Affordable Learning Georgia Affordable Materials Grants  
Transformation Grants Final Report

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* Invoice for the second half of the grant’s award amount (optional)

Follow the instructions on the webpage for uploading your documents. Based on receipt of this report, ALG will process the final payment for your grant. ALG will follow up in the future with post-project grantee surveys and may also request your participation in a publication, presentation, or other event.

# General Information

**Date:** May 16, 2025

**Grant Round:** 25

**Grant Number:** 706

**Institution Name(s):** College of Coastal Georgia

**Project Lead:** C. Tate Holbrook, Professor of Biology and Interim Chair, Department of Natural Sciences, cholbrook@ccga.edu

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

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| --- | --- | --- |
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**Course Name(s) and Course Numbers:** BIOL 1107 Principles of Biology I and BIOL 1108 Principles of Biology II

**Semester Project Began:** Summer 2024

**Final Semester of Implementation:** Spring 2025

**Total Number of Students Affected During Project:** 104 in BIOL 1107 + 155 in BIOL 1108 = 259 students

# Narrative

We accomplished our overarching goal to support student success, accessibility, and educational equity in BIOL 1107-1108 Principles of Biology I-II at the College of Coastal Georgia (CCGA) by:

* Adopting the no-cost OER [OpenStax Biology](https://openstax.org/details/books/biology-2e) textbook in place of the expensive commercial textbook previously in use
* Selecting and adopting a low-cost courseware platform that integrates OpenStax Biology content and adaptive assessment tools with our Learning Management System
* Developing ancillary materials to support faculty instruction and student learning using the new OER textbook and low-cost courseware
* Updating course learning outcomes and aligning OpenStax Biology content and student assessments with those outcomes

Below we summarize our activities and evaluate the experiences of students and instructors through this course transformation.

Starting in Summer 2024, we revised and aligned course-level Student Learning Outcomes with Program Learning Outcomes and Core IMPACTS. We also reviewed multiple OpenStax-allied adaptive courseware platforms. We ultimately selected [Lumen Waymaker](https://lumenlearning.com/what/waymaker/) Biology for Majors after brokering an agreement between Lumen and Barnes & Noble College to provide low-cost access ($40 per student per course).

During Fall 2024, we formally adopted and integrated Lumen Waymaker with our LMS (D2L), confirmed College bookstore availability, prepared language to guide student access to courseware, facilitated instructor training, customized the course shell, developed master syllabi and ancillary course materials (lecture slides, etc.), and conducted a pre-OER survey of students enrolled in BIOL 1107-1108.

In Spring 2025, we implemented the new course materials across all class sections of BIOL 1107-1108, conducted a post-OER-implementation student survey, and compared student survey responses and grade distributions between Fall 2024 and Spring 2025.

During the first semester of implementation (Spring 2025), 259 students saved approximately $253 each (= $293 Freeman textbook – $40 courseware), totaling $65,527. If we conservatively assume that all students take BIOL 1107-1108 across consecutive semesters and would have purchased the previous commercial textbook for use in both courses, then the annual savings are an estimated $213 per student (deducting $40 courseware per course) or $55,167 total. These savings will increase with growing enrollment, which CCGA is currently experiencing. Combined with the estimated savings of $199 per student achieved by our previous ALG Affordable Materials Grant #638 for the co-requisite lab courses BIOL 1107L-1108L, CCGA students completing the full Principles of Biology course sequence will save more than $100,000 per year!

Instructor experiences teaching through the course transformation were largely positive. The main benefits of the new course materials identified by the instructors were lower cost, greater accessibility including the availability of a free trial period before students purchased access to Lumen Waymaker (or waited on financial aid), effective structure and D2L integration of the adaptive courseware, and online self-assessment tools (study plans, quizzes) that engaged students in active learning. Difficulties and challenges cited by the instructors focused mostly on the adaptive courseware and included confusion among students about how to successfully complete the online study plans and quizzes, errors in quizzes, failure of figures to load, and lack of instructor control to manage online assignments and student access. Instructors also reported the depth of content was inconsistent, ranging from shallow to overly detailed. All instructors recommended continuing to use the no-cost OpenStax Biology textbook but responses were mixed about the utility of the low-cost adaptive courseware, with some suggesting that new ancillary course materials could be developed to eventually replace Lumen Waymaker.

