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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Fourteen (2019-2020)
Category:	University System of Georgia
Award Cycle:	Round 14
Submission Deadline:	04/09/2019 at 11:59 PM

Application Information

Submitted By:	Michael Wetherholt
Appplication ID:	3387
Application Title:	439
Date Submitted:	04/09/2019 at 8:21 AM

Personal Details

Institution Name(s):	Columbus State University
Applicant First Name:	Lydia
Applicant Last Name:	Ray
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Applicant Phone Number:	706-507-8174
Primary Appointment Title:	Associate Professor
Submitter First Name:	Michael
Submitter Last Name:	Wetherholt
Submitter Email Address:	wetherholt_michael@columbusstate.edu
Submitter Phone Number:	706-507-8949
Submitter Title:	Director, Office of Sponsored Programs

Application Details

Proposal Title

439

Final Semester of Project

Spring 2020

Requested Amount of Funding

$30,000

Type of Grant

Scaling Up OER

Course Title(s)
Computer Science II; Data Structures; Information Security

Course Number(s)
(CPSC 1302); (CPSC 2108); (CPSC 2106)

Team Member 1 Name
Rania Hodhod

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hodhod_rania@columbusstate.edu

Team Member 2 Name
Japheth Koech

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Team Member 3 Name
Yesem Kurt-Peker

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peker_yesem@columbusstate.edu

Team Member 4 Name
Alfredo Perez

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perez_alfredo@columbusstate.edu

Additional Team Members (Name and email address for each)
Hyrum Carroll

carroll_hyrum@columbusstate.edu

Sponsor Name
Michael Wetherholt

Sponsor Title
Director

Sponsor Department
Office of Sponsored Programs

Original Required Commercial Materials (title, author, price)

CPSC 1302: Java Foundations by John Lewis, Peter De Pasquale and Joseph Chase, 4th edition, $164.6 (http://www.mypearsonstore.com/bookstore/java-foundations-introduction-to-program-design-and-9780134285436?xid=PSED)

CPSC 1302 zyBook (online book), $77

Total cost for CPSC 1302: ($164.65 + $77): $241.65

CPSC 2108 zyBook (online book), $77

CPSC 2106: The Basics of Information Security, by Jason Andress, $30

Average Number of Students per Course Section Affected by Project in One Academic Year
30

Average Number of Sections Affected by Project in One Academic Year
17

Total Number of Students Affected by Project in One Academic Year
CPSC 1302: 180 students CPSC 2108: 165 students CPSC 2106: 180 students Total: 525 students

Average Number of Students Affected per Summer Semester
CPSC 1302: 30 students CPSC 2108: 30 students CPSC 2106: 30 students Total: 90 students

Average Number of Students Affected per Fall Semester
CPSC 1302: 60 students CPSC 2108: 60 students CPSC 2106: 60 students Total: 180 students

Average Number of Students Affected per Spring Semester
CPSC 1302: 90 students CPSC 2108: 75 students CPSC 2106: 90 students Total: 255 students

Original Total Cost per Student
$348.65

Post-Project Cost per Student
No post-project costs

Post-Project Savings per Student
$348.65

Projected Total Annual Student Savings per Academic Year
CPSC 1302: $241.65 * 180 students = $43,497 CPSC 2108: $77 * 165 students = $12,705 CPSC 2106: $30 * 180 students = $5,400 Total: $61,602 per year

Using OpenStax Textbook?
No

Project Goals

College textbooks are so expensive that 65% of students report not buying a required textbook [1], which increases the challenges the students face in their education and decreases their chances to succeed in those courses. Use of open educational resources (OERs) has proven to be an effective way to address this problem [2, 3].

The goal of the Textbook Transformation for Computer Science Foundation Courses project is to transform all sections of three core Computer Science (CS) courses into affordable no-cost courses that use OERs to help each student save $348.65 during completion of their degree requirements. The three target courses are: CS II (CPSC 1302), Data Structures (CPSC 2108) and Information Security (CPSC 2106). These transformations will be adopted by all sections in the Total Systems (TSYS) School of Computer Science, impacting a total of 525 CS students per year. These courses are currently required for all CS and IT majors so every student in the TSYS School of Computer Science will benefit from the transformation. It is worth noting that these classes are transferable among institutions in the University System of Georgia (USG).

The team members of this project will search for, select and develop OERs as needed for these three courses during the Summer 2019 semester. The resources are expected to make education more equitable by supporting the aggregation, creation, and dissemination of high-quality reusable affordable resources. The team aim to use these resources in an active learning environment not only to help our students save money, but also to improve student learning [1, 4] and increase student engagement and retention in these classes [5]. The TSYS School of Computer Science is currently renovating and transforming one of their labs (CCT 407) to an active learning space. The active learning space will allow for active student engagement and successful implementation of the designed material in the classroom. The project team will use existing OERs and develop new resources as needed in multiple formats (e.g., text, audio, video, webpages, etc...) following USG's accessibility guidelines.

