60×30TX
Texas Higher Education Coordinating Board

Academic Quality and Workforce

A Study on the Feasibility of a Texas Repository of Open Educational Resources

Senate Bill 810, 85th Texas Legislature, Regular Session

DRAFT

July 2018

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Texas Higher Education Coordinating Board

Agency Mission

The mission of the Texas Higher Education Coordinating Board (THECB) is to provide leadership and coordination for the Texas higher education system and to promote access, affordability, quality, success, and cost efficiency through *60x30TX*, resulting in a globally competitive workforce that positions Texas as an international leader.

Agency Vision

The THECB will be recognized as an international leader in developing and implementing innovative higher education policy to accomplish our mission.

Agency Philosophy

The THECB will promote access to and success in quality higher education across the state with the conviction that access and success without quality is mediocrity and that quality without access and success is unacceptable.

The Coordinating Board's core values are:

Accountability: We hold ourselves responsible for our actions and welcome every opportunity to educate stakeholders about our policies, decisions, and aspirations.
Efficiency: We accomplish our work using resources in the most effective manner.
Collaboration: We develop partnerships that result in student success and a highly qualified, globally competent workforce.
Excellence: We strive for excellence in all our endeavors.

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Executive Summary

During the 85th Texas Legislature, Regular Session, the Texas Higher Education Coordinating Board (THECB or Coordinating Board) was directed to undertake a study to determine the feasibility of creating a state repository of open educational resources (OER), as described in the Texas Education Code (TEC), Section 61.0669 (see Appendix A).

Texas Education Code, Section 51.451, defines OER as "a teaching, learning, or research resource that is in the public domain or has been released under an intellectual property license that permits the free use, adaptation, and redistribution of the resource by any person. The term may include full course curricula, course materials, modules, textbooks, media, assessments, software, and any other tools, materials, or techniques, whether digital or otherwise, used to support access to knowledge."

Most of the feedback solicited during the study suggests that a Texas Repository of Open Educational Resources would be feasible given appropriate resources. However, due to significant developments in OER initiatives, there is little need to reinvent the wheel by either reviving the former Texas Learning Object Repository (TxLOR) or creating a new one. Instead, Texas can capitalize on other robust, high-quality repositories now in existence. This could be the most cost-effective means for OER to become a strategy to help support the goals of *60x30TX* by providing, for example, no-cost textbook options to students to help them lower the costs of higher education and even persist.

After an analysis of the current research on OER repositories and the practice of their development and use, Coordinating Board staff, in consultation with faculty and staff at Texas public institutions of higher education, relevant state agencies, textbook publishers, representatives of the OER community, and other stakeholders, makes the following recommendations regarding the feasibility of creating a statewide OER repository:

1. Develop an open statewide portal where existing available OER can be accessed by faculty members, students, and others.
2. Work with OER Commons or Texas Digital Library to develop and maintain the statewide portal.
3. Ensure that the portal links to repositories including a wide range of open resources.
4. Incentivize faculty to adopt resources through the portal, to contribute new or adapted resources to repositories available through it, and to submit reviews/evaluations on the portal of resources used.
5. Require any resources developed with state funds be contributed to a repository available through the portal and be licensed through a Creative Commons license.
6. Provide sufficient resources to create a long-term integrated portal and resource awareness program.
7. Create a state OER Council to oversee and promote the use of OER statewide.
8. Fund a new position of state Director/Coordinator of OER (either at the THECB or the Texas State Library & Archives Commission).

A list of the recommendations with more explanation begins on page 13 of this report.

Introduction

Legislative Directive

During the 85th Texas Legislature, Regular Session, the Texas Higher Education Coordinating Board (THECB or Coordinating Board) was directed to undertake a study to determine the feasibility of creating a state repository of open educational resources (OER) as described in the Texas Education Code (TEC), Section 61.0669 (see Appendix A).

The Rising Costs of Textbooks and Other Educational Resources

The rising costs of textbooks and other educational resources used in higher education are now well documented. Senator Kolkhorst, the author of the legislation mandating this study, cited a 2012 American Enterprise Institute report in her introduction of Senate Bill (SB) 810 during the Senate Higher Education Committee hearing on March 29, 2017.

The report estimates that college textbook prices increased by 812 percent between 1978 and 2012, and that during the same period, the Consumer Price Index rose by only 250 percent (Perry, 2012). According to 2013 data compiled by The College Board, the average amount spent by students at public and private colleges and universities on books and supplies ranged from $1,207 to $1,253 per year. For students at public two-year community colleges, textbooks and supplies equaled approximately 39 percent of the costs of tuition and fees (Baum & Ma, 2013, p.11).

Although the National Association of College Stores reported that annual spending on textbooks declined by an average of $63 from 2007 to 2014 due to students increasingly turning to textbook rentals and digital materials, the costs of textbooks remain high. And data from that same association indicate that first-generation college students may be less familiar with such alternatives, paying on average 17 percent more per textbook than other students (Hill, 2016).

The effect of increasingly expensive educational resources on college students' ability to afford higher education and complete a credential also is no longer arguable. Significant research and data now exist on the impact of these dramatically rising costs. A survey of 2,039 students from more than 150 different university campuses by the Student Public Interest Research Groups (PIRG) and U.S. PIRG Education Fund found that 65 percent indicated that they had decided against buying a textbook because of the cost. However, 94 percent of the students surveyed were concerned that their grades would suffer as a result. Additionally, 48 percent indicated that the cost of textbooks impacted their decision to take a course, sometimes decreasing the number of courses in which they enrolled. Strikingly, 82 percent of students felt they would do *significantly better* in a course if the textbook was available free online and buying a hard copy was optional (Senack, 2013, pp. 4-5).

