook and that 94% of those who opt-out, do so realising that it could negatively impact their grade (College PIRG, 2014).

The US Government found the costs of college textbooks to be so exorbitant that they enacted the Higher Education Opportunity Act (HEOA) of 2008, requiring publishers and college bookstores to be more transparent about the prices of textbooks. Today, students can perform price-comparisons and select courses that have lower cost materials. However, the cost of college textbooks is still an issue in making education affordable. Several states have enacted legislation and funded activities to assist in the reduction of textbook costs.

1.1 California Open Educational Resources Council

The California legislature passed Senate Bill 1052 in 2012 which funded the creation of the California Open Educational Resources Council (CAOERC). With $5 million dollars provided by the State of California, additional matching funds were acquired from the Gates and William and Flora Hewlett Foundations. California's three public segments of higher education together are the largest state-related system of higher education in the nation (Hanley and Bonilla, 2016).

- California Community College (CCC): 113 campuses, offering two-year degrees. Many students take courses that help them transfer to CSU and UC systems.
- California State University (CSU): 23 campuses, offering bachelor's and master's degrees. The focus is mostly on undergraduate education and applied research. Largest state college system in the USA.
- University of California (UC): Nine out of ten campuses have large undergraduate programs. The UC system also offers graduate and doctoral degrees. Scholarship and research are more prominent at these campuses.

Council members, representing their respective academic senate bodies, engaged a critical mass of faculty colleagues for peer review, surveys, and feedback on OER options. The CAOERC began work in January 2014 and met several milestones by its demise in August 2016:

- identify 50 courses common to all three segments with high enrolments as well as high textbook costs
- finding over 200 high-quality, free or low-cost textbooks for high-enrolment courses in the state college systems
- creation of a rigorously peer-reviewed collection of over 200 textbooks in a centralised repository (Cool4Ed, http://www.coolfored.org/facultyshowcase.html)
- The development of faculty e-Portfolios, in which, faculty report on their experiences with an adopted OER textbook (available on Cool4Ed, http://www.coolfored.org/facultyshowcase.html).
- Development of knowledge base of best practices for promotion of OER on college campuses.
- The review and awarding of state funding to 45 CSU and CCC campuses to develop impactful OER programs.

This study was done as part of the CAOERC effort to understand problems that faculty encountered during adoption of OER materials and was based on the issues identified in a 2014 widespread survey of 1,230 UC, CSU, and CCC faculty regarding their awareness, use, implementation, and adoption of OER textbooks and supplementary materials (Hanley and Bonilla, 2016).

This 2015 study recruited 28 faculty from the UC, CSU, and CCC systems to adopt one or more chapters of an OER textbook. Faculty received a $1,000 stipend to:

1 implement the OER chapter(s) in their courses
2 participate in a faculty survey
3 administer a student survey
4 attend webinars to discuss issues with the OER textbooks
5 build an ePortfolio, describing their adoption.

By the conclusion of the study in fall 2015, 16 CSU and CCC faculty members from a variety of disciplines recorded their experiences during monthly webinars, an in-depth survey, and participation in e-Portfolios (currently available on Cool4Ed, http://www.coolfored.org/facultyshowcase.html). Students in all courses were also surveyed at the conclusion of their use of the OER materials. Much of the research on OER focuses on faculty perceptions of OER quality (Spilovoy and Seaman, 2015). Few studies have looked at OER implementation issues. The focus of this study was to look at challenges of OER use once an OER textbook was selected.

The CAOERC, chose to focus on resources that could be readily used in existing courses. For this reason, the emphasis of this study was to adopt CC:BY textbooks, complete courses, or videos that were readily available to fit into existing curriculum.

Faculty did not curate materials for an entire course; rather, in most instances, they adopted a chapter of an OER textbook for a particular section of the curriculum.

Faculty, familiar with OER were recruited in 2015 to adopt one or more chapters of an OER textbook. Faculty received a $1,000 stipend to participate in several activities, designed to capture their insights in using the OER texts. This included participating in a survey that measured perceptions of quality of the OER, workload and usability.

