Initial Evaluation of the Impact of Textbook Costs on Course Success and Student Persistence

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Executive Summary

Background

In the Fall 2021 semester the Cosumnes River College (CRC) Open Educational Resources (OER) Award Program[1] began with the goal of lowering the cost of textbooks for all students. Zero Cost Textbooks (ZTC) is a designator for courses that have zero costs associated with textbooks[2] and Open Educational Resources (OER) are educational resources which can be openly shared, copied, or edited to serve students. For the purpose of this study ZTC/OER textbooks refer to textbooks which had no cost options advertised by the College Bookstore. In an effort to support this effort, the CRC Research and Equity Office sought to describe the cost incurred by students when purchasing textbooks and evaluate the impact of textbook costs on course success (earning a letter grade of A, B, C, or P) and persistence (continuing enrollment from one term to the next).

Summary of Findings

Finding 1: Students enrolled in courses with exclusively paid textbooks (defined in this report as "cost textbooks") had a minimum estimated cost per unit of $19.12 and a maximum estimated average cost per unit of $42.03. Students enrolled in a combination of courses with free textbooks and cost textbooks had a minimum estimated cost per unit of $9.93 and a maximum estimated cost per unit of $22.72 (Table 3, Page 5).

Finding 2: An analysis of 14 course sections that had multiple instructors, as well as Zero Textbook Costs ZTC) and OER compared with traditional paid textbook options, showed that 11 courses (78.6% of courses) had a higher success rate in the ZTC/OER textbook sections. However, it is extremely challenging to account for instructional differences, making it difficult to draw definitive conclusions.

Finding 3: Cost of textbooks per unit is not a statistically significant predictor of student persistence when accounting for known predictors of student persistence such as a student's course success, unit load, number of enrollments, race/ethnicity, and income level.

Conclusions and Recommendations

General Conclusions

Estimated textbook costs range from $9.93 per unit to $42.03 per unit, depending on the combination of courses in which the student is enrolled. For students enrolled full-time in 12 units, a switch to entirely

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[1] https://employees.crc.losrios.edu/institutional-equity-and-research-and-planning/oer-award-program
[2] https://crc.losrios.edu/admissions/enroll-in-classes/zero-textbook-costs

ZTC/OER textbooks could result in a savings of $119.16 per semester (at $9.93 per unit) and $504.36 per semester (at $42.03 per unit). No discernable differences were found when comparing the total cost of textbooks for students across race/ethnicity and income level groups.

The campus course success rate was slightly higher for ZTC/OER than for traditional cost textbook courses overall. An analysis of like courses (more than one instructor and a section with a ZTC/OER and a section with a traditional cost textbook) showed that, of 14 courses meeting the criteria, 11 had higher course success rates in their ZTC/OER sections. Based on the findings in this report, it appears unlikely that the implementation of ZTC/OER textbooks in courses would cause a decline in course success.

The cost of textbooks was not a predictor of student persistence when accounting for factors known to effect student persistence rates (course success, units enrolled, number of enrollments, race/ethnicity, and income level).

Recommendations

Although there do not appear to be significant differences in course success rates or student persistence, whenever possible, the adoption of an ZTC/OER textbook should be considered as a means to lower the cost burden on students. A reduction in cost could have other qualitative and quantitative[3] results not captured by the present study and future research is warranted to capture the qualitative student perspective of the use of ZTC/OER textbooks.

A college-wide adoption of ZTC/OER textbooks will likely not have a negative impact on course success rates, but within any department or course there could be differences in course success rates. It is recommended that each department analyze their course success rates as they implement ZTC/OER textbooks and conduct qualitative studies to determine the impact on students and the student experience.

It appears that the adoption of ZTC/OER textbooks does not have a direct effect on student persistence after accounting for known predictors of persistence. It is recommended to continue to monitor persistence rates as more ZTC/OER textbooks are adopted while taking into account other related factors such as enrollments, units taken, and course success rates.