At least one study also indicates that less than half of students purchase the current edition of their textbook, potentially opting for older, cheaper editions, often with out-of-date information (Book, 2013). And in a 2016 Florida Virtual Campus survey of 22,000 students in that state, two-thirds of the respondents failed to purchase at least one of their required course textbooks, with 38 percent indicating they earned a poor grade as a result. Furthermore, 48 percent of respondents had taken fewer courses, 26 percent had dropped a course, and 21

percent had withdrawn from a course, all reportedly due to cost (Florida, 2016). As Allen (2016) **admonishes, "Students can't learn from books they can't afford."**

OER as a Possible Solution

One remedy to rising costs has been open educational resources. [Texas Education Code, Section 51.451](), defines OER as:

> a teaching, learning, or research resource that is in the public domain or has been released under an intellectual property license that permits the free use, adaptation, and redistribution of the resource by any person. The term may include full course curricula, course materials, modules, textbooks, media, assessments, software, and any other tools, materials, or techniques, whether digital or otherwise, used to support access to knowledge.

Similarly, one of the primary funders of OER in the United States, The William and Flora Hewlett Foundation (2014), describes them as:

> teaching, learning, and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use and re-purposing by others. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

UNESCO (2012) defines OER as:

> teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions. Open licensing is built within the existing framework of intellectual property rights as defined by relevant international conventions and respects the authorship of the work.

For preeminent OER scholar David Wiley (n.d.), central to any definition are five **components, known as the "5Rs," which provide users with free and perpetual permission to** engage in five crucial activities:

1. Retain **–** the right to make, own, and control copies of the content (e.g., download, duplicate, store, and manage)
2. Reuse **–** the right to use the content in a wide range of ways (e.g., in a class, in a study group, on a website, in a video)
3. Revise **–** the right to adapt, adjust, modify, or alter the content itself (e.g., translate the content into another language)
4. Remix **–** the right to combine the original or revised content with other open content to create something new (e.g., incorporate the content into a mashup)
5. Redistribute **–** the right to share copies of the original content, your revisions, or your remixes with others (e.g., give a copy of the content to a friend)

Central to OER is freedom **–** freedom of access to content, freedom from cost to access, and freedom to use in any way.

Thus, the advantages of OER use go beyond student cost savings to an adaptability, flexibility, and freedom that all serve to support more innovative pedagogy, better learning

outcomes, and increased student success. However, open and free are not synonymous, and the development, implementation, and maintenance of OER often require considerable resources. A now ubiquitous admonition in the field, riffing on a famous phrase about free speech, is that open is like a free puppy, not a free beer.[1]

When Wiley coined the term "open content" in 1998, he moved discussions on open platforms and open source software, which were already occurring, into the arena of higher education. With the establishment of Connexions, an educational repository and content management system at Rice University in 1999, OER in higher education took off. Funding from the William and Flora Hewlett Foundation primed the pump of a number of groundbreaking OER initiatives, including the Massachusetts Institute of Technology's OpenCourseWare and Carnegie Mellon University's Open Learning Initiative. A more complete history of OER up to 2014, including the development of Creative Commons open licensing and Massive Open Online Courses (MOOCs), can be found in the THECB report "A Study on Open Educational Resources and Their Potential for Use at Texas Colleges and Universities" (2014, pp. 5-8).

Since the 2014 report, several developments have cemented OER as a viable solution to rising costs of textbooks and other learning and instructional resources. A proliferation of (from the 15 described in that report to more than 30 now) national, state, and institutional OER repositories and initiatives, and the expansion of existing ones, is contributing to the accessibility of the resources and boosting faculty knowledge of them. The creation of entire degree programs using only OER also indicates an increased acceptance of this solution. For example, Tidewater Community College in Virginia became the first accredited institution in the U.S. to offer a degree in which students pay nothing for required textbooks. The TCC "Z-Degree" (for zero textbook cost) is an Associate of Science in business administration and saves students as much as $2,500. The federal Achieving the Dream Open Educational Resources Degree Initiative supported its development.

The goal of this initiative is "to boost college access and completion, particularly for underserved students, by engaging faculty in the redesign of courses and degree programs through the replacement of proprietary textbooks with open educational resources." The Open Educational Resources Degree Initiative — which involves 38 community colleges in 13 states — is attempting to lay the groundwork for nationwide adoption of OER Degrees. For example, Northern Virginia Community College's OER-based courses can be taken for a general education certificate or associate degrees in general studies or social sciences. In Texas, eight community college campuses are participating in the initiative, including Odessa College; and a consortium, led by Austin Community College, of Alamo District-Northeast Lakeview College, Alamo District-Northwest Vista College, Alamo District-Palo Alto College, Alamo District-San Antonio College, Alamo-District-St. Philip's College, San Jacinto Community College District, and El Paso Community College District.

