Understanding the Impact of OER Courses in Relation to Student Socioeconomic Status and Employment

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ABSTRACT

The purpose of this study was to measure efficacy of Open Educational Resources (OER) on student academic achievement as well as student perceptions and use of OER, specifically among students of low socioeconomic status (SES). The authors of this study collected achievement and demographic data from students enrolled in 10 sections of an undergraduate course at a private, four-year not-for-profit institution in the Pacific Northwest. Students in earlier class sections of the course used non-OER materials ($n=95$), and those in later sections used materials developed from OER ($n=111$). An online survey including questions on socioeconomic status, perceived achievement and motivation, experience in the course, textbook-buying habits, and preferences in textbook formats was distributed to the participants in both the OER and non-OER sections. Data were analyzed using a random effects model design. No significant difference in academic achievement between the OER and non-OER courses was found. Survey responses indicated that students perceived their motivation and achievement to be improved with OER. Additionally, students with self-
reported low SES indicators perceived they worked significantly more than high SES students, and working more is slightly positively correlated to perceived impact of OER on achievement and motivation. The results from this study may inform further research on the impact of SES and employment on student perceptions and use of OER.

**Keywords:** open educational resources, academic achievement, higher education, socioeconomic status, student attitudes, student perception

**Introduction: The Cost of Education**

It is still true that individuals with a college degree experience greater income and wealth over time when compared with individuals without a college degree. However, the increasing costs of attending college combined with stagnant or slight wage increases and heavy student loan debt have made the price of a college degree significantly steeper both immediately and over a lifetime. A recent and popular Forbes article highlighted that the cost of attending college has grown nearly eight times faster than wages, and student loan debt is now higher than any other non-housing debt at $1.4 trillion dollars (Maldonado, 2018). The average cost of tuition and expenses for an undergraduate degree from a four year institution now comes to $104,480, with tuition costs rising 34% for public and 26% for private institutions from the 2005-2006 school year to the 2015-2016 school year, when adjusted for inflation (National Center for Education Statistics [NCES], 2018).

Similarly, from roughly 1974 to 2016, the average cost of attending college rose 2.5 times while median family income grew only 1.6 times (Cahalan, Perna, Yamashita, Wright, & Santillan, 2018). In about the same time period, state and local funding for higher education decreased by 21% and costs incurred by students and families increased by 18% (Cahalan, Perna, Yamashita, Wright, & Santillan, 2018). When low and middle income college graduates have financed their degrees with student loans, the ability to purchase a home, contribute to retirement savings, qualify for other loans, and save for dependents’ college expenses are all diminished by
significant monthly loan payments. For example, graduates with debt have two times less retirement savings and 40% less home equity (Elliot & Lewis, 2013, p. 54). While student loans have increased access among lower socioeconomic groups, some have called into question the degree to which an indebted college education is an equalizer in wealth inequalities, with higher student loan debt increasing wealth disparities by race and class (Elliott & Lewis, 2013; Jackson & Reynolds, 2013).

**Figure 1. Costs of Education**

Although faculty are disempowered from affecting tuition and room and board costs, faculty usually do control textbook and other course materials selection. Libraries are increasingly playing an influential role in the selection process. Consequently, required course materials selection, access, and costs are one area where libraries can contribute towards a more equitable classroom. The reduction in costs can have an immediate effect on student budgets. For example, the College Board recommended that undergraduate students budget stay between $1240-$1440 for books and supplies for the 2018-2019 academic year (College Board, n.d.). When students cannot afford their course materials, some choose not to purchase them.
According to the Student Public Interest group, 65% of students have not purchased a course textbook because it was too expensive (Senack, 2014). Almost 1 in 4 students report that they frequently do not buy textbooks because of the cost (Florida Virtual Campus, 2012). The textbook is often the primary channel for students to receive course knowledge (Robinson, Fischer, Wiley, & Hilton, 2014). Further, without purchasing textbooks, students risk lowered course performance (Florida Virtual Campus, 2016; Senack, 2014). Making strides to reduce costs and promote access is in keeping with the historical mission and role of the library. While originally libraries were only available to elite populations, libraries now have a long and rich history of being champions of equitable access to information and knowledge. “Equitable Access to Information and Library Services” remains one of eight key action areas for the American Library Association ([ALA], n.d.). In fact, the ALA’s motto, established in 1892, could easily be co-opted by the OER movement: “The best reading, for the largest number, at the least cost” (ALA, 2008).

