

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: June 1, 2015

Grant Number: 17

Institution Name(s): Valdosta State University

Team Members (Name, Title, Department, Institutions if different, and email address for each):

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Project Lead: Timothy Henkel

Course Name(s) and Course Numbers:

BIOL 1010 – Evolution and Biodiversity
BIOL 1030 – Organismal Biology

Semester Project Began: Fall 2015

Semester of Implementation: Fall 2014/Spring 2015

Average Number of Students Per Course Section: 160

Number of Course Sections Affected by Implementation: 6

Total Number of Students Affected by Implementation: 959

1. List of Resources Used in the Textbook Transformation

Concepts of Biology from OpenStax College, ISBN 1-938168-11-9

2. Narrative

Adopting the OpenStax textbook was equivalent to any new textbook adoption for a course. The material presented aligned fairly well with the previous text used in both courses, which made the transition easier. In-class presentations had to be altered, though this was made somewhat easier by the provided graphics used in the text.

The textbook is a substantial reference text, though some students and instructors noted that the language was very technical in sections for a non-majors audience. In addition, some errors were found in the text. This is where working with an online, open-source text is a great benefit, as corrections and suggestions were added to the errata page on the publisher's website and will be incorporated into future editions.

In setting out with this project, we did not expect there to be a large learning increase solely based on the textbook. Previous surveys have suggested that students are not purchasing college textbooks due to cost and reduced cost may increase student engagement with the material. Our project did not find any increase in student performance using the OpenStax book compared to the pre-OpenStax course offerings. In addition, surveys of our students suggest that while students are very aware of the cost of college textbooks, at Valdosta State University (VSU), cost does not limit their obtaining the required texts. Student's did perceive the text to be useful, informative and valued the content as well as the selection of a free/low-cost text. This perceived value may impact student's perception of their courses and university experience, which could work to maintain or increase student retention at VSU. Finally, given that the OpenStax textbook did not increase student performance, we suggest future work should focus on free/low-cost tools that complement this textbook. These tools should work to engage students in a deeper level with the content outside of class.

3. Quotes

"I think having the free textbook online is an amazing idea. Students already pay enough money for tuition and other fees, and taking off fees for textbooks is such a stress-reliever. I would love if more classes had their textbooks online, especially ones that we actually use in class like this one. It was extremely beneficial in helping study and understand concepts."

"I loved using this textbook. The material was great, and easy to understand. Went well with the class and saved me stress from having to decide if I could have a book for the class or not."

"The textbook expanded on a lot of the topic covered in class that I did not completely understand. For a lost cost book it contained good information that I used to study for my exams; the chapters were easy to read, which helped me understand some of the harder parts of my Biology course."

4. Quantitative and Qualitative Measures

Survey Responses

A survey of student perceptions of the OpenStax textbook was administered during the last week of the Spring 2015 semester (Appendix 1), with 57% of students (n=233) completing the online survey. While the majority of respondents (84%) consider the cost of a textbook before buying the book, 64% claim to buy all required books for their courses. Over half of the respondents were aware that the book used in the course was free, and 22% responded that they selected the course sections because of the free text (Fig 1). Overall, students found the textbook assisted their understanding of concepts covered in class and the graphics and figures were useful (Fig 2).

Students reported use of the OpenStax textbook in the biology courses did not differ from their use of textbooks in other courses (Fig 3). The majority of students (66%) stated they used the free online version of the text and 33% purchased a print copy of the text. Only 13% reported printing off pages from the electronic version.

Impact on Student Performance

We originally hypothesized that the specific textbook used in a general biology course should not impact student achievement, though access to a free textbook may increase engagement with course material and result in increased achievement. Based on survey responses, most students at VSU purchase all required texts, despite their concern about cost. In addition, students reported engaging with the OpenStax book as often as they did textbooks in other courses. Therefore, it does not appear that students were more engaged with the free, open access text.

Student performance was examined by comparing rates of DFW's, rates of failure (achieving a final course grade of F, which is failing in most non-majors courses), and level of achievement on an assessment between the pre-OpenStax course and the OpenStax course. For each treatment, final grades were collected for two semesters, with each instructor teaching one section each semester (n=6). The standardized assessment questions were administered during the final exam of 5 sections for each treatment (pre-OpenStax and OpenStax courses). Level of achievement on the assessment was scored as Exceeds Expectations (scored >8), Meets Expectations (scored 6-8), and Fails to Meet Expectations (scored < 6).

While there is a slight decrease in DFW rates and failure rates in the OpenStax semesters, these differences were not significantly different (Fig 4; $p > 0.05$; Wilcoxon rank-sum). Similarly, while there was a small decrease in the percent of students that failed to meet expectations on the assessment, these differences were not significant (Fig 5; $p > 0.05$; Wilcoxon rank-sum).