A recent show of support from state and federal governments also may signal an uptick in the use of OER nationwide. On March 23, 2018, the U.S. Congress passed an appropriations bill that includes $5 million for a pilot open textbook grant program. The program will be administered by the U.S. Department of Education and will support projects at institutions of higher education that create new open textbooks or expand their use to achieve savings for students while maintaining or improving instruction and student learning outcomes. Also this spring, Virginia's legislature passed a bill that "[r]equires the governing board of each public

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[1] Attributed to Kenneth C. Green of Campus Computing in Bubinas (2014).

institution of higher education to implement guidelines for the adoption and use of low-cost and no-cost open educational resources in courses offered at such institution."

Cable Green, a leader in the OER movement, points out that OER are possible today because:

- educational resources are digital and digital resources can be stored, copied, and distributed for near zero cost;
- the internet makes it simple for the public to share digital content; and
- Creative Commons licenses (and public domain tools) make it simple and legal to keep one's copyright and legally share educational resources with the world.

Because OER are so possible and effective, he argues, educators and governments supporting public education have an obligation to support them (2017, p. 30).

Research on Impact and Outcomes

Perhaps the most compelling evidence to suggest that OER are viable alternatives to traditional, often costly textbooks and other learning and instructional materials, is the growing body of research on impact and outcomes. The OER Knowledge Cloud is a project gathering together all publications that relate to OER, and it has seen an increase in publications *per year* from three in 2001 to 183 in 2014. Much of this research suggests that OER are as effective as, or even more effective than non-OER.

Some studies focus in part, or entirely, on cost-savings. For example, in 2013 Bliss et al. studied open textbook adoption at eight different institutions of higher education, with 490 students and 58 instructors completing surveys regarding their experiences with OER. Although much of the self-reported data focused on perceptions of quality, comments included such statements as "Without this free text I would not be able to take this course" and "The materials were free to my students, which reduced a barrier to their chances for academic success." A 2015 study by Wiley et al. compared the cost savings in courses with sections that used OER and sections that did not. The average cost of $140.85 for commercial textbooks across the courses equaled a potential total cost of $1,324,017.68 for that sample, representing significant possible savings for students in the courses that used OER.

But surveys regarding quality and efficacy and studies on cost savings, while useful, fall short of providing empirical evidence regarding how OER support student learning. Since 2008, multiple studies have supported the argument that student learning outcomes (including exam and course grades, as well as failure and withdraw rates) remain largely the same for courses in which OER are utilized vs. courses using traditional textbooks and other non-OER learning materials.[2] For example, one case study at Scottsdale Community College examined OER use in four math classes, all of which used the same departmental exam for each course for several years. When OER replaced traditional learning materials in fall 2012, faculty members were able to compare how students performed on the exams when OER were used compared to prior semesters. Grades were approximately the same as those earned by students in fall 2011 and fall 2010 (Hilton, Gaudet, Clark, Robinson, & Wiley, 2013).

Experimental research in higher education is notoriously complicated, since withholding potentially beneficial learning activities or resources from a control group could be ethically questionable. Controlling for all variables is extremely difficult as well. However, several non- or quasi-experimental studies indicate that not only do OER have the same outcomes as non-OER,

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[2] See, for example, Lovett et al. (2008), Bowen et al. (2014), and Allen et al. (2015).

but also they actually can support *improved* learning outcomes. For example, researchers at Mercy College in New York found that when faculty integrated OER into math courses, the pass rates increased from 63.6 percent in fall 2011, when non-OER learning materials were used, to 68.9 percent in fall 2012 when all courses used OER.

A study of OER and non-OER sections of a reading course yielded similar results (Pawlyshyn, Braddlee, Casper, & Miller, 2013). A study at Houston Community College of introductory psychology courses compared 23 sections using open textbooks in the fall of 2011 with classes taught the following semester using commercial textbooks. The overall results indicated that students in the former group had a higher class GPA, a lower withdrawal rate, and higher scores on the departmental final exam (Hilton & Laman, 2012).[3]

Perhaps the most significant research yet, by Fischer, Hilton III, Robinson, & Wiley (2015) on the impact and outcomes of OER focused on its use by more than 16,000 students at four baccalaureate-granting institutions and six community colleges. The 15 courses examined, in a wide range of subjects, included sections in which either OER or commercial textbooks (the control group) were used. Outcomes studied included: rates of completion of courses; rates of passing courses with a C- or better grade; course grade, as measured by the numerical grade; and "enrollment intensity," or credit load.

For the first three outcomes, students whose faculty chose OER generally performed as well or better than students whose faculty assigned commercial textbooks. For the outcome of enrollment intensity, which is an indicator of student progress toward graduation, the researchers found that "[e]ven when controlling for differences in previous enrollment, students in courses using OER enrolled in a significantly higher number of credits in the next semester," suggesting that this may be due to "the cost savings associated with OER." They conjecture that students' lack of access to the core instructional materials for the non-OER course put them at an "academic disadvantage," and that the differences in enrollment intensity were likely "a function of affordability." The authors conclude:

> [we] do not believe differences of mode of delivery or instructional design between OER and commercial textbooks to be the primary mechanisms responsible for the differences in outcomes observed in this study. On the contrary, our informal review reveals strikingly similar, essentially equivalent instructional designs in the OER and commercial textbooks. We believe the effects demonstrated in this study result from differing degrees of access and affordability facilitated by open licenses used by OER.

However, additional high-quality, holistic research by neutral observers on impact and outcomes is needed. For example, the above studies focus largely on open textbooks, while OER can represent a wide range of educational materials, such as slide decks, websites, videos, and learning activities. One of the largest scale independent studies to date looked at learning outcomes in the Affordable Learning Georgia (ALG) initiative, implemented through grants to University System of Georgia faculty, libraries and librarians, and institutions to "transform their use of textbooks and other learning materials into using lower cost options."