The team will evaluate the newly acquired OERs to determine the impact of the transformation on student retention and success. The three target courses will be taught in Fall 2019 with the new OERs. At the end of Fall 2019, student performance data and student survey data will be collected from all sections of these courses. The selection of OERs will be revised and improved based on the collected data. The three target courses will be offered in the Spring 2020 semester with the revised and improved OERs. At the end of the Spring 2020 semester, student performance data and survey data will be collected and analyzed. Final revisions and modifications will be performed in the Summer 2020 semester.

Statement of Transformation

Textbook Transformation Grants are awarded to teams focused on creating impactful changes. This section allows teams to describe why the project should be awarded. Include the following:

- A description of the current state of the course, department, and/or institution if relevant.
- An overall description of the project and how it will impact the course, department, and institution as described previously. Include references to scholarly literature to support the claims of your impact if possible.

Building off of successfully eliminating textbook costs for CS I (CPSC 1301) students this past academic year, the team is targeting to transform three additional Computer Science courses at the TSYS School of Computer Science: CS II (CPSC 1302), Data Structures (CPSC 2108) and Information Security (CPSC 2106).

CS II is one of the USG core curriculum courses for which text transformation has not been done yet. This is a mandatory course for all Computer Science and Information Technology (IT) major students, as well as for all Computer Science minors. Data Structures (CPSC 2108) is the next CS programming course in the sequence after CS II and is mandatory for all CS major and minor students. Since these courses are sequential, the team currently require one traditional textbook that covers all concepts of the Java programming language for both courses, in addition to an interactive online Zybook for each course.

Information Security (CPSC 2106) is a mandatory course for all CS and IT major and minor students. Due to the increasing importance of information security in all sectors of a modern society, the team anticipates that this course will soon become one of the core courses for all non-CS majors as well.

Textbook costs have become simply unaffordable for many students, and can become a barrier to their academic success [1, 6]. For example, students may withdraw due to financial hardship. Even though the textbook currently used in the Information Security course is low-cost, it needs to be updated. The book was published in 2011 and no updated version is available. Most other books are quite expensive and do not cover the material included in our curriculum entirely or in the order the team would like them to be covered. Information security is an ever evolving area of study and it is crucial to provide students up-to-date knowledge on the subject. The course is currently supplemented with various external freely available resources. The dependency to the textbook can be eliminated by putting together a well-examined and well-planned selection of open resources.

The new OERs for these three courses will be adopted by the TSYS School of Computer Science in all sections of each of these courses. This adoption will impact approximately 525 CSU students per year with a net savings of $348.65 per student. Newly developed OERs will be accessible and available to all USG institutions via Galileo.

With the flexibility OERs provide, faculty teaching these courses can easily adopt and create innovative teaching pedagogies to implement the course material and provide activities in an active learning environment setting.

In addition to cost savings, there are numerous potential benefits of this project.

- Ease of revision and update: Computer Science is very dynamic in nature. With the progress of technology, programming concepts and information security are being evolved and transformed on a regular basis. A traditional textbook faces difficulty keeping pace with the rate of progress in CS topics. OERs, on the other hand, are easy to review, update and modify.
- Quality of resources: High quality resources based on "wisdom of the crowd" in Computer Science have already become an established and successful culture of open source software (OSS). Success and popularity of OSS indicate that OERs, once established, will be beneficial to CS students in a very similar manner.
- Impact on instructors: Any USG faculty member will be able to access and use these resources for her class. The quality of instruction in these three courses will also improve significantly since instructors will have a lot of teaching materials available to them.
- Ease of accessibility: Team members of this project will modify/develop open courseware following accessibility guidelines from the USG. Learning materials will be available in multiple formats, thus accommodating students with disabilities and different learning styles.
- Higher enrollment, retention and success rate: A survey released by the U.S. PIRG Education Fund shows that 65% students report not buying textbook because of the expense [1]. Many students also consider expenses before enrolling in a class. Traditional CS textbooks are quite expensive (most above $100). Many CS students avoid buying textbooks altogether and complete a course using online free resources anyway. However, since they do not get any guidance for selecting such resources, and because courses are designed based on traditional textbooks as main resources, student performances are negatively impacted. the team hypothesizes

that transforming these CS courses will make improvements in enrollment, retention and success rates.

- Improved overall academic performances and higher rate of graduation: The target courses are among the most fundamental CS courses that build the foundation for all other courses in CS and IT. If students get high quality resources along with high quality instruction in the target courses, they will perform better in all other CS courses. This in turn will increase the rate of graduation of CS and IT majors.
- Better employability of students: Since OERs are updated frequently and new resources can be added easily, students will be able to acquire the most recent and updated knowledge and skills in Computer Science, thus increasing their employability after graduation.