Caveats and Limitations

The cost of the textbooks presented in this study are the costs associated with the CRC bookstore pricing. The cost at the bookstore may not accurately represent the costs actually incurred by the students. Anecdotally, instructors and students report that other means of gaining access to textbooks exist to help students lower their costs (borrowing textbooks, renting textbooks, or obtaining PDF copies of textbooks). While the exact cost of textbooks may be challenging to determine, the CRC bookstore data represents an advertised expected cost to the students at the time of enrollment and serves as a starting point to begin future research related to the actual cost of textbooks incurred by students.

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[3] For example, see the report *Enrollment and the Cost of Textbooks* (Meinz, 2022).

The present study was limited by the currently accessible in the college and district databases. Many factors influence course success and student persistence, and the textbook status could be one of those factors; however, to determine the extent to which ZTC/OER textbooks influences those outcomes will necessitate further study and research into areas such as instructional practice and implementation.

Finally, this study represents a first attempt at analyzing the potential impact of institutional ZTC/OER textbook adoption and is limited to a single term of textbook costs and a single year of persistence data. Continuous analysis of these data will be needed to determine the long-term impacts of the adoption of ZTC/OER at scale.

Background and Methodology

Method

The Datasets

Two datasets were used in the present evaluation. They are referred to here as the Success Dataset and the Persistence Dataset. The Success Dataset consisted of all student enrollments (n=32,152) in the Fall 2021 term. The Persistence Dataset tracked students (n=14,059) in the Fall 2021 term into the Spring 2022 term. For both datasets, textbooks were identified via bookstore data as OER, ZTC, Textbook (if there was a known cost), and unknown (if there was no reported cost). Textbook costs were determined from the listings on the CRC Bookstore website. Given the multitude of textbook options for each course (e.g. used textbooks, digital options, etc.), estimated cost was calculated in three ways: minimum cost (the lowest cost available), maximum cost (the highest cost available), and the mid cost (the average of the minimum and maximum cost values).

Cost Analysis

The cost analysis utilized the aforementioned Persistence Dataset and categorized the student experience into three cost type categories (free = only ZTC/OER books, mixed = some ZTC/OER books and some cost books, and cost = only had cost textbooks). The cost per unit was then calculated for each of these groups. Cost per unit was disaggregated by race/ethnicity and income level to determine if any group of students was experiencing higher costs of textbooks.

Course Success Rate Differences - By Textbook Type and Specific Courses

The success rate analysis used the aforementioned Success Dataset. Each enrollment in the Success Dataset was categorized by textbook type free (any OER or ZTC label) and cost (any textbook with an associated cost) with Unknown textbook types removed. Courses sections where more than two sections were taught by more than one instructor and with at least sections using ZTC/OER and traditional cost textbooks were selected. An average course success rate was calculated for each course separated by textbook type.

Student Persistence Rate Differences - By Textbook Type and Units

Each student in the Persist Dataset was categorized by two experience types with textbook costs, free (OER or ZTC only) and cost (they paid for at least one textbook). For each student in the Persist Dataset the expected textbook costs per unit enrolled was calculated. Two analyses were conducted, first a visual inspection of the persistence rates of the students separated by quartile ranges of expected textbook cost per unit. Second, a logistic regression was conducted with persistence as the dependent variable and independent variables such as course success, unit load, number of enrollments, race/ethnicity, income level, and maximum estimated textbook cost per unit. A student's unit load has historically been a strong predictor of persistence and unit load correlates with cost. Additionally, instructional practices could be correlated with ZTC/OER implementation. For these reasons, this analysis looks at ZTC/OER as a factor in student persistence while controlling for a student's course success and units enrolled.

Student Demographics

Because the data were representative of all students, the initial datasets (Persistence and Course Success) are the actual student population of the college during the terms analyzed. A breakdown of the different book types by race/ethnicity can be found in *Table 1* below. The ZTC/OER column is defined as the students who only had ZTC/OER books required in their courses. The Cost column represents students with at least one enrollment with a required textbook cost. Although differences were small, African American and White students were the two groups most overrepresented in ZTC/OER only courses when compared to the student population in Fall 2021. Asian students were the most over represented in Cost (at least one cost textbook) textbook courses when compared to the student population in Fall 2021. Other student groups' representation was less than a one percentage point difference when compared to the overall population.