In colleges and universities across the globe, librarians have emerged as leaders in OER and textbook affordability initiatives (Bell & Johnson, 2019). There are many reasons for this leadership role, including librarians’ established cross-campus relationships in addition to their specific areas of expertise (Colson, Scott, & Donaldson, 2017). In a 2019 SPARC report, libraries at all 132 institutions that self-reported campus OER programs, are involved in such initiatives with a marked increase in engagement from both librarians and library administrators (Nyamweya, 2019). In a 2016 report from the Association of Research Libraries (ARL), 64% of ARL survey respondents indicated that their institutions’ OER programs originated in the library and 73% percent were implemented by the library (Walz, Jensen, & Salem, 2016). It is no surprise given the role that libraries play, and those who facilitate these roles are generally
proponents of all things open: open access, open source, open educational resources (OER), etc. The openness of OER is not just in access, but the flexibility of customizing high-quality educational resources that can become an alternative to costly commercial textbooks (Hilton, Wiley, & Lutz, 2012; Hilton, Wiley, Stein, & Johnson, 2010; Hilton, Gaudet, Clark, Robinson, & Wiley, 2013). When an open license is combined with copyright, college instructors can retain and reuse existing open license resources, or if necessary, revise and remix them aligned with their course objectives, as well as redistribute the customized resources to their students (Lin & Tang, 2017; Wiley & Hilton, 2018).

OER provide an opportunity to marry student, faculty, and administration interests in reducing reliance on commercial textbooks. OER can dramatically reduce or entirely eliminate textbook costs for students in courses that use OER (Wiley, Green, & Soares, 2012). For administrators, OER initiatives might be used as a way to attract new students by demonstrating a commitment to reducing student costs, while also addressing key metrics like student drop and withdrawal rates which have been shown to be reduced in courses that utilize OER (Schaffert, 2010; Colvard, Watson, & Park, 2018; Hilton, Fischer, Wiley, & Williams, 2016). For libraries specifically, OER and textbook affordability initiatives have the power to remove barriers to both required course content and knowledge, reinforcing the library’s role in increasing equitable access to information while at the same time decreasing the cost of obtaining a college degree. The authors of the present study share how one library-led and OER-focused initiative impacted students of low socioeconomic status.

**Literature Review**

Open Educational Resources Initiatives in Higher Education
The rise of Open Educational Resources (OER) can be dated back to UNESCO’s 2002 Forum on Open Courseware when the term OER was initially coined. According to UNESCO (2012), OER include “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” (UNESCO, 2012, para.1). In contrast to the increasing price of commercial textbooks, OER are advantageous in affording educators and students free access to a wide range of educational resources, which might significantly reduce students’ financial burden (Bliss, Robinson, Hilton, & Wiley, 2013; Hilton, Robinson, Wiley, & Ackerman, 2014). Furthermore, with an open license endorsed by Creative Commons, OER can be customized, unlike commercial textbooks (D’Antoni, 2009; Hilton et al., 2013, 2014). For customization, OER allow users to retain (e.g., save a downloaded copy), reuse (e.g., use a portion of or the whole materials in another context), revise (e.g., make needed changes to the resources), remix (e.g., combine two resources), and redistribute (e.g., share with a class or a larger community beyond classes) available resources in line with their needs and course objectives (Hilton et al., 2013, 2014; Wiley & Hilton, 2018). An additional benefit of OER lies in the time-effectiveness of updated resources in OER repositories since they become immediately available for use without undergoing the long wait for the publication cycles dominated by commercial publishers (Kimmons, 2015). With these advantages, OER have gained attention in higher education settings as a low-cost alternative to commercial textbooks.