Transformation Action Plan

Textbook Transformation Grant projects can be work-intensive and require project management in order to be successful. This section allows teams to describe how the team will fulfill the goals of the project. Include the following:

- The activities expected from each team member and their role(s): subject matter experts, instructional designer, librarian, instructor of record, et al. The identification, review, selection, and adoption/adaptation/creation of the new course materials. A fully prepared application should include a preliminary evaluation of currently existing OER or no/low-cost materials for adoption or modification, or a preliminary plan to create new materials.
- Any redesign work necessary for the transformation. This includes instructional design, curriculum alignment, accessibility, etc.
- The plan for providing open access to the new materials. GALILEO Open Learning Materials will host any newly created materials. Please indicate if you are using other platforms in addition to the repository.

To successfully achieve the goals established for this grant, the team implement the following plan:

Phase 1. Understanding of Copyright Law and Open Licensing: Each of the team members will acquire the necessary knowledge about copyright law and the different options when releasing material under the Creative Commons licensing to adapt new materials. Personnel in charge: all team members.

Phase 2. Search and Catalog of Available Open Materials: Faculty responsible for the grant will document and search current materials available in the Internet under open licenses to be used for the transformation. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106).

Phase 3. Adaptation, Transformation and Creation of Open Materials: In this phase, the faculty will work along with the instructional designer to adapt and transform the materials found in phase 2. The faculty will create new open materials for the classes to be transformed as needed. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

Phase 4. Deployment and Evaluation: In this phase, the team will use the materials developed/adapted in phase 3 in our course deliveries. the team will collect data during this phase according to the evaluation plan described in this proposal. Since materials will be deployed in the Fall 2019 semester, the faculty will use feedback gathered in this semester to improve the materials for delivery during the Spring 2020 semester. The team will prepare and apply for the IRB approval in this phase. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

Phase 5. Final Report: The team will prepare and deliver the final report of the transformation of the materials to the sponsoring agency. The faculty will also publish the adapted materials as required by the agency in the corresponding databases/systems. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

Quantitative & Qualitative Measures

Quantitative Measures:

Past research has established that there is a strong correlation between student engagement and academic achievement [8]. Based on the research, the team has developed the following hypotheses:

- The no-cost OERs will increase student engagement, motivation and interest towards gaining knowledge in these three courses and acquiring programming skills.
- The newly deployed OERs will be effective in increasing student retention and student success in the three target courses;
- The newly deployed OERs will be effective in improving overall academic performance of students.

The team plans to test these hypotheses based on the following data collected for all students enrolled in the three target courses during the Fall 2019 and the Spring 2020 semesters:

- Demographic information such as gender, ethnicity and age - from CSU Banner Student Information System (SIS) that holds institutional student data.
- GPA (semester, mid-term and institutional GPA) - CSU Banner SIS.
- Credit hours attained towards degree completion (both institutional and transfer since most students in these courses are transfers) - CSU Banner SIS.
- Number of credit hours remaining for graduation - CSU Banner SIS.
- Student engagement surveys that will ask students to rate their engagement in a class with OERs on a scale of 1 to 5 - Qualtrics online survey.

In order to compare student performance with traditional textbook requirements, the team will collect the following data for these three target courses from the Fall 2016 till the Spring 2020 semesters:

- Number of students enrolled in each of these courses - from CSU Banner SIS.
- D/F/W rates of each of the three required courses - CSU Banner SIS.
- Grade earned by each student in the three required courses - CSU Banner SIS.

Qualitative Measures:

The main goal of a qualitative measure is to obtain a deeper understanding of students' perception of the effectiveness of a custom-designed OERs on their own learning. In order to fulfil this goal, the team plan to conduct an asynchronous discussion forum in each of the three required courses. The discussion forum will seek student feedback on the following four aspects of the required OERs:

- 1) Organization (usefulness, consistency, accuracy, format, examples);
- 2) Content (coherence, clarity, alignment to standards and learning objectives, integration, appropriateness, diversity, depth of knowledge, assessment tools used to test content knowledge, range and quality of material, enhancement of creative thinking, collaboration, and problem solving skills);
- 3) Inclusion (differentiation, sensitivity, and diversity);
- 4) Alignment (course objectives, unit objectives, and assessments).

Some sample discussion forum questions are:

- Please provide elaborate responses supported by relevant examples:
1. How do you feel about the overall course content?
2. What are your thoughts about the lesson contents in relation to the length of the course?
3. How do you feel about the online platform for the programming assignments?
4. What do you think about the essential skills and knowledge that you have acquired after reading the suggested materials?
5. How confident are you in applying the skills and concepts you learned in the next level CS courses?
6. What differences do you find in traditional CS textbooks and the open educational resources (OERs) used in the course in terms of lesson contents, clarity, accuracy and development of CS concepts and skills?
7. What are your thoughts on the organization of the OERs?
8. What differences do you find in general computer science textbooks and the OERs used in the course in terms of organization, consistency and summary of key points?