Table 1: Demographics of Students Enrolled in ZTC/OER Courses and Cost Courses

Race/Ethnicity	ALL	ZTC/OER	Cost
African American	9.44% (1298)	10.68% (218)	9.22% (1080)
Asian	23.73% (3263)	19.05% (389)	24.55% (2874)
Filipino	4.91% (675)	4.55% (93)	4.97% (582)
Hispanic/Latino	27.98% (3847)	27.04% (552)	28.15% (3295)
Multi-Race	7.58% (1043)	7.25% (148)	7.64% (895)
Native American	0.32% (44)	0.39% (8)	0.3% (36)
Other Non-White	0.12% (17)	0.24% (5)	0.1% (12)
Pacific Islander	1.15% (159)	1.07% (22)	1.17% (137)
Unknown	1.86% (256)	2.4% (49)	1.76% (207)
White	22.87% (3144)	27.29% (557)	22.1% (2587)

Findings and Analysis

Finding 1 - Cost Analysis

Table 2 shows the average total cost experienced by students in the Fall 2021 semester. Students that enrolled in courses with only cost textbooks who purchased all the lower cost options would pay an estimated $106.39 on average (the "minimum cost") and a cost of $228.38 if purchasing the most expensive options (the "maximum cost"). Students enrolled in courses with a mixture of cost and free textbooks experienced a minimum estimated cost of $105.53 and a maximum estimated average cost of $242.23. However, these data may be skewed by students who take more units who necessarily have higher textbook costs. With that said, an additional analysis focused on the average cost per unit.

Table 2: **Average Total Textbook Costs**

Student Textbook Status	Average Total Minimum Cost	Average Total Mid Cost	Average Total Maximum Cost	Average Enrollments	Average units	n	Frequency
Both Free and Cost	$105.53	$173.88	$242.23	3.5	10.6	5005	36.41%
Cost Only	$106.39	$167.38	$228.38	1.7	5.7	6448	46.91%
Free Only	$0.00	$0.00	$0.00	1.3	3.8	2293	16.68%
All Textbook Types	$88.33	$141.83	$195.33	2.3	7.1	13746	100.00%

Table 3 shows the average textbook cost for students per unit enrolled in the Fall 2021 semester. Students that enrolled in courses with only cost textbooks experienced a minimum estimated cost per unit of $19.12 and a maximum estimated average cost per unit of $42.03. Students enrolled in a combination of courses with free textbooks and cost textbooks experienced a minimum estimated cost per unit of $9.93 and a maximum estimated cost per unit of $22.72.

Table 3: **Average Textbook Cost Per Unit Enrolled**

Student Textbook Status	Average Minimum Cost Per Unit	Average Mid Cost Per Unit	Average Maximum Cost Per Unit	Average Number of Enrollments	Average Number of Units Taken	n	Frequency
Both Free and Cost	$9.93	$16.33	$22.72	3.5	10.6	5005	36.41%
Cost Only	$19.12	$30.57	$42.03	1.7	5.7	6448	46.91%
Free Only	$0.00	$0.00	$0.00	1.3	3.8	2293	16.68%
All Textbook Types	$12.58	$20.29	$27.99	2.3	7.1	13746	100.00%

If students in a mixture of ZTC/OER and paid textbook courses enrolled in only ZTC/OER courses they would save between an estimated $9.93 and $22.72 per unit enrolled. If students in all cost textbook courses enrolled in only ZTC/OER courses they would save between and estimated $19.12 and $42.03 per unit enrolled.

Demographic Disaggregation by Cost

A demographic breakdown of cost per unit can be found in tables 4 and 5 below. While there are some differences between the average costs of textbooks per unit by race/ethnicity groups, the differences are too small to discern any pattern or draw any clear conclusions, especially given that demographic groups also enroll in a varying number of units as well. The difference in average costs of textbooks per unit by income level description are also too small to discern any pattern or draw any clear conclusions.

