

Affordable Learning Georgia Affordable Materials Grants Transformation Grants Final Report

(or Textbook Transformation Grants, if R17 or earlier)

Once you have completed this template, to submit your Final Report, go to the [Final Report submission form](#).

The final report submission form allows you to submit the following:

- This completed narrative document (required)
- Syllabus or syllabi (required)
If multiple files, compress into one .zip folder
- Qualitative/Quantitative Measures data files (optional, as needed)
If multiple files, compress into one .zip folder
- Photo of your team or a class of your students for future ALG promotions (optional)
- 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 05, 2024

Grant Round: 23

Grant Number: 667

Institution Name(s): Georgia Southern University

Project Lead: Weitian Tong

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

- Weitian Tong, Associate Professor, Computer Science, wtong@georgiasouthern.edu

Course Name(s) and Course Numbers:

- CSCI 7501 Computational Intelligence

Semester Project Began: Spring 2023

Final Semester of Implementation: Spring 2024

Total Number of Students Affected During Project:

Course	Number of sections	Enrollment
CSCI7501	2	20

1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project.

Include:

- Summary of your transformation experience, including challenges and accomplishments
- Transformative impacts on your instruction
- Transformative impacts on your students and their performance

B. Describe lessons learned, including any things you would do differently next time.

C. Describe any materials you created or revised/remixed that will be shared with the public. Include the [open license your materials will be shared under](#)—for most materials, this will be an Attribution 4.0 License (CC BY) as required in the Grants Request for Proposals.

A: Describe the key outcomes, whether positive, negative, or interesting, of your project.

Include:

Summary of your transformation experience, including challenges and accomplishments:

Our project aimed at transforming a key graduate-level computer science course, specifically CSCI 7501 Computational Intelligence. Through the dedicated effort and substantial time investment by the project team, we have successfully met our overarching objectives. The redesign of the course involved updating the learning modules to ensure they are in alignment with both the specific learning outcomes of the course and the broader outcomes of the program. We rigorously evaluated and selected high-quality learning materials for each module. These materials were then organized in an adaptive manner, enhancing student engagement across various teaching modalities. A significant achievement was the development of a dedicated webpage for CSCI 7501, offering students access to free, current, and interactive resources. One of the major challenges encountered was the collection and organization of learning materials, a daunting task given the fast-paced evolution of the field of computer science.

Transformative impacts on students: Each academic year, our initiative positively affects approximately 20 graduate students. The provision of current educational content ensures that students remain at the forefront of developments within their computer science discipline. Furthermore, the modernized, interactive, and flexible learning resources we provide significantly increase student engagement, thereby enhancing the overall educational experience. By meticulously aligning these materials with the defined learning outcomes of our programs, we anticipate improved student success rates, which we believe will contribute to higher retention, progression, and graduation statistics.

Our evaluative data, as presented in Tables 1-5, indicates that our no-cost educational resources are equally effective as traditional textbooks. Notably, as detailed in Table 4, we observed an uptick in success rates. Moreover, the majority of students have expressed a favorable view of our educational materials, as evidenced by the responses documented in Table 1.

Transformative impacts on the institution: The enhanced success rates resulting from the utilization of our learning materials are anticipated to contribute to improved retention, progression, and graduation metrics within the institution. Additionally, by offering educational resources at no cost, our programs become more financially accessible, potentially leading to an uptick in departmental enrollments.

B: Describe lessons learned, including any things you would do differently next time

The field of Computational Intelligence is rapidly expanding, encompassing an extensive range of topics and practical examples. One of the main challenges we faced was curating the most emblematic content and presenting it in a manner that is easily digestible for students. Additionally, the constant emergence of new topics presents a difficulty in maintaining currency with the latest developments. A valuable insight from our experience is the effectiveness of integrating course projects that encourage students to investigate the forefront of the discipline. This approach has proven beneficial and is something we would emphasize in future iterations of the course.

C: Describe any materials you created or revised/remixed that will be shared with the public. Include the open license your materials will be shared under—for most materials, this will be an Attribution 4.0 License (CC BY) as required in the Grants Request for Proposals.

