



Impact of OER on First Generation College Students: A Case Study

RESEARCH ARTICLE

SARAH LEMIRE 



ABSTRACT

This case study examined the impact of open educational resources (OER) textbooks on student academic performance at a large public research-intensive university in the United States. The study employed logistic regression of course grades in 20 undergraduate courses to examine the relationship between student performance in a course and the type of textbook their professors chose to use. Study findings suggest that students using OER textbooks are likely to have improved academic performance compared to students in classes using commercial textbooks. This study also specifically examined the impact of OER on first-generation college students, or students whose parents did not complete a four-year college degree, as an underserved population likely to be negatively impacted by high textbook costs. Findings suggest that first-generation students are significantly more likely to receive an A in a course if their professor is using an OER textbook. This study's findings support the notion that students for whom purchasing a textbook is a barrier are likely to see academic improvement if provided free access to course materials.

CORRESPONDING AUTHOR:

Sarah LeMire

Texas A&M University, United States

slemire@tamu.edu

KEYWORDS:

open educational resources; OER; research-intensive university; first-generation students; college students; open textbooks; affordability; course materials; academic achievement; academic performance

TO CITE THIS ARTICLE:

LeMire, S. (2026). Impact of OER on First Generation College Students: A Case Study. *Open Praxis*, 18(1), pp. 132–145. DOI: <https://doi.org/10.55982/openpraxis.18.1.926>

Although students in the United States who complete their degrees are likely to see a positive return on their investment in higher education, students who are unable to complete their degrees are unlikely to see the same benefits. Indeed, many students who leave college without a degree are likely to be paying off loans for a degree that they did not receive (Blagg & Blom, 2018).

At many institutions, including Large Public University (LPU), a public research-intensive university in the United States, campus student success initiatives target specific student populations that have lower retention and completion rates than the overall student body. At LPU, one of these populations is first-generation students, or students who do not have a parent who completed a four-year college degree. According to institutional data, first-generation college students at LPU have lower first-year retention rates and four- and six-year graduation rates compared to their continuing generation peers. In order to address these gaps, LPU has offered scholarship funding, programming, and other types of support to first-generation students. Although these efforts appear to have had a positive impact on some metrics, including first-year retention and four-year graduation rates, gaps persist.

One reason that first-generation students may experience lower student success rates is due to financial barriers. This study examined whether strategies to reduce or eliminate textbook costs as a financial barrier have an impact on student course grades. Specifically, this study focused on one type of intervention to reduce textbook costs; namely, open educational resources, or OER. It examined the impact of those costs on the course grades of students in general as well as the impact on first-generation college students specifically.

The access hypothesis indicates that OER are likely to impact specific populations of students who would otherwise not have access to course materials (Grimaldi et al., 2019). Researchers have studied the access hypothesis with populations such as recipients of Pell grants, a U.S. need-based form of financial aid (Smith et al., 2020). First generation college students are another population that may be more likely to be positively impacted due to faculty use of OER.

First generation college students, for the purposes of this study, are students for whom neither parent graduated from a four-year college or university. Compared with their continuing-generation peers, first-generation college students can experience additional financial barriers (Rehr et al., 2022). First-generation students are more likely to come from a lower socioeconomic background (Bui, 2002) and experience financial stress (Bennett et al., 2021) as well as other financial challenges, such as a need to work in college or support dependents (D'Amico & Dika, 2013). Pascarella et al. (2004) found that financial aid for first-generation students is insufficient for those students to engage fully in the college experience, particularly as they were unable to complete as many credit hours per semester and worked more hours than continuing-generation students.

This case study examined the academic impact of OER on first-generation college students through an analysis of student course grades in courses with both OER and non-OER sections. Specifically, the research questions for this study were as follows:

1. What is the relationship between OER textbook use and student course performance for students in general?
2. What is the relationship between OER textbook use and student course performance for first generation college students specifically?

THEORETICAL FRAMEWORK: MASLOW'S HIERARCHY OF NEEDS

Maslow's Hierarchy of Needs was the theoretical framework chosen for this study. Maslow's Hierarchy of Needs was originated by Maslow in his 1943 article "A Theory of Human Motivation." In this article, Maslow argued that human needs can be categorized into at least five hierarchical groups: "physiological, safety, love, esteem, and self-actualization" (1943). According to Maslow's theory, an unsatisfied need at the bottom of the hierarchy (i.e., physiological, safety) interferes with the human ability to focus on higher-level needs (i.e., esteem, self-actualization) (1943).

Maslow's hierarchy has been broadly used in higher education to identify ways to better address student needs. For example, Maslow's hierarchy has been used to advocate for resources such as childcare, food banks, residence halls, and recreational facilities (Freitas & Leonard, 2011; Hege et al., 2021; Tolman & Trautman, 2018). Financial means are also a need that can fit in multiple categories at the bottom of the hierarchy (Oleson, 2004). Without sufficient funds, students may be unable to purchase adequate or healthy food or may get behind on their rent or utility bills (Brotton & Goldrick-Rab, 2018; Hege et al., 2021).

In the context of higher education, textbook costs are closely intertwined with students' basic needs. Although scholars have identified textbooks and other materials as basic needs that must be met in order to reach higher levels of understanding (Milheim, 2012), many students report that they do not purchase course materials due to the need to prioritize physiological needs such as food (Hege et al., 2021). For these students, textbooks and physiological needs are in financial tension; students must choose between textbooks as a higher-level need and the more fundamental needs of housing and food.

Based on Maslow's hierarchy, I hypothesize that first-generation students, as students who are more likely to experience financial barriers, may also be more likely to forgo textbook purchases. Therefore, this study hypothesizes that first-generation students will be more likely than their continuing-generation peers to experience a positive impact on course grades in courses that are using OER.