The study found that the initiative helped students save money without negatively impacting learning outcomes (Croteau, 2017). As Hilton (2016) points out in his comprehensive overview of sixteen studies on OER efficacy and perceptions, "The decision to employ OER appears to have financial benefits to students (and the parents and taxpayers who support them) without any decrease in their learning outcomes. . . . researchers and educators may

need to more carefully examine the rationale for requiring students to purchase commercial textbooks when high-quality, free and openly-licensed textbooks are available**" (pp. 588**-89).

Taken as a whole, the existing body of research suggests that the significant return on investment (ROI) of OER makes it a particularly effective strategy to support all four goals of *60x30TX*. Having open access to affordable learning resources that reinforce and enhance pedagogy and learning outcomes from day one of a semester or term can support retention and completion, ensure that students are graduating with marketable skills when these are tied to the resources, and help students manage debt when they no longer must pay often significant amounts for textbooks.

Barriers to OER Adoption

If evidence points to OER supporting student learning outcomes as well as — and in some cases better than — traditional, commercial, non-open educational resources, and they lower the cost of degree attainment, thus supporting access, retention, and success, why are they not being more widely adopted? Several, not insignificant, barriers exist to their use.

Evidence of Efficacy. Although body of research on OER efficacy is beginning to amass, much more is needed, particularly experimental studies that control for as many variables as possible. Faculty members might still hesitate to adopt OER until more evidence is available that they do not negatively impact student learning outcomes and success. According to a 2017 survey of faculty by Seaman & Seaman, 28 percent were concerned about the quality of OER offerings. It is important to note, though, that little rigorous research exists on student learning outcomes using *commercially produced* textbooks either. But the extensive time and effort that it takes for faculty to find appropriate OER and redevelop courses using them likely raises the bar for demands for evidence of efficacy.

Intellectual Property Rights. Confusion over intellectual property rights when educational resources are open also contributes to hesitation about adopting them. Fortunately, growing awareness of [Creative Commons](#) (CC) licensing, increasingly ubiquitous for OER, is **alleviating much of those concerns. Founded in 2001, Creative Commons "develops, supports,** and stewards legal and technical infrastructure that maximizes digital creativity, sharing, and **innovation." Licensing materials under CC licenses does not mean that the author relinquishes** all rights; creators retain copyright while allowing others to copy, distribute, and make some uses of their work, at least non-commercially. CC licenses also ensure that creators receive credit for their work, and they can choose additional permissions regarding how their work can be used. Increasingly, governments and foundations are requiring grantees to license funder work products under open licenses.

Learning materials are only truly **"open" if users have been granted the explicit rights to retain, reuse, revise, remix, and redistribute them. CC licenses support those necessary "5Rs."** These actions in turn can support, potentially, a more innovative pedagogy, making their use advantageous for students beyond cost savings by promoting continuous improvement of instruction. However, that takes time that many faculty members may not have. If one views **"open" not as an adjective — "this open textbook is free for students" — but as a verb — "if we open this course it will be available to people around the world" —** as Biswas-Diener has suggested, then its potential for innovation and collaboration becomes more evident (2017, p. 259).

Time, Effort, and Cost to Develop, Maintain, and Market OER. Perhaps the most difficult barrier to OER adoption is the time, effort, and cost — often significant on all three

counts — that is required to develop them, find and assess them, use them to create or redevelop a course, and to maintain and, when needed, update them. In the survey of faculty cited above, nearly one half reported that "there are not enough resources for my subject," and 50 percent that it is "too hard to find what I need (Seaman & Seaman, 2017, p. 29)." With challenges such as heavy teaching loads, ambitious research agendas, contingent status, and lack of incentive from institutional administration or policy, transitioning to OER can seem daunting for faculty. Since OER often involve a transfer of costs from student to institution, financial resources and infrastructure also might be lacking, not only to develop but also to maintain the materials.

Even if "you build it," they still "may not come." In the 2017 survey of faculty, 56 percent indicated that they were generally unaware of OER, and only 10 percent reported that they were very aware. As one part-time business faculty member stated, "I am not fully aware of the content available through OER but I will take a look. I am always interested in getting the right materials into my students' hands" (Seaman & Seaman, p. 15-16). Jhangiani (2017) asserts in *Open: The Philosophy and Practices that are Revolutionizing Education and Science*:

> For open educational resources (OER) to become the default choice for the majority of faculty they will first need to learn of their existence. Unlike traditional publishers' textbooks, OER do not have a well-oiled marketing machine — there are no unsolicited and cumbersome packages clogging faculty mailboxes, no offers to sponsor research conferences or student events, no smiling faces knocking on office doors (p. 270).

Therefore, it is imperative that grant programs and other incentives to develop OER include realistic resources for marketing and promotion of the materials and/or the repositories and portals created to house, disseminate, and support discovery of them.

Appendix B outlines budgets for a number of existing OER initiatives, such as grant programs, OER councils, and in some cases, repositories. Although it is difficult to estimate total costs to develop, maintain, and market a repository specifically, the chart demonstrates that potentially they are not insignificant if one wants to effectively support sustainability. But as suggested by the increasingly extensive research on the efficacy of OER to support student success, overcoming these challenges is both possible and worth it, presenting substantial ROI.

