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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Seventeen (Summer 2020 - Summer 2021)
Category:	University System of Georgia
Award Cycle:	Round 17
Submission Deadline:	04/20/2020 at 11:59 PM

Application Information

Submitted By:	Kaleigh Kendrick
Application ID:	4780
Application Title:	540
Date Submitted:	04/21/2020 at 8:48 AM

Personal Details

Institution Name(s):	Kennesaw State University
Applicant First Name:	Kaleigh
Applicant Last Name:	Kendrick
Applicant Email Address:	kkendri3@kennesaw.edu
Applicant Phone Number:	
Primary Appointment Title:	Lecturer, Software Engineering
Submitter First Name:	Kaleigh
Submitter Last Name:	Kendrick
Submitter Email Address:	kkendri3@kennesaw.edu
Submitter Phone Number:	
Submitter Title:	Lecturer, Software Engineering

Application Details

Proposal Title

540

Requested Amount of Funding

15000

Priority Category (if applicable)

Scaling Up OER

Course Title(s)

Introduction to Computing Principles

Course Number(s)

CSE 1300

Team Member 1 Name

Kaleigh Kendrick

Team Member 1 Email

kkendri3@kennesaw.edu

Team Member 2 Name

Deepa Muralidhar

Team Member 2 Email

dmural1@kennesaw.edu

Team Member 3 Name**Team Member 3 Email****Team Member 4 Name****Team Member 4 Email****Additional Team Members (Name and email address for each)****Sponsor Name**

Svetlana Peltsverger

Sponsor Title

Associate Dean

Sponsor Department

College of Computing and Software Engineering

Total Number of Student Section Enrollments Affected by Project in One Academic Year

1,000

Average Number of Student Section Enrollments Affected per Summer Semester

40

Average Number of Student Section Enrollments Affected per Fall Semester

240

Average Number of Student Section Enrollments Affected per Spring Semester

240

Original Required Commercial Materials (title, author, price, and bookstore or retailer URL showing price)

Introduction to Computing Principles by zyBooks

ISBN 978 1 5418 4221 2

Original Total Cost per Student

54

Post-Project Cost per Student

0

Post-Project Savings per Student

54

Projected Total Annual Student Savings per Academic Year

28,080

Using OpenStax Textbook?

No

Project Goals

CSE 1300 Introduction to Computing Principles is a popular course in its second year at Kennesaw State University. It is intended for students with little or no computing background. Our philosophy is that even if this is the only computer science course that many non-majors take, it is still a gateway for many higher-level courses and hence there is a need to provide a strong foundation for the course. The course is part of our newly launched First Year Experience initiative and is designed for students who have no previous exposure to fundamental computing concepts or experience with high-level programming languages. Computing is involved in nearly every field of study today and the knowledge of which is needed for career growth in the industry. Computer science prepares students to be active and informed contributors to a society that is increasingly getting technology dependent as our recent pandemic situation has made evident. The intent is for this course to provide a foundation for digital fluency, programming, logic, problem-solving, and algorithmic thinking—all of which are essential skills needed for success in our required introductory courses: CSE 1321 Programming and Problem Solving I and CSE 1322 Programming and Problem Solving II. Both of these courses already successfully utilize OER thanks to previous Textbook Transformation Grants.

Our vision is to create a computer science course which is rigorous, engaging, and approachable that explores many of the foundational ideas of computing, so all students understand how these concepts are transforming the world we live in. In this project, we propose to create entirely new content based solely on OER materials to offer equivalent or better educational effectiveness than our existing course material. CSE 1300 is not a required class for any degree program at Kennesaw State University; however, the demand for the course has proven to be profound. We offered 2 sections in the first semester (Fall 2018) on the Marietta Campus, which is the campus where the College of Computing and Software Engineering is housed. We capped each section at 120 students (240 total students). Both sections of the course filled very quickly, and caps were eventually increased to 135 students per section. After drop add, enrollment for both sections was still high (128 and 130 students respectively). Since then we've begun offering a section on the Kennesaw Campus which has proven to be equally popular and we have also created an online version of the course which will be offered in Summer 2020. The Distance Learning Center provides instructional design support for our online courses at KSU. We expect that this course will continue to be very popular with dual enrollment students.

We believe the impact of this project will be profound for RPG. Providing a robust, low-cost introduction to computing will enable students to consider if one of our degree programs is truly right for them before declaring a major. If we are awarded this grant and are able to offer better quality of instruction with no material costs, students, without investing additional money in the course, will be able to explore the option of computing as a major before committing to years of study.

