Faculty Scholarship and Creative Works

8-5-2021

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STARS Citation

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Background

Students in higher education have struggled with the increasing price of textbooks and course materials for the last decade. A 2018 survey of 24,000 Florida college students found that 64% of students did not purchase the required textbook, 43% took fewer courses, and 36% earned a poor grade due to the high costs of textbooks (Florida Virtual Campus, 2018). These figures demonstrate that textbook costs have a significant negative academic impact on students.

Several solutions have been offered to mitigate the cost of materials for students. The most promising lies with open educational resources (OER). These are resources that are free to the user, but also licensed in a way that allows users to adopt, adapt, and share the resource. Not only is there a cost savings for students, but the teacher has the ability to rearrange and edit the resource to fit the perceived needs of the particular class. Teacher concerns about using OER have included questioning the quality of the resource as well as the lack of ancillary resources such as homework systems. In addition, choosing a different textbook often requires a course redesign, which requires a significant commitment of time and energy.

Since 2015, deNoyelles and Raible have partnered with university faculty, other instructional designers, and librarians to seek solutions to lower textbook prices while maintaining faculty choice, textbook quality expectations, and workload. Data such as potential savings began being collected in 2016. Since 2016, UCF faculty have taught over 200 classes using OER, in turn reaching over 26,000 students and potentially saving them just over $3.6 million. In a deeper investigation into an American History course, we found that academic performance did not suffer in the course sections in which OER was used (Beile, deNoyelles, & Raible, 2020).

In addition to documenting cost savings and analyzing academic performance, student perceptions and attitudes also were gathered in some of the classes that replaced costly textbooks with OER. The purpose of this multi-year study is to examine student use and perceptions about the OER they were assigned to use, as well to better understand overall perceptions and trends of OER. This paper and corresponding session share those results. It is our intention that better understanding perceptions can help improve the learning experiences of students using OER, compare our university's trends with others, and build a solid research body that speaks to teachers about the advantages of selecting OER when appropriate.

Participants and Methods

Survey data was collected from 4,270 undergraduate students in the 2018-2019, 2019-2020, and 2020-2021 academic years who were enrolled in 30 distinct courses which replaced a commercial textbook with an OER. Most courses fulfilled a general education requirement, such as U.S. History, College Physics, Elementary Spanish, and American Government, among others. Because of our work in OER, teachers were identified either through our direct work with them or from the list which documented the cost savings across campus, which was maintained by the library.

The survey consists of the items in the bulleted list below. Categories include device use, perceptions of the OER's usefulness, perceptions of free resources in general, and individual behaviors. Most are closed-ended and answered on a 5-point Likert scale, asking the student to select from "strongly agree" to "strongly disagree". There is one completely open-ended question which asks students to provide feedback about the resource they used.

Survey Items

- What device did you use most frequently to access the book? *(desktop/laptop, smartphone, tablet, eBook reader)*
- The OER was: (1) easy to acquire; (2) easy to use; (3) easy to read; (4) easy to study from; (5) high in quality; (6) credible; (7) relevant; (8) valuable
- The OER: (1) supported my performance; (2) prepared me for quizzes and exams; (3) increased my interest in the subject; (4) increased my learning about the subject; (5) increased my enjoyment of the class; (6) encouraged me to think about the content in a new way; (7) challenged the way I think
- Please provide some feedback about the open textbook you used for this class. What improvements do you suggest? [open-ended]
- I would be more likely to use a textbook if it was available for free.
- In your opinion, the quality of free educational materials available online when compared with traditional materials (printed or digital materials available for purchase) is usually: *significantly worse to significantly better Likert scale*.
- Have you ever done any of the following? Select all that apply.
    - Not purchased a required resource because of cost
    - Delayed purchasing a resource because of cost
    - Shared a book with a peer because of cost
    - Not registered for a course because of cost of materials
    - Taken fewer courses because of cost of materials
- If all of your college books were free, how would you spend the saved money? Select all that apply. *Clothes, education, entertainment, food, health, housing, transportation, Other (can describe "Other")*.
- How are your textbooks paid? Select all that apply. *You, parents, scholarship, loan, other*
- How is your tuition paid? Select all that apply. *You, parents, scholarship, loan, other*

Descriptive statistics were used to analyze the closed-ended survey results. For the open-ended question that asked students to provide feedback about the OER, each author independently coded 20% of the responses, and then came to an agreement on the final codes. Each author returned to their 20% of responses to make any adjustments. Codes include usability, content, and alignment, among others.