Accordingly, OER initiatives have increasingly emerged and expanded at individual institutions, across university systems, and in collaborative networks. According to David Ernst, Executive Director of the Open Textbook Network (OTN), membership in the OTN has grown
from representing 53 institutions in 2014 to 1,107 institutions in 2019 (personal communication, October 15, 2019). The OTN’s affiliated digital curation of peer-reviewed open textbooks, the Open Textbook Library, has seen traffic increase from an average 75 visits a day in 2012 to 11,074 visits per day in 2019. In British Columbia, 40 institutions have adopted or are currently adopting OER, with 619 faculty responsible for over 3,000 adoptions resulting in student savings of 12-13 million dollars (BCcampus, 2019). Open Oregon Educational Resources, a state-funded program serving public 2-year and 4-year institutions in Oregon, has saved students an estimated 4.6 million dollars through its OER grant programs between 2016 and 2019 (OpenOregon, 2019). Affordable Learning Georgia (n.d.) reports student savings of 61.9 million dollars, affecting 379,000 students at 26 institutions. The Maryland Open Source Textbook (M.O.S.T.) initiative from the university system of Maryland has saved students an estimated $3.4 million across 89 courses from 19 institutions from Spring 2014 to Spring 2018 (University System of Maryland, 2017). In all, OER provide learners with cost-effective options of open licensed content to support their learning. To measure the effectiveness of these OER initiatives, it is also important for OER stakeholders to understand whether OER have been efficiently used without any harm to learner achievement and learner perception (Robinson et al., 2014), especially for those students with low socioeconomic status (Colvard, Watson, & Park, 2018).

**Open Educational Resources and Learner Achievement**

Improving learner achievement is one of the primary goals for instructional interventions in educational settings. Whether the use of OER has improved or inhibited student performance in college courses also garners much attention. Plentiful evidence has revealed that, in general, there is no significant disadvantage to learner achievement with the use of OER in college-level courses. Some researchers referred to students’ course grade or exam scores in determining
whether OER improved student performance or not. For example, Hilton and Laman (2012) piloted the use of open textbooks in introductory psychology courses at Houston Community College and their findings indicated students using open textbooks earned a higher score in department-wide final exams than those in courses that used traditional textbooks. Bowen et al. (2012) found students using OER on statistics created by Carnegie Mellon University’s Open Learning Initiative in a blended course scored higher on standardized exams than those attending a face-to-face course without using OER. Allen et. al (2015), reported no significant difference in overall exam grade and item-specific question scores between students in an experimental group (whose textbook was openly licensed) and those in the control group (using a commercial textbook). Grewe and Davis (2017) indicated the use of OER were positively correlated to students’ final grades in an online history course. Ross, Hendricks and Mowat (2018) noted that no significant difference in average grade existed between two offerings of a college-level introductory sociology course, one of which used OpenStax textbooks and the other used commercial counterparts. Other researchers used the rate of pass or Drop Fail Withdraw (DFW) rates as a metric to evaluate the effectiveness of OER adoption. For example, Pawlyshyn et al. (2013) compared the pass percentage between two offerings of the same course taught by the same instructor (one section used OER and the other did not) and an increase in the pass rate was found when OER were adopted. Croteau (2017) found the overall DFW rate and completion rate did not significantly change after implementing OER based on a synthesis of numerous reports from the textbook transformation initiative sponsored by Affordable Learning Georgia. Chiorescu (2017) reported students using OER in her college-level algebra classes were less likely to fail the course compared to other sections she taught using commercial textbooks. Furthermore, Chiorescu (2017) examined the rate of withdrawal in four different course sections,
indicating students enrolled in the OER section of Spring 2015 (5% withdraw rate) were significantly less likely to withdraw from the course than those in the non-OER sections, Spring 2014 (9.9%), Fall 2014 (8.8%), and Fall 2015 (10%).

It is evidenced that adopting OER has no harm to overall student performance in college-level courses, but the call for disaggregated analysis of subgroups’ performance in OER courses increasingly emerges (Colvard, Watson, & Park, 2018; Delgado, Delgado & Hilton III, 2019). Students with low socioeconomic status (SES) are one important subgroup, especially when evaluating OER programs as equity initiatives. For example, Colvard et al. (2018) reported a significant difference in course performance between Pell recipients (students who receive federal Pell grants due to significant financial need) and non-Pell recipients. Specifically, students in OER courses who were Pell recipients experienced final grade increases as well as decreasing failure and withdrawal rates. Similarly, Colvard et al. (2018) found that OER have a greater impact on grades for students from historically underserved populations.

