

## Impact of Open Educational Resources on Student Performance: A Comparative Study

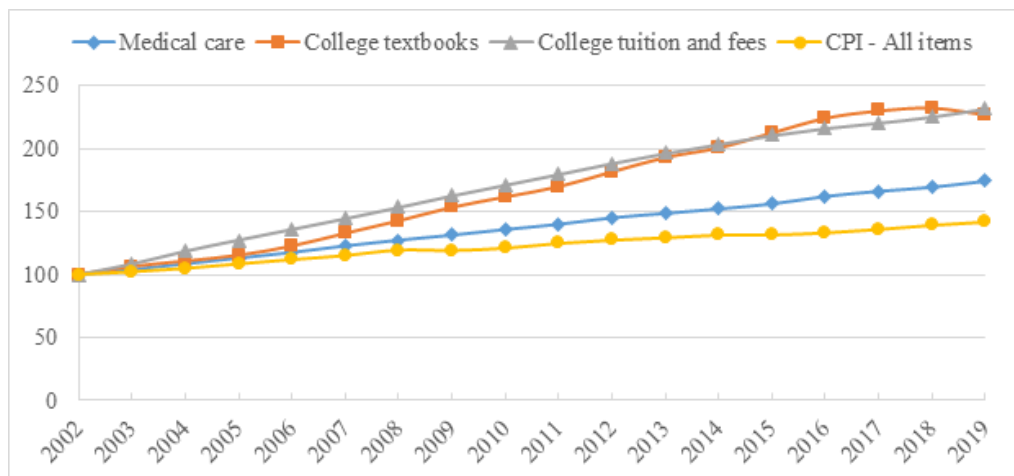
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REDI Report – February 2020

<http://www.redi.colostate.edu/>

- We examine whether the use of open educational resources (OER), increasingly used as a reaction to high textbook costs, have a negative effect on performance of students<sup>1</sup>.
- We analyze student performance data from courses using OER that had previously used commercial textbooks. We find no statistically significant results that OER use reduces student performance or, conversely, that the use of commercial textbooks improves student performance.
- Our research contributes to better understanding and awareness of OERs. It encourages public policies to support the creation and implementation of OERs to alleviate the burden of high textbook costs that disproportionately fall on low income students.

College has become increasingly unaffordable and students are incurring large amounts of debt. Cost of textbooks adds to this financial burden. As shown in the chart below, the costs of higher education, particularly textbooks, have increased much faster than inflation and even the cost of healthcare. This puts an immense financial burden on students, forcing them to choose other options including going without textbooks<sup>2</sup>. Colleges and universities are increasingly adopting OERs to alleviate this problem. However, there is a concern of whether such adoption has a negative impact on student learning. Our study examines if adopting OER has a detrimental effect on student performance.



Source: U.S. Bureau of Labor Statistics, 2002 = 100

We created a cross-sectional dataset on students and faculty for a major 2-year college in Colorado. The dataset ranged from fall semester of 2013 through the spring semester of 2017 (n= 2428) affiliated with principles of economics courses. The economics department had switched from a commercial textbook to an OER in the fall semester of 2015, providing an opportunity to study the impact of OERs on student performance. The sample characteristics for OER and paid- resource (PR) groups were very similar. The mean student course grade was 76.9% (OER) and 78.1% (PR) and average GPA was 2.7 (OER) and 2.8 (PR). Majority of the students enrolled in both cohorts were males, with females constituting only 30.5% of the OER cohort and 28.6% of the PR cohort. 36.2% of OER and 38% of PR cohort did not have a parent with a college degree.

We analyzed the data controlling for student characteristics (such as gender, race, age, parents' education and home county) and institutional characteristics (such as instructor and when the course was offered). We found no