9. In what ways did the cost savings from not purchasing a textbook in this course help you?
10. How effective were the supporting material, activities, and videos in covering the learning and course objectives?
11. In your opinion, how could the supporting material and activities be improved to better support student learning?**Data Analysis**The quantitative data will be analyzed using mixed method approach in order to:

Compare performance of current students in OER courses to previous non-OER courses

Measure and compare D/F/W rates in non-OER sections of the target courses (in previous semesters) vs OER sections (Fall 2019 and Spring 2020)

Measure the impact of OERs in student involvement and motivation from the student engagement survey

The team will conduct the following types of statistical analysis to measure the impact of OERs from various aspects:

First the team will conduct descriptive (univariate) statistical analysis to understand the impact of OERs separately on student learning, success, and overall academic performances.

For inferential analysis, the team will use linear regression and multivariate statistical analysis. These techniques will help us obtain a deeper understanding of the causal relationship among various variables such as gender, age, GPA, number of credit hours and engagements scores.

Qualitative data analysis will be conducted in NVivo (Version 11) by following the guidelines for analyzing qualitative data [7]. Using NVivo the team will conduct narrative analysis and discourse analysis to obtain causal explanations of the impact of OERs in the three target courses.

Data Management Plan:

Data Collection: Student data (described above) will be collected from SIS Banner and will be stored in a password protected Excel file. Survey data will be collected from the Qualtrics online system (which employs TLS encryption for data transmitted over the Internet). The qualitative data from discussion boards will be collected and stored in the CougarVIEW learning management system, thereby being accessible only to the faculty and staff members of the project.

Data Sharing: No student data with personally identifiable features will be shared with anyone outside the team members. Data will be analyzed and anonymized and then shared with the publications of projects findings to ALG site, articles, book/chapter, research conferences, and other scholarly publications. To ensure that no identifiable data is released, a number of precautions will be undertaken such as: aggregations of data and anonymizing data.

Ethics and Privacy: The following measures will be undertaken in order to ensure privacy and ethics:Survey participants will be given an informed consent statement.Data will be anonymized before data is shared and stored.

Data Organization and Storage Duration: Data will be anonymized before long-term storage. The project team will be responsible for cataloging and storing all final forms of data, analysis and representation. All

project data will be stored for two years after the Summer 2020 semester. The data will be permanently deleted from the computer's hard drive after the Summer 2022 semester.

The Grants Team will seek approval from the CSU Institutional Review Board for the Protection of Human Subjects in Research.

Timeline

Phase 1: Understanding of Copyright Law and Open Licensing

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April 25-30, 2019

* Institutional sign-off on Service Level Agreement (SLA) provided by the University System Office

May 1, 2019

* Start IRB application

* Notify students enrolled in CPSC 1302, CPSC 2108 and/or CPSC 2106 for the Fall 2019 Semester (and the CSU bookstore) that these courses will require only no-cost textbooks

May 20, 2019

* Attendance by at least two team members at the required kickoff meeting at Middle Georgia State University

May 21-24, 2019

* All project members will review and expand their knowledge of copyright law and open licensing

Phase 2: Search and Catalog of Available Open Materials

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May 28, 2019

* Solidify evaluation criteria for textbooks (e.g., appropriate level for our students and course, completeness, helpful figures, meaningful examples, current (includes current technologies and techniques), long-term suitability (author's anticipated plans to keep material current))

May 29, 2019 - July 5, 2019

* Review and revise current courseware

* Conduct extensive research on all available free and open resources and make a collection of these resources

* Collect open and freely available textbooks that align with the course objectives, evaluate them based on established criteria and make a shortlist of them

* Store all these materials in a CSU LibGuide, and make the link available through MERLOT and other open databases

Phase 3. Adaptation, Transformation and Creation of Open Materials

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July 8-12, 2019

* Finalize selection of free and open courseware from collected materials

July 15, 2019 - August 2, 2019

* Create additional materials as needed (new materials will be made accessible to the public through the GALILEO Open Learning Materials repository)

Phase 4: Deployment and Evaluation

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August 5-9, 2019

* Modify syllabi

* Write and submit Summer 2019 Semester project status report

Fall Semester 2019: August 12, 2019 - December 7, 2019

August 19-23, 2019

* Write IRB application

August 26, 2019

* Submit IRB application for approval to CSU IRB

August 27-30, 2019

* Team members meet to share and discuss students' initial reactions to the OERs used in their courses

November 18-22, 2019

* Administer surveys (worth extra credit) to all students enrolled in CPSC 1302, CPSC 2108 and CPSC 2106

December 2-6, 2019

* Team members meet to share their experiences about using OERs in their courses

December 9-10, 2019

* Write and submit Fall 2019 Semester project status report

December 11, 2019 - January 10, 2020

* Evaluate the alignment between student learning outcomes of each course and the OERs

* Analyze student survey data

* Re-evaluate selected OERs

* Update course content using no-cost-to-students learning materials according to the evaluation results

Spring Semester 2020: January 16, 2020 - May 11, 2020

January 27-31, 2020

*Team members meet to share and discuss students' reactions to the OERs used in their courses (including modifications)

April 13-17, 2020

* Administer surveys (worth extra credit) to all students enrolled in CPSC 1302, CPSC 2108 and CPSC 2106