Table 4: **Average cost per student per unit by race/ethnicity**

Race/Ethnicity	Average Minimum Cost Per Unit	Average Mid Cost Per Unit	Average Maximum Cost Per Unit	Average Units Taken	n	Frequency
African American	$11.85	$19.65	$27.46	6.8	1298	9.4%
Asian	$13.21	$20.80	$28.38	7.7	3263	23.7%
Filipino	$13.47	$21.41	$29.35	7.7	675	4.9%
Hispanic/Latinx	$11.97	$19.40	$26.83	7.3	3847	28.0%
Multi-Race	$12.61	$20.24	$27.87	7.1	1043	7.6%
Native American	$12.10	$21.49	$30.87	5.4	44	0.3%
Other Non-White	$13.05	$23.16	$33.26	4.0	17	0.1%
Pacific Islander	$13.09	$21.56	$30.04	7.1	159	1.2%
Unknown	$12.76	$21.36	$29.96	6.1	256	1.9%
White	$12.74	$20.69	$28.64	6.5	3144	22.9%
ALL Students	$12.58	$20.29	$27.99	7.1	13746	100.00%

Table 5: **Average cost per student per unit by income level descriptors**

Income Level Description	Average Minimum Cost Per Unit	Average Mid Cost Per Unit	Average Maximum Cost Per Unit	Average Units Taken	n	Frequency
Below Poverty	$12.43	$19.91	$27.39	7.2	3614	26.29%
Low	$12.80	$20.41	$28.01	7.1	3347	24.35%
Middle And Above	$12.80	$20.85	$28.89	7.1	5194	37.79%
Unable to Determine	$11.73	$19.05	$26.36	7.2	1591	11.57%
ALL Students	$12.58	$20.29	$27.99	7.1	13746	100.00%

Finding 2 - Course Success Rate Analysis

Course success rate differences by textbook type, with Unknown textbook labels and work experience courses removed from the calculation, initially show that there is a higher success rate for courses using ZTC/OER textbooks (*Table 6* below). However, the unit average is slightly lower for the ZTC/OER textbooks than for cost textbooks. This suggests that there may be differential adoption. Certain course subject areas may have adopted more ZTC/OER textbooks, and the difference in course success may be related to other differences, e.g. instructional factors, curriculum, etc.

Table 6: **Average Course Success Rate Cost Textbook and Free Textbook Courses**

Textbook Status	Average Course Success Rate	n	Average Units Per Course	Frequency
Cost	66.06%	20772	3.3	65.51%
Free (ZTC/OER)	68.06%	10935	2.8	34.49%

In order to partially address the aforementioned confound, one can look at how the course success rate differs within courses where there is differential adoption. That is, some large courses at CRC have sections with cost textbooks and ZTC/OER textbooks. Analysis using these courses helps account for potential differences in the course formats, number of units, and difficulty differences in various disciplines. Acknowledging that there are differences within each subject area this analysis was considered from a high-level adoption of ZTC/OER perspective.

Courses were selected within a department that had more than two instructors and ZTC/OER and a traditional textbook section. Across campus, 14 courses met these criteria. Of those courses, 11 had a higher success rate in the ZTC/OER textbook courses, or 78.6% of the courses showed a higher course success rate. These data are presented in *Table 7* below.

Table 7: **Course Success Rate Differences of Course Sections Using ZTC/OER and Traditional Cost Textbooks**

Course	ZTC/OER Textbook Success Rate	Cost Textbooks Success Rate	Success Rate Difference (ZTC/OER Success Rate - Cost Success Rate)
CRC 1	89.47%	63.16%	26.32%
CRC 2	84.27%	60.31%	23.96%
CRC 3	75.69%	57.89%	17.80%
CRC 4	70.39%	60.00%	10.39%
CRC 5	72.22%	61.86%	10.36%
CRC 6	64.93%	58.64%	6.29%
CRC A	62.67%	57.65%	5.02%
CRC 7	38.56%	34.00%	4.57%
CRC B	77.00%	72.63%	4.37%
CRC 8	69.32%	67.01%	2.31%
CRC C	54.10%	52.62%	1.48%
CRC 9	53.59%	54.89%	-1.30%
CRC 10	72.82%	76.74%	-3.93%
CRC 11	22.03%	31.03%	-9.00%

Although ZTC/OER courses seemingly have higher success rates, findings must be interpreted with caution. There are potential confounding factors and sample size issues with these data. For example, instructors with higher success rates may be more likely to adopt OER textbooks. However, it is unlikely that course success rates would decline after adoption of ZTC/OER textbooks because the higher course success rates observed for these courses.