2 Literature review

The William and Flora Hewlett Foundation (http://www.hewlett.org/programs/education/open-educational-resources) describes open educational resources ('OERs') as "those in the public domain, with an intellectual property license that makes OER materials free for use and re-purposing by others. This includes textbooks, full courses, videos, software and articles." Early research on OER materials indicated that faculty were highly motivated to help students but, were sceptical about the quality of OER and needed more assistance finding OER textbooks. Other issues in adopting OER textbooks are workload, student learning, and usability.

For faculty to have an opinion about OER resources, they would need an awareness of and experience with OER textbooks. In studies about faculty selection of textbooks and their criteria for selection, a national survey reports that 64% of faculty are unaware of OER and that an additional 15% report that they are unsure how to use them (Spilovoy and Seaman, 2015). In the same survey, faculty reported that proven efficacy, quality, and breadth of coverage were the most important factors in selecting a text. Cost was rated as the least important.

A concern for faculty adopting OER materials is that the perceived quality is not the same as that of a traditionally published textbook (Zobel, 2015). A traditionally published textbook has an advantage of being professionally edited, enhanced with supplementary support materials, and often comes with support courseware, albeit more expensive for students. Faculty, once made aware of the potential for cost savings and a lack of negative impact on student learning, are more willing to consider adopting OER textbooks (Allen and Seaman, 2014).

Many faculty diversify their course content by curating OER (articles, primary source documents, videos and multimedia) as a beneficial quality resource for their students. For example, using free resources "helped them implement various types of learning materials from some educational sources that they otherwise would not have been aware of" (Chae and Jenkins, 2015). Incorporating OER can give faculty more flexibility outside the traditional course materials by providing the opportunity to create new elements in their curriculum (Chae and Jenkins, 2015).

Faculty are curious about how the OER material perform in comparison to traditionally edited textbooks. In a resource as abundant as the internet, it is no surprise that faculty are sceptical of the efficacy of free OER textbooks. Faculty require evidence that the use of OER does not negatively impact student learning. Several studies indicate that OER-supported courses have the same or better student success rate as those taught with traditionally published materials (Allen et al., 2015; Fischer et al., 2016; Hilton, 2016, n.d.; Schaffhauser, 2015). One of the most compelling reviews by the Open Educational Research Group shows the results of ten studies that focused on efficacy and

how well students performed. Studies compared sections of courses with OER materials to courses that used traditional for-profit publisher content. Each student showed that student learning was the same or better than with the traditional materials (Hilton, 2016).

Finding OER resources is a problem. Faculty report the top three obstacles to adoption are not enough OER resources exist (49%), it is difficult to find OER (48%) and there is no comprehensive catalogue of OER resources (45%) (Allen and Seaman, 2014). This study suggests that if institutions want to have a successful OER program, they need to support faculty adoption of OER in specific ways. For example, support for understanding copyright of OER texts, the ability to integrate OER into existing learning management systems, and release time or stipends to support OER adoption and implementation.

Faculty interested in adopting free materials for their courses are also wary of the time and effort required to locate, review and implement them (Allen and Seaman, 2014; Grajek, 2013; Chae and Jenkins, 2015). Some institutions provide these incentives as a way to encourage OER textbook adoption, and in so doing, help students that lack the financial resources to purchase or access educational materials. Other faculty view the time and effort of implementation of OER textbooks as the same as required in adopting a traditional textbook, already part of faculty workload (Petrides et al., 2011).

In addition to selecting OER textbooks for cost savings, faculty report that ease of use is key to its adoption of OER (Allen and Seaman, 2014). For example, the portability of OER textbooks in digital format eliminates the need to carry heavy or bulky books to class or the library. In addition, the ability to integrate or curate OER materials into existing course materials whether remixing or organising the topics in preferred order for the course can be beneficial for the instructor (Petrides et al., 2011). Using the search features in the digital OER materials is helpful when referencing specific content in class and to keep the students on task (Abaci et al., 2015).