National and International OER Repositories and Initiatives

As mentioned, the number of national, institutional, and state/system OER repositories and initiatives to support OER creation and adoption has increased considerably since 2014, from around 15 to more than 30 now. Below is a description of some of the most widely utilized repositories. For a list of additional collections and initiatives, see Appendix C.

Affordable Learning Solutions (AL$)

Affordable Learning Solutions at California State University "enables the discovery" of a wide array of affordable course content, including commercial publisher content, library resources, and OER. This includes open textbooks, course materials, online courses, and open access journals and articles in the California Open Online Library for Education (Cool4Ed). In 2016-2017, AL$ programs saved students approximately $36M in course material costs. AL$ partners include such institutions as the University of Georgia System.

The Florida Orange Grove

This statewide repository of OER resources is operated by the Florida Virtual Campus, which is funded by the Florida Legislature and administered by the University of West Florida. It is one of the oldest and largest statewide K-20 OER initiatives and includes open courseware, **open textbooks, 3D object models, learning modules, and videos. The repository "provides an** environment for educators to search for, use, remix, share, and contribute educational **resources" and also** can be integrated with various learning management systems.

Khan Academy

Created by Salman Khan in 2007, Kahn Academy has developed into an internationally renowned site with free instructional videos, exercises, and personalized learning tools. It offers resources in numerous disciplines and at all educational levels and also has been the subject of studies on its impact. For example, the New England Board of Education conducted a two-year study of Khan Academy with 1,226 students in developmental math classes at 12 community colleges in five states. The study suggests that Khan Academy resources help reduce the number of remedial courses a student needs to take.

Multimedia Educational Resources for Learning and Online Teaching (MERLOT)

In 1997, the California State University Center for Distributed Learning developed MERLOT. Two years later, four state higher education systems — The University of Georgia System, Oklahoma State Regents for Higher Education, University of North Carolina System, and the California State University (CSU) System — formed an informal consortium to further develop the project, with CSU providing operational leadership. By July 2000, twenty-three systems and institutions of higher education had become institutional partners of MERLOT. With more than 125,500 members, including over 50,000 students, and more than 80 institutional partners and affiliates, MERLOT currently contains more than 40,000 digital learning materials. Learning materials accessed through MERLOT can be retained, reused, revised, remixed, and redistributed.

National Repository of Online Courses (NROC)

NROC is a nonprofit organization that "partners with educators to create open and low-cost courses and tools designed to improve how college and career readiness is approached and

supported." Funded in part through the William and Flora Hewlett Foundation, the James Irvine Foundation, and the Bill and Melinda Gates Foundation, NROC and its companion site HippoCampus.org are free for both faculty and students to use. Additionally, for a fee, member institutions gain access to materials adapted specifically for their institutional use.

OER Commons

OER Commons is a digital public library and collaboration platform that offers a "comprehensive infrastructure for curriculum experts and instructors at all levels to identify high-quality OER and collaborate around their adaptation, evaluation, and use to address the needs of teachers and learners." OER Commons is managed by the Institute for the Study of Knowledge Management in Education (ISKME), an independent education nonprofit whose mission is "to improve the practice of continuous learning, collaboration, and change in the education sector." Established in 2002, ISKME is known as a pioneer and innovator in open education and assists policy makers, foundations, and education institutions in designing, assessing, and bringing continuous improvement to education policies, programs, and practice. States can create microsites under the aegis of OER Commons, branding in any way they see fit to suit the needs of the state. One example is Open Washington, a localized OER repository serving Washington state's community and technical college system.

OpenStax

In 1999, Richard Baraniuk of Rice University founded Connexions, an OER repository through which faculty around the world could publish, share, and remix educational materials. Now titled OpenStax, the nonprofit began publishing its first open, peer-reviewed textbooks in 2012 and now offers 29 books in numerous disciplines for college and AP courses used by hundreds of thousands of students. 70 percent of institutions of higher education in Texas have used at least one OpenStax textbook. Serving over 2 million students nationwide, OpenStax has saved them over $155 million. Institutional partners in Texas include Alamo Colleges District, Houston Community College, Tarrant County College District, and the University of Texas at San Antonio.

Open Textbook Library

The Open Textbook Library, managed by the Open Textbook Network (OTN), is a repository of peer-reviewed, openly licensed academic textbooks. Although the OTL is free to use and contribute to, "additional publishing support" is available to OTN members. Institutions can join OTN for a one-time first year programming fee of $5,000. Continued membership, which includes all community benefits, is sustained by an annual $1,500 community fee. Texas OTN members include Texas Tech University, University of Houston, University of North Texas, the University of Texas at Arlington, and the University of Texas of the Permian Basin.

SkillsCommons

MERLOT and California State University (CSU) also designed and manages SkillsCommons, a repository of free and open learning materials and program support materials for workforce development. More than 700 community colleges across the nation created the collection of over 12,000 OER with a $1.9 billion investment from the U.S. Department of Labor's Trade Adjustment Assistance Community College and Career Training (TAACCCT) program.

Texas Digital Library

The Texas Digital Library is a state repository of resources open only to member Texas institutions of higher education. Base membership fees per year range from $75,000 for doctoral universities to $2,000 for community colleges. In addition to access to the library, membership benefits include governance rights; participation in working groups, interest groups, and committees; and access to members-only email lists, webinars, and discounts. Currently, there are 22 member universities, both public and independent, but no community or technical colleges.

