

# Affordable Learning Georgia Textbook Transformation Grants

## Final Report

**Date:** 12/22/2017

**Grant Number:** 235

**Institution Name(s):** Georgia Institute of Technology

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**Project Lead:** Shana Kerr

**Course Name(s) and Course Numbers:** BIOL 1520 Introductory Organismal Biology; BIOL 1521, Honors Introductory Organismal Biology

**Semester Project Began:** Spring 2017

**Semester(s) of Implementation:** Fall 2017

**Average Number of Students Per Course Section:** 100

**Number of Course Sections Affected by Implementation:** 1 (3 in Spring 2018)

**Total Number of Students Affected by Implementation:** 105 to date

### 1. Narrative

We developed and delivered targeted, online, open-source materials (text, video, interactives, and online homework) that more closely aligned to the student learning objectives in our second semester introductory biology course than the textbook previously used and substantially lowered costs for students. (The transformation of the first semester introductory biology course was funded by a previous ALG grant). Assessment based on student usage of the web content, comments on web pages, and performance on formative assessment questions have enabled instructors to revise and refine the websites in just-in-time fashion to better facilitate student learning. This project impacted approximately 105 students in Fall 2017 (the implementation semester), and has been adopted on a department-wide basis. We anticipate it will impact over 200 students in Spring 2018.

We successfully adapted and revise content from OpenStax Biology and Khan Academy, as well as created new content, to be highly tailored to our introductory biology course curriculum. Support from two curriculum development TAs was instrumental identifying high-quality open-source image and video content. In addition, a course development TA successfully acquired

ongoing student feedback on the quality of the content throughout the implementation semester. This feedback will serve as an important foundation for future revisions to the content. While we were able to successfully adapt and create content needed for the course, we found that development of the course materials to the standard of quality we intended required additional instructor buyout beyond what the ALG grant was able to provide. This reality was similar to our experience transforming the first semester biology course (BIOL 1510).

As a result of this transformation, instruction in the classroom is now more focused on activities that promote active learning, rather than standard lecture. During the implementation semester, we found no declines in student learning as measured by final course grades, final exam averages, common final exam questions, and D/F/W rates. Because our majors-specific section of this course (BIOL 1521) has not been yet been offered since the transformation, data in this report will focus exclusively on BIOL 1520.

During this transformation, we have learned that it can be more time consuming to revise existing content (OpenStax Biology, Khan Academy) to meet our needs compared to creating specific content ourselves. We also learned that providing students a regular, moderated mechanism to document gaps, inadequate information, or too much detail in the content is essential for obtaining high-quality feedback to further improve the content as part of ongoing maintenance and improvement of the course website.

## 2. Quotes

In response to the question “Compare the overall quality of the online reading for this course with a traditional textbook that you have used in your other college courses, and explain your answer”

- This was the same quality as textbooks, but in this case it was very easy to navigate, I did not have to buy a book, and all the information I needed was plainly stated; I did not have to fish through multiple sections of a textbook to find what I needed to learn.
- I found it much more interesting and less wordy than regular books.
- It was free, had all the information I needed, and allowed me to easily search the page for whatever I was looking for because it was online (i.e. it was awesome).
- I much preferred having an online textbook. This one was also written by the biology department professors, so it included only the information relevant to this course.
- The online text is free and integrated with resources and videos. The content is high quality and the text is easily accessible.
- The price of my textbooks are often overwhelming, therefore I appreciate the free alternative. The course readings conveyed to me all the information necessary for the course and added engaging multimedia (videos, pictures, etc).

Often, some of the sections were not extremely organized by section and there could have been more diagrams and explanations for clarity, but overall I have been very satisfied.

- Compared to other texts, I would say this is one of the best I've used so far. The couple of videos in each were very helpful.