Across the Likert-scale survey questions, student perceptions of the new course materials were more positive than the previous commercial textbook (Table 1; Figures 1-7). The vast majority of students reported that the new course materials were clear and effective, with text and figures that supported student learning. They also agreed that the new course materials were accessible and—with the largest increase from 36% to 80% agreement—provided good value. In their responses to the open-ended survey questions, students repeatedly acknowledged the affordability and accessibility of the new course materials and credited the interactive self-assessment tools for enhancing their learning. But they also identified technical issues with Lumen Waymaker that reduced the quality of their user experience. Student and instructor feedback, both positive and negative, will be shared with Lumen to support their efforts to continuously improve the courseware. Moreover, student responses to the question, “Do you have any suggestions to help students use the textbook and supplemental resources more effectively?”, will be shared with future students to promote their success.

Combining final grade data across the two courses, student grades increased and DFW rates decreased following implementation of the new course materials in Spring 2025 (Figure 8). However, responses varied between courses. In BIOL 1107, there was a significant increase in GPA points and a decrease in DFW rate from Fall 2024 to Spring 2025. In BIOL 1108, there was no significant change in GPA points and a slight increase in DFW rate. Student data are described in more detail below (3. Quantitative and Qualitative Measures).

Instructors revised openly licensed PowerPoint lecture slides provided by Lumen to align with course learning outcomes and curriculum. We are submitting the slide decks with this report so they can be shared via OpenALG under an Attribution 4.0 License (CC BY).

# Quotes

Post-OER-implementation student survey responses to open-ended questions, “What did you like most about the [course materials]?

* “The price was low while I get the same if not more from a physical textbook.”
* “I like that I could go back and reassess the concepts I couldn't fully grasp. After using a book in [BIOL 1107] compared to this program, I've noticed a substantial difference in my grade this semester because the program really helped me understand the concepts.”
* “The study plans and module quizzes were extremely helpful. I also liked how you were able to check your answers.”

# Quantitative and Qualitative Measures

## Uniform Measurements Questions

**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: 259 students in Spring 2025

* Positive: 91.4 % of 64 number of respondents
* Neutral: N/A
* Negative: 8.6 % of 64 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:

* X 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?**

24% of students, out of a total 258 students affected (excluding 1 Incomplete), dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

* X 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)

## Measures Narrative

Student opinion surveys were conducted before (Fall 2024) and after (Spring 2025) implementation of the new course materials, using Qualtrics. The Likert-scale questions and results are summarized in Table 1 and Figures 1-7. The vast majority of students agreed the new course materials were clear, effective, and accessible. Moreover, student responses to all Likert-scale questions were more positive in Spring 2025 following OER implementation than they were in Fall 2024 when the commercial textbook was still in use.  
  
Open-ended questions asked students what they liked best about the course materials and what could be improved. Responses were summarized and discussed among team members. Representative feedback is discussed in the narrative above.

Table 1. Ratios of the percentage of students responding Agree: Disagree to the common Likert-scale survey questions administered in Fall 2024 (pre-OER commercial textbook) and Spring 2025 (post-OER-implementation of OpenStax textbook and adaptive courseware).

|  |  |  |
| --- | --- | --- |
| Survey Question | Pre-OER  Fall 2024\* | Post-OER  Spring 2025\* |
| Chapter objectives were clearly defined | 87%-13% | 95%-5% |
| Textbook was clearly written and easy to understand | 62%-38% | 89%-11% |
| Text supported learning objectives for each chapter | 77%-23% | 98%-2% |
| Figures supported chapter | 79%-21% | 95%-5% |
| Textbook helped me understand concepts taught in class | 62%-38% | 89%-11% |
| Textbook was good value for the money | 36%-64% | 80%-20% |
| Textbook was accessible | 79%-21% | 92%-8% |

\*(Somewhat Agree + Strongly Agree): (Somewhat Disagree + Strongly Disagree)

Figure 1. Results of the Fall 2024 pre-OER student survey (“pre-survey”) regarding the previous commercial textbook and Spring 2025 post-OER-implementation student survey (“post-survey”) regarding the new OpenStax textbook and adaptive courseware. The Likert-scale question was “Were the objectives of each chapter/module clearly defined?” Shown are the percentages of students answering each question.

Figure 2. Results of the Fall 2024 pre-survey regarding the previous commercial textbook and the Spring 2025 post-survey regarding the new course materials. The Likert-scale question was “Was the textbook clearly written and easy to understand?” Shown are the percentages of students answering each question.