University of Georgia System Affordable Learning Georgia (ALG)

Like California, Georgia has one of the most comprehensive programs for OER access and support in the country (and was created in partnership with CSU). The University System of Georgia maintains Affordable Learning Georgia**, "a one**-stop service to help USG faculty and staff identify lower-**cost, electronic, free, and open educational resources." This includes the** OER repository Galileo Open Learning Materials. According to their **website, "Since ALG's funded** inception in Fiscal Year 2014-2015, all ALG programs have saved students a total projected $31.3 million in textbook costs, affecting **219,343 students."** They also have experienced more than 150,000 downloads since 2016.

Texas Learning Object Repository (TxLOR)

Perhaps most relevant to this study is the history (and suspension) of Texas' own OER repository, TxLOR. In 2009, The University of Texas (UT) System TeleCampus created TxLOR, funded by the THECB after a pilot project at University of North Texas. When the TeleCampus closed in 2010, TxLOR was transferred to the University of Texas at San Antonio and led by Dr. Rob Robinson. Upon his departure from UT-San Antonio in 2012, Dr. Sunay Palsole directed the project. The goal of **TxLOR was to create a "web application that provides a method for Texas higher education institutions to review and share a variety of learning materials," focusing** particularly on high-impact, general education and developmental education courses taught across Texas. The Office of Health Affairs at the University of Texas System provided one-time funding for TxLOR to share content developed for their health science institutions.

In 2014, TxLOR had 55 users registered as contributors or administrators from 23 Texas institutions and several contributors from outside Texas (such as SUNY Binghamton) (THECB, 2014, p. 27). By 2015, TxLOR contained 1,502 learning objects, up from the 1,065 objects contained in August 2013. From 2011-2015, TxLOR had seen 5,182 searches resulting in 309,251 item views. Among the objects with the most usage were learning resources for United States History I and II, Chemistry, and Statistics. The average views per item was 225 (Palsole & Sebesta, 2015).

Figure 1. TxLOR Homepage

Because the general education content was available only to Texas public institutions of higher education, and resources developed through funds from the UT System were available only to faculty at schools within that health sciences system, TxLOR was not, technically, an open repository. Another limitation became that, while faculty, who were the primary drivers behind its use, contributed objects, they generally did not update them, an important continuous improvement process.

In its 2014 report on OER in Texas, the Coordinating Board recommended that TxLOR be expanded. Outlining several goals for the expansion, the report also suggested that additional funds would be needed. However, TxLOR was suspended in 2014. Ultimately, the lack of ongoing funding led it to being underdeveloped and under-marketed, with a total investment of only $75,000, plus in-kind support from UT-San Antonio and the Texas Digital Library, and no funds for sustainability.

In 2014, Palsole developed a proposal for the Texas Workforce Commission to use TxLOR. The budget included a minimum of $279,000 for the first year to update the technology and build out additional features, about $100,000 each year for subsequent years. He points out that year one expenses would now be higher and difficult to estimate since the project is completely retired and would need to be resurrected from scratch (S. Palsole, personal communication, May 21, 2018.)

The Feasibility of a Texas Repository of Open Educational Resources

In conducting the study for this report, Coordinating Board staff engaged in extensive research into OER policy and practice, building on information included in the 2014 OER Coordinating Board report. They also collaborated with a variety of stakeholders to gain their input from diverse perspectives, including faculty and staff from public institutions of higher education, relevant state agencies, textbook publishers, representatives of the open educational resource community, and others. Soliciting their feedback and insight included holding a day-long meeting at which experts in the field gave presentations and led discussions on the feasibility of a statewide OER repository (see Appendices C and D for meeting agenda and attendees).

Most of the feedback solicited suggests that a Texas Repository of Open Educational Resources would be feasible given appropriate resources. However, due to significant developments in OER initiatives since the creation and suspension of TxLOR, there is little need to reinvent the wheel by either reviving that repository or creating a new one. Instead, Texas can capitalize on other robust, high-quality repositories now in existence. This could be the most cost-effective means for OER to become a strategy to help support the goals of *60x30TX*.

Therefore, the Coordinating Board makes the following recommendations regarding methods by which OER would be gathered and curated, measures to ensure public access to the repository, methods of encouraging the use of the repository, management of intellectual property rights, **and other measures necessary to ensure the repository's success.**

1. *Develop an open statewide portal through which existing available OER can be accessed by faculty members, students, and others.*

The current availability of extensive OER through many high-quality repositories renders the need to resurrect TxLOR or create a new repository obsolete. Materials that were housed on TxLOR could be migrated to one of the existing repositories. Resources available through the portal should be searchable, using localized, user-friendly metadata, by course and learning outcome (especially those found in *the Lower-Division Academic Course Guide Manual* or ACGM); Programs and Fields of Study; marketable skills; college readiness; and the like. They also should be accessible, following standards for ADA compliance. The portal should include a system for tracking faculty adoption of OER and student use of the resources.