The convenience of not having to rely on commercial or traditional textbooks because they have not arrived in time for the first week of class, students not purchasing the course materials because they cannot afford them, and the challenges of students using older (thus cheaper) editions are eliminated with the adoption of OER textbooks (Chae and Jenkins, 2015; Abaci et al., 2015). It is important to note that some students still consider the convenience and familiarity of print copies of their course materials also citing the advantages of portability and ease of use (Annand, 2008).

Professional development for faculty or training on the use of OER for students is key to implementation success. Technical support has been cited as critical to overcoming potential barriers as well (Chae and Jenkins, 2015). In her article 'Affordable learning at scale with OER', Schaffhauser recounts an OER leader stating, "provide as much training and information as possible for your faculty team up front before they start building their OER courses.... because it will eliminate some trepidation" (Schaffhauser, 2015). Chae and Jenkins (2015) have recommended setting up an encouraging climate for the use of OER. Professional development should include training on selecting and integrating OER into curriculum. Collaborative partnerships on campus between stakeholders for support is imperative. The need for incentives for the faculty to consider engaging in and sustaining their OER adoption effort (Chae and Jenkins, 2015) is as important as providing support for the range of student technology awareness and skills. Universities should provide ongoing student technology training on digital literacy to support their academic success.

Much of the OER research focuses on the benefits of OER, and it encourages faculty to reflect on their potentially improved teaching and learning experiences and impact as a result (Petrides et al., 2011; Annand, 2008; Allen and Seaman, 2014). For example, in the Washington study, several faculty shared that through their adoption of OER textbooks and materials, they needed to rethink their instructional style and course setup. In addition, it afforded them the opportunity to adapt to the OER materials and adjust their teaching style (Chae and Jenkins, 2015).

We are seeing steady growth of the awareness and adoption of OER textbooks and materials because the cost of course materials is the biggest driver for faculty (Grajek, 2013; Petrides et al., 2011). A growing number of faculty believe in implementing OER to provide equal access to all their students on the first day of class (Hilton, 2016).

An unexpected cost factor for first-year students is that they spend more on their course materials because they lack the experience or mentoring on how to manoeuvre college (Massie, 2015). Many of the first year students are also first generation students who spend more on textbooks than non-first generation students (Hill, 2016). Because many first generation students do not have anyone in their world who have attended college or university, they lack the cultural capital to be efficient and cost savvy (Caufield, 2016). First generation students and textbook costs can negatively impact students' learning experiences and their time to graduation (Hill, 2016). Thus, one could argue that reducing textbook costs to zero could potentially increase persistence rates, retention, and graduation (Fischer et al., 2016).

3 Methodology

The purpose of this research was to investigate issues with adoption of OER textbooks in university courses. The approach was to find faculty willing to adopt all or part of an OER textbook in their courses and then support them with monthly discussion webinars. Faculty were also asked to build and share an e-Portfolio of their experience adopting and implementing OER textbooks. At the end of the study, faculty participated in a survey about specific aspects of teaching with OER. Faculty received a $1,000 stipend for participation in the study.

Table 1 Courses adopting OER chapter(s) and texts

Business communication	Introduction to sociology
Ecology	Introductory statistics
English	Lifespan development
History of graphic design	Marketing principles
History of US to reconstruction	Physics
Human communication	Principles of biology
Human development	Public speaking
Humanities	Trigonometry

All participants had previous knowledge of OER textbooks and materials and were willing to adopt at least one chapter of an OER textbook. Most faculty adopted more than that, with the exception of one. Six faculty were from the CSU state university system and nine were from CCC community colleges. Full-time and adjunct faculty were equally

represented. Table 1, shows the diversity of the subjects taught by the faculty participating in the study. Nine of the faculty reported having prior experience with OER, while seven faculty had no experience.

4 Results

4.1 OER textbook design and editorial conventions

Survey questions about the OER textbook subject matter relate to the clarity, currency and relevance and cultural sensitivity of the material used in the textbook. Faculty overwhelmingly agreed that the OER materials met these criteria (Table 2). Regarding quality of OER textbooks, this result shows that faculty in the study were able to find materials that fit their subject matter and used examples, terminology and timely materials, just as one would expect from a traditionally published textbook. Just as for-profit publisher textbooks have a range of quality, OER textbooks are no different, with the exception that OER textbooks may be harder to discover.