GOALS:

1. Provide quality OER resources in lieu of paid materials.
2. Prepare the course to go through KSU's quality control process.
3. Solicit feedback to use for the College of Computing and Software Engineering's continual improvement process.

Statement of Transformation

Traditional textbooks used for survey courses are not only costly, but also not very effective in facilitating student learning. Computing-related fields of study are constantly evolving, and we need to be able to update our curriculum routinely to ensure that we are staying current. This requires a commitment by faculty to create new courses (like 1300) and revisit them to implement continuous improvement.

The dynamic nature of technology poses several challenges to the traditional textbook model. First, it is often difficult to find appropriate textbooks for computing courses. Survey-level textbooks often include unnecessary material and often don't cover all the learning objectives for a course without being supplemented with additional materials which the instructors have to create and/or seek out existing materials to bridge gaps. Further, traditional textbooks cannot keep pace with the evolution of technology. Material is often outdated within a short period of time, and a new edition must be selected. The use of new editions limits student options to purchase used textbooks and can also decrease the resale value of the older edition. Finally, there is the issue of access. We acknowledge that inequalities exist within the field of computer science and removing barriers to computer science is key to reaching the goal of bringing CS to all students--not only for those students who plan to pursue computing as a career, but also for those who simply wish for an understanding of basic computing principles and programming. Providing no-cost material serves to further increase accessibility and broaden participation.

We aim to create a course that captures the fun and joy that computing brings. Our goal is twofold. First, for students to recognize and understand that code and the act of creating code can be a beautiful and creative process that can positively impact all disciplines and professions. Second, develop a course that addresses the issue of access. Some students need more support than others. Our goal is to reach all students by providing the right support and opportunities. While we aim for more accessibility, we do not mean easier or less work. We plan to create rigorous coursework that provides students an outlet for personal expression and creativity. When provided with such materials, students are intrinsically motivated to deepen their understanding of the subject (which we have already seen as a result of previous Textbook Transformation grant course revisions within our college). A solid understanding of computer science can be life changing. This would be a phenomenal outcome of this course. We plan to select material for each of the learning modules in the course: Data Abstraction and Logic Gates, HTML and CSS, Computer Hardware and the Internet, Impact of Computing in Society, Computational Thinking, and Programming using Java. The algorithm and program development in Java modules comprise about one half of the course content.

All material we choose will be publicly accessible, free to use, and/or openly licensed. We plan to use an openly licensed textbook for Java and identify supplemental readings and materials from other textbooks and online sources for the remaining learning modules. For example, W3 Schools Tutorials provide free, interactive materials we could use to supplement the course. This type of web content is more interactive than traditional textbooks, increasing student engagement and improving learning experiences. Any materials we create from scratch will also be licensed openly as required by ALG. We recognize that we may need to pull from several quality resources to meet all of the learning outcomes of the class and are excited about the prospect. Pulling from multiple resources ensures that we can closely align course content with learning outcomes for the course and our programs of study. We will also create assignments/exercises and test banks to compliment these new materials, which will allow us to assess the learning outcomes for the course. Finally, we will develop the course using these new materials in our learning management system, D2L Brightspace, with an emphasis on creating accessible material for all students and will ensure that the new content meets the requirements to receive institutional approval for online delivery.

Our team is composed of subject matter experts in computing who are well prepared for the proposed transformation. The PI will select, organize, and integrate the new materials and transform them into instructionally sound, engaging learning materials. Our college has an outstanding record of successfully completing ALG Grants to benefit our students. By consulting with peers within the college, our team is confident that we can build on the successes of our predecessors and further increase the cost-saving benefits to the students within our college.

Transformation Action Plan

Our team proposes to accomplish the following:

- Research and identify no-cost reading material (required and optional) for each learning module in the course. NOTE: We've already preliminarily identified a few textbooks that we are considering for the four Java Modules, Think Java: How to Think Like a Computer Scientist by Allen Downey and Chris Mayfield, and Java, Java, Java. Object Oriented Problem Solving by R.Morelli and R.Wade, both of which are free textbooks available under the Creative Commons Attribution-NonCommercial-ShareAlike license.
- Develop lecture notes for the students' use to review course content and key learning points. These will also be openly licensed as required by ALG.
- Develop assignments and exercises to replace the ones provided in traditional textbooks.
- Develop quiz banks and test banks to replace the ones provided in traditional textbooks.
- Organize all the new content inside our learning management system, D2L Brightspace.
- Ensure that newly developed materials meet accessibility requirements for all students.