Findings

Generally, students reported positively about their perceptions of the OER's quality (M=4.31), ease of reading (M=4.34), and support of their academic performance (M=4.14) (Table 1). One consistent finding has been the slightly lower ratings of items that ask the student if the OER increased their interest in the subject (M=3.70) or increased their enjoyment of the class (M=3.61). We suspect that if students using commercial textbooks were asked these same questions, similar results would be found.

Table 1. Perceptions of the OER.

Item	Mean (5-point Likert)
Easy to use	4.46
Easy to read	4.34
Easy to study from	4.11
High in quality	4.31
Supported academic performance	4.14
Prepared me for quizzes and exams	4.04
Increased my interest in the subject	3.70
Increased my enjoyment of the class	3.61

Themes

Several qualitative themes emerged when analyzing the open-ended question which asked students to suggest improvements to the OER. A total of 525 comments were coded. However, it is important to note 60% of those responses (n=317) the authors reviewed were "no suggestions - it's great!"

- *12% of responses (n = 65) addressed Content*. There was a desire for more interactive elements like quizzes, teacher annotations, and answers to practice problems.
- *9% of responses (n=47) addressed Usability*. Features like highlighting, keyword search, and table of contents were cited.
- *8% of responses (n=44) expressed Gratitude*. "As a student who works to pay for everything myself, I more than appreciate the digital textbook and its free availability to students."

- *4.5% of responses (n = 24) addressed on Access*. Some wanted the entire resource, some wanted the resource to be shared throughout the modules.
- *3.5% of responses (n= 18) addressed Alignment*. "Although the material covered in the textbook appears in the exam, sometimes the textbook felt separate from the rest of the class and material we were covering."
- *1.5% of responses (n=8) addressed a Preference for print*. "I wish that it was easier to print because I often prefer studying and taking notes with a physical copy of the textbook."

Students Beyond the Course

To better understand general behaviors associated with affordability, we asked students how they would spend the money if their course materials were free. Table 2 displays their responses, before and after the onset of COVID-19 crisis. Housing has emerged as the top factor, surpassing food which had consistently been the most selected item. This serves as a powerful talking point to faculty who may not be struggling with housing or food insecurity, especially through the COVID-19 pandemic.

When asked about purchasing habits, the results revealed that 32% of student respondents named themselves as primarily responsible for purchasing course materials, while only 16% named themselves as primarily responsible for tuition. This also points to the burdens placed on students with respect to material fees.

Table 2. How would you spend the saved money? Select all that apply.

Item	Before March 2020 (n=1630)	After March 2020 (n=1838)
Food	20.6%	20.2%
Housing	18.1%	21.2%
Transportation	14.2%	14.0%
Education	15.3%	15.9%
Entertainment	7.8%	6.5%
Health	12.6%	12.9%
Clothes	7.9%	6.0%
Other	3.4%	3.2%

Conclusion

This ongoing study demonstrates the paradigm shifting impact of OER on students and faculty. Several implications can be drawn. First, the feedback from students on the quality and usefulness of OER is positive. These results confirm the growing body of research that has found that students perceive OER

favorably, and OER quality is perceived as equal or greater than commercial textbooks (Clinton & Khan, 2019; Cuttler, 2019; Hilton, 2020). This type of positive feedback is another benefit which can influence faculty's future adoption. Second, collecting information like who pays for course materials, and how they'd spend the saved money, demonstrates the struggles that their students face. Third, students prefer flexibility in their interactions with the textbook. Following the CAST (2018) Universal Design for Learning (UDL) principle of multiple means of representation, providing students choice on format (print or digital), connectivity (online vs offline), and navigation (whole book or one chapter at a time) allows for students to use the textbook in various and sometimes unexpected ways. As part of the course orientation, faculty need to be explicit on the multiple ways that students can access the resource, with an explanation of why the flexibility is offered. Fourth, more interactive elements like those offered through tools like H5P and Hypothesis should be utilized, as they actually take advantage of the digital nature of the resource. Finally, it is important to make sure the resources and assessments in the course are aligned.

Anecdotally, we have heard a connection between gratitude and student perceptions of instruction ratings. This should be further explored, as it would be a motivator for faculty to take on the challenge of redesigning their course around a new resource. Running the survey in courses that require commercial textbooks would also serve as a control of sorts.

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