Figure 3. Results of the Fall 2024 pre-survey regarding the previous commercial textbook and the Spring 2025 post-survey regarding the new course materials. The Likert-scale question was “Did the textbook support the learning objectives of each chapter/module?” Shown are the percentages of students answering each question.

Figure 4. Results of the Fall 2024 pre-survey regarding the commercial textbook and Spring 2025 post-survey regarding the new course materials. The Likert-scale question was “Did the figures in each chapter/module support the learning objectives of each chapter/module?” Shown are the percentages of students answering each question.

Figure 5. Results of the Fall 2024 pre-survey regarding the commercial textbook and Spring 2025 post-survey regarding the new course materials. The Likert-scale question was “Did the textbook help me understand the concepts taught in class?” Shown are the percentages of students answering each question.

Figure 6. Results of the Fall 2024 pre-survey regarding the commercial textbook and Spring 2025 post-survey regarding the new course materials. The Likert-scale question was “Was the textbook good value for the money spent?” Shown are the percentages of students answering each question.

Figure 7. Results of the Fall 2024 pre-survey regarding the commercial textbook and Spring 2025 post-survey regarding the new course materials. The Likert-scale question asked was “Was the textbook accessible?” Shown are the percentages of students answering each question.

Figure 8. Percentage of students receiving each grade for BIOL 1107 and BIOL 1108. Courses are broken down into “pre-OER” Fall 2024 and “post-OER-implementation” Spring 2025 student groups.  
  
The GPA points of students were compared between Fall 2024 (pre-OER) and Spring 2025 (post-OER-implementation) using a Mann-Whitney *U* test to determine if there was a difference between the mean rank of students who took the courses in Fall 2024 compared to Spring 2025. Students earning an “A” earned 4 GPA points, a “B” earned 3 GPA points, a “C” earned 2 points, a “D” earned 1 point, and an “F” earned 0 points. A Mann-Whitney *U* test was used due to unequal numbers of students in Fall 2024 and Spring 2025. When BIOL 1107 and BIOL 1108 were combined, there was a significant difference in student GPA points (*Z* = 4.68, *p* < 0.00001) before vs. after the course transformation. The mean rank of Fall 2024 students was 194.93, and the mean rank of Spring 2025 students was 252.7. This indicates that students’ grades increased in Spring 2025 when the new course materials were implemented.  
  
Separating the two courses, there was a significant difference in student scores when comparing students enrolled in BIOL 1107 between Fall 2024 and Spring 2025 (*Z* = -5.46, *p* <0.0001). The mean rank of scores for Fall 2024 was 92.86, and the mean rank for Spring 2025 was 140.76, indicating that students’ grades increased when the new course materials were implemented. However, there was no significant difference in student scores when comparing students enrolled in BIOL 1108 between Fall 2024 and Spring 2025 (*Z* = -0.0238, *p* = 0.98).   
  
In the pre-OER group of Fall 2024, there were 156 students enrolled in BIOL 1107 and 90 students in BIOL 1108. Of those, 41% had a D, F, or W. In the post-OER-implementation group of Spring 2025, there were 105 students in BIOL 1107 and 156 students in BIOL 1108. Of these, 24% had a D, F, or W. A test of independence was used to compare DFW rates among students in the pre- and post-OER groups. There was a significant difference in the number of students receiving a D, F, or W between the two groups (*χ*2 = 41.91, *df* = 1, *p* < 0.0001). The DFW rate was greater than expected in the pre-OER BIOL 1107 group and lower than expected in the post-OER BIOL 1107 group. In contrast, the DFW rate was lower than expected in the pre-OER BIOL 1108 group and greater than expected in the post-OER BIOL 1108 group. In addition to the main effect of course materials, observed variation in grade distributions may have been influenced by sampling error, differences in student preparedness, and/or variability among instructors, which were similar but not identical between Fall 2024 and Spring 2025.

# Sustainability Plan

The Department of Natural Sciences is committed to using the new course materials across all sections of BIOL 1107-1108 in AY 2025-2026. Moving forward, we may possibly revise or replace the adaptive courseware while continuing to use the OpenStax Biology textbook. We plan to share feedback and seek solutions with Lumen first. We have created D2L sites to share course materials among current and new instructors.

# Future Affordable Materials Plans

We are considering developing our own ancillary course materials to support the no-cost OpenStax textbook and replace the low-cost Lumen Waymaker courseware in BIOL 1107-1108.

# Future Scholarship Plans

N/A

# Description of Photograph (optional)