April 20-24, 2020

* Team members meet to share their experiences about using OERs in their courses and compare their experience with the updated OERs to their fall experience with the original OERs

Phase 5: Final Report

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May 12-29, 2020

* Evaluate the alignment between student learning outcomes of each course and the OERs

* Analyze the data collected from the surveys

* Reflect on the whole text transformation process

* Make modifications as needed (including updating syllabi)

June 1-26, 2020

* Write and submit final project report

Budget

PERSONNEL:

Lydia Ray.....................$4,520.84
Rania Hodhod..............$4,520.82
Japheth Koech.............$4,520.82
Yesem Kurt-Peker........$4,520.82
Alfredo Perez...............$4,520.82
Hyrum Carroll..............$4,520.82

Total Personnel.........$27,124.94

FRINGE BENEFITS:

Ray (FICA) 6.20%.......................$280.29
Ray (FICA Medicare)....................$65.55

Hodhod (FICA) 6.20%................$280.29
Hodhod (FICA Medicare)............$65.55

Koech (FICA) 6.20%...................$280.29
Koech (FICA Medicare)................$65.55

Kurt-Peker (FICA) 6.20%..........$280.29
Kurt-Peker (FICA Medicare).......$65.55

Perez (FICA) 6.20%..................$280.29
Perez (FICA Medicare)...............$65.55

Carroll (FICA) 6.20%.................$280.29
Carroll (FICA Medicare).............$65.55

Total Fringe Benefits...........$2,075.06

TRAVEL:

Mileage and Per Diem.............$800.00

Total Travel,,,,,,,......................$800.00

TOTAL PROJECT...............$30,000.00

Sustainability Plan

The Grant team will work with librarians and instructional designers to establish a central location to maintain the compiled OERs using the following locations and resources:

- LibGuides hosted by the CSU library to host links and any other web content on CSU Library site;
- SoftChalk Share OER to store and make it publicly available any compiled OER interactive artifacts such as lessons, course activities and SCORM contents on SoftChalk Share site;
- All grants artifacts, reports, and supporting applications will be hosted by the ALG and Galileo Open Learning Materials website ;
- Some resources may be shared via Merlot site or any other OER applicable site the team may find.

Our sustainability plan aligns with the TSYS School of Computer Science's effort to continuously improve the quality of teaching. OERs are the most effective way to reduce textbook cost, in addition to providing flexibility on the students' side as they can have access these materials anytime anywhere.

All faculty teaching CS I, CS II, Data Structures, and Information Security are committed to collaborating to adopt, adapt and create freely available online learning materials that align with the courses' learning objectives and can promote student engagement, excellence and innovation in teaching, and lifelong learning for the students.

As part of the evaluation and sustainability process, the course coordinators will meet at the end of each semester after the conclusion of this project to review the OERs, evaluate student feedback and performance, and revisit the alignment between the OERs, activities and assessments in these courses.

This grant will develop free-to-use and open student-centered materials that will address the high-cost of the current materials used in these courses. OERs can be a powerful tool to lower the cost to the students while enhancing student learning and maintaining/improving course quality. The support and use of OERs will produce a significant return of investment for the students.

The success of this project will provide an incentive for the project team and other faculty at TSYS School of Computer Science to transform textbooks for more CS courses, eventually progressing to create no-cost or low-cost BS in CS and BS in IT degree programs.

The grant team plan to share their experience with textbook transformation through presenting this study and the results from their work to CS educational conferences such as ACM SIGCSE or CISSE to promote nationwide textbook transformation.

References:

[1] Survey Shows Students Opting out of Buying High-cost Textbooks. retrieved from: https://uspirg.org/news/usp/survey-shows-students-opting-out-buying-high-cost-textbooks [Accessed: 4/4/2019]

[2] Dichev, Christo, et al. "Trends and opportunities in computer science OER development." Cybernetics and Information Technologies 15.3 (2015): 114-126. Retrieved from: https://www.wssu.edu/profiles/dichevc/trends-opportunities-in-cs-oer.pdf [Accessed: 4/4/2019]

[3] Ashadevi, B., and P. Muthamil Selvi. "Open Educational Resources in Computer Science: Opportunities and Challenges." International Journal of Computer Science Issues (IJCSI) 14.5 (2017): 42-49. Retrieved from: http://www.ijcsi.org/papers/IJCSI-14-5-42-49.pdf [Accessed: 4/4/2019]

[4] Grimaldi, Phillip J., et al. "Do open educational resources improve student learning? Implications of the access hypothesis." PloS one 14.3 (2019): e0212508. Retrieved from:https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6402753/ [Accessed: 4/4/2019]

[5] Choi, Young Mi, and Cathy Carpenter. "Evaluating the Impact of Open Educational Resources: A Case Study." portal: Libraries and the Academy 17.4 (2017): 685-693. Retrieved from: https://preprint.press.jhu.edu/portal/sites/ajm/files/17.4choi.pdf [Accessed: 4/5/2019]

[6] SPARK: Survey Says: Textbook Costs a Threat to Students Success (2007-2018). Retrieved from: https://sparcopen.org/news/2014/survey-says-textbook-costs-a-threat-to-student-success/ [Accessed: 4/6/2019]

[7] Walsh, Margaret. "Teaching qualitative analysis using QSR NVivo." The Qualitative Report 8.2 (2003): 251-256. Retrieved from: https://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1890&context=tqr/ [Accessed: 4/4/2019]

[8] Lee, Jung-Sook. "The relationship between student engagement and academic performance: Is it a myth or

reality?." The Journal of Educational Research 107.3 (2014): 177-185.