Table 2 Faculty perceptions of OER textbook subject matter

	The OER uses sufficient and relevant examples to present its subject matter	*The OER uses a clear, consistent terminology to present the subject matter*	*The OER reflects current knowledge in the subject matter*	*The OER presents its subject matter in a culturally sensitive manner*
Strongly agree	10	13	11	7
Slightly agree	4	3	5	3
Neutral	1	0	0	6
Slightly disagree	1	0	0	0
Strongly disagree	0	0	0	0

Many faculty agreed that searching for course materials from the traditional publishers is less difficult than locating OER, although they admitted that the effort to find any resource and integrate them into their courses was significant (Allen and Seaman, 2014). A key finding of this study is that the majority of faculty reported the "difficulty in searching and the lack of a comprehensive catalogue on OER materials were important barriers to their use of OER." This became a key goal of the CAOERC: finding high-quality OER texts and making them available in the centralised repository Cool4Ed.org.

The design of the textbook can help textbook adoption in several ways. Primarily, the OER textbook needs to closely support the existing learning objectives of an existing course. Faculty would not adopt a calculus textbook that did not cover differentiation or a communication text that did not cover recognising and understanding communication styles. The closer the textbook is to meeting the course objectives, the less time faculty are required to spend on developing the course. The OER textbooks used in this study were selected by the faculty because they felt that the OER textbooks strongly supported the learning objectives of the course. Not surprising, 16 faculty rated the textbooks as being well aligned with the course objectives (Table 3). Likewise, the reading level of the

textbook was rated mostly as appropriate for undergraduate students (14 agreed, 1 neutral and 1 slightly disagreed). Two faculty rated their OER textbook as not representing the best practices in instruction for the discipline. Though, one of the textbooks rated as "not representing best practices" (introduction to sociology) received high ratings on most of the other questions in the survey. The other poor rating on best practices (for marketing) was a web-based textbook that clearly did not meet the needs of the faculty member.

Table 3 Faculty perceptions of OER textbook design

	The OER textbook materials/chapter(s) supported the learning objectives for the part of the course in which they were used	*The OER textbook materials/chapters(s) presented the subject material at appropriate reading levels for undergraduate use*	*The OER textbook chapter(s) reflect best practices in the instruction of the designated course*
Strongly agree	12	10	8
Slightly agree	4	4	4
Neutral	0	1	2
Slightly disagree	0	1	2
Strongly disagree	0	0	0

Table 4 Faculty perceptions of OER editorial conventions

	The language of the OER textbook chapter(s) was free of grammatical, spelling, usage and typographical errors	*The OER textbook chapter(s) adheres to effective principles of design (e.g., pages are laid out clearly and the book is visually engaging)*	*The OER textbook chapter(s) uses conventional editorial features (e.g., table of contents, glossary, citations)*	*The OER textbook chapter(s) used multimedia elements effectively (e.g., graphics, animations, audio)*
Strongly agree	11	6	10	4
Slightly agree	3	5	5	5
Neutral	1	2	0	3
Slightly disagree	1	3	0	1
Strongly disagree	0	0	1	3

Faculty gave very high marks to the OER textbooks in editorial conventions such as correct spelling and grammar and use of conventions such as contents and glossary (Table 4). Fewer faculty 'strongly agreed' that the OER textbook used was visually clear and engaging. Three faculty 'slightly disagreed' that the textbook was visually clear and engaging. Faculty experiences with multimedia in the adopted OER textbooks were mixed. Three faculty 'strongly disagreed' that multimedia was used effectively in the book they adopted, in courses in English, human development and trigonometry.

It is possible that the question was poorly worded. Asking if multimedia was required for a textbook or if multimedia was necessary for ancillary materials may have made more sense in examining fit of content to the discipline. Instead "the OER textbook chapter(s) used multimedia elements effectively (e.g., graphics, animations, audio)." would correctly generate a response 'strongly disagree' if no multimedia was used.