**College Students’ Perception of Open Educational Resources**

Another important metric in assessing the effectiveness of OER initiatives is students’ perceptions of OER. Research indicates many college students enrolled in OER courses or using open textbooks expressed a preference towards open textbooks over commercial ones, mainly due to the fact that OER are free, accessible, and flexible to use (Bliss et al., 2013; Delimont, Turtle, Bennett, Adhikari, & Lindshield, 2016; Morales & Baker, 2018; Ross et al., 2018). However, some research findings report dissenting voices on students’ preferences towards commercial textbooks. For example, Lawrence and Lester (2018) reported 74% of students in the earlier offerings of an American Government course were satisfied with used commercial textbooks, but students’ satisfaction with the open textbook used in the converted course was
only 57%. Lawrence and Lester (2018) explained that this difference in student satisfaction might result from the insufficient quality of the open textbook. Some students may also be less satisfied with the electronic format of some OER textbooks since some studies have shown that students prefer reading in print over digital (Mizrachi et al., 2018; Woody, Daniel, & Baker, 2010; Millar & Schrier, 2015). In other words, these studies confirm the importance of further understanding student perceptions of OER when evaluating the effectiveness of OER initiatives. Conversely, it could be plausible that differences in student perception might also be influenced by individual characteristics, such as student SES and employment status. Though scarce evidence is available regarding how individual SES and employment status influence student perception of OER, it is also necessary to reveal student perception of OER for each subgroup, as well as perceptions of students from historically marginalized and underserved populations, to examine the overall effectiveness of OER initiatives through an equity lens.

![BENEFITS OF OER](image)

*Figure 2. Benefits of OER*

**Project Background**
In 2016, the library at a private four-year not-for-profit institution in the Pacific Northwest initiated conversations on the use of Open Educational Resources (OER). As of 2018, the University had a total student population of 5,874 - 1,569 undergraduates, and 4,305 graduate students. As part of an OER pilot initiative led by the dean of the library, the University partnered with the Open Textbook Network (OTN), an outside alliance of campuses promoting affordable course resources and student success. During the pilot project, 17 faculty and staff attended an OER workshop conducted by representatives from the OTN. Of those who attended, nine received stipends to peer-review an open textbook. In the second phase of the OER and Textbook Affordability initiative, a competitive application process provided stipend funds for five faculty members to convert courses from commercial textbooks to OER. The following year, another 15 faculty attended the workshop. Five of these faculty reviewed textbooks and the initiative was able to fund six OER converted courses. Currently, the initiative is in its third year of course conversions.

During the first year of implementing this campus-wide OER and Textbook Affordability initiative, the library began a study to measure the efficacy of the use of Open Educational Resources (OER) on students’ academic achievement in courses where OER are used. The study also sought to investigate student perceptions of OER as well as their use of OER, specifically examining the academic achievement and perceptions of low socioeconomic status (SES) students enrolled in OER courses. The rationale for the study was to collect data on student achievement and student perceptions in classes where OER were used to make future decisions about the OER campus initiative.
**Methods**

The researchers of this study collected achievement and demographic data from ten sections of an undergraduate course both prior to, and after being converted to OER. Pre- and post-conversion sections were taught by the same instructor. The achievement data included final exam scores and final course grades. Demographic data included gender, PELL eligibility, expected family contribution, and FAFSA family income. Achievement and demographic data were collected from 95 students in the earlier commercial textbook sections, and 111 students in the OER-converted sections. Two students opted out of having their data collected.

Additionally, students in the OER sections received an online Qualtrics survey which included questions on socioeconomic status, perceived achievement and motivation, experience in the course, textbook buying habits, and preferences in textbook formats. A total of 93 students participated in the survey.
In order to determine the effect of using OER course materials in place of commercial textbook materials a random effects model design was used - also known as hierarchical linear modeling or mixed-effects modeling. This method controls for bias due to multiple instructors and classrooms in the same data set. It is important to control for this confound because some instructors and classrooms are more favorable for students (i.e., better instructor, more collaborative peers, etc.), and using a mixed-effects model teased out the classroom differences to obtain an unbiased estimate of the effect of OER when compared with commercial materials. Correlations were performed using Pearson’s R and the survey responses were treated as continuous data.

While some researchers have argued that studies such as these are methodologically fraught due to the access hypothesis (Grimaldi, Mallick, Waters, & Baraniuk, 2019), we argue that an increase or decrease in student achievement when comparing OER and commercial textbook materials may be the result of many factors other than the access hypothesis, such as a difference in textbook relevance to students, outcome alignment to a course, the alignment between the textbook and the way the instructor teaches the course, or improvements in the way content is presented. In addition, this study could potentially strengthen the research showing no significant difference in academic outcomes when using OER.