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 8, 2019

Dear Textbook Transformation Grant Program:

The Office of Sponsored Programs (OSP) at Columbus State University (CSU) is the institutional unit responsible for the receipt and distribution of any Textbook Transformation grant awards made to CSU. The OSP together with the CSU Total Systems School of Computer Science at fully support the submission of the Textbook Transformation grant proposal titled, "Textbook Transformation for Computer Science Foundation Courses".

The project's sustainability plan aligns with the CSU Total Systems School of Computer Science effort to continuously improve the quality of teaching. Open educational resources are the most effective way to reduce textbook cost to students. The CSU Total Systems School of Computer Science faculty are fully committed to collaborating to find free available learning materials to promote excellence in teaching, cultural enrichment and lifelong learning for students. Students can freely access open educational resources anytime, anywhere, either online or by downloading to a laptop, tablet or smartphone. Faculty will align OER (Open Educational Resources) with course and program outcomes and continuously check on the relevant and current material (within the last 5 years). As a part of the sustainability process, the team members will meet each semester to review the current digital learning materials, evaluate student feedback, and ensure ongoing achievement of the desired learning outcomes. In addition to the coordination arrangement and course related no-cost-to-students learning materials availability within the CSU Total Systems School of Computer Science, each semester, a day for course assessment is organized. The purpose of this assessment is to evaluate the student learning outcomes of each course and update course content using no-cost-to-students learning materials according to the evaluation. This ensures the CSU Total Systems School of Computer Science continuously improves courses using no-cost-to-students learning materials. OER provide a means of addressing the cost of education and the need for more student-centered materials in the CSU Total Systems School of Computer Science. This is a powerful tool to enhance learning while lowering the cost and maintaining quality. Supporting and using OER will produce a significant return on investment for the students.

Sincerely,

Michael S. Wetherholt, PhD
Director

TEL.: (706) 507-8949 • FAX: (706) 565-1311
4225 University Avenue • Columbus, GA • 31907-5645 • www.ColumbusState.edu/grants
University System of Georgia

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April 08, 2019

Dear Textbook Transformation Grant Committee:

As the chair of the TSYS School of Computer Science, I fully support the submission of the textbook transformation grant proposal titled, "Textbook Transformation for Computer Science Foundation Courses".

Our school is fully committed to make learning affordable to students and to provide them with high quality instruction. We have successfully eliminated the cost of textbook for CS I (CPSC 1301) during the past academic year. The next goal is to transform the remaining programming courses in the sequence: CS II (CPSC 1302) and Data Structures (CPSC 2108) and another core course Information Security (CPSC 2106). The open education resources acquired and developed by the project team will be adopted for all sections of these three courses, thereby resulting in a total savings of $348.65 per student per year. The faculty members of the project team have adequate experience in teaching these courses over multiple semesters with high quality courseware. The team is, therefore, fully qualified to acquire and develop high quality open open source educational materials for these courses. I truly believe that this transformation will benefit our school by increasing student enrollment, and improving student engagement and overall academic performance.

As the chair of the TSYS School for Computer Science, I also fully support the project's sustainability and maintenance plan that aligns with the school's effort to continuously improve the quality of teaching.

The success of this project will inspire the project team and other faculty at our school to transform textbooks for more CS courses, eventually moving towards creating an affordable BS in CS and BS in IT degree programs.

I highly recommend that this project be funded and look forward to seeing its success.

Sincerely,

Dr. Wayne Summers
Department Chair / Professor

TSYS School of Computer Science

Affordable Learning Georgia

Textbook Transformation Grants, Round Fourteen
(Summer 2019 –Summer 2020)
Proposal Form and Narrative

Notes
- The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.
- The only way to submit the official proposal is through the online form in Georgia Tech's InfoReady Review. The link to the online application is on the Round 14 RFP Page.
- The italic text we provide is meant for clarifications and can be deleted.

Applicant, Team, and Sponsor Information
The **applicant** is the proposed Project Lead for the grant project. The **submitter** is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant – if so, leave the submitter fields blank.