LITERATURE REVIEW

Over the last 10 years, textbook costs have increased by approximately 35 percent in the United States (US Bureau of Labor Statistics, 2021). Students at a public four-year institution in the U.S. pay an estimated \$1,240 annually for books and supplies (Ma & Pender, 2022). The high cost of textbooks and other course materials can negatively impact students in a number of ways. For instance, research shows that high textbook costs have a negative impact on student success rates (Becker et al., 2023). This may be because scholars have found a positive relationship between completion of course readings and student performance (Landrum et al., 2012) as well as between textbook use and student interest in the course subject (Li & Wang, 2024). Students who did not purchase assigned textbooks to save money also commonly reported experiencing academic struggles (Appedu et al., 2021).

Students who forgo purchasing a required textbook are likely aware that their choice may impact their grade. Jenkins et al. (2020) quote one student who eloquently sums up these students' thought process on this issue: "The 200–500 I save every three months is worth dropping a half GPA point" (p. 83). One reason that students are willing to sacrifice high grades is because they need the money to fulfill their basic needs. In order to afford textbooks and other educational expenses, students reported working long hours, and even multiple jobs (Florida Virtual Campus, 2022; Martin et al., 2017). Despite students' efforts, researchers found that high textbook costs led students to forgo basic necessities such as hygiene products and medicine (Florida Virtual Campus, 2022). Students also indicated that textbook costs impacted their dietary choices; students noted that they would purchase better quality food if they had not had to spend so much money on textbooks (Martin et al., 2017).

REDUCING THE BARRIER OF TEXTBOOK COSTS

Although textbook costs may appear insignificant in comparison with other costs of higher education, such as tuition or housing, textbook costs can pose a substantial barrier to student success because budgeting for them can be challenging for cost-conscious students. Since faculty often choose the textbooks for their own courses, different sections of a multi-section course could have different textbook costs. Students may not learn the cost of a textbook for their registered section until the course instructor is assigned or even until the semester begins (LeMire et al., 2024). Although many instructors consider cost when selecting textbooks, it is important to note that concerns about cost are often secondary to issues about curricular relevance and content quality (Scott et al., 2023). In fact, Collins et al. (2020) argue that faculty assigning textbooks are akin to doctors prescribing medicine; in the U.S., like physicians, college professors do not pay directly for the materials they select and thus some may be unlikely to be cost-sensitive in their selections.

Many students try to minimize textbook costs using a variety of strategies. They may shop around for better prices online, purchase used copies from bookstores or other students, or rent digital copies (Katz, 2019). They often borrow textbooks from friends or classmates (Florida Virtual Campus, 2022). They may also try to access a copy from the library. If available, they may access a library electronic copy (Thomas & Bernhardt, 2018) or check out a print copy from course reserves (Christie et al., 2009). They may search for a pirated copy of the textbook online (Todorinova & Wilkinson, 2019). Finally, many students try to minimize their textbook costs by eschewing the textbook altogether. Researchers found that many students postpone textbook purchases (Jenkins et al., 2020), hoping to avoid paying for a textbook that they may not end up using. Researchers also found that a majority of students have simply skipped purchasing a required textbook to save money (Florida Virtual Campus Survey, 2022; Jenkins et al., 2020).

Although students employ a variety of strategies to save money on textbooks, technological advances have also made it more difficult for students to be thrifty consumers. In many disciplines, especially STEM disciplines, homework sites have become popular (Magalhães et al., 2020). These sites enable faculty to assign homework that is commercially developed and auto graded. Students access homework sites using access codes that are either bundled with textbooks or sold separately, often for a hefty price. In order to acquire an access code, students may have to purchase a new copy of the most recent textbook edition, eliminating their ability to save money (Florida Virtual Campus, 2022). Another innovation is automatic textbook billing, also known as inclusive access. Automatic textbook billing programs are when a university and a textbook vendor partner to automatically bill enrolled students for their course textbook (typically an eBook) (Hughes & Taylor, 2022). In the automatic textbook billing model, students receive a discounted price while textbook vendors make a profit due to the volume of textbooks sold. Although automatic textbook billing can save students money, it also reduces students' agency and their ability to shop around for a better price.

OPEN EDUCATIONAL RESOURCES

In recent years, some faculty have turned to another innovation, OER, in order to reduce, or even eliminate, textbook costs for their classes. The term OER dates back to the 2002 UNESCO Forum on the Impact of Open Courseware for Higher Education in Developing Countries. At this gathering, the foundational definition of OER was created: "The open provision of educational resources, enabled by information and communication technologies, for consultation, use and adaptation by a community of users for non-commercial purposes" (UNESCO, 2002, p. 24). This definition highlights the fundamental principles of OER; namely, it specifies that these educational resources are freely available not only for use, but also for revision and redistribution.

In the two decades since the initial UNESCO definition of OER, other definitions have emerged (Stracke et al., 2019). The Hewlett Foundation, a major funding agency for OER work, defines OER 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 or re-purposing by others" (Atkins et al., 2007). SPARC, a nonprofit organization actively involved in OER advocacy, defines OER as "teaching, learning, and research resources that are free of cost and access barriers, and which also carry legal permission for open use" (SPARC, n.d., para. 6). These definitions, as Stracke et al. (2019) point out, broaden the definition of OER to include materials licensed for commercial purposes as well as those in the public domain.

This study uses the definition of OER set forth by UNESCO in its 2019 Draft Recommendation on Open Educational Resources:

Open Educational Resources (OER) are learning, teaching and research materials in any format and medium that reside in the public domain or are under copyright that have been released under an open license, that permit no-cost access, re-use, re-purpose, adaptation and redistribution by others. (p. 2-3)

This definition specifically delineates the types of materials that are considered OER as well as the specific rights afforded to users of those OER.