Team Member Responsibilities:

Team Member	Role	Responsibilities
Kaleigh Kendrick	Project lead. Subject matter expert and developer. Course architect. Instructor of Record.	Identify the new resources that will be used for the course. Create the lecture notes. Organize the content inside of D2L. Ensure accessibility requirements are met. Solicit IRB approval and co-design the survey.
Deepa Muralidhar	Subject matter expert and developer.	Develop assignments and exercises. Develop quiz banks and test banks. Pull average grade and DWF data from previous semesters. Co-design the survey.

Quantitative & Qualitative Measures

The zyBooks textbook costs \$54. Despite incentivizing the purchase of this resource by making the exercises in it worth 10% of the overall grade for the course, some students still elect not to purchase the book. We plan to survey our students to determine how many of them utilized the free, online materials compared to the number who would have purchased the textbook. This will, of course, require IRB approval.

Research shows that OER improves student success and retention. By switching to free materials, we believe that our students will be more successful and more likely to continue on to our introductory programming classes. We will use our previous sections' average grades and DWF rates as a baseline and compare that data to the new OER course. We will also examine how many students continue on to enroll in 1321 as compared to previous semesters.

Timeline

Summer 2020

- Kendrick will identify the new resources that will be used in the course.
- Muralidhar will gather baseline statistics.

Fall 2020

- Kendrick will create lecture notes and other instructional materials to accompany the new resources.
- Kendrick will organize the content inside of D2L and ensure that accessibility requirements are met and solicit IRB approval to administer surveys.
- Muralidhar will develop exam question banks as well as assignments for each module.
- Muralidhar will develop quiz banks and exercises for each module.

Spring 2021

- Both team members will collaborate to create the survey.
- We will offer the newly designed course (Kendrick will be the instructor of record).
- We will administer the survey to our students.

Summer 2021

- Both team members will collaborate to analyze the data for the project.
- Both team members will collaborate to compile and submit the project's final report.

Budget

The funding primarily compensates both team members for activity beyond their normal teaching loads and job responsibilities in order to complete the project. Kendrick will spend approximately 65 hours developing the no-cost learning materials and 15 hours on the survey and report. Muralidhar will spend approximately 65 hours developing materials and 15 hours gathering and organizing data for survey analysis and completing the report.

We are requesting the following:

Kaleigh Kendrick, Project Lead, Course Architect, and Instructor \$5000

Deepa Muralidhar, Subject Matter Expert \$5000

Travel and Other Expenses \$3000

Ideally, we would like to attend (and hopefully present our project results) at the [ITiCSE Innovation and Technology in CS Education](#) conference.

Equipment (materials to support classroom activities) \$2000

As we create assignments and plan classroom activities to complement them, we will inevitably identify supplies that are needed to support those activities. Equipment like Raspberry Pis, Adafruit MetroX Classics, or even Turing Tables would allow our students to participate in hands-on learning that doesn't require a computer lab with 120 seats.

TOTAL BUDGET: \$15,000

Sustainability Plan

The college implements a course architect system for all courses. Each course is assigned to a faculty member who is responsible for the content of the course and who teaches the course regularly. Our PI is the course architect for the course. She will ensure that the course is continuously taught using the developed no-cost materials in the future regardless of the instructor of record for each section.

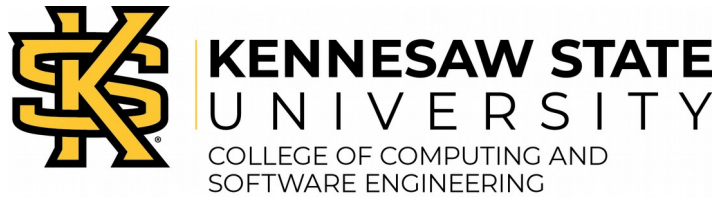
We are committed to continuously updating the no-cost material based on research, assessment results, and feedback from our students. As shown in the letter of support provided, our transformation efforts also have strong support from the college which further ensures the sustainability of our transformation efforts.

As discussed in the Budget for this proposal, we would like to share our work by presenting our results at ITiCSE. Kendrick also plans to participate in KSU's Unconference.