Institution(s)	Columbus State University
Applicant Name	Lydia Ray, PhD
Applicant Email	ray_lydia@columbusstate.edu
Applicant Phone #	(706) 507-8174
Applicant Position/Title	Associate Professor
Submitter Name	Michael Wetherholt, PhD
Submitter Email	wetherholt_michael@columbusstate.edu
Submitter Phone #	(706) 507-8949
Submitter Position	Director, Office of Sponsored Programs

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

	Name	Email Address
Team Member 1	Rania Hodhod	hodhod_rania@columbusstate.edu
Team Member 2	Japheth Koech	koech_japheth@columbusstate.edu
Team Member 3	Yesem Peker	peker_yesem@columbusstate.edu

Team Member 4	Alfredo Perez	perez_alfredo@columbusstate.edu
Team Member 5	Hyrum Carroll	carroll_hyrum@columbusstate.edu

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

Dr. Michael S. Wetherholt, Director, Office of Sponsored Programs, Columbus State University

Project Information and Impact Data

Title of Grant Project	Textbook Transformation for Computer Science Foundation Courses
Type of Grant	*"No-or-Low-Cost-to-Students Learning Materials," "Specific Core Curriculum Courses," "Scaling Up OER," or "Gateways to Completion."*
Requested Amount of Funding	$30,000
Course Names and Course Numbers	Computer Science II (CPSC 1302) Data Structures (CPSC 2108) Information Security (CPSC 2106)
Final Semester of Project	*Summer 2020*
Average Number of Students Per Course Section Affected by Project	30 students per section
Average Number of Sections Affected by Project in One Academic Year	17
Total Number of Students Affected by Project in One Academic Year	*CPSC 1302: 180 students* *CPSC 2108: 165 students*

	CPSC 2106: 180 students *Total: 525 students*
Average Number of Students Affected per Summer Semester	*CPSC 1302: 30 students* *CPSC 2108: 30 students* *CPSC 2106: 30 students* *Total: 90 students*
Average Number of Students Affected per Fall Semester	*CPSC 1302: 60 students* *CPSC 2108: 60 students* *CPSC 2106: 60 students* *Total: 180 students*
Average Number of Students Affected per Spring Semester	*CPSC 1302: 90 students* *CPSC 2108: 75 students* *CPSC 2106: 90 students* *Total: 255 students*
Title/Author of Original Required Materials	CPSC 1302: Java Foundations by John Lewis, Peter De Pasquale and Joseph Chase CPSC 1302 zyBook (online book) CPSC 2108 zyBook (online book) CPSC 2106: The Basics of Information Security, by Jason Andress
Original Total Cost Per Student	*$ 348.65*
Post-Project Cost Per Student	No post-project costs
Post-Project Savings Per Student	$348.65
Projected Total Annual Student Savings Per Academic Year	CPSC 1302: $241.65 * 180 students = $43,497 CPSC 2108: $77 * 165 students = $12,705 CPSC 2106: $30 * 180 students = $5,400

	Total: $61,602 per year
Using OpenStax Textbook?	*No*

Narrative Section

Project title: Textbook Transformation for Computer Science Foundation Courses

1. Project Goals

Goals for a Textbook Transformation Grant project go beyond just cost savings. Include goals for student savings, student success, materials creation, and pedagogical transformation here.

College textbooks are so expensive that 65% of students report not buying a required textbook [1], which increases the challenges the students face in their education and decreases their chances to succeed in those courses. Use of open educational resources (OERs) has proven to be an effective way to address this problem [2, 3].

The goal of the Textbook Transformation for Computer Science Foundation Courses project is to transform all sections of three core Computer Science (CS) courses into affordable no-cost courses that use OERs to help each student save $348.65 during completion of their degree requirements. The three target courses are: CS II (CPSC 1302), Data Structures (CPSC 2108) and Information Security (CPSC 2106). These transformations will be adopted by all sections in the Total Systems (TSYS) School of Computer Science, impacting a total of 525 CS students per year. These courses are currently required for all CS and IT majors so every student in the TSYS School of Computer Science will benefit from the transformation. It is worth noting that these classes are transferable among institutions in the University System of Georgia (USG).

The team members of this project will search for, select and develop OERs as needed for these three courses during the Summer 2019 semester. The resources are expected to make education more equitable by supporting the aggregation, creation, and dissemination of high-quality reusable affordable resources. The team aim to use these resources in an active learning environment not only to help our students save money, but also to improve student learning [1, 4] and increase student engagement and retention in these classes [5]. The TSYS School of Computer Science is currently renovating and transforming one of their labs (CCT 407) to an active learning space. The active learning space will allow for active student engagement and successful implementation of the designed material in the classroom. The project team will use existing OERs and develop new resources as needed in multiple formats (e.g., text, audio, video, webpages, etc...) following USG's accessibility guidelines.

The team will evaluate the newly acquired OERs to determine the impact of the transformation on student retention and success. The three target courses will be taught in Fall 2019 with the new OERs. At the end of Fall 2019, student performance data and student survey data will be collected from all sections of these courses. The selection of OERs will be revised and improved based on the collected data. The three target courses will be offered in the Spring 2020 semester with the revised and improved OERs. At the end of the Spring 2020 semester, student

performance data and survey data will be collected and analyzed. Final revisions and modifications will be performed in the Summer 2020 semester.