From the 14 courses that met the criteria of having at least two instructors and both ZTC/OER and cost textbook options, there were three courses that had at least a total of at least 700 total enrollments. To evaluate the potential impact of textbook cost reduction on equity gaps, course success rates within these courses were broken down by race/ethnicity. Tables A.1, A.2, and A.3 in the appendix provide a summary of the equity gaps that exist within different race/ethnicity groups for each of the textbook cost categories. Course numbers and names have been replaced with pseudonyms.

In short, adopting free textbooks currently does not show a college wide difference in course success rates. Within each department, course success rates and adoption of free textbooks should be considered on an individual department basis, while weighing the cost benefits to students. Further data, which is both qualitative and quantitative as well as longitudinal, should be gathered at the

department level before drawing any conclusions about the differences in course success rates within a department.

Finding 3 - Persistence and the Total cost per student

Cost of textbooks and persistence

Tables 8 and 9 show the average cost of textbooks per unit quartile ranges and the corresponding persistence rate of the students within those ranges. To account for variation in the enrollments of the students these tables show the students enrolled in two or more courses. Persistence rates varied little across the different average cost ranges. Further analysis of the relationship between the student persistence rates and the cost of textbooks per unit was conducted (see below).

Table 8: **Persistence Rates by Minimum Average Cost Per Unit Ranges**

Minimum Cost Per Unit Ranges	Persistence Rate	Average Units Enrolled	n
1st Quartile ($0 - $6.40)	66.81%	9.1	2055
2nd Quartile ($6.40 - $11.07)	72.16%	10.3	2058
3rd Quartile ($11.07 - $ 16.50)	71.35%	10.6	2056
4th Quartile ($16.50 - $93.75)	67.91%	9.1	2057

Table 9: **Persistence Rates by Maximum Average Cost Per Unit Ranges**

Maximum Cost Per Unit Ranges	Persistence Rate	Average Units Enrolled	n
1st Quartile ($0 - $14.46)	67.35%	9.1	2055
2nd Quartile ($14.46 - $25.56)	73.35%	10.4	2056
3rd Quartile ($25.56 - $38.13)	71.04%	10.6	2058
4th Quartile ($38.13 - $266.00)	66.50%	8.9	2057

Persistence and the cost per unit

Known predictors of student persistence are the student's course success, unit load, number of enrollments, race/ethnicity, and income level. Using a logistic regression analysis with these known factors, the maximum cost of textbooks per unit is not a statistically significant predictor of student persistence ($z=-0.916$, $p=0.3597$).

Persistence and the cost per enrollment

A similar logistic regression analysis using the maximum cost of textbooks per enrollment yields similar results. When accounting for the factors of the student's course success, units enrolled, number of

enrollments, race/ethnicity, and income level, the maximum cost of textbooks per enrollment is not a statistically significant predictor of student persistence (z=-0.484, p=0.6281).

Conclusions and Recommendations

Cost

The estimated textbook costs ranges from a low of $9.93 per unit to $42.03 per unit. For students enrolled in a mixture of ZTC/OER and paid textbook courses, a switch to only ZTC/OER courses would result in an estimated savings between $9.93 and $22.72 per unit enrolled. For students enrolled in only traditional cost textbook courses, a switch to only ZTC/OER courses would result in an estimated savings between $19.12 and $42.03 per unit enrolled.

To put the savings into another perspective, students enrolled full-time in 12 units could save an estimated $119.16 per semester (assuming the low cost of $9.93 per unit) and $504.36 per semester (assuming the high cost of $42.03 per unit).

No discernable differences were found when comparing the total cost of textbooks for students across race/ethnicity and income level groups.