The results of this project support the initial claim that the specific textbook would not impact student performance. The consistent level of performance also underscores the quality of information provided by the freely available OpenStax textbook relative to the previous text used. Based on these results, the team will continue to use the OpenStax text as the primary textbook for the two courses.

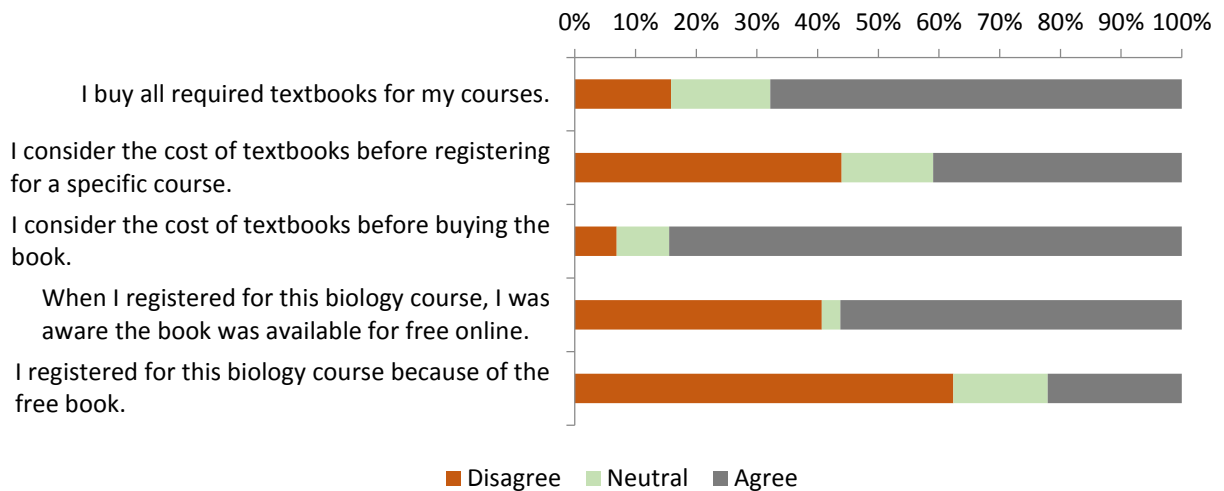


Fig 1: Levels of agreement reported by students regarding the purchasing of textbooks in their courses (n=233 students)

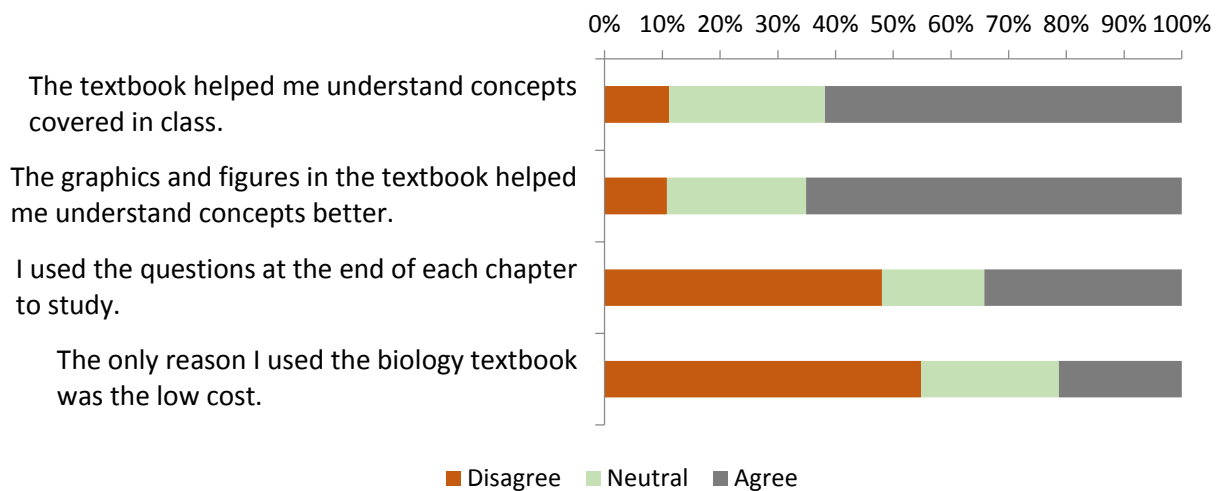


Fig 2: Levels of agreement reported by students regarding the use of the OpenStax textbook *Concepts in Biology* during BIOL 1010 and BIOL 1030 (n=233 students).