Acknowledgment

Grant Acceptance

[Acknowledged] I understand and acknowledge that acceptance of Affordable Learning Georgia grant funding constitutes a commitment to comply with the required activities listed in the RFP and that my submitted proposal will serve as the statement of work that must be completed by my project team. I further understand and acknowledge that failure to complete the deliverables in the statement of work may result in termination of the agreement and funding.



April 17, 2020

Dear Affordable Learning Georgia Grant Reviewers,

It is my pleasure to write this letter in support of the proposal, "Affordable Digital Fluency for All", submitted by Prof. Kaleigh Kendrick from Software Engineering and Game Development and Prof. Deepa Muralidhar at Kennesaw State University.

In this project, the primary investigators will develop learning materials for CSE 1300 Introduction to Computing Principles. In this course students will learn how computers define and power our world. The importance of this course in the curriculum is stressed by University System of Georgia that recently added a Digital Fluency course to the new General Education Requirements. To emphasize computational thinking the course needs special learning materials that will engage students more than any textbook. In addition, this effort will significantly lower the cost of education for students and generate a positive impact on the retention, progression, and graduation for the Kennesaw State University.

I strongly support this proposal. The course will be evaluated using the College of Computing and Software Engineering Instructional Design rubric to ensure quality and continuous improvement. This is a very sustainable proposal as the College has a large enrollment in CSE 1300 course. Creating these learning materials will allow students to save on learning materials for many years.

Prof. Kaleigh Kendrick is also a designated course architect who is responsible for the development and the maintenance of the CSE 1300. This will ensure that the developed materials will be updated every semester. The developed materials will be distributed using Desire2Learn Brightspace course management system, Digital Commons, and CCSE website <http://ccse.kennesaw.edu/fye/>. Therefore, I believe the effort of this project will be sustainable over the long term and benefit students throughout Georgia.

This proposal has the support of the College of Computing and Software Engineering.

Sincerely,

Svetlana Peltsverger, PhD, CISSP
Interim Associate Dean & Professor of Information Technology
College of Computing and Software Engineering
Kennesaw State University
1100 South Marietta Parkway MD#9036
Marietta, Ga 30060

680 Arntson Drive / Atrium Building, Marietta, GA 30060

Phone: (470) 578-5572 ccse.kennesaw.edu



Textbook Transformation Grants, Round Seventeen (Summer 2020 – Summer 2021)

Proposal Form and Narrative

Applicant, Team, and Sponsor Information

Institution(s)	Kennesaw State University
Applicant Name	Kaleigh Kendrick
Applicant Email	kkendri3@kennesaw.edu
Applicant Phone #	
Applicant Position/Title	Lecturer, Software Engineering
Submitter Name	Kaleigh Kendrick
Submitter Email	kkendri3@kennesaw.edu
Submitter Phone #	
Submitter Position	Lecturer, Software Engineering

	Name	Email Address
Team Member 1	Kaleigh Kendrick	kkendri3@kennesaw.edu
Team Member 2	Deepa Muralidhar	dmurali1@kennesaw.edu
Team Member 3		
Team Member 4		
Team Member 5		
Team Member 6		
Team Member 7		
Team Member 8		

Please provide the sponsor's name, title, department, and institution. The sponsor is the provider of your Letter of Support.

Svetlana Peltsverger, Associate Dean, College of Computing and Software Engineering, Office of the Dean

Project Information and Impact Data

Priority Category / Categories	Scaling Up to OER
Requested Amount of Funding	
Course Names and Course Numbers	CSE 1300
Final Semester of Project	Summer 2021
Total Number of Student Section Enrollments Affected by Project in One Academic Year	5 sections (2 in fall, 2 in spring, and a smaller section in summer)
Average Number of Student Section Enrollments Affected per Summer Semester	40
Average Number of Student Section Enrollments Affected per Fall Semester	240
Average Number of Student Section Enrollments Affected per Spring Semester	240
Original Required Commercial Materials	Introduction to Computing Principles by zyBooks ISBN 978 1 5418 4221 2
Average Price of Original Required Materials Per Student Section Enrollment	\$54
Average Post-Project Cost Per Student Section Enrollment	\$0

Average Post-Project Savings Per Student Section Enrollment	\$6480
Projected Total Annual Student Savings Per Academic Year	\$28,080
Using OpenStax Textbook?	No

Narrative Section

1. Project Goals

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GOALS:

1. Provide quality OER resources in lieu of paid materials.
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2. Statement of Transformation

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6. Budget

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Deepa Muralidhar, Subject Matter Expert \$5000

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TOTAL BUDGET: \$15,000

7. Sustainability Plan

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