Course Success

Course success rate was slightly higher for ZTC/OER than for traditional cost textbook courses overall. However, since there is apparent variation in adoption (across courses, unit loads, format, instruction, etc.), an analysis was conducted with courses that met specific criteria (more than one instructor, a ZTC/OER option and a traditional cost textbook option). This comparative analysis showed that of the 14 courses meeting the criteria, 11 of the courses with ZTC/OER had a higher success rate than their traditional textbook counterparts, that is, 78.6% of the courses that had both textbook options and more than one instructor teaching the courses had a higher average course success rate.

Although it is difficult to draw definitive conclusions, it appears unlikely that implementation of ZTC/OER textbooks in courses would cause a decline in course success rates.

Persistence

When accounting for other factors known to effect student persistence rates (course success, units enrolled, number of enrollments, race/ethnicity, and income level), the cost of the textbook was not a predictor of persistence.

Recommendations

It is clear that there will be cost savings to the students if the college were to adopt free textbooks at scale. Whenever possible, the adoption of a ZTC/OER textbook should be considered as a means to lower the cost burden on students. Since there do not appear to be significant differences in course success or persistence rates between ZTC/OER textbooks and traditional textbooks, after accounting for typical strong predictors of success and persistence, the adoption of ZTC/OER textbooks should be considered a safe option for reducing costs. Reduction in cost could have other qualitative results not captured by the present study.

The adoption of college-wide ZTC/OER textbooks will likely not have a negative impact on college-wide course success rates, but within any department or course there could be differences in course success rates. It is recommended that each department analyze their course success rates as they implement ZTC/OER textbooks and conduct qualitative studies to determine the impact on students and the student experience.

While it appears that the adoption of ZTC/OER textbooks does not have a direct effect on student persistence, we recommend the continuous monitoring of persistence rates as more ZTC/OER textbooks are adopted and the consideration of other related factors such as enrollments, units taken, and course success rates.

Caveats and Limitations

The cost of the textbooks presented in this study are the costs associated with the CRC bookstore pricing. The cost at the bookstore may not accurately represent the costs actually incurred by the students. Anecdotally, instructors and students report that other means of gaining access to textbooks exist to help students lower their costs (borrowing textbooks, renting textbooks, or obtaining PDF copies of textbooks). While the exact cost of textbooks may be challenging to determine, the CRC bookstore data represents an advertised expected cost to the students at the time of enrollment and serves as a starting point to begin future research related to the actual cost of textbooks incurred by students.

The present study was limited by the data we currently possess in our databases. Many factors influence course success and student persistence, and the textbook status could be one of those factors, however to determine the extent at which ZTC/OER textbooks influences those outcomes will necessitate further study and research into areas such as instructional practice and implementation.

Finally, this study represents a first attempt at analyzing the potential impact of institutional ZTC/OER textbook adoption and is limited to a single term of textbook costs and a single year of persistence data. Continuous analysis of these data will be needed to determine the long-term impacts of the adoption of ZTC/OER at scale.

Appendices

Table A.1: **CRC Course B Equity Gaps (N = 764)**

	Course	Race	Cost Textbooks	ZTC/OER Textbooks	**Equity Gap Difference** (ZTC/OER Gap - Cost Gap)
Equity Gap	CRC B	African American	-9.67%	-3.47%	6.20%
Headcount	CRC B	African American	27	34	
Equity Gap	CRC B	Asian	5.32%	10.88%	5.56%
Headcount	CRC B	Asian	127	66	
Equity Gap	CRC B	Filipino	4.29%	13.48%	9.18%
Headcount	CRC B	Filipino	39	21	
Equity Gap	CRC B	Hispanic/Latino	-12.48%	-11.86%	0.62%
Headcount	CRC B	Hispanic/Latino	138	109	
Equity Gap	CRC B	Multi-Race	5.94%	9.96%	4.01%
Headcount	CRC B	Multi-Race	28	23	
Equity Gap	CRC B	Pacific Islander	27.37%	-10.33%	-37.70%
Headcount	CRC B	Pacific Islander	3	6	
Equity Gap	CRC B	Unknown	-2.63%	23.00%	25.63%
Headcount	CRC B	Unknown	10	2	
Equity Gap	CRC B	White	9.98%	7.21%	-2.77%
Headcount	CRC B	White	92	38	

For CRC Course B, equity gap differences between cost textbooks and ZTC/OER textbooks were closed for African American, Asian, Filipino, Hispanic/Latino, and Multi-Race student groups. Pacific Islander and Unknown race student groups had sample sizes too small to draw conclusions. This indicates that for this particular course while equity gaps still exist for African American and Hispanic/Latino students, the gap was smaller in the ZTC/OER textbook courses. Further longitudinal analysis is needed to determine if these improvements are statistically significant and attributed to ZTC/OER.