**Results**

The results of the mixed-effects model are presented below. Expected Family Contribution (EFC), Federal Student Aid loans (FAFSA), Gender (coded as female (1) and male (0)), PELL (a binary variable indicating whether students received Pell Grant money), OER (a binary variable indicating whether the student was enrolled in an OER section or a commercial copyrighted textbook section), and groups shows the coefficient and standard error for the
amount of variance explained by each of the four courses included in the analysis. For this analysis, log transformation for both the FAFSA and EFC was used due to heavily right skewed data. The dependent variable in our regression was the final grade students received in their course (see Table 1).

Table 1. The Mixed Effects Model Results

| Variable | Coef  | Std Err | z     | P>|z| | [0.025] | [0.975] |
|----------|-------|---------|-------|-----|---------|---------|
| Intercept| 72.734 | 9.984   | 7.285 | 0.000 | 53.166  | 92.303  |
| EFC      | 0.741 | 1.118   | 0.663 | 0.507 | -1.450  | 2.933   |
| FAFSA    | 0.481 | 0.960   | 0.501 | 0.616 | -1.401  | 2.364   |
| Gender   | 2.409 | 1.358   | 1.773 | 0.076 | -0.254  | 5.071   |
| PELL     | 0.413 | 2.703   | 0.153 | 0.879 | -4.886  | 5.711   |
| OER      | 1.094 | 1.288   | 0.849 | 0.396 | -1.431  | 3.619   |
| groups   | 24.612| 2.296   |       |       |         |         |

Similar to many other studies, a p-value of 0.396 for the OER variable indicated that academic achievement between OER and non-OER sections was not statistically significant. In other words, students in OER sections performed no better or no worse than students in commercial textbook sections of the same course taught by the same instructor. This was true of both low and high SES students. Interestingly, PELL, FAFSA, and EFC were not significant predictors of student final grade in these courses in the presence of the other variables in this analysis, as seen in Table 1 with p-values of 0.879, 0.616, and 0.507, respectively.

Survey Results
A descriptive analysis of the survey results showed that 75 percent of students perceived both their achievement and their motivation to be improved with OER (see figure 4, Table 2, and Table 3 below).

**Figure 4.** Student perceptions of achievement and motivation with OER

Table 2. Results of Q17: How did having free access to your textbook/required course materials impact your ACHIEVEMENT in this class?

<table>
<thead>
<tr>
<th>Achievement</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatly improved</td>
<td>27</td>
<td>31</td>
</tr>
<tr>
<td>Moderately improved</td>
<td>24</td>
<td>28</td>
</tr>
<tr>
<td>Improved a little</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Same</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>Worsened a little</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Moderately worsened</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Greatly worsened</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 3. Results of Q18: How did having free access to your textbook/required course materials impact your MOTIVATION in this class?

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greatly improved</td>
<td>23</td>
<td>26</td>
</tr>
<tr>
<td>Moderately improved</td>
<td>31</td>
<td>36</td>
</tr>
<tr>
<td>Improved a little</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Same</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Worsened a little</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Moderately worsened</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Greatly worsened</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

In addition, interesting results were found when examining students who were employed. Not surprisingly, low SES students (those who receive loans and/or Pell grants) work more than high SES students. In fact, conducting an independent samples $t$-test between low SES student work hours and high SES student work hours shows that low SES students work significantly more than high SES students ($p$-value < .01), working on average 8 hours more per week. The group that received loans and Pell grants worked the most out of any other group. Working more is slightly positively correlated to perceived impact of OER on achievement and to perceived impact of OER on motivation.

Socioeconomic status did not impact student responses to the achievement or motivation questions in the same way that hours worked per week did. There was a slight trend, meaning the low SES student mean on the achievement and motivation questions was slightly higher than the high SES student mean, but after conducting an independent samples $t$-test, the difference was not significant ($p > 0.05$). Additionally, achievement and motivation had a small positive correlation ($r = .35$) showing students that believed OER increased their achievement were more likely to believe OER increased their motivation in the course. Finally, students with self-reported low SES indicators (loans, Pell grants, and/or employment) indicated a strong
preference for OER over commercial textbooks when compared with students with no low SES indicators (see figure 5).

