

Affordable Learning Georgia Textbook Transformation Grants

Final Report

To submit your Final Report, go to the [Final Report submission page](http://affordablelearninggeorgia.org/site/final_report_submission) on the ALG website:
http://affordablelearninggeorgia.org/site/final_report_submission

The final report submission form allows up to five files:

- This completed narrative document (required)
- Syllabus or syllabi (required)
If multiple files, compress into one .zip folder
- Qualitative/Quantitative Measures data files (required)
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: 06/12/2020

Grant Round: 14

Grant Number: 440

Institution Name(s): Kennesaw State University

Project Lead: Selena He

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

- Selena He, Associate Professor of Computer Science, she4@kennesaw.edu
- Patrick Bobbie, Professor of Computer Science, pbobbie@kennesaw.edu
- Chih-Cheng Hung, Professor of Computer Science, chung1@kennesaw.edu
- Jose Gorrido, Professor of Computer Science, jgarrido@kennesaw.edu

Course Name(s) and Course Numbers:

- CS 3305/L Data Structures/Data Structures Lab
- CS 3502 Operation Systems
- CS 4306 Algorithm Analysis

- CS 4632 Modelling & Simulations

Semester Project Began: Summer 2019

Final Semester of Implementation: Spring 2020

Total Number of Students Affected During Project:

Course	Enrollment
CS3305	506
CS3305L	437
CS3502	406
CS4306	349
CS4632	17
Total	1715

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.*

In this project, we have developed and implemented no-cost-to-student course learning material for the five proposed courses, and it is a success. We asked the students to complete a survey, and we recorded the results in Table 1, which shows the students' opinions on the no-cost-to-student course material are positive. We also list our assessment data in this report, which demonstrate the effectiveness of our no-cost-to-student course learning material compared to the textbooks used in our courses.

Table 1. Students' Opinion on No-Cost Learning Material

Survey Questions	Average Score
In general, the learning modules were organized.	4.76
The content, links and other leaning module materials were sufficient to help me learn.	4.52
I liked not having to buy a textbook and instead used the materials that were provided and free.	4.85
I prefer using selected open source/free learning materials rather than a paid textbook for this course.	4.86
Overall, compared to a potential paid textbook, open resource learning materials provided the necessary assistance to learn the material.	4.67
I would take another course that uses open/free learning material.	4.89

A. In this survey, students are asked to express their opinion on a list of question using a 5-points scale where 1 is mostly disagree, 3 is neutral, and 5 is mostly agree. Over the years, CS faulty members are continuously improving the quality of our programs while endlessly seeking ways to make our programs more affordable so that more good quality, underrepresented, and career-changing students will be encouraged to apply for and enter our programs.

Designing our own version of no-cost-to-student course learning material not only enables us to update the curriculum of CS programs frequently to keep up with the ever-increasing pace of Computer Science and Technology, but also provide students with free learning material that will not be covered by a single traditional textbook. To achieve this goal, faculty members really committed themselves to developing lecture notes, study guides, PowerPoint presentations, instructional/tutorials content videos, online and offline reading materials, assignments and exercises, and assessment tools, with the strong supports from the ALG grant.

With our sustainability plan, the no-cost-to-student course learning material will be continually used in our department and new coming students of Computer Science in Kennesaw State University will benefit from this project.

B. Based on students' survey, we have successfully create no-cost-to-student course learning materials in a way that will allow us to better teach context as well as introduce new laboratory guidelines for hands-on experiences in this project. In the future, some lab instructions need more clear and step-by-step description. More source code examples should be provided as well.

2. Quotes

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

"The outlines / material power points were really helpful with learning the new material. Personally, I do not see a way to improve the lessons. They were great!" (From CS 3502)

"While textbooks are very helpful and have been useful for many years and courses, I do not consider it a necessity in order to successfully learn the subject at hand. In this course, by utilizing the chapters, PowerPoints and recorded lectures, I have learned not only a sufficient amount of materials, but I feel as I if was able to learn efficiently than merely reading a textbook." (From CS 3305)

"Open source materials are usually easier to understand." (From CS 4306)

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: ____1715____

- Positive: _94.73_____ % of ____515_____ number of respondents
- Neutral: __4.35_____ % of ____515_____ number of respondents
- Negative: __0.92_____ % of ____515_____ 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?

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

Course	Enrollment	Student Average Grade	
		No-cost Material	Textbook
CS3305	506	3.48	3.42
CS3305L	437	2.65	2.64
CS3502	406	3.33	3.06
CS4306	349	3.45	3.07
CS4632	17	3.36	3.5

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:

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

Course	Enrollment	Drop/Fail/Withdraw Rate Comparison	
		No-cost Material	Textbook
CS3305	506	6.9%	7.4%
CS3305L	437	14.7%	16%
CS3502	406	5.7%	6.6%
CS4306	349	12.7%	11.4%
CS4632	17	5.3%	4.5%

___7.6___% of students, out of a total ___1715___ 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)
- __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)

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.*

In this ALG project, we assessed our project both quantitatively and qualitatively, including comparisons of students' performance before and after the adoption of no-cost-to-students learning materials, surveys, comparison of course-level retention, etc.

Quantitatively, we referred to KSU student registration system, Faculty Course Assessment Report (FCAR), and other measurements to compare students' DFW rates, grades, and success in course learning outcomes. It is mandatory for faculty in the Computer Science department at Kennesaw State University to create an FCAR for every course they teach for each semester, and we referred to FCAR to assess student grades and success in course learning outcomes.

Qualitatively, we asked students to complete a survey on students' opinion on the learning material used in the courses, which has two parts. In part one, students rated their experience using a 5 points scale on statements such as "The content, links and other leaning module materials were sufficient to help me learn.", "I liked not having to buy a textbook and instead used the materials that were provided and free.", etc. In part two, students were encouraged to enter any comments. Based on the assessment data we collected, the learning material we created offer the higher level of the learning effectiveness than the textbook. Students'

performance outcomes are higher than the textbook period, while DFW in generally stay the same pre-implementation and post-implementation.

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.

For each course taught in the Department of Computer Science at KSU, a coordinator is assigned who is responsible for the course content maintenance and updates, course teaching, and coordinating instructors teaching different sections of the same course in a semester. All of our team members are coordinators of the corresponding course(s) in this textbook transformation project, and we monitor the course teaching for following semesters to make sure the course teaching is consistent. Furthermore, all course related materials will be available at the official KSU D2L Brightspace site as well as the department depository to make sure that any future instructor for a course has access to the no-cost-to-students learning materials. All these arrangements make sure all no-cost materials and resources are highly sustainable in the future offerings of this course.

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.

As the second textbook transformation project in the Department of Computer Science, this project will serve as a pioneer and that the success of this project will encourage many more future textbook transformation projects in the Department of Computer Science at KSU. In fact, after the acceptance of this grant proposal, another textbook transformation mini project from the Department of Computer Science led by Dr. Selena has been awarded as well. Additionally, Dr. North is submitting the third textbook transformation project in fall 2020.

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 also plan to submit research work based on our textbook transformation project to education conferences such as ACM-SIGCSE and IEEE-FIE and present our work to a wide range of audiences.

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.