In the three formats represented in this study (PDF, video, and web-based text), a web-based textbook has a clear advantage in providing multimedia content. A PDF textbook typically would only support hyperlinks as a link to different types of multimedia content. If text from the web or a PDF is printed by a student, the use of multimedia integrated with the textbook or linked to it is impossible. If multimedia elements are a significant part of the interaction with the text, it is important to understand if students have a way to access e-textbooks (home, library, laptop with wireless capabilities).

In adopting an OER textbook, a faculty member may be required to explain how to find, use, and annotate the text. They may also need to assist students in finding a hard copy or a way to access the textbook if they do not own a computer. There may also be technical issues that a faculty member has to troubleshoot.

Table 5 Faculty ratings of ease of implementation of OER text

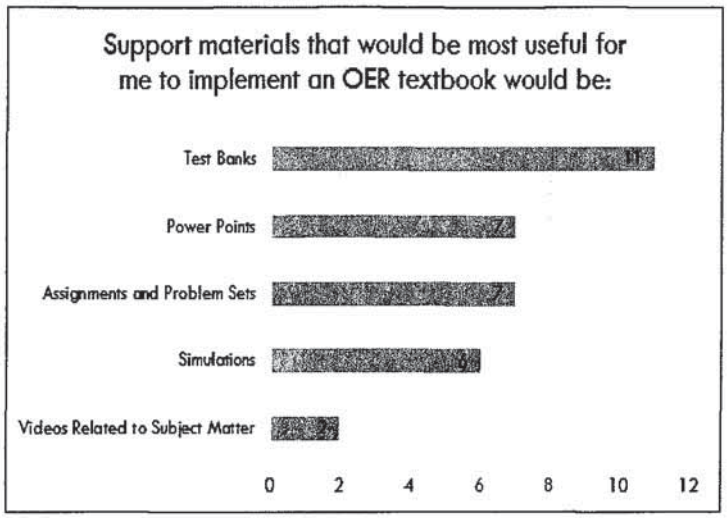
	It was easy for me to make the OER textbook chapter(s) available for students to use	*I had students who had technical problems accessing the OER textbook in my class*	*The work I had to do to explain how to access to the OER textbook was significant*
Strongly agree	14	0	0
Slightly agree	1	2	2
Neutral	0	1	3
Slightly disagree	1	2	5
Strongly disagree	0	11	6

The faculty in this study found it easy to explain the use of the OER textbooks to the students (Table 5). Only a few people reported difficulties using the OER. Of the two who identified problems, one professor was working with a student with a disability in the class. In this particular course, the textbook was a website, not a PDF. This particular site did not have accessibility conventions, such as alternative text and video captioning.

The widespread use of PDF as a file format may be a partial reason for the successful introduction of OER to the classroom. When asked if it was difficult to explain accessing the OER textbook to the students, results indicate that most faculty had no trouble.

Having a textbook that is searchable is an advantage that a digital textbook has over a traditional textbook. Eleven of the faculty reported that their OER textbook was searchable. A Website based textbook might be difficult to search, considering the content may be distributed over hundreds of different web pages. For a web based text, the student may navigate the content via headings but cannot search the entire site.

Figure 1 Support materials most useful to faculty (see online version for colours)