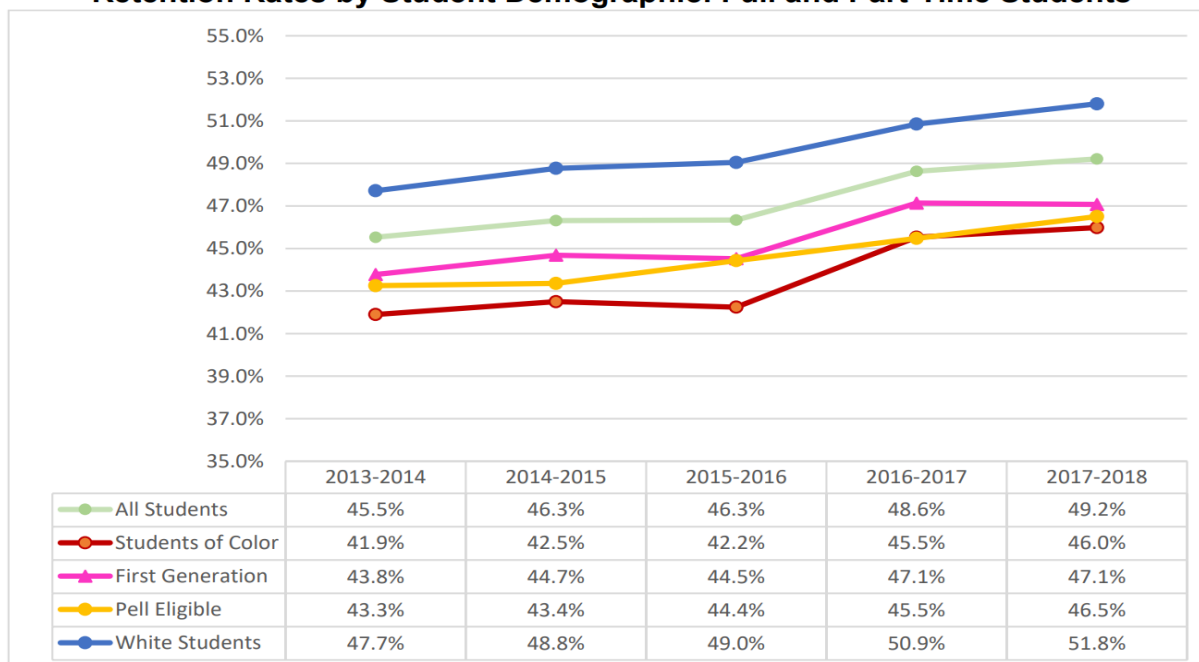
<sup>1</sup> Research funded through a grant made by FRCC Student Learning Committee

<sup>2</sup> Lumpkin, Lauren. (2020, Jan 17). Textbooks are pricey. So, students are getting creative. The Washington Post. Retrieved from <https://www.washingtonpost.com/>

evidence that OER use reduced student performance or, conversely, that the use of PR produced better student performance. Therefore, if OERs are available, we see no added benefit of adopting a high-cost commercial textbook, given that the textbook market is controlled by few publishers, resulting in market failure<sup>3</sup>.

Financial burden of high cost of textbooks fall on students, particularly from low-income families. This has forced some to go without one, but further study is needed to see if it acts as a barrier to attending college or forces students to enroll in less credits per semester, possibly delaying graduation<sup>4</sup>. Although retention of students from vulnerable groups (chart below<sup>5</sup>) has been growing in 2-year colleges, lower textbook costs could provide needed respite for these students, possibly reducing the dropout rate.

**Retention Rates by Student Demographic: Full and Part-Time Students**



Source: Colorado Community College System

Availability of OER is sparse—with some disciplines having high-quality peer-reviewed textbooks like OpenStax<sup>6</sup> and Core<sup>7</sup>. To increase the availability of OERs in multiple disciplines, we recommend resources be made available to faculty for development of high quality OERs. We appreciate the opportunity to present our work in front of then-Congressman Jared Polis, and applaud the effort of both Governor Jared Polis<sup>8</sup> and Congressman Joe Neguse<sup>9</sup> for their work in this space.

<sup>3</sup> Wall Street Journal reports that the merger between Cengage and McGraw-Hill will shrink the competition further. <https://www.wsj.com/articles/mcgraw-hill-cengage-plan-all-stock-merger-11556683590>

<sup>4</sup> The Practical Cost of Textbooks: <https://opencontent.org/blog/archives/4040>

<sup>5</sup> The chart above from Colorado Community College System shows that the retention rates are much lower for first generation, Pell eligible, and students of color, possibly affecting their completion. <https://www.cccs.edu/wp-content/uploads/documents/AY-2018-2019-Fact-Book-Master-Copy-Revised-10.17.2019-final.pdf>

<sup>6</sup> Open Stax offers textbooks in multiple subjects <https://openstax.org/subjects>

<sup>7</sup> Core Economics is available for free at <https://www.core-econ.org/>

<sup>8</sup> Governor Jared Polis’ Roadmap, which plans to reduce textbook cost and create “Z-degree” is a movement in the right direction. <https://highered.colorado.gov/Publications/Reports/Roadmap-to-Containing-College-Costs-and-Making-College-Affordable.pdf>

<sup>9</sup> We thank the Congressman Neguse for securing \$5M in federal funds for affordable textbooks pilot program. <https://neguse.house.gov/media/press-releases/congressman-neguse-secures-5-million-federal-funding-affordable-textbooks-pilot>