In the decades since the term OER was coined, adoption of OER has grown dramatically in the United States and around the globe. In just the last five years, the number of OER available via the popular Open Textbook Library has more than doubled (Open Textbook Library, 2020;

[Open Textbook Library, 2025](#)). And worldwide cost savings associated with OER textbooks are estimated to be over \$1 billion ([Allen, 2018](#)).

Although dollars saved is an important metric of OER impact, researchers have also identified other important impact metrics that illustrate how OER support student success. Many scholars have studied faculty and student perceptions of OER textbooks and course materials and have generally found that students perceive OER to be similar or better in quality than commercial textbooks ([Mullens & Hoffman, 2023](#)). Researchers have also found that faculty perceive OER quality to be comparable to that of commercial textbooks ([Lantrip & Ray, 2021](#)). However, researchers have also found that some faculty had concerns about the accuracy of OER content ([Martin & Kimmons, 2020](#)) and the availability of ancillary resources such as homework sites to supplement OER textbooks ([Nagashima & Hrach, 2021](#); [Spilovoy & Seaman, 2015](#)).

Another important OER metric is student performance. Researchers have generally found that students using OER textbooks perform as well or better than their peers in courses using commercial textbooks ([Mullens & Hoffman, 2023](#)). Researchers have also found that students in courses using OER textbooks are less likely to receive D, F, and Withdraw grades ([Colvard et al., 2018](#)) or withdraw from classes ([Clinton & Khan, 2019](#)).

OER AND UNDERSERVED STUDENTS

Although much of the research on OER focuses on impact on the student body overall, the access hypothesis, advanced by Grimaldi et al. ([2019](#)), suggests that “OER intervention should only affect a subset of students—specifically those who would not otherwise have access to the textbook” (p. 2). Since students who could easily afford a commercial textbook would be likely to purchase it, increasing access to course materials by switching to an OER would hypothetically not increase textbook access for these students. For this reason, researchers have examined the impact of OER on specific student populations that researchers theorize would be less likely to have access to commercial textbooks. First-generation students are a population that may be specifically impacted by OER.

In particular, researchers have found that first-generation students are particularly likely to experience academic challenges resulting from high textbook costs ([Appedu et al., 2021](#)). Although the literature on the impact of OER on first-generation students in the U.S. is still very limited, initial research findings suggest that OER can have an impact on first-generation students’ sense of belonging within a specific disciplinary context (psychology) ([Nusbaum, 2020](#)). In their 2020 study, Nusbaum et al. examined the impact of OER on first-generation students in a single introductory psychology course. Their work provides a preliminary indication that first-generation students are particularly sensitive to textbook costs, although it does not find that first-generation students performed better academically as a result of OER use. This study intends to expand upon Nusbaum et al.’s ([2020](#)) work by exploring whether OER positive impacts first-generation student academic success across multiple disciplines.

METHODOLOGY

The data set for this study was drawn from existing institutional records at LPU, a large public research-intensive in the southern United States. Following approval by the Institutional Review Board (IRB) and other campus entities, data was obtained via a request from LPU’s office of the registrar. The data set consisted of student-level data for multi-section undergraduate courses that had at least one section using an OER textbook and at least one section using a commercial textbook during the Fall 2023 semester. The data set included only multi-section courses in order to compare student performance in OER and non-OER sections of the same course. For the Fall 2023 semester, 20 courses fit this criterion. [Table 1](#) depicts the number of courses per disciplinary group. No identifiable student data was included; instead, each student was identified with a unique code for the purposes of this study. This code, created as part of the institutional data request, enabled identification of the same student in multiple courses. To keep samples independent, if the same student was enrolled in multiple courses in the data set, one record was randomly selected to remain and the others deleted.

Table 1 Types of Courses.

COURSE TYPE	NUMBER OF COURSES
Humanities	7
Social Sciences	5
STEM	8

RESEARCH STUDY DESIGN

Table 2 depicts the variables of interest and the type of data collected. For the purposes of this study, dependent variables included student grade as well as incomplete and withdrawal rates. Independent variables included first generation status and OER.

Table 2 Quantitative Variables.

VARIABLE	DESCRIPTION AND CODING
Dependent Variable	
Student Course Grade	1 = A, 0 = Any grade other than an A
Independent Variables	
OER	1 = OER or no cost textbook, 2 = commercial textbook
First Generation	First Generation = 1, Continuing Generation = 0
Pell Eligibility	Pell Eligible = 1, Not Pell Eligible = 0
Race Other than White Only	1 = Student identifies as a racial category other than white only; 0 = student identifies as white only
Class Standing	Class standing by credit hours. 3 = Senior, 2 = Junior, 1 = Sophomore, 0 = First Year. The reference group is first year students.
Disciplinary Group	Disciplinary group for each course. 0 = Humanities, 1 = Social Sciences, 2 = STEM. The reference group is humanities courses.
Overall Grade Point Average	Grade point average on a 4.0 scale

Control variables included the following demographic characteristics: eligibility for U.S. need-based Pell grants, race, class level (e.g., freshman, sophomore), course type, and student grade point average. These control variables were included in order to ensure that study findings were likely to be attributable to OER and not to other factors. For example, there could be potential differences in student outcomes between a fourth-year student and a first-year student enrolled in a 100-level general education course. Student grade point average was included as a control variable because a student’s past performance can be a key indicator of their current performance. Course name and number was also crucial because student grades and incomplete/withdrawal rates may show considerable variation from one course to another. For example, an introductory chemistry course may have a lower course GPA than an upper-division English course. For this reason, it was important to examine whether there are differences in outcome for students enrolled in different types of courses (e.g., STEM vs. Social Sciences vs. Humanities). By controlling for these variables, the study’s findings are more trustworthy.