We have diligently curated and refined high-quality educational resources for each module to ensure they effectively engage students across various teaching modalities. Specifically for CSCI 7501, we developed webpages to house these resources, offering them at no cost while ensuring they remain contemporary and interactive. These educational resources have been made publicly available, contributing to the global learning community through the OpenALG platform and the GALILEO Open Learning Materials repository.

2. Quotes

Provide three quotes from students evaluating their experience with the no-cost learning materials.

The following comments are from the anonymous survey that we conducted during this project.

CSCI 7501:

- Good job!
- Open-sourced materials are awesome!
- Well organized.
- The up-to-date materials are very helpful.

3. Quantitative and Qualitative Measures

A. Uniform Measurements Questions

The following are uniform questions asked to all grant teams. Please answer these to the best of your knowledge.

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: 20

- Positive: 100 % of 8 number of respondents
- Neutral: 0 % of 8 number of respondents
- Negative: 0 % of 8 number of respondents

Refer to Table 1 and Table 2 for more details.

Table 1. Students' response to the question "In general, the learning modules were organized" in our survey. Note: in the survey, students are asked to express their opinion on a list of question using a 10-point Likert scale where 1 is strongly disagree, 5 is neutral, and 10 is strongly agree.

1	2	3	4	5	6	7	8	9	10
0%	0%	0%	0%	0%	0%	0%	0%	12.5%	87.5%

Table 2. Students' Opinion on Cost-free Learning Material. Note: in the survey, students are asked to express their opinion on a list of question using a 10-point Likert scale where 1 is strongly disagree, 5 is neutral, and 10 is strongly agree.

Field	Min	Max	Mean	Standard Deviation	Variance	Responses	Sum
In general, the learning modules were organized	9.00	10.00	9.88	0.33	0.11	8	79.00
The content, links and other leaning module materials were sufficient to help me learn.	10.00	10.00	10.00	0.00	0.00	8	80.00
I prefer using selected open source/free learning materials rather than a paid textbook for this course.	10.00	10.00	10.00	0.00	0.00	8	80.00
Overall, compared to a potential paid textbook, open resource learning materials provided the necessary assistance to learn the material.	10.00	10.00	10.00	0.00	0.00	8	80.00
I would take another course that uses open/free learning materials.	9.00	10.00	9.88	0.33	0.11	8	79.00

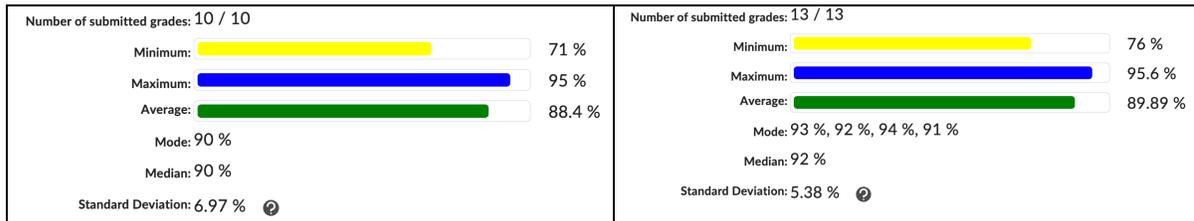
Student Learning Outcomes and Grades

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?

Student outcomes should be described in detail in Section 3b.

As shown in Table 3, the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters was **positive**.

Table 3 CSCI 7501 Students' grades in Spring 2023 (left) and Spring 2024 (right)



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?

Depending on what you and your institution can measure, this may also be known as a drop/failure rate or a withdraw/failure rate.

As shown in Table 4, the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters was **positive**.

Choose One:

- ___ Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- x 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)

Table 4 Students' DFW rates

	Previous Semester	Current Semester
CSCI 7501	0% in Spring 2023	0% Spring 2024

B. Measures Narrative

In this section, summarize the supporting impact data that you are submitting, including all quantitative and qualitative measures of impact on student success and experience. Include all measures as described in your proposal, along with any measures developed after the proposal submission.