![Student textbook preferences by self-reported SES indicators](image)

**Figure 5.** Student textbook preferences by self-reported SES indicators

Table 4. Student textbook preferences by self-reported SES indicators

<table>
<thead>
<tr>
<th>SES indicator</th>
<th>Prefer commercial textbooks %</th>
<th>Prefer OER %</th>
<th>No preference %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students who receive loans (59)</td>
<td>12</td>
<td>54</td>
<td>34</td>
</tr>
<tr>
<td>Students who receive Pell grants (32)</td>
<td>19</td>
<td>56</td>
<td>25</td>
</tr>
<tr>
<td>Students who work (63)</td>
<td>14</td>
<td>54</td>
<td>32</td>
</tr>
<tr>
<td>Students with no low SES indicators / employment (11)</td>
<td>36</td>
<td>18</td>
<td>45</td>
</tr>
</tbody>
</table>

In terms of overall student perceptions of the quality of open textbooks used in their course compared with the quality of their textbooks in other courses, 36% thought the quality was better, 56% thought the quality was the same, and 8% thought the quality was worse. When
 asked about the online format of their open textbook compared to printed textbooks, 41% liked the online format more, 20% liked the online format less, and 39% had no preference.

**Discussion**

It is clear that of the students who took a course that used OER instead of commercial textbooks, most preferred OER, perceived that OER contributed to their achievement and motivation, and thought the quality of OER was the same or better than commercial textbooks, echoing Bliss et al. (2013), Delimont et al. (2016), Morales and Baker (2018), and Ross et al. (2018). On the other hand, this also adds to Lawrence and Lester’s (2018) assumption that student perception of OER and/or open textbooks might be influenced by the perceived quality of these resources. In this study, students reported that they perceived the OER used in the conversion effort to be of higher quality, which might contribute to their preference towards OER and open textbooks in general. This also provides implications for future efforts in course conversion and other institution-level adoption of OER, especially reinforcing the importance of quality assurance in OER initiatives.

In addition, the authors of this study found students with low SES indicators (loans, Pell grants, and/or employment) preferred OER compared to commercial textbooks. Though no significant difference was reported in learner achievement between students with low and high SES indicators, this subgroup difference still merits attention when evaluating the overall effectiveness of OER initiatives in the future implementation. As aforementioned, the reason why significant difference in student performance was not found might result from the small sample size. It deserves further effort to better understand the influence of students’ SES indicators on their achievement in and perception of OER courses.
The results of this study reinforce one of the library’s goals for the upcoming academic year, which is to involve students in advocating for OER. Because of working students’ perceptions of the impact of OER, the results of this study further inspired the researchers to specifically consider employed students in this advocacy endeavor. Interestingly, the library is the largest student employer on campus. The results encouraged the faculty and staff at the University to both consider how the OER and Textbook Affordability initiative could be used to support student workers in the library (and elsewhere on and off campus) and also how those students might be involved in the initiative, including adding OER and textbook affordability work to job descriptions, where appropriate. Additionally, with twenty percent of students preferring print to online formats, the library will continue to buy print copies of open textbooks used in courses whenever possible.

**Limitations**

This research also has some limitations. First, the sample size of this research was small. Some insignificant findings might result from this limitation. Second, in measuring student perception, self-reported data were collected using survey as the sole source of data. We cannot ensure the data truly reflected student perceptions of OER and our initiative. Additionally, conducting interviews and focus groups on the student OER experience, especially those students with low SES indicators and higher employment status, could provide more useful data on perceptions and experiences, including those that relate directly to topics such as effect on student budgets. Finally, collecting additional demographic information to identify achievement and perception of students from historically marginalized and underserved groups could better inform OER work as an equity initiative. Therefore, it is recommend adding race, ethnicity, and language data gathering as well as increasing the sample size of participants in relevant research
on OER adoption. We also suggest providing supplementary formats of data on student perceptions to triangulate the data source and increase the rigor of these findings.


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Appendix A

Student Survey

Q1 In general, how often do you purchase the required texts for the courses you take?
- Never (1)
- Rarely (2)
- About Half the Time (3)
- Often (4)
- Always (5)

Q2 For a typical course, how often do you use the required texts?
- Never (1)
- 2-3 Times a Semester (2)
- 2-3 Times a Month (3)
- 2-3 Times a Week (4)
- Daily (5)

Q3 Have you received any LOANS to fund your education?
- Yes (1)
- No (2)

Q4 Have you received any PELL GRANTS to fund your education?
- Yes (1)
- No (2)

Q5 If you are currently employed, how many hours per week do you work (on average)?
- I am not currently employed
- Fewer than 5
- 6-10
- 11-15
- 16-20
- 21-25
- 26-30
- 31-35
- More than 35
- Prefer not to say

Some of the questions that follow refer to "this course." In these questions, we are referring to the course taught by the instructor who sent you the link to this survey.