Once the data was collected, certain variables were collapsed into larger categories to facilitate analysis. Due to a lack of normal distribution in the Student Course Grade and Race categories, these categories were coded as binary variables. Similarly, the Course Name and Number category was collapsed into disciplinary groups (e.g., STEM, Humanities, Social Sciences) due to the number of disciplines represented or the number of records from courses in each discipline.

DATA ANALYSIS

The dependent variable for this study is student course grades. I recoded this variable as a binary variable indicating if students received an A in the course or if they received any grade other than an A in the course. I chose to recode this variable due to the unequal distribution

of grades along the grade spectrum (A-F). Because the dependent variable was a binary variable, the primary statistical test selected for this study was logistic regression. This test was preferable for two reasons: it allows for a categorical dependent variable, and it does not require a normal distribution (Norušis, 2004).

In order to ensure a valid analysis, the data was examined using several tests. First, Pearson's residuals and deviance residuals were used to assess the logistic regression model's goodness of fit. This aligns with Hosmer et al. (2013), who identify these two measures as appropriate ways to "measure the difference between observed and fitted values" (p. 155). Based on these tests, three outliers were dropped from the analysis. In addition, the data was tested for multicollinearity. Hosmer et al. (2013) recommend "using a collinearity analysis similar to that performed in linear regression" in order to identify "the dependencies among the covariates" (p. 149). Collinearity tests indicated that multicollinearity was not a concern (Mean VIF = 1.23).

For this study, the minimum acceptable sample size of the data set was estimated at 90 records, using a minimum of 10 observed events for each of the 9 variables in Table 2 (Hosmer et al., 2013, p. 407). The institutional data set far exceeded this number at 10,597 records. Some students were enrolled in multiple courses; in this case, I randomly selected one record to keep and removed the other records (n = 967). Missing data was handled using listwise deletion due to the large number of records in the data set (Meeyai, 2016). After outliers and records with missing data were removed, 9,430 records remained in the final data set. Table 3 provides descriptive statistics for the data set.

Table 3 Descriptive Statistics.

VARIABLES	FREQUENCY			
Dependent variable				
Course Grade = A	5,229			
Course Grade = Other than A	4,201			
Categorical independent variables				
OER	4,568			
Not OER	4,862			
First Generation	2,012			
Continuing Generation	7,418			
Pell Eligible	1,924			
Not Pell Eligible	7,506			
Race = Not White Only	4,376			
Race = White	5,054			
Class Level: Freshman	1,993			
Class Level: Sophomore	2,945			
Class Level: Junior	2,201			
Class Level: Senior	2,291			
Disciplinary Group: STEM	1,707			
Disciplinary Group: Social Sciences	2,589			
Disciplinary Group: Humanities	5,134			
Continuous Independent Variable	Mean	Standard Deviation	Min	Max
Student Grade Point Average	3.238	.598	0	4

RESULTS

IMPACT OF OER ON STUDENTS IN GENERAL

In order to answer the first research question, which focused on the impact of OER on students generally (without regard for first-generation status). This question is aimed at establishing

a baseline of OER impact in the selected courses. I used logistic regression to examine the relationship between student performance in a course and the type of textbook their professors chose to use. The dependent variable was receiving an A in the course or not. Table 4 shows the logit coefficients, standard errors and odds ratios for the model.

	b	SE	OR
Constant	-9.722***	.232	.00006
OER	.491***	.052	1.634
First-Generation	-.117	.069	.890
Pell Eligibility	-.067	.070	.935
Race = Not White Only	.177**	.053	1.193
Class level (Reference Group: First-Year Students)			
Sophomores	.170*	.073	1.186
Juniors	.326***	.078	1.385
Seniors	.417***	.080	1.517
Disciplinary Group (Reference Group: Humanities)			
Social Sciences	.092	.062	1.097
STEM	-.961***	.073	.383
Overall GPA	2.657***	.061	14.250
Observations	9,430		
LR R ²	.2671		
Log Likelihood	-4749.4911		
df_m	10		
LR χ^2	3461.48		

Table 4 Logit Coefficients, Standard Errors and Odds Ratios (Overall Population).

b = unstandardized regression coefficient; OR = odds ratio; ***p < .001, **p < .01, *p < .05.

For this model, the independent variables were use of OER, first generation status, Pell eligibility, race, class standing, course discipline, and a student's overall GPA. The likelihood ratio test showed that the model with the ten predictors had a statistically significantly better fit than the null model, $\chi^2_{(10)} = 3461.48$, $p < .001$. This reduced misfit by 19.69% compared to the null model. This model improved the overall classification rate to 75.14%, compared to 55.45% based on the null model.

Controlling for first-generation status, Pell eligibility, race, class standing, course discipline, and overall GPA, when a professor used an OER, the odds of a student receiving an A increased by 63.4%, $z = 9.51$, $p < 0.001$. For students who identified as any race other than white only, the odds of receiving an A in the class increased by 19.3%, $z = 3.33$, $p = .001$ when controlling for textbook type, first-generation status, Pell eligibility, class standing, course discipline, and overall GPA.

Other student identifiers were correlated with lower odds of receiving an A in the class, though the findings were not significant. The odds of receiving an A in the class decreased by 11.04% for first-generation students, controlling for textbook type, Pell eligibility, race, class standing, discipline, and overall GPA, $z = -1.69$, $p = .092$. For students who were Pell eligible, the odds of receiving an A in the class decreased by 6.6%, controlling for textbook type, first-generation status, race, class standing, discipline, and overall GPA, $z = -.96$, $p = .336$.