Table A. 2: **CRC Course A Equity Gaps (N = 1912)**

	Course	Race	Cost Textbooks	ZTC/OER Textbooks	Equity Gap Difference (ZTC/OER Gap - Cost Gap)
Equity Gap	CRC A	African American	-19.66%	-11.35%	8.31%
Headcount	CRC A	African American	129	76	
Equity Gap	CRC A	Asian	6.03%	12.58%	6.55%
Headcount	CRC A	Asian	223	206	
Equity Gap	CRC A	Filipino	22.75%	9.33%	-13.41%
Headcount	CRC A	Filipino	51	50	
Equity Gap	CRC A	Hispanic/Latino	-1.72%	-9.79%	-8.07%
Headcount	CRC A	Hispanic/Latino	363	261	
Equity Gap	CRC A	Multi-Race	-0.17%	-9.94%	-9.76%
Headcount	CRC A	Multi-Race	87	55	
Equity Gap	CRC A	Native American	-57.65%	37.33%	94.98%
Headcount	CRC A	Native American	3	1	
Equity Gap	CRC A	Pacific Islander	-20.80%	-0.17%	20.64%
Headcount	CRC A	Pacific Islander	19	8	
Equity Gap	CRC A	Unknown	-4.31%	-12.67%	-8.35%
Headcount	CRC A	Unknown	15	4	
Equity Gap	CRC A	White	6.72%	5.36%	-1.36%
Headcount	CRC A	White	188	172	

For CRC Course A, equity gap differences between cost textbooks and ZTC/OER textbooks were closed for African American and Asian student groups. Native American, Pacific Islander and Unknown race student groups had sample sizes too small to draw conclusions. This indicates that for this particular course while equity gaps still exist for African American students, the gap was smaller in the ZTC/OER textbook courses. Further longitudinal analysis is needed to determine if these improvements are statistically significant and caused by conversion to ZTC/OER.

Table A. 3: **CRC Course C Equity Gaps (N = 725)**

	Course	Race	Cost Textbooks	ZTC/OER Textbooks	Equity Gap Difference (ZTC/OER Gap - Cost Gap)
Equity Gap	CRC C	African American	-13.08%	-17.06%	-3.98%
Headcount	CRC C	African American	43	27	
Equity Gap	CRC C	Asian	3.86%	9.90%	6.04%
Headcount	CRC C	Asian	108	100	
Equity Gap	CRC C	Filipino	8.49%	-6.27%	-14.76%
Headcount	CRC C	Filipino	36	23	
Equity Gap	CRC C	Hispanic/Latino	-7.32%	-4.67%	2.65%
Headcount	CRC C	Hispanic/Latino	117	87	
Equity Gap	CRC C	Multi-Race	1.67%	-7.04%	-8.71%
Headcount	CRC C	Multi-Race	35	17	
Equity Gap	CRC C	Pacific Islander	-15.12%	-54.10%	-38.98%
Headcount	CRC C	Pacific Islander	8	2	
Equity Gap	CRC C	Unknown	4.52%	-4.10%	-8.62%
Headcount	CRC C	Unknown	7	2	
Equity Gap	CRC C	White	11.02%	4.60%	-6.42%
Headcount	CRC C	White	66	46	

For CRC Course C, equity gap differences between cost textbooks and ZTC/OER textbooks were closed for Asian and Hispanic/Latino student groups. Pacific Islander and Unknown race student groups had sample sizes too small to draw conclusions. This indicates that for this particular course while equity gaps still exist for Hispanic/Latino students, the gap was smaller in the ZTC/OER textbook courses. Further longitudinal analysis is needed to determine if these improvements are statistically significant and caused by conversion to ZTC/OER.