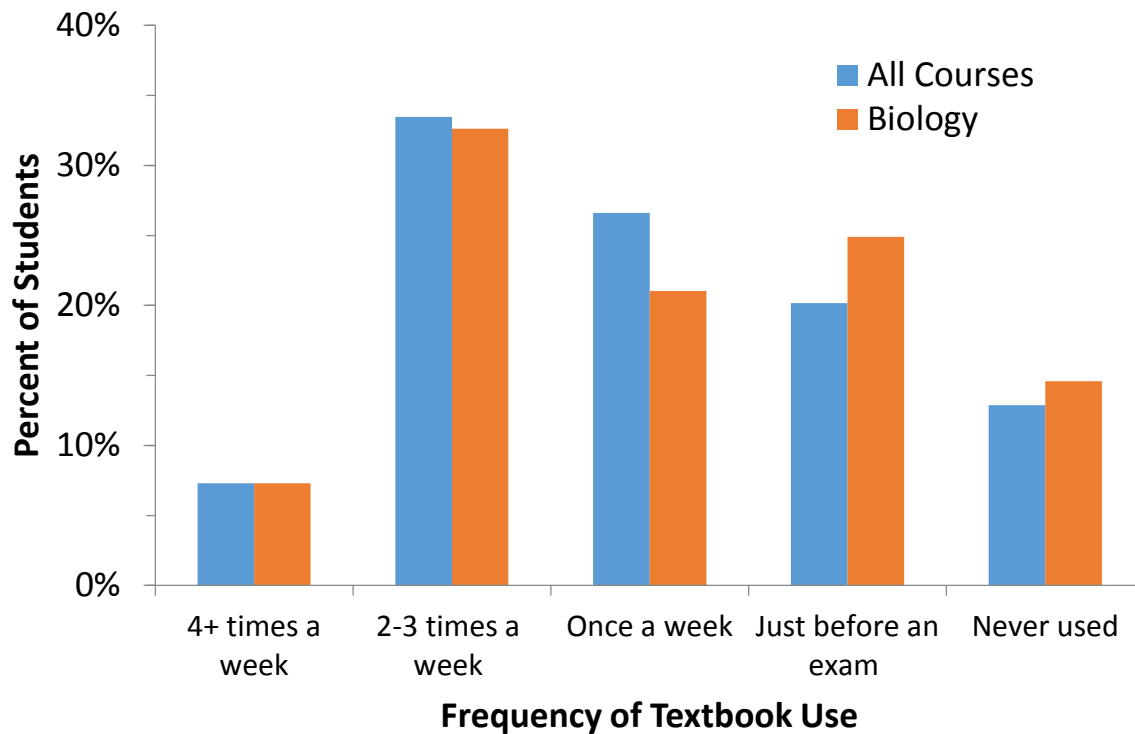


Fig 3: Reported use of textbooks in all of college courses and specifically during their current biology course (n=233 students).

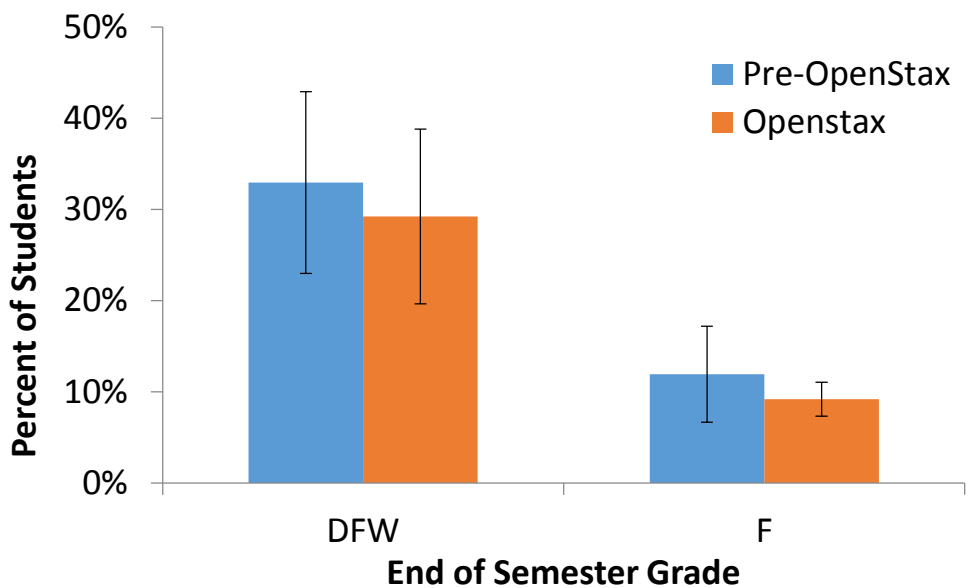


Fig 4: Average DFW and Failure rates (\pm SD) for pre-OpenStax and OpenStax course offerings of BIOL 1010 and BIOL 1030 (n=6).