Regression results did identify significant differences in odds based on class standing. Compared to first-year students and controlling for textbook type, first-generation status, Pell eligibility, race, course discipline, and overall GPA, the odds of a sophomore receiving an A in the class increased by 18.6%, $z = 2.35$, $p = .019$. For juniors, the odds of receiving an A in the class increased by 38.5%, $z = 4.17$, $p < .001$. Compared to first-year students, the odds of a senior receiving an A in the class increased by 51.7%, $z = 5.22$, $p < .001$.

Controlling for type of textbook, first-generation status, Pell eligibility, race, class standing, and GPA, there were no statistically significant differences in the odds of students in social science courses receiving an A compared to students in humanities courses. The odds of students in STEM courses receiving an A decreased by 38.3%, $z = -13.21$, $p < .001$, compared to students in humanities courses when controlling for textbook type, first-generation status, Pell eligibility, race, class standing, and GPA.

Finally, controlling for textbook type, first-generation status, Pell eligibility, race, class standing, and course discipline, as a student's overall GPA increased by one point, their odds of receiving an A in the course was 14.25 times greater, $z = 43.90$, $p < .001$.

IMPACT OF OER ON THE FIRST-GENERATION STUDENTS

In order to answer the second research question, I eliminated the continuing-generation students from the data set and then used logistic regression to reexamine the relationship between student performance in a course and the type of textbook their professors chose to use. The dependent variable was receiving an A in the course or not. Table 5 shows the logit coefficients, standard errors and odds ratios for the model.

	b	SE	OR
Constant	-7.733***	.419	.0004
OER	.567***	.108	1.763
Pell Eligibility	-.161	.111	.852
Race = Not White Only	.285*	.121	1.330
Class level (Reference Group: First-Year Students)			
Sophomores	.160	.152	1.173
Juniors	.445**	.162	1.561
Seniors	.483**	.168	1.622
Disciplinary Group (Reference Group: Humanities)			
Social Sciences	-.015	.130	.985
STEM	-1.22***	.165	.295
Overall GPA	2.283***	.119	9.802
Observations	2,012		
LR R^2	.2341		
Log Likelihood	-1061.7867		
df_m	9		
LR χ^2	649.17		

Table 5 Logit Coefficients, Standard Errors and Odds Ratios (First-Generation Students).

b = unstandardized regression coefficient; OR = odds ratio; *** $p < .001$, ** $p < .01$, * $p < .05$.

For the first-generation student model, the independent variables were use of OER, Pell eligibility, race, class standing, course discipline, and a student's overall GPA. The likelihood ratio test showed that the model with the nine predictors had a statistically significantly better fit than the null model, $\chi^2_{(9)} = 649.17$, $p < .001$. This reduced misfit by 17.7% compared to the null model. This model improved the overall classification rate to 72.22%, compared to 54.52% based on the null model.

Controlling for Pell eligibility, race, class standing, course discipline, and overall GPA, when a professor used an OER, the odds of a first-generation student receiving an A increased by 76.3%, $z = 5.24$, $p < 0.001$. For first-generation students who identified as any race other than white only, the odds of receiving an A in the class increased by 33%, $z = 2.36$, $p = .018$ when controlling for textbook type, Pell eligibility, class standing, course discipline, and overall GPA.

Controlling for type of textbook, race, class standing, and GPA, there were no statistically significant differences in the odds of first-generation students who were Pell eligible receiving an A compared to those who were not Pell eligible. Similarly, there were no significant

differences in the odds of first-generation sophomores receiving an A compared with their first-year counterparts when controlling for textbook type, Pell eligibility, race, course discipline, and overall GPA. However, for juniors, the odds of receiving an A in the class increased by 56.1%, $z = 2.75$, $p = .006$. Compared to first-year students, the odds of a senior receiving an A in the class increased by 62.2%, $z = 2.88$, $p = .004$.

Controlling for type of textbook, Pell eligibility, race, class standing, and GPA, there were no statistically significant differences in the odds of first-generation students in social science courses receiving an A compared to students in humanities courses. The odds of students in STEM courses receiving an A decreased by 70.5%, $z = -7.39$, $p < .001$, compared to students in humanities courses when controlling for textbook type, first-generation status, Pell eligibility, race, class standing, and GPA.

Finally, controlling for textbook type, Pell eligibility, race, class standing, and course discipline, as a first-generation student's overall GPA increased by one point, their odds of receiving an A in the course was 9.8 times greater, $z = 19.14$, $p < .001$.

DISCUSSION

This study examined the academic performance of students enrolled in OER and non-OER sections of several courses at a large public research-intensive university in the United States during the Fall 2023 semester. The first logistic regression model supports the generally held notion that faculty use of OER has positive impacts on student academic performance (Mullens & Hoffman, 2023). This study found that, even when controlling for all of the independent variables, the odds of receiving an A in a course were 63.4% higher for students in courses using an OER. This aligns with prior research which found that faculty use of OER was associated with higher course grades (Cho & Permzadian, 2024; LeMire, 2024). This finding suggests that a faculty member's use of OER is likely to have a positive impact on student academic performance regardless of the course discipline or a student's class standing, race, Pell eligibility, or prior academic background.

First generation students are a population that has been targeted for additional support at LPU. Based on Maslow's hierarchy of needs, this study hypothesized that first-generation students, who are more likely to experience financial challenges (Rehr et al., 2022), would be likely to see a positive academic impact in courses using OER. This hypothesis aligns with the well-known access hypothesis described by Grimaldi et al. (2019), which suggests that OER are likely to impact specific populations of students who would otherwise not have access to course materials. Indeed, the second logistic regression supports the premise that assigning OER instead of commercial textbooks can result in improved academic performance for underserved populations such as first-generation students (Colvard et al., 2018). Although prior research did not find a relationship between textbook type and course grades of first-generation students (Nusbaum et al., 2020), this study found that, when controlling for all of the independent variables, the odds of a first-generation student receiving an A in a course increased by 76.3% if their faculty member was using an OER. This finding suggests that faculty and administrators who are trying to improve student success for first generation students may wish to consider including OER alongside other common efforts such as programming, scholarships, and other types of support.