4.2 OER textbook support materials

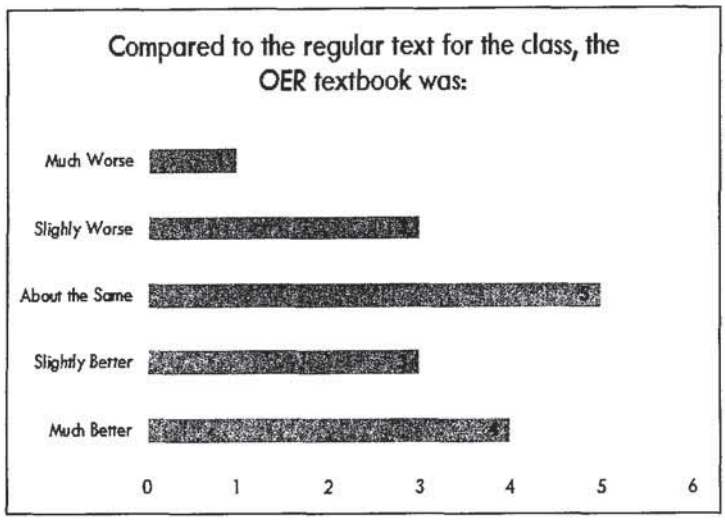
Many academic textbooks published by a traditional publisher come with a wide range of ancillary materials. The support materials often include Power Point presentations, test banks for each chapter and video or exercise support materials. For a faculty member teaching a course for the first time, high-quality support materials can significantly reduce the preparation time for the course. For large courses, it enables departments to offer a consistent course content, and it lets them orient adjunct faculty without a tremendous workload.

Table 6 Faculty experiences with of OER support materials

	The quality of the OER textbook support materials supported student learning	*It took a significant amount of time to implement the OER textbook support materials*
Strongly agree	3	2
Slightly agree	2	2
Neutral	3	1
Slightly disagree	4	3
Strongly disagree	2	3

Faculty had mixed ratings on the quality of the OER support materials and on the time required to implement the OER support materials (Table 6). Faculty were also asked to identify what type of support materials they would find most useful. Having a test bank was identified as the most useful item (Figure 1). One person remarked that having the free textbook was enough, the quality of the support materials would follow later.

Figure 2 OER compared to the traditional text for the course (see online version for colours)



4.3 OER comparison to traditional textbooks

Faculty were asked to evaluate quality of the text, the quality of student learning and preparation time, comparing the OER to the traditional textbook. Faculty were also asked to reflect on how this experience may have influenced their teaching. In comparing the two textbooks, faculty were mostly in favour of the OER textbooks (Figure 2). Only four of 16 faculty felt that the OER textbook was worse. Five faculty members rated the difference as neutral, while seven reported that the textbook was slightly or much better than the traditional textbook.

When asked to compare the OER textbook with the traditional textbook for the course, the majority of faculty agreed that the OER was thorough and complete compared to the traditional textbook. The majority of faculty agreed that the students learned as well with the OER textbook in comparison to the traditional textbook for the course (Table 7).

One faculty member 'strongly disagreed' that the students learned as well. The data shows that the faculty member evaluated the textbook to be slightly worse than the traditional one used in the course and that the faculty member also had issues with the quality of the support materials and the time it took to prepare the materials. It may be that the OER textbook selected was not of high-enough quality in several areas to justify replacing the traditional textbook. The faculty member indicated that s/he remained positive about adopting a free or low-cost OER textbook once one was available.

Table 7 Student learning compared to traditional textbook

	Compared to the regular textbook, the OER textbook materials were thorough and complete in presenting the required topics and competencies	*Students learned as well with the OER textbook as with the regular text from the class*	*The OER textbook chapter(s) took the same amount of time to prepare as a traditional textbook for the class*	*Compared to other textbooks, the OER textbook chapter(s) were easy to integrate into my course*
Strongly agree	6	5	6	7
Slightly agree	6	5	1	2
Neutral	2	3	2	5
Slightly disagree	2	1	7	2
Strongly disagree	0	1	0	0