### **3. Quantitative and Qualitative Measures**

#### **3a. Overall Measurements**

##### **Student Opinion of Materials**

**Was the overall student opinion about the materials used in the course positive, neutral, or negative?**

Total number of students affected in this project: 105

- Positive: 82.76 % of 85 number of respondents
- Neutral: 9.20 % of 85 number of respondents
- Negative: 5.75 % of 85 number of respondents

## Student Learning Outcomes and Grades

**Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?**

Choose One:

- Positive: Higher performance outcomes measured over previous semester(s)
- Neutral: Same performance outcomes over previous semester(s)
- Negative: Lower performance outcomes over previous semester(s)

## Student Drop/Fail/Withdraw (DFW) Rates

**Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?**

**Drop/Fail/Withdraw Rate:**

9.5% of students, out of a total 105 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- Negative: This is a higher percentage of students with D/F/W than previous semester(s)

## 3b. Narrative

We collected student comments and student survey data, and completed a test question comparison from pre- and post-implementation of open-source course materials (data attached, for internal use only,).

Student opinions of the course website were overwhelming positive, as indicated by an anonymous end-of-course survey.

- In response to the question “Compare the overall quality of the online reading for this course with a traditional textbook that you have used in your other college courses, and explain your answer”
  - 17.24% of 87 respondents rated the quality as “Excellent”
  - 51.72% of 87 respondents rated the quality as “Good”
  - 22.99% of 87 respondents rated the quality as “Average”

- 8.05% of 87 respondents rated the quality as “Poor”
- 0% of 87 respondents rated the quality as “Terrible”
- In response to the question “How important were each following course components for your understanding, success, and enjoyment in this class?” focused on “Reading the online textbook”
  - 41.38% of 87 respondents rated the online textbook as “Really helpful”
  - 41.38% of 87 respondents rated the online textbook as “Somewhat helpful”
  - 9.2% of 87 respondents rated the online textbook as “Neutral”
  - 5.75% of 87 respondents rated the online textbook as “Somewhat unhelpful”
  - 0.0% of 87 respondents rated the online textbook as “Really unhelpful”
  - 2.3% of 87 respondents indicated that they did not use the online textbook

Average GPA and D/F/W rates remained similar in the pre- and during-semesters of implementation:

- Fall 2015 (pre-implementation): 3.21 average course GPA; 9.2% of 98 students with D/F/W;
- Spring 2016 (pre-implementation): 3.33 average course GPA; 6.6% of 106 students with D/F/W
- Fall 2016 (partial implementation using OpenStax Biology without any adaptation): 3.24 average course GPA; 6.36% of 110 students with D/F/W
- Spring 2017 (partial-implementation using slightly-adapted OpenStax Biology): 3.64 average course GPA; 3.5 % of 115 students with D/F/W
- Fall 2017 (implementation): 3.35 average course GPA; 9.5% of 105 students with D/F/W

There are a number of important variables which may have contributed to the GPA and D/F/W rates across multiple terms, including instructor, student population, and level of transformation. The course has had a different individual instructor or set of instructors for each term listed above. In addition, the population of students who take the course in fall compared to spring, with many first-semester freshmen taking the course in the fall. Finally, the transformation has been implemented incrementally over a sequence of 3 semesters beginning in Fall of 2016.

#### **4. Sustainability Plan**

We continue to use the website in BIOL 1520 and review and revise content on a per semester basis. We will use the same content in BIOL 1521 and BIOL 1520 offered on

the Georgia Tech Pacific Study Abroad program. The School of Biological Sciences will continue to provide IT support to host and maintain the course website.

## **5. Future Plans**

The success of this project has helped faculty in our School recognize the value of utilizing no-cost-to-student materials, and has prompted another member of our faculty to pursue an ALG grant to transform APPH 1050, an introductory level course offered by our School.

## **6. Description of Photograph**

Photo 1: Screen capture of [bio1510.biology.gatech.edu](http://bio1510.biology.gatech.edu), the open-source course materials site created and curated by David Garton and Shana Kerr, funded by a grant from ALG.

Photo 2: Dr. David Garton, subject matter expert and instructor of record; Dr. Shana Kerr, team lead, subject matter expert, and instructor of record.