Findings from the two logistic regressions suggest that, while faculty and administrators may want to consider supporting OER as a strategy to support first generation students, those efforts are also likely to benefit the overall undergraduate population. Many other initiatives aimed at supporting specific target populations come with an opportunity cost; for example, funding allocated to support first-generation students will not be available to support other groups of students. However, because the academic benefits of using OER are not isolated to first-generation college students, dollars allocated to OER programs as part of targeted student success programs also can have broader impacts on the student body as a whole.

LIMITATIONS AND FUTURE RESEARCH

An examination of the OER literature reveals that studies purporting to measure the impact of OER on student performance are commonly limited by failures to control for teacher effect or

to randomly assign students to OER and non-OER sections of courses (Hilton, 2016). Because this study relied on a pre-existing data set, students were not randomly assigned to OER and commercial sections, and it is unknown if there were characteristics (e.g., student athlete status, class standing) that assigned students to one section of a course over another. Many factors determine student course assignment; they may choose a course based on preference for morning or afternoon classes, scheduling compatibility with other courses, or simply based on which course has seats available. Preliminary research suggests that, while course registration systems allow them to choose based on textbooks, most students are unaware of their assigned textbook at the point of registration (LeMire et al., 2024). Further, instructors will not be randomly assigned to use an OER or a commercial textbook; instructor textbook choice is completely separate from this study. In addition, multi-section courses with sections using commercial and OER textbooks are likely to be lower-division undergraduate courses. For this reason, the study's results will not be generalizable to all types of courses. Finally, this study examines student academic performance for a single semester at one somewhat selective academic institution and thus the findings cannot be generalized to other types of institutions. Future research could examine the impact of OER on first-generation academic performance across multiple semesters and different types of institutions.

CONCLUSION

This study contributes to the literature about OER impact on study performance by showing a positive relationship between the use of OER in courses and student academic performance. In particular, this study suggests that first generation students are significantly more likely to achieve an A in a course if their professor has chosen to use an OER. This finding has implications for administrators striving to increase campus student success rates; OER may be a valuable strategy that administrators can use to reduce barriers and improve outcomes for undergraduates generally and first-generation students specifically. Further, this study has implications for individual faculty making decisions about course materials for their own courses. Although faculty are aware of the burdensome cost of higher education for many students, they typically have little ability to reduce that burden for their students. By switching to an OER textbook, faculty can remove one small part of that burden and make a positive impact on student academic achievement, especially for first generation students.

DATA ACCESSIBILITY STATEMENT

Restrictions apply to the availability of the data that supports the findings of this study, which were used under license for the current study, and so are not publicly available.

SUSTAINABLE DEVELOPMENT GOALS (SDGs)

This study is linked to the following SDG(s): Quality education (SDG 4).

ETHICS AND CONSENT

This study received a determination of not human subjects research by the Texas A&M University IRB (STUDY2024-0292).

ACKNOWLEDGEMENTS

Many thanks to Dr. Luis Ponjuan, who chaired the dissertation study upon which this article is based.

FUNDING INFORMATION

This research was supported by scholarship funding from Texas A&M University and the Pat Tillman Foundation. Its contents are solely the responsibility of the author and do not necessarily represent the official views of Texas A&M University or the Pat Tillman Foundation.

AUTHOR CONTRIBUTIONS (CRediT)

Sarah LeMire: Conceptualization, Formal Analysis, Investigation, Methodology, Writing – original draft, Writing – review & editing. The author has read and agreed to the published version of the manuscript.