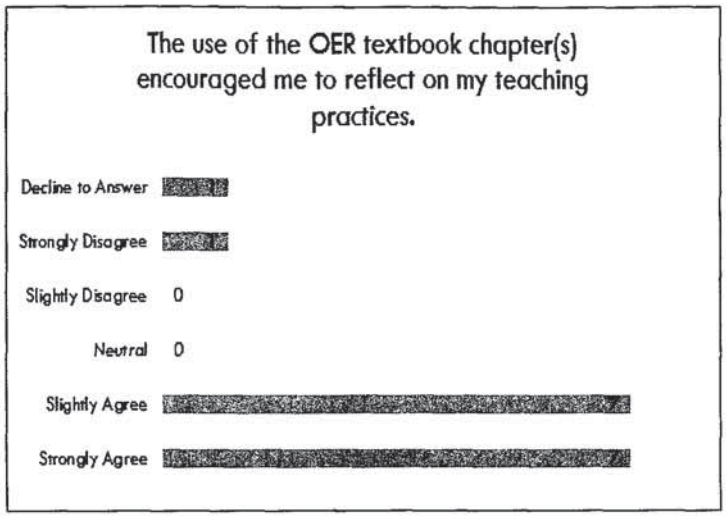
Results were mixed on the issue of preparation time to implement the OER textbook. Looking into this question further with the filter of OER type reveals that faculty may have had an easier time implementing a PDF as compared to a book website. While only 16 people participated in this study, the faculty using websites had a more negative rating of preparation than those using PDFs. The three faculty reporting 'disagree' on the PDFs were faculty that implemented significant amounts of the OER textbook.

4.4 Influence on teaching and future use of OER

Studies on the influence of OER textbooks and teaching materials having a positive impact on teaching are just beginning (Weller et al., 2015). The results of this study support that (Figure 3). Fourteen of the 16 faculty reported that using an OER textbook encouraged them to reflect on teaching. Implementing an OER textbook, or a new textbook, clearly takes time and effort to adapt the materials. However, the open-copyright nature of the OER textbook could give faculty the freedom to modify and enhance the materials based on their years of expertise in the discipline.

The OER movement often states that the future of OER textbooks and open culture is to reuse, revise, remix, and redistribute OER materials (Wiley, n.d.). Faculty who participated in the OER textbook adoption study were highly positive about their interest in adopting an OER textbook in the future (reuse) (Table 8). When asked about their desire to change (revise) a textbook for their own purposes, 14 faculty responded positively. When asked if they would be interested in sharing what they created with the OER community, 12 of faculty expressed a desire to do this.

Figure 3 OERs impact on the practice of teaching (see online version for colours)



During the study, faculty had several opportunities to give written responses. From the comments, the largest obstacle to OER adoption that faculty reported was having enough time to find and implement an OER textbook. "The biggest challenge was supplementing the textbook with my own handouts, writing prompts/assignments, and particularly chapter review and critical thinking questions." Other reported having to adjust the OER text to fit with their particular course.

Table 8 Future use of OER textbooks

	Based upon my experiences in this class, I would be interested in fully adopting an OER textbook	*I would be interested in adopting an OER textbook with a copyright that allowed me to alter the text for my own purposes*	*I would be interested in sharing materials that I created for an OER textbook with other faculty using the text*
Strongly agree	11	12	8
Slightly agree	2	2	4
Neutral	1	1	3
Slightly disagree	1	0	0
Strongly disagree	1	1	0
Decline to answer	0	0	1

4.5 Insights from faculty e-Portfolios

Prior to this project, faculty participants agreed to produce publically available, e-Portfolios describing their OER adoption experiences. The e-Portfolios are posted with other OER adoption portfolios on the Cool4Ed.org website. The impact of OER textbooks on teaching and learning was measured by the e-Portfolio instructors according to four indices: collaboration with other faculty; use of a wider range of teaching materials; improvements in student learning; improvement of student retention. Instructors also indicated whether they had seen any unexpected results in their use of OER textbooks.

There was only one measure which showed a clear positive; 11 out of 15 faculty reported using a wider range of teaching materials when they adopted OER textbooks. Most faculty (11 out of 15) did not find increased collaboration with other faculty. About half of the faculty reported unexpected results of their OER textbook adoption but there was no description of these unexpected results.

When instructors did broaden the range of their teaching materials, the digital media of the OER textbook encouraged this wider range. For instance, two instructors reported using videos linked to the textbook. Other instructors linked the textbook to internet resources. For example, one instructor added primary sources, available on the internet, to the textbook.