2. Statement of Transformation
Textbook Transformation Grants are awarded to teams focused on creating impactful changes. This section allows teams to describe why the project should be awarded. Include the following:

- *A description of the current state of the course, department, and/or institution if relevant.*
- *An overall description of the project and how it will impact the course, department, and institution as described previously. Include references to scholarly literature to support the claims of your impact if possible.*

Building off of successfully eliminating textbook costs for CS I (CPSC 1301) students this past academic year, the team is targeting to transform three additional Computer Science courses at the TSYS School of Computer Science: CS II (CPSC 1302), Data Structures (CPSC 2108) and Information Security (CPSC 2106).

CS II is one of the USG core curriculum courses for which text transformation has not been done yet. This is a mandatory course for all Computer Science and Information Technology (IT) major students, as well as for all Computer Science minors. Data Structures (CPSC 2108) is the next CS programming course in the sequence after CS II and is mandatory for all CS major and minor students. Since these courses are sequential, the team currently require one traditional textbook that covers all concepts of the Java programming language for both courses, in addition to an interactive online Zybook for each course.

Information Security (CPSC 2106) is a mandatory course for all CS and IT major and minor students. Due to the increasing importance of information security in all sectors of a modern society, the team anticipates that this course will soon become one of the core courses for all non-CS majors as well.

Textbook costs have become simply unaffordable for many students, and can become a barrier to their academic success [1, 6]. For example, students may withdraw due to financial hardship. Even though the textbook currently used in the Information Security course is low-cost, it needs to be updated. The book was published in 2011 and no updated version is available. Most other books are quite expensive and do not cover the material included in our curriculum entirely or in the order the team would like them to be covered. Information security is an ever evolving area of study and it is crucial to provide students up-to-date knowledge on the subject. The course is currently supplemented with various external freely available resources. The dependency to the textbook can be eliminated by putting together a well-examined and well-planned selection of open resources.

The new OERs for these three courses will be adopted by the TSYS School of Computer Science in *all sections* of each of these courses. This adoption will impact approximately 525 CSU students per year with a net savings of $348.65 per student. Newly developed OERs will be accessible and available to *all* USG institutions via Galileo.

With the flexibility OERs provide, faculty teaching these courses can easily adopt and create innovative teaching pedagogies to implement the course material and provide activities in an active learning environment setting.

In addition to cost savings, there are numerous potential benefits of this project.

- *Ease of revision and update*: Computer Science is very dynamic in nature. With the progress of technology, programming concepts and information security are being evolved and transformed on a regular basis. A traditional textbook faces difficulty keeping pace with the rate of progress in CS topics. OERs, on the other hand, are easy to review, update and modify.
- *Quality of resources*: High quality resources based on "wisdom of the crowd" in Computer Science have already become an established and successful culture of open source software (OSS). Success and popularity of OSS indicate that OERs, once established, will be beneficial to CS students in a very similar manner.
- *Impact on instructors*: Any USG faculty member will be able to access and use these resources for her class. The quality of instruction in these three courses will also improve significantly since instructors will have a lot of teaching materials available to them.
- *Ease of accessibility*: Team members of this project will modify/develop open courseware following accessibility guidelines from the USG. Learning materials will be available in multiple formats, thus accommodating students with disabilities and different learning styles.
- *Higher enrollment, retention and success rate:* A survey released by the U.S. PIRG Education Fund shows that 65% students report not buying textbook because of the expense [1]. Many students also consider expenses before enrolling in a class. Traditional CS textbooks are quite expensive (most above $100). Many CS students avoid buying textbooks altogether and complete a course using online free resources anyway. However, since they do not get any guidance for selecting such resources, and because courses are designed based on traditional textbooks as main resources, student performances are negatively impacted. the team hypothesizes that transforming these CS courses will make improvements in enrollment, retention and success rates.
- *Improved overall academic performances and higher rate of graduation:* The target courses are among the most fundamental CS courses that build the foundation for all other courses in CS and IT. If students get high quality resources along with high quality instruction in the target courses, they will perform better in all other CS courses. This in turn will increase the rate of graduation of CS and IT majors.
- *Better employability of students:* Since OERs are updated frequently and new resources can be added easily, students will be able to acquire the most recent and updated knowledge and skills in Computer Science, thus increasing their employability after graduation.

3. Transformation Action Plan

Textbook Transformation Grant projects can be work-intensive and require project management in order to be successful. This section allows teams to describe how the team will fulfill the goals of the project. Include the following:

- *The activities expected from each team member and their role(s): subject matter experts, instructional designer, librarian, instructor of record, et al.*
    - o *The identification, review, selection, and adoption/adaptation/creation of the new course materials.*
    - o *A fully prepared application should include a preliminary evaluation of currently existing OER or no/low-cost materials for adoption or modification, or a preliminary plan to create new materials.*
- *Any redesign work necessary for the transformation.*
    - o *This