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](https://survey.zohopublic.com/zs/xTCCvG) 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: 12/17/2024**

**Grant Round: 24**

**Grant Number: 673**

**Institution Name(s): Kennesaw State University**

**Project Lead: Dr. Tu Nguyen**

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

|  |  |  |  |
| --- | --- | --- | --- |
| Department | Name | Title | Email address |
| Computer Science | Tu Nguyen | Assistant Professor | [tu.nguyen@kennesaw.edu](mailto:tu.nguyen@kennesaw.edu) |
| Computer Science | Ahyoung Lee | Assistant Professor | alee146@kennesaw.edu |
| Computer Science | Mahmut Karakaya | Assistant Professor | mkarakay@kennesaw.edu |
| Computer Science | Coskun Cetinkaya | Professor | ccetinka@kennesaw.edu |

**Course Name(s) and Course Numbers:**

**Computer Organization and Architecture, CS 3503**

**Semester Project Began: Spring 2024**

**Final Semester of Implementation: Fall 2024**

**Total Number of Students Affected During Project: 233**

# Narrative

* 1. *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*

Accomplishments:

* Successfully transformed 233 sections of a key core computer science courses offering additional open-source and free online textbooks and course materials.
* Completely revamped course content, including lectures, assignments, projects, exams, and presentations, optimized for both face-to-face and online learning formats.
* Deployed course materials on faculty websites and KSU's D2L platform, incorporating uHoo Analytics to monitor student progress and gather actionable feedback.

Challenges:

* Creating a website with a cohesive theme and comprehensive content covering all course material and relevant case studies;
* Adapting the course project using open-source systems can be time-consuming and challenging, requiring thorough bug fixes to ensure seamless functionality and accessibility for students;
* Locating and restructuring freely available online resources to complement traditional textbooks used in the course;
* Maintaining and updating the website and course materials based on students’ feedback requires significant time and effort;
* Tracking individual student performance, expectations, and feedback necessitates dedicated time and effort for thorough measurement and analysis;

Transformative impact on instruction and students:

* Students generally accept it positively (nearly 92%);
* Most students reported that using free and online course materials helped them improve their learning and progress in the course;
* The financial burden on students has been greatly reduced, the student participation rate in this course has been increased, and the withdrawal rate has been reduced compared to before;
* The students enjoy using free and open-source materials and resources to complete course projects. Most of them have already got used to digital resources and they can refer to the materials wherever and whenever they want;
  1. *Describe lessons learned, including any things you would do differently next time.*

Lessons learned:

* It may take some time for some students to adjust to online textbooks and resources.
* Because technology is developing/changing rapidly, course materials need to be continually updated since course development.
* More time is needed to create various case studies for assignments and projects.
* More supporting materials need to be provided for students’ in-depth learning.
* More feedback surveys are needed to identify issues students may be experiencing.
  1. *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*](https://creativecommons.org/share-your-work/)*—for most materials, this will be an Attribution 4.0 License (CC BY) as required in the Grants Request for Proposals.*

Course websites (including all slides/homework/projects) Sample:

* <https://facultyweb.kennesaw.edu/mkarakay/CS-3503.php>

New course projects:

* <https://facultyweb.kennesaw.edu/alee146/cs3503.php>

# Quotes

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

|  |  |
| --- | --- |
| 1 | The lectures and homework used each other to create great problems requiring in-depth thinking. Although the homework is not required, it was very much needed in review for the tests. |
| 2 | The lectures were phenomenal and incredibly informative, the test review also helped fill in the gaps that were there |
| 3 | Very lenient and flexible in allowing me to work with my summer vacations and volunteers. Allowed me to take an exam a week early to accommodate being offline for a week |

# Quantitative and Qualitative Measures

## 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: 233

* Positive: 91.76% of 233 number of respondents
* Neutral: 5.9% of 233 number of respondents
* Negative: 2.4% of 233 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.*

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.*

\_\_\_\_\_\_\_% of students, out of a total \_\_\_\_\_\_\_ 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)

## 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.*

Table 1 presents the Pass/Fail/Withdrawal (PFW) metrics, including the number and percentage of students, for the CS 3503: Computer Architecture & Organization courses during the 2024 academic year at Kennesaw State University.

Table 1. Courses, number of enrolled students, and pass/fail/withdrawal percentages

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Courses | Terms | Section | Instructor | Num. of students | Pass (%) | Fail or Withdraw  (%) |
| CS 3503 | Spring 2024 | 3503/W03 | Coskun Cetinkaya | 41 | 97.6% | 2.4% |
| Spring 2024 | 3503/W02 | Tu Nguyen | 35 | 85.7% | 14.3% |
| Summer 2024 | 3503/W02 | Coskun Cetinkaya | 36 | 71.82% | 18.18% |
| Summer 2024 | 3503/W01 | Tu Nguyen | 38 | 94.7% | 5.3% |
| Fall 2024 | 3503/W02 | Coskun Cetinkaya | 39 | 100% | 0% |
| Fall2024 | 3503/W02 | Tu Nguyen | 46 | 88.64% | 11.36% |

* Upon analyzing the trends in student performance across various semesters, we observed a notable improvement in outcomes following the adoption of newly developed course materials of the CS3503. Specifically, there was a significant increase in the percentage of students achieving grades A and B. Additionally, the proportion of students receiving F's has remained consistently manageable despite these changes.
* The adoption of new course materials in all sections of CS3503 has not led to a notable change in student enrollment numbers. Over multiple semesters, the average enrollment for the course has remained steady at approximately 40 students per section.
* Based on our data, there was a slight decline in student success rates initially. This drop could be attributed to students needing time to adjust to the new materials and open-source project format, which may have presented initial challenges. However, over time, the data shows a significant improvement, with success rates consistently averaging above 88%. This indicates that the updated course materials not only support academic success but also effectively reduce student costs.

# 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.*

To address diverse student needs and enhance the learning experience, we plan to implement the following improvements in upcoming semesters:

* **Lecture Slides**: Develop clear, visually engaging, and concise slides using tools like PowerPoint or Google Slides to effectively convey key concepts.
* **Lecture Recordings**: Record lectures (with prior consent) and upload them to D2L or the KSU platform, ensuring students who miss classes or prefer asynchronous learning have access to the material.
* **Interactive Sessions**: Integrate interactive tools such as Poll Everywhere or Kahoot to create engaging lectures that include real-time polls, quizzes, and discussions.
* **Code Demonstrations**: Provide detailed, well-documented code examples to illustrate core concepts in parallel and distributed computing. Code repositories like GitHub will be used to manage versions and share examples efficiently with students.

# 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.*

For this course, we will continue utilizing the materials developed through this project while regularly updating the content, including lectures, homework, exams, and projects, to ensure relevance and quality.

For other courses, we plan to leverage the insights and successful practices gained from this project to transition away from commercial textbooks and materials. Instead, we aim to adopt free or low-cost learning resources that minimize student expenses. Target courses for this initiative include CS7540: Network Security, and other relevant computer science courses.

# 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.*

Our team aims to develop a teaching-focused research paper that highlights the experiences, lessons learned, and data gathered from this project. We plan to submit the paper to the IEEE QCE 2025 conference for consideration. If accepted, team members will participate in the conference to deliver presentations and share key findings with the academic community.

# 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.*