Although faculty generally do not report increased collaboration through OER textbook adoption, at least two instructors cite the OER itself as a catalyst for collaboration. For example, one professor sought help from colleagues in locating an appropriate OER textbook. Another shared the same OER textbook with an instructor for a different course section and, so, traded notes and reactions to the textbook.

Although most instructors could not attribute any improvements in student learning or retention to OER textbook adoption, a handful did indicate some learning improvements. These ranged from 'improved grammar' to one report of '87% of students' producing 'superior assignments'. At least one instructor cited the low cost and greater accessibility of the OER textbook as a possible factor in improved student learning: "I will say that since the textbook was free and easily accessible ... [this] could have led to an overall increase in the number of students who learned the text." Another instructor notes that the digital media of the OER textbook and availability on devices like the iPad increased student engagement and, hence, retention.

Faculty found that OER was pedagogically advantageous. They noted that creating lecture slides for some OER was easily accomplished. OpenStax Publishing, for instance, provides images as separate downloadable files. One faculty reported that while students tend to not take the time to read and refer to images when they are using physical textbooks, OER material in video form overcame this issue as the students were presented with the images while voiceover provided information. OER advantages included search-ability, direct links, and other features that are not replicable in a physical textbook. Faculty expressed appreciation for the support they received for this project to make adjustments and improvements to their courses that they had thought about for a long time, but never had the support to push to implement.

Only one instructor reports making significant changes to his or her curriculum. Most of the curricular changes noted by the instructors were minor and of the sort typically required by adoption of any new textbook. These minor revisions included: adding new

quizzes and assignments, adding new modules or lessons, and adjusting lectures. For instance, one instructor describes that "lessons on genre, grammar, prewriting and revision, as well as research have been adapted to incorporate this text." Another says, "I have added a short-answer writing assignment based on the addition of the supplemental chapter."

The instructor who reported making significant changes to the class curriculum does raise a significant issue. She states: "Faculty workload increased upon adoption of the new textbook in order to (re-)create and re-organize lectures (about an hour per week), homework assignments (about an hour per assignment) and quizzes (about an hour per quiz)." The instructor estimates that these changes required an extra two to four hours a week of instructor-time. Again, this workload increase might happen with any new textbook adoption. On the other hand, the possible workload increases associated with a transition from print to digital textbook (for those instructors who adopted a digital version of the open textbook) should be recognised.

5 Conclusions

The results of the faculty survey showed that faculty had high ratings of OER textbook content, design and editorial conventions. Faculty who participated in this study found that OER textbooks were easy to implement and make available to the students. When it came to the support materials, such as Power Point presentations or test banks, the faculty were less satisfied. This came through in their e-Portfolio comments along with other concerns about having the time to implement OER textbooks. When comparing the OER text to the traditional textbook for the course, four faculty rated the OER text as 'worse', seven as 'better' and five as 'about the same'. Not surprisingly, an OER text that meets the student learning outcomes of a class is very much like a traditional textbook, except in one regard, it's free.

A nice result was that 14 of the 16 faculty reported that the OER caused them to be more reflective about their teaching. Making OER textbooks into a familiar option for faculty and common experience for students requires adequate, consistent support. AB 798 and its OER Adoption Incentive Program represent an important step forward in this commitment. However, more may be required. Campuses and systems might need to consider durable incentives and types of recognition for OER activity similar to the CSU's Affordable Learning Solutions initiative. Long-term financial support might be achieved through a variety of configurations: direct State funding; system-wide budgeting; campus-based instructionally-related funds; campus or system-wide student micro-fees. In any case, no OER textbook initiative can survive, much less prosper, without fiscal nutrition (Hanley and Bonilla, 2016).

OER in general suffers from a lack of recognition, a lack that the CAOERC spent a considerable amount of time attempting to overcome. Faculty are often already using OER materials but are not aware that they are participating in OER. Though proponents of OER have been working to publicise OER as well as open access, OER in general still suffers from a lack of extensive outreach and education. Rather than OER textbooks and materials needing further infrastructure, education about existing OER resources and materials needs to be widely distributed across colleges and universities.

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