2. *Work with OER Commons or Texas Digital Library to develop and maintain the statewide portal.*

Two of the most viable, cost-effective options for creation of the portal include partnering with:

a) OER Commons, which is an international digital public library and collaboration platform managed by ISKME, a nonprofit innovator in open education. A state OER Commons **"microsite" can be branded specifically for Texas as well as customized to meet the** needs of individual institutions of higher education. OER Commons also offers such services as faculty development and training and social sustainability through its extensive network of users. Options also include, where needed, links to proprietary, commercial learning resources, and the Commons also enables interoperability with all

the major Learning Management Systems utilized at the various campuses in Texas. As of this writing, the cost to become a microsite of OER Commons would be $87,000 in set-up fees, including the first-year service plan, plus $20,000/per year after the initial year service plan for up to 100,000 registered users and unlimited anonymous users.

b) Texas Digital Library (TDL), which is a state repository of resources open only to member Texas institutions of higher education. TDL also builds and manages individual repositories for member institutions. Additionally, they have the capability to develop a statewide portal, given additional resources to do so, through which a wide range of repositories containing OER could be accessed, with search function customization possible to include a variety of metadata appropriate for Texas and its institutions (e.g. searching by learning outcomes, etc.). A minimum of $300,000 would be needed for staff and technology to develop a customized site, with at least $100,000 required annually for ongoing maintenance. Staff needed would include a full-time OER Director (see recommendation below), a full-time developer (the first year), and a part-time system administrator on an ongoing basis (K. Park & D. Plumer, personal communication, May 22, 2018).

3. *Ensure that the portal links to repositories including a wide range of open resources.*

OER include textbooks, like those offered by OpenStax, but they also include a wide range of other resources, such as full courses, course materials, modules, images, videos, assessments software, and any other tools, materials, or techniques used to support learning. These should all be accessible through the portal.

4. *Incentivize faculty to adopt resources through the portal, to contribute new or adapted resources to repositories available through it, and to submit reviews/evaluations of resources utilized.*

Grant programs, like the OER grant program, created in 2017, found in TEC, Section 61.0668, can be an effective means to incentivize faculty. The THECB cautions against mandating these activities in favor of encouraging them through incentives such as grants.

5. *Require that any resources developed with state funds be contributed to a repository available through the portal, and that they be licensed through a Creative Commons license.*

Using one of the most "permissive" CC licenses will ensure that faculty can retain, reuse, revise, remix, and redistribute the OER, capitalizing on the pedagogical advantages of OER use while still allowing creators to receive credit for their work.

6. *Provide sufficient resources to create a long-term integrated portal and resource awareness program.*

Simply building the portal will not ensure that faculty and students use it; significant resources need to be allocated to communicate the existence of, and benefits to students in the use of, the portal and OER available through it. This should include training for faculty in effective use of the portal and the materials available through it, harnessing the experience and skills of campus librarians and instructional designers to do so when possible. Professional development materials, such as materials on how to find and evaluate OER, how to develop and

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distribute OER, how to incorporate OER into a course, and how to create degree programs that use only OER, should be included as well. Numerous organizations/groups across the state also could assist with awareness; some of these include the Texas Community College Teachers Association, the Texas Distance Learning Association, the Texas Association of College Technical Educators, the Texas Faculty Association, Independent Colleges & Universities of Texas, Texas Council of Academic Libraries, Learning Technologies Advisory Council, Texas Association of Community Colleges, Texas Library Association, the Texas Digital Library, and the Texas State Library & Archives Commission.

7. *Create a state OER Council to oversee and promote the use of OER statewide.*

This body should be involved in actively monitoring state and national developments in the field of OER to make recommendations to the THECB **and Texas' public institutions of higher** education, as needed. It should be comprised of faculty members from universities, community and technical colleges, and health-related institutions; staff at institutions of higher education, such as librarians and instructional designers; at least one student; a representative from P-12; and administrators and other OER stakeholders as appropriate. The Learning Technology Advisory Committee of the THECB could be utilized to oversee OER activities, instead of a separate body, if deemed appropriate.

8. *Fund a new position of state Director/Coordinator of OER.*

This position should oversee the development and ongoing maintenance of the portal, including managing content on it; lead the OER Council; coordinate statewide OER efforts, including grant programs; and represent the state in the field at the national and international levels. This position could be under the aegis of either the THECB or the Texas State Library and Archives Commission.

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Appendix A

OER, as described in the TEC, Section 61.0669:

(a) In this section, **"open educational resource" has the meaning assigned by Section** 51.451.

(b) The board shall conduct a study to determine the feasibility of creating a state repository of open educational resources. The study must consider:
(1) methods for facilitating public access to open educational resources;

(2) the resources needed to create the repository; and

(3) any potential challenges in creating the repository.

(c) In conducting the study, the board shall collaborate with relevant state agencies, textbook publishers, representatives of the open educational resource community, and other stakeholders, including the Texas Education Agency and representatives of public institutions of higher education and school districts.

(d) Not later than September 1, 2018, the board shall submit to the governor, lieutenant governor, speaker of the house of representatives, and each standing legislative committee with primary jurisdiction over higher education a report on the results of the study and any recommendations for legislative or other action. The report must include information on:
(1) methods by which open educational resources would be gathered and curated;

(2) measures to ensure public access to the repository;

(3) methods of encouraging the use of the repository;

(4) management of intellectual property rights; and

(5) **any other measures necessary to ensure the repository's success.**

(e) The board may not use appropriated funds in an amount greater than $100,000 for purposes of the study. The board may use any amount of other available funds for purposes of the study and may solicit and accept gifts, grants, and donations for that purpose.

(f) This section expires September 1, 2019.

Appendix B

The table represents available budget information for a range of OER initiatives. Although not exhaustive, the costs in this table represent information available through research and interviews at the time of the writing of this report.