AUTHOR AFFILIATIONS

Sarah LeMire  orcid.org/0000-0003-2526-0442
Texas A&M University, United States

REFERENCES

- Allen, N. (2018, October 12). \$1 billion in savings through open educational resources. SPARC. <https://sparcopen.org/news/2018/1-billion-in-savings-through-open-educational-resources/>
- Appedu, S., Elmquist, M., Wertzberger, J., & Birch, S. (2021). Inequitable impacts of textbook costs at a small, private college: Results from a textbook survey at Gettysburg College. *Open Praxis*, 13(1), 69–87. <https://doi.org/10.5944/openpraxis.13.1.1147>
- Atkins, D. E., Brown, J. S., & Hammond, A. L. (2007). *A review of the open educational resources (OER) Movement: achievements, challenges, and new opportunities*. The William and Flora Hewlett Foundation.
- Becker, K. L., Safa, R., & Becker, K. M. (2023). High-priced textbooks' impact on community college student success. *Community College Review*, 51(1), 128–141. <https://doi.org/10.1177/00915521221125898>
- Bennett, D., McCarty, C., & Carter, S. (2021). Grit, financial stress, and academic success for FGCS. *Journal of Instructional Pedagogies*, 26, 1–16.
- Blagg, K., & Blom, E. (2018). *Evaluating the return on investment in higher education: An assessment of individual- and state-level returns*. Urban Institute. <https://files.eric.ed.gov/fulltext/ED592627.pdf>
- Broton, K. M., & Goldrick-Rab, S. (2018). Going without: An exploration of food and housing insecurity among undergraduates. *Educational Researcher*, 47(2), 121–133. <https://doi.org/10.3102/0013189X17741303>
- Bui, K. V. T. (2002). First-generation college students at a four-year university: Background characteristics, reasons for pursuing higher education, and first-year experiences. *College Student Journal*, 36(1), 3–12.
- Cho, K. W., & Permzadian, V. (2024). The impact of open educational resources on student achievement: A meta-analysis. *International Journal of Educational Research*, 126, 102365. <https://doi.org/10.1016/j.ijer.2024.102365>
- Christie, A., Pollitz, J. H., & Middleton, C. (2009). Student strategies for coping with textbook costs and the role of library course reserves. *portal: Libraries and the Academy*, 9(4), 491–510. <https://doi.org/10.1353/pla.0.0077>
- Clinton, V., & Khan, S. (2019). Efficacy of open textbook adoption on learning performance and course withdrawal rates: A meta-analysis. *AERA Open*, 5(3), 1–20. <https://doi.org/10.1177/2332858419872212>
- Collins, M. E., Mitchell, N. K., & Nojeim, M. J. (2020). Removing the excuse: using free course materials to improve student success in general studies courses. *Journal of Higher Education Theory and Practice*, 20(5), 110–125. <https://doi.org/10.33423/jhetp.v20i5.3041>
- Colvard, N. B., Watson, C. E., & Park, H. (2018). The impact of open educational resources on various student success metrics. *International Journal of Teaching and Learning in Higher Education*, 30(2), 262–276.
- D'Amico, M. M., & Dika, S. L. (2013). Using data known at the time of admission to predict first-generation college student success. *Journal of College Student Retention: Research, Theory & Practice*, 15(2), 173–192. <https://doi.org/10.2190/CS.15.2.c>
- Florida Virtual Campus. (2022). 2022 Student textbook and instructional materials survey. <https://dlss.flvc.org/documents/210036/1314923/FLVC+Textbook+Survey+Report+--+2022.pdf/>
- Freitas, F. A., & Leonard, L. J. (2011). Maslow's hierarchy of needs and student academic success. *Teaching and Learning in Nursing*, 6(1), 9–13. <https://doi.org/10.1016/j.teln.2010.07.004>
- Grimaldi, P. J., Basu Mallick, D., Waters, A. E., & Baraniuk, R. G. (2019). Do open educational resources improve student learning? Implications of the access hypothesis. *PLoS One*, 14(3), e0212508. <https://doi.org/10.1371/journal.pone.0212508>
- Hege, A., Stephenson, T., Pennell, M., Revlett, B., VanMeter, C., Stahl, D., Oo, K., Bressler, J., & Crosby, C. (2021). College food insecurity: Implications on student success and applications for future practice.

- Hilton, J. (2016). Open educational resources and college textbook choices: A review of research on efficacy and perceptions. *Educational Technology Research and Development*, 64, 573–590. <https://doi.org/10.1007/s11423-016-9434-9>
- Hosmer, D. W., Jr., Lemeshow, S., & Sturdivant, R. X. (2013). *Applied logistic regression*. Wiley. <https://doi.org/10.1002/9781118548387>
- Hughes, J., & Taylor, J. (2022). *Textbooks 101: What you really need to know about textbook access codes, inclusive access, open access, and more!* Association Supporting Computer Users in Education.
- Jenkins, J. J., Sánchez, L. A., Schraedley, M. A., Hannans, J., Navick, N., & Young, J. (2020). Textbook broke: Textbook affordability as a social justice issue. *Journal of Interactive Media in Education*, 1(3), 1–13. <https://doi.org/10.5334/jime.549>
- Katz, S. (2019). Leveraging library expertise in support of institutional goals: A case study of an OER initiative at Lehman College. *CUNY Academic Works*. https://academicworks.cuny.edu/le_pubs/269/
- Landrum, R. E., Gurung, R. A., & Spann, N. (2012). Assessments of textbook usage and the relationship to student course performance. *College Teaching*, 60(1), 17–24. <https://doi.org/10.1080/87567555.2011.609573>
- Lantrip, J., & Ray, J. (2021). Faculty perceptions and usage of OER at Oregon community colleges. *Community College Journal of Research and Practice*, 45(12), 896–910. <https://doi.org/10.1080/10668926.2020.1838967>
- LeMire, S. (2024). Beyond cost savings: The impact of open textbooks on writing studies course grades. *Evidence Based Library and Information Practice*, 19(2), 51–62. <https://doi.org/10.18438/ebliip30490>
- LeMire, S., Anders, K. C., & Pantuso, T. (2024). Exploring first-generation student experiences with OER textbooks. *College & Research Libraries*, 85(7), 952–965. <https://doi.org/10.5860/crl.85.7.952>
- Li, F., & Wang, L. (2024). A study on textbook use and its effects on students' academic performance. *Disciplinary and Interdisciplinary Science Education Research*, 6(1), Article 4. <https://doi.org/10.1186/s43031-023-00094-1>
- Ma, J., & Pender, M. (2022). *Trends in college pricing and student aid 2022*. College Board. <https://research.collegeboard.org/media/pdf/trends-in-college-pricing-student-aid-2022.pdf>
- Magalhães, P., Ferreira, D., Cunha, J., & Rosário, P. (2020). Online vs traditional homework: A systematic review on the benefits to students' performance. *Computers & Education*, 152, 103869. <https://doi.org/10.1016/j.compedu.2020.103869>
- Martin, M. T., Belikov, O. M., Hilton, J., Wiley, D., & Fischer, L. (2017). Analysis of student and faculty perceptions of textbook costs in higher education. *Open Praxis*, 9(1), 79–91. <https://doi.org/10.5944/openpraxis.9.1.432>
- Martin, T., & Kimmons, R. (2020). Faculty members' lived experiences with choosing open educational resources. *Open Praxis*, 12(1), 131–144. <https://doi.org/10.5944/openpraxis.12.1.987>
- Maslow, A. H. (1943). A theory of human motivation. *Psychological Review*, 50(4), 370–396. <https://doi.org/10.1037/h0054346>
- Meeyai, S. (2016). Logistic regression with missing data: A comparison of handling methods, and effects of percent missing values. *Journal of Traffic and Logistics Engineering*, 4(2), 128–134. <https://doi.org/10.18178/jtle.4.2.128-134>
- Milheim, K. L. (2012). Towards a better experience: Examining student needs in the online classroom through Maslow's hierarchy of needs model. *Journal of Online Learning and Teaching*, 8(2), 159–171.
- Mullens, A. M., & Hoffman, B. (2023). The affordability solution: A systematic review of open educational resources. *Educational Psychology Review*, 35(3), 72. <https://doi.org/10.1007/s10648-023-09793-7>
- Nagashima, T., & Hrach, S. (2021). Motivating factors among university faculty for adopting open educational resources: Incentives matter. *Journal of Interactive Media in Education*, 2021(1), 19. <https://doi.org/10.5334/jime.678>
- Norušis, M. J. (2004). *SPSS 13.0 advanced statistical procedures companion*. Prentice Hall.
- Nusbaum, A. T. (2020). Who gets to wield academic Mjolnir?: On worthiness, knowledge curation, and using the power of the people to diversify OER. *Journal of Interactive Media in Education*, 2020(1), 1–9. <https://doi.org/10.5334/jime.559>
- Nusbaum, A. T., Cuttler, C., & Swindell, S. (2020). Open educational resources as a tool for educational equity: Evidence from an introductory psychology class. *Frontiers in Education*, 4. <https://doi.org/10.3389/feduc.2019.00152>
- Oleson, M. (2004). Exploring the relationship between money attitudes and Maslow's hierarchy of needs. *International Journal of Consumer Studies*, 28(1), 83–92. <https://doi.org/10.1111/j.1470-6431.2004.00338.x>
- Open Textbook Library. (2020, March 20). <https://web.archive.org/web/20200321084856/https://open.umn.edu/opentextbooks/>
- Open Textbook Library. (2025, May 19). <https://open.umn.edu/opentextbooks>

