Affordable Learning Georgia Textbook Transformation Grants

Final Report

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

Final report submission requires four files:

- *This completed narrative document*
- *Syllabus or syllabi*
  - *(if multiple files, compress into one .zip folder)*
- *Qualitative/Quantitative Measures data files*
  - *(if multiple files, compress into one .zip folder)*
- *Photo of your team or a class of your students w/ at least one team member, minimum resolution 800x600px*
  - *(nearly all smartphones take photos larger than this size by default)*

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: 12/16/2019

Grant Round: 12

Grant Number: 375

Institution Name(s): Kennesaw State University

Project Lead: Yong Shi

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

- Yong Shi, Associate Professor of Computer Science, yshi5@kennesaw.edu
- Dan Lo, Professor of Computer Science, dlo2@kennesaw.edu
- Selena He, Associate Professor of Computer Science, she4@kennesaw.edu
- Mingon Kang, Assistant Professor of Computer Science, KSU/UNLV, mkang9@kennesaw.edu/ mingon.kang@unlv.edu
- Sarah North, Senior Lecturer of Computer Science, snorth@kennesaw.edu

Course Name(s) and Course Numbers:

- CS 3503 Computer Organization and Architecture
- CS 4322/CS7455 Mobile Software Development
- CS 4524/CS 7125 Cloud Computing
- CS 4712 User Interface Engineering
- CS 7267(CS 789) Machine Learning

Semester Project Began: Fall 2018

Final Semester of Implementation: Fall 2019

Total Number of Students Affected During Project:

Course	Enrollment
CS 3503	385
CS 4322/CS7455	34
CS 4524/CS 7125	47
CS 4712	114
CS 7267(CS 789)	13
Total	593

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

In this project, we have developed and implemented no-cost-to-student course learning material for the seven proposed courses, and it is a success. We list the links of our no cost online course learning material in the table 1. We asked the students to complete a survey, and we recorded the results in table 2, 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. URL of No-Cost Learning Material

Course	URL of No-Cost Learning Material	Developer
CS 3503 Computer Organization	https://legacy.cnx.org/content/col29954/latest/	Dan Lo

and Architecture		
CS 4322/CS7455 Mobile Software Development	http://ksuweb.kennesaw.edu/~she4/2019Fall/cs4322/lectures.php	Selena He
CS 4524/CS 7125 Cloud Computing	http://ksuweb.kennesaw.edu/~yshi5/CloudComputing/CloudComputing.html	Yong Shi
CS 7267 Machine Learning	http://mkang.faculty.unlv.edu/?menu=UNLV_CS789	Mingon Kang
CS 4712 User Interface Engineering	http://ksuweb.kennesaw.edu/~snorth/ALG_CS4712_UIE/indexALG.html	Sarah North

Table 2. Students' Opinion on No-Cost Learning Material

Statements	Score
In general, the learning modules were organized	4.63
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.	4.82
I prefer using selected open source/free learning materials rather than a paid textbook for this course.	4.84
Overall, compared to a potential paid textbook, open resource learning materials provided the necessary assistance to learn the material.	4.66
I would take another course that uses open/free learning material.	4.80

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

CS 3503

What worked well:

Students can reference online free textbook with the latest update.

What needs to be done still:

Some new technology or concepts may be added.

CS 4322/CS7455

What worked well:

Based on the students' evaluation, they like the no-cost course materials. Everything done so far is good.

What needs to be done still:

Some lab instructions need more clear or step-by-step descriptions.

CS 4524/CS 7125

What worked well:

The online no-cost materials are a great fit to the courses.

What needs to be done still:

More lab components are needed for student practice.

CS 4712

What worked well:

We have successfully revised and reordered the curriculum in a way that will allow us to better teach context as well as introduce new laboratory guidelines for hands-on experiences in the upcoming academic year.

What needs to be done still:

We have full intention to incorporate and revising all hands-on computer laboratory guideline used in each modules that will serve over 100 students for upcoming academic year.

CS 7267(CS 789)

What worked well:

All lecture notes, lecture recordings, and related links were provided in the course web page.

What needs to be done still:

We need to provide more source code examples

2. Quotes

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

  "The outlines / material powerpoints were really helpful with learning the new material. Personally, I don't see a way to improve the lessons. They were great!" (From CS 4322)

  "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 4712)

  "Open source materials are usually easier to understand." (From CS 3503)

3. Quantitative and Qualitative Measures

3a. 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: __593_____

- Positive: __94.71_____ % of __178_____ number of respondents
- Neutral: __4.31_____ % of ___178_____ number of respondents
- Negative: _0.98_____ % of ___178_____ 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	
		Semester with no-cost material	Semester with textbooks
CS 3503	385	3.48	3.42
CS 4322/CS7455	34	2.65	2.64
CS 4524/CS 7125	47	3.33	3.06
CS 4712	114	3.45	3.07
CS 7267 (CS 789)	13	3.36	3.5

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?

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	
		Current semester	Previous semester
CS 3503	385	6.9%	3.4%
CS 4322/CS7455	34	14.7%	16%
CS 4524/CS 7125	47	12.7%	6.4%
CS 4712	114	1.7%	6.6%
CS 7267(CS 789)	13	11.11%	0

_7.6___% of students, out of a total __593__ 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)

3b. 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 1, 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 2, 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 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.*
- *Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.*

As the first 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 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 January 2020.

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.

6. Description of Photograph

- *On the Final Report Submission page, you will be submitting a photo. In this document, list the names of the people shown in this separately uploaded photograph, along with their roles.*

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    In the photo we submitted there are three persons (from left to right): Dr. Sarah North (course coordinator), Dr. Yong Shi (ALG project leader and course coordinator), and Dr. Selena He (course coordinator).