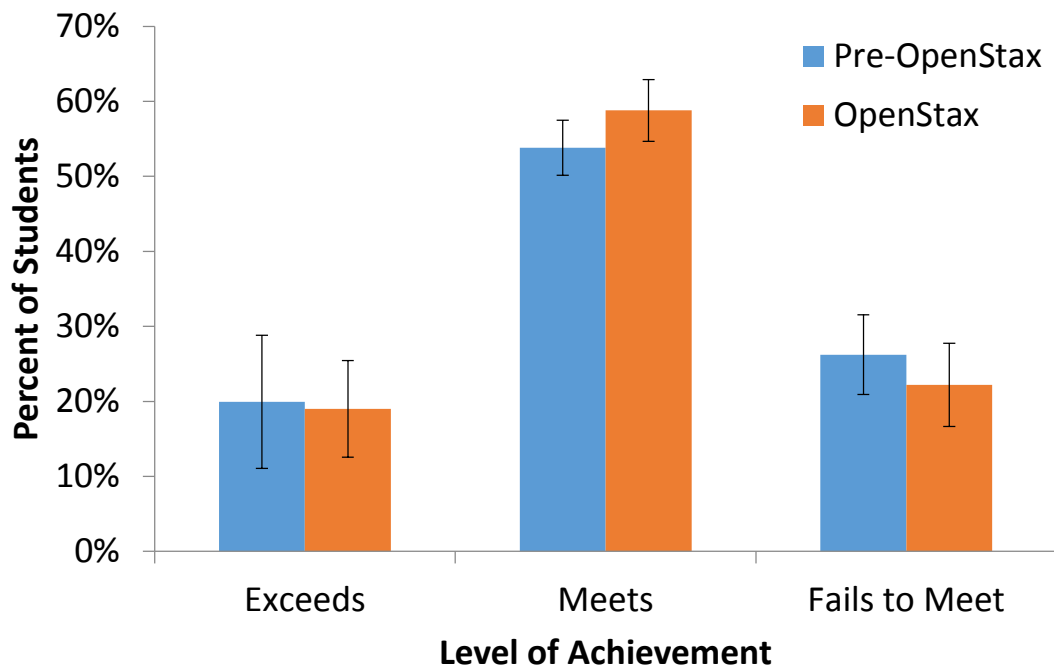


Fig 5: Percentage of students exceeding, meeting, or failing to meet expectations on the standardized assessment questions for pre-OpenStax and OpenStax course offerings (n=5).

5. Sustainability Plan

As stated above, the team is committed to using these resources whenever they teach either course. In addition, we will provide instructors of record copies of our in class materials as requested for their use.

6. Future Plans

Currently, we plan to share this information within the department to promote the use of OpenStax textbooks. There is another team of faculty in the biology department at VSU working on an ALG grant to revise the majors introductory biology course using the OpenStax majors biology book. Given that the OpenStax provide as good a reference as other texts, we hope to encourage more faculty to use these books.

We also recognize that additional tools are needed to increase student performance in these courses. The DFW rate between the two courses was 30% for all semesters examined, and given the increased emphasis on retention, graduation in higher education, and student financial aid like the HOPE Scholarship tied to performance, additional pedagogical approaches should be examined. Like the OpenStax book, these should be free to low cost tools and additional research should focus on identifying these tools and their impact on student performance.

7. Description of Photograph

- From Left to Right: Drs. Timothy Henkel, Emily Croteau, and Matthew Waters

Appendix 1 – ALG Textbook Survey

Survey was administered online using D2L

State Your Level of Agreement (1-5; Strongly Disagree to Strongly Agree)

1. I buy all required textbooks for my courses.
 2. I consider the cost of textbooks before registering for a specific course.
 3. I consider the cost of textbooks before buying the book.
 4. When I registered for this biology course, I was aware the book was available for free online.
 5. I registered for this biology course because of the free book.
-
6. In your experience in other courses, how often did you use the required textbooks? (check one)
 - 4 or more times a week
 - 2-3 times a week
 - Once a week
 - Just before an exam
 - Never used
-

[PAGE BREAK]

Now consider your experience with the biology textbook this semester.

Please state Your Level of Agreement (1-5; Strongly Disagree to Strongly Agree)

7. The textbook helped me understand concepts covered in class.
 8. The graphics and figures in the textbook helped me understand concepts better.
 9. I used the questions at the end of each chapter to study.
 10. The only reason I used the biology textbook was the low cost.
-
11. How often did you use the **biology textbook this semester?** (check one)
 - 4 or more times a week
 - 2-3 times a week
 - Once a week
 - Just before an exam
 - Never used
-
12. Check all that apply
 - I used the free version of the textbook
 - I printed copies from the free version
 - I purchased the ebook app version
 - I purchased the print version of the book

13. Please share any comments or your experience with using the textbook this semester.

(open ended)