Affordable Learning Georgia Textbook Transformation Grants

Final Report

General Information

Date: 05/7/2021

Grant Round: 16

Grant Number: 502

Institution Name(s): Kennesaw State University

Project Lead: Sarah North

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

- Sarah North, Senior Lecturer of Computer Science, snorth@kennesaw.edu
- Yong Shi, Associate Professor of Computer Science, yshi5@kennesaw.edu
- Dan Lo, Professor of Computer Science, dlo2@kennesaw.edu
- Alan Shaw, Assistant Professor of Computer Science, ashaw8@kennesaw.edu
- Xiaohua Xu, Assistant Professor of Computer Science, xxu6@kennesaw.edu

Course Name(s) and Course Numbers:

- CS 3410 – Introduction to Database Systems
- CS 4265 – Big Data Analytics
- CS 4722 – Interactive Computer Graphics

Semester Project Began: Spring 2020

Final Semester of Implementation: Spring 2021

Total Number of Students Affected During Implemented project on Spring 2021:

Course	Enrollment
CS 3410	88
CS 4265	35
CS 4722	38
Total	161

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 three proposed courses, and it is a success. We list the links of our no cost online course learning material in the table 1 that was implemented in two sections in CS 3410, one section in CS 4265, and one section in CS 4722. 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 materials are positive. We also list our assessment data in this report which demonstrates the effectiveness of our no-cost-to-student course learning materials 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 3410 Introduction to Database Systems	http://ksuweb.kennesaw.edu/~snorth/ALG_CS3410_DB/indexALG_DB.html	Sarah North & Xiaohua Xu
CS 4265 Big Data Analytics	CS 4265 Big Data Analytics Website https://kennesawedu-my.sharepoint.com/personal/dlo2_kennesaw_edu/_layouts/15/onedrive.aspx?id=%2Fpersonal%2Fdlo2%5Fkennesaw%5Fedu%2FDocuments%2FALG%2FHandsOnBigDataAnalyicsUsingApacheSpark%2Epdf&parent=%2Fpersonal%2Fdlo2%5Fkennesaw%5Fedu%2FDocuments%2FALG&originalPath=aHR0cHM6Ly9rZW5uZXNhd2VkdS1teS5zaGFyZXBvaW50LmNvbS86YjovZy9wZXJzb25hbC9kbG8yX2tlbm5lc2F3X2VkdS9FWlQtRU1fdXNXNXA3ek1IWlBpcm9lekJvYnNZMDJMdVQtRU1fdXNXNXA3ek1IWlBpcm9lekJvYnNZMDJMdVpiRHNZMlZ3cndCZWRDQmVvYWVJUDNJb2FdWlPVBvQy1zSjhSMLVn	Dan Lo & Yong Shi
CS 4722 Interactive Computer Graphics	http://ksuweb.kennesaw.edu/~ashaw8/Alg_CS4722/	Alan Shaw

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

Statements	Scores CS 3410	Scores CS 4265	Scores CS 4722	Overall Average
In general, the learning modules were organized	4.68	3.65	4.79	4.38
The content, links and other leaning module materials were sufficient to help me learn.	4.54	3.57	4.53	4.55
I liked not having to buy a textbook and instead used the materials that were provided and free.	4.77	4.5	4.29	4.52
I prefer using selected open source/free learning materials rather than a paid textbook for this course.	4.64	4.5	4.60	4.58
Overall, compared to a potential paid textbook, open resource learning materials provided the necessary assistance to learn the material.	4.63	3.72	4.36	4.24
I would take another course that uses open/free learning material.	4.56	4.36	4.46	4.46

In this survey, students are asked to express their opinion on a list of question using a 5points scale where 1 is mostly disagree, 2 is disagree, 3 is neutral, 4 is agree, 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 materials 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 3410

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: Some new technology or concepts may be added.

CS 4265

What worked well: Based on the students' evaluation, they like the no-cost course materials. Everything done so far appears to be great. Over 92.86% of students in CS 4265 agree or strongly agree that they like not having to buy a textbook and instead use the online textbook that is provided for free.

What needs to be done still: We need to provide more source code examples, and some lab instructions need more clear or step-by-step descriptions. Some chapters need to be revised for errors and additional information. This is a typical revising process.

CS 4722

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.

2. Quotes

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

"I have been enjoying this no-cost learning experience. It saves me a lot of money. Also, I find the open source material very helpful. And I can always look up it quickly online". "Free resources were great to used, as expected for students, the source material was cited for the students". "Not having to pay outrageous prices for a textbook was great. I really don't understand why textbooks cost so much. That is the one big advantage I see a textbook having over the free materials. Like any good computer program, It is only going to get better." (From CS 3410)

"Overall, I like the open source learning materials and free textbooks. I would also like to take another course with open/free learning materials. (From CS 4265)

"Open source materials are usually easier to understand"; "I have been enjoying this no-cost learning experience. It saves me a lot of money.", "My overall experience is positive as I grasped the essentials of the course material without having to sift through pages of a textbook to find what I need."
(From CS 4722)

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 in Spring 2021 as collected data: __161_____

- Positive: __88.75_____ % of __108_____ number of respondents
- Neutral: __ 9.13_____ % of __108_____ number of respondents
- Negative: _ 2.12_____ % of __108_____ 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 3410	88	3.38	3.18
CS 4265	35	3.31	3.15
CS 4722	38	3.33	3.07

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.

		Drop/Fail/Withdraw Rate Comparison	
Course	Enrollment	Current semester	Previous semester
CS 3410	88	3.52%	12.4%
CS 4265	35	5.7%	23.8%
CS 4722	38	4.1%	8.4%

_6.4___% of students, out of a total __161__ students affected, 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)

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:
  - o Drop, fail, withdraw (DFW) delta rates of Course retention and completion rates
  - o Average GPA

- o Pre-and post-transformation DFW comparison to Student success in learning objectives
- o 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 have been enjoying this no-cost learning experience. It saves me a lot of money.", 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 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.
- 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 a few textbooks transformation project in the Department of Computer Science, this project will serve as a great example 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 He has been awarded as well. Additionally, Drs. Yong Shi and Sarah North is submitted Continues Improvement Grants called Mini grant for the third textbook transformation project in Fall 2020 and Spring 2021.

6.   Future Scholarship Plans

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)

☐ 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.

☐

Due to the pandemic, we were not able to take a group picture. Therefore, the photos below is provided from Computer Science Department Website. Dr. Sarah North (ALG Project Leader), Dr. Dan Lo, (ALG course coordinator) Dr. Yong Shi (ALG course coordinator), and Dr. Alan Shaw (course coordinator). Dr. Xiaohua Xu is no longer with KSU since Spring 2021.

Sarah North

Position:
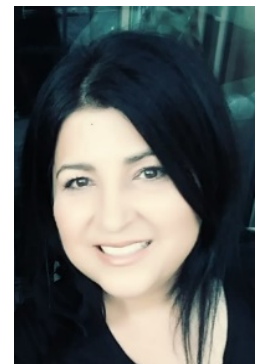Senior Lecturer of Computer Science & IEEE/ACM Student Group
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Dan Lo

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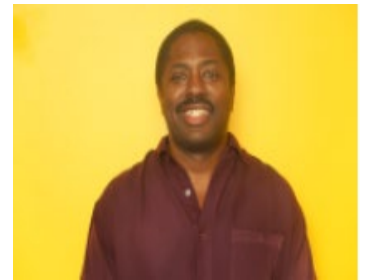Phone: (470) 578-5487
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Xiaohua Xu is no longer with KSU

Xiaohua Xu

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