- Pascarella, E. T., Pierson, C. T., Wolniak, G. C., & Terenzini, P. T. (2004). First-generation college students: Additional evidence on college experiences and outcomes. *The Journal of Higher Education*, 75(3), 249–284. <https://doi.org/10.1080/00221546.2004.11772256>
- Rehr, T. I., Regan, E. P., Abukar, Z., & Meshelemiah, J. C. (2022). Financial wellness of first-generation college students. *College Student Affairs Journal*, 40(1), 90–105. <https://doi.org/10.1353/csj.2022.0007>
- Scott, R. E., Jallas, M., Murphy, J. A., Park, R., & Shelley, A. (2023). Exploring faculty perspectives on text selection and textbook affordability. *College & Research Libraries*, 84(2), 180–202. <https://doi.org/10.5860/crl.84.2.180>
- Smith, N. D., Grimaldi, P. J., & Basu Mallick, D. (2020, October). Impact of zero cost books adoptions on student success at a large, urban community college. *Frontiers in Education*, 5, 579580. <https://doi.org/10.3389/educ.2020.579580>
- SPARC. (n.d.). Open education. <https://sparcopen.org/open-education/>
- Spilovoy, T. M., & Seaman, J. (2015). Opening public institutions: OER in North Dakota and the nation, 2015. Babson Survey Research Group. <https://eric.ed.gov/?id=ED582436>
- Stracke, C. M., Downes, S., Conole, G., Burgos, D., & Nascimbeni, F. (2019). Are MOOCs open educational resources? A literature review on history, definitions and typologies of OER and MOOCs. *Open Praxis*, 11(4), 331–341. <https://doi.org/10.5944/openpraxis.11.4.1010>
- Thomas, W. J., & Bernhardt, B. R. (2018). Helping keep the costs of textbooks for students down: Two approaches. *Technical Services Quarterly*, 35(3), 257–268. <https://doi.org/10.1080/07317131.2018.1456844>
- Todorinova, L., & Wilkinson, Z. T. (2019). Closing the loop: Students, academic libraries, and textbook affordability. *Journal of Academic Librarianship*, 45(3), 268–277. <https://doi.org/10.1016/j.acalib.2019.03.010>
- Tolman, S., & Trautman, C. (2018). The need for college amenities and their benefit to the student and institution's success. *Counterpoints*, 517, 391–408. <https://www.jstor.org/stable/45178186>
- UNESCO. (2002). *Forum on the impact of open courseware for higher education in developing countries: Final report (CI-2002/CONF.803/CLD.1)*. UNESCO. <http://unesdoc.unesco.org/images/0012/001285/128515e.pdf>
- UNESCO. (2019). *Draft recommendation on open educational resources*. UNESCO. <https://unesdoc.unesco.org/ark:/48223/pf0000370936.locale=en>
- U.S. Bureau of Labor Statistics. (2021). Cost of college tuition has remained stable since September 2019. *TED: The Education Daily*. <https://www.bls.gov/opub/ted/2021/cost-of-college-tuition-has-remained-stable-since-september-2019.htm>

TO CITE THIS ARTICLE:

LeMire, S. (2026). Impact of OER on First Generation College Students: A Case Study. *Open Praxis*, 18(1), pp. 132–145. DOI: <https://doi.org/10.55982/openpraxis.18.1.926>

Submitted: 02 June 2025

Accepted: 04 September 2025

Published: 24 February 2026

COPYRIGHT:

© 2026 The Author(s). This is an open-access article distributed under the terms of the Creative Commons Attribution 4.0 International License (CC-BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited. See <http://creativecommons.org/licenses/by/4.0/>.

Open Praxis is a peer-reviewed open access journal published by International Council for Open and Distance Education.