Initiative	Programs/Features Included	Budget
Affordable Learning $olutions	• Portal enabling discovery of OER and other learning resources	$4.7 million ($3 million for faculty development; $1.7 million to 45 campuses for general expenses over 2 years)
Colorado OER Initiative	• Institutional Grants • Individual Grants • Virtual Meetings and Annual Conference • State OER Council • Full-Time Staff Member in the CO Dept. of Higher Education • Annual Report to the Legislature • Awards	$2,820,0702* *See chart with budget breakdown below.
New York College Textbook Affordability Act	• State Repository • State OER Council • Individual Grant Program to Create OER • Institutional OER Adoption Incentive Program	$5,000,000* *An additional $8,000,000 has been allocated for 2018-19.
North Dakota Statewide Initiative	• Individual Grants	$1,000,000
OER Commons State Microsite	• Customized state microsite or portal • Individual institutional hubs • Training for administrators and users	$87,000/set up fees and first year service plan + $20,000/per year after initial year service plan for up to 100,000 registered users; unlimited anonymous users
Oregon OER Initiative	• Grants • Full-time state OER Specialist	$700,000
SkillsCommons	• Repository	$4,000,000*

Initiative	Programs/Features Included	Budget
		*$800,000/year over five years; includes training and outreach for the 700+ campuses included in the federal TAACT grant.
TxLOR	• Repository	$75,000 for set up; maintenance funded through in-kind support by UTSA and TDL.

Colorado OER Initiative Budget:

Activity	FY 19	FY20	FY21	Total
Targeted Grants[7]	$450,000	$900,000	$900,000	$2,250,000
CDHE Support[8]	$90,000	$91,350	$92,720	$274,070
Communications Development, including website	$35,000	$20,000	$20,000	$75,000
State OER Council[9]	$5,000	$3,000	$3,000	$11,000
Annual OER Professional Development Event	$40,000	$40,000	$40,000	$120,000
Workshop/ Open Course[10]	$40,000	$5,000	$5,000	$50,000
Recognition[11]	$0	$20,000	$20,000	$40,000
TOTALS	$660,000	$1,079,350	$1,080,720	$2,820,070

Appendix C

Additional OER Repositories, Organizations, and Initiatives

[Affordable Learning Exchange](#) at Ohio State University
[Carnegie Mellon University Open Learning Initiative](#)
[Community College Consortium for Open Educational Resources](#)
[Lumen Learning](#)
[Maryland Open Source Textbook (MOST) Initiative](#)
[MIT OpenCourseware Initiative](#)
[National Science Digital Library](#)
[NOBA Project Textbooks](#)
[North Carolina Learning Object Repository](#)
[Open/Alternative Textbook Initiative](#) at Kansas State University
[Open.Michigan](#)
[Open SUNY](#)
[PhET: Interactive Simulations For Science and Math](#)
[Project Gutenberg](#)
[Saylor Academy](#)
[Shareable Online Learning Resources (SOL*R)](#)
[WikiEducator](#)

Appendix D

OER Feasibility Study Stakeholder Meeting

May 2, 2018
9:00 AM – 3:00 PM
Board Room

Key Staff
Dr. Rex Peebles, Assistant Commissioner, Academic Quality and Workforce
Dr. Judith Sebesta, OER Project Director

AGENDA

9:00   Welcome and Introduction – Dr. Rex Peebles, Assistant Commissioner, Academic Quality and Workforce

9:15   Panel Discussion on OER Repository Policy: Opportunities and Challenges
Daniel Williamson, Managing Director, OpenStax
Nicole Allen, Director of Open Education, SPARC
Moderator: Dr. James Goeman, Assistant Director, Graduate and Professional Studies

10:15 Break

10:30 Panel Presentations on OER Repository Practice: Case Studies
Dr. Gerard L. Hanley, Assistant Vice Chancellor, Academic Technology Services;
        Executive Director, MERLOT; Director, SkillsCommons; California State University
Jeffrey Gallant, Program Manager, Affordable Learning Georgia, Board of Regents of the
        University System of Georgia
Moderator: Dr. Stacey Silverman, Deputy Assistant Commissioner

12:00 Lunch

12:30 OER Repository Policy and Practice in Texas: TxLOR – Dr. Sunay Palsole, Assistant Vice
Chancellor for Engineering Remote Education, Texas A&M University

1:00   Roundtable Discussions among Stakeholders
Moderator: Dr. Peebles
Discussion Topics May Include:
        What are the pros/cons and primary challenges of creating a statewide
          repository for Texas?
        Where would a repository be most effectively housed? On what platform(s)?

        What staff would be needed to maintain the repository?
        What are the cost categories and how could they be funded?
        What learning resources should be included in the repository?
        How will OER be collected, reviewed, curated, and updated?

What issues are involved in the management of intellectual property rights?

Who "owns" the license for each resource? Institution? Developer/Creator/ Adaptor?

How should/can the repository be marketed to content creators/contributors *and* users?

What are models for sustainability?

2:30   Open Q&A and Comments

2:55   Wrap Up **–** Dr. Peebles

Note: The times indicated for the start and conclusion of each section of the agenda are approximate and depend on the length of discussion for each item.

This meeting will be web-cast through the Coordinating Board's website at: http://www.thecb.state.tx.us

Appendix E

OER Feasibility Study Stakeholder Meeting

May 2, 2018
9:00 AM – 3:00 PM
Board Room

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This document is available on the [Texas Higher Education Coordinating Board website](#).

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