Q6 What course did you take that used free textbooks/materials (OER)?
Q7 Did you purchase any texts for this course?
- Yes (1)
- No (2)

**Answer:** If Did you buy one or more texts for this course? Yes Is Selected

Q8 How much did you spend on texts for this course?
- Less than $20 (1)
- $21 - $40 (2)
- $41 - $60 (3)
- $61 - $80 (4)
- $81 - $100 (5)
- $101 - $120 (6)
- $121 - $140 (7)
- More than $140 (8)

**Answer:** If Did you purchase one or more texts for this course? No Is Selected

Q9 Why did you not purchase the texts for this course? (select all that apply)
- Print versions of the texts were not available for purchase (1)
- The texts were available free of charge online (2)
- I simply didn't want to purchase texts for this course (3)
- I borrowed someone else's texts (4)
- I used library copies (5)
- I heard the instructor doesn't use texts for this course (6)
- I couldn't afford to purchase the texts (7)
- The texts were sold out (8)
- I rented the texts (9)
- Other reasons (10) ____________________

Q10 Did you print text materials for this course?
- Yes (1)
- No (2)

**Answer:** If Did you print text materials for this course? Yes Is Selected

Q11 How much did you spend on printing text materials for this course?
Q12 For this course, how often did you use the required texts?
- Never (1)
- 2-3 Times a Semester (2)
- 2-3 Times a Month (3)
- 2-3 Times a Week (4)
- Daily (5)

Q13 How often did your instructor encourage you to read or use your textbook?
Q14 How did having free access to your textbook/required courses materials impact your achievement in this class?
- Never
- Rarely
- Occasionally
- Frequently
- Always

Q15 How did having free access to your textbook/required courses materials impact your motivation in this class?
- No impact - my motivation was the same as it would have been with a textbook I had to pay for
- Little impact - my motivation was improved a little with free materials
- Moderate impact - my motivation was moderately improved with free materials
- Significant impact - my motivation was greatly improved with free materials

Q16 How would you rate the quality of the texts used for this course?
- Worse than the quality of the texts in my other courses (1)
- About the same as the quality of the texts in my other courses (2)
- Better than the quality of the texts in my other courses (3)

Answer If How would you rate the quality of the texts used for this... Worse than the quality of the texts in my other courses Is Selected
Q17 Please briefly describe what made the quality of this course's texts WORSE than those in other courses.

Answer If How would you rate the quality of the texts used for this... Better than the quality of the texts in my other courses Is Selected
Q18 Please briefly describe what made the quality of this course's texts BETTER than those in other courses.

Q19 How do you feel about the online format of the texts used for this course?
- I like the online format MORE than traditional printed texts (10)
- I like the online format LESS than traditional printed texts (11)
- I have no preference (12)
Q20 How likely are you to register for a future course with free online texts like those used in this course?
○ Very Unlikely (1)
○ Somewhat Unlikely (2)
○ Somewhat Likely (3)
○ Very Likely (4)

Q21 Assume cost is not a factor. Which of the following textbook formats would you prefer?
○ Print
○ Digital
○ Both

**Answer If Which of the following formats would you prefer is print Is Selected**
Q22 If you prefer your textbooks in print format, please indicate the reason(s) for your lack of interest in using digital textbooks? (Check all that apply)
☐ They are inconvenient to read
☐ I like to have a printed copy to write in and highlight
☐ English is my second language. I am more comfortable with a print copy of a textbook.
☐ It is difficult to move to different pages/sections of the book.
☐ Some digital textbooks are not compatible with my print disability solutions.
☐ Some digital e-reader devices are not compatible with my print disability solutions.
☐ I do not have access to the technology to take advantage of digital textbooks.
☐ Other: (please specify) ____________________

Q23 Imagine a future course you are required to take. If two different sections of this course were offered by the same instructor during equally desirable time slots, but one section used texts similar to those used in this course and the other used traditional published texts, which section would you prefer to enroll in?
○ I would enroll in the section with TRADITIONAL PUBLISHED TEXTS (1)
○ I would enroll in the section with TEXTS LIKE THOSE OFFERED IN THIS COURSE (2)
○ I would have no preference (3)