[When submitting your final report, as noted above, you will also need to provide the separate file (or .zip with multiple files) of supporting data on the impact of your Textbook Transformation, such as surveys, analyzed data collected, etc.]

- *Include measures such as:*
 - *Drop, fail, withdraw (DFW) delta rates*
 - *Course retention and completion rates*
 - *Average GPA*
 - *Pre-and post-transformation DFW comparison*
 - *Student success in learning objectives*
 - *Surveys, interviews, and other qualitative measures*
- *Indicate any co-factors that might have influenced the outcomes.*

Multiple types of data were collected to measure the effectiveness of our no-cost learning materials quantitatively and qualitatively.

	Measures
Quantitative	<ul style="list-style-type: none"> • Student's grades, obtained from Folio (our teaching system of Georgia Southern) [Refer to Table 3] • DFW rates, taken from student registration system. [Refer to Table 4] • Students' numerical feedback on learning materials, collected via anonymous surveys designed by investigators. [Refer to Tables 1 and 2] Note that a numeric reporting scale of 1-10 was applied to measure students' attitude towards the cost-free learning materials. • Students' success in learning objectives, assessed via the regular teaching evaluation. [Refer to Table 5] Note that every course needs to be evaluated every semester at Georgia Southern University. This evaluation form includes students' success in achieving the learning outcomes.

Qualitative	<ul style="list-style-type: none"> Anonymous survey questionnaire was designed to allow students to share their learning experiences and discuss the effectiveness of the learning materials. The survey was conducted at the end of the semester. Qualitative comments and suggestions are collected. [Refer to Tables 1 and 2]
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Survey results are provided in Tables 1 and 2. Based on the assessment data we collected, the cost-free learning materials offer the similar learning effectiveness as the textbook (in some case, even better). Students' performance outcomes (refer to Tables 3) and DFW rates (Refer to Table 4) show improvement after applying our learning materials. Students' overall feedback to our teaching materials are positive as indicated in Tables 1 and 2, and their comments.

The question list in regular teaching evaluation has been modified a lot during the past two semesters. In the current evaluation form, there is one question that is specifically related to the course materials.

- Q15 Including materials from diverse perspectives

Table 5 Students' Teaching Evaluation

		Previous Semester	Current Semester
CSCI 7501	Q15	N/A	4/4

Comment(s) from students regarding the course materials:

- CSCI 7501:
 - The course has deepen my interest in the field of AI and Algorithm the more. With the extensive array of papers we were to study in other to progress in the course, I'm particularly intrigued with the Graph Coloring problem and it's application use cases.

4. Sustainability Plan

Describe how your project team or department will offer the materials in the course(s) in the future, including the maintenance and updating of course materials.

The course CSCI 7501 is scheduled for offering each semester and is typically overseen by our team members. We are committed to the ongoing maintenance and timely updating of the course materials to ensure their relevance and effectiveness. Additionally, we will continuously enhance the course based on insights gathered from the evaluations conducted at the end of each semester.

5. Future Affordable Materials Plans

Describe any impacts or influences this project has had on your thinking about or selection of learning materials in this and other courses that you will teach in the future.

The dynamic nature of computer science as a discipline has shifted our preference towards contemporary, open-source, cost-free, and adaptable online resources over traditional textbooks. Faculty members in the Computer Science department have individually completed projects under the Affordable Learning Georgia support. The positive outcomes from these projects will be disseminated among colleagues, serving as a catalyst for increased faculty participation in creating no-cost learning materials for additional computer science courses. This project has fundamentally influenced our approach to selecting and utilizing educational resources in current and future courses.

6. Future Scholarship Plans

Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.

We intend to compile and disseminate the findings from this textbook transformation initiative in the form of presentations at academic conferences, such as the ACM Southeast Conference, and potential journal publications. This will allow us to share our insights and methodologies with a broader educational audience.

7. Description of Photograph (optional)

This is where a team can list the names of the people shown in this separately uploaded photograph, along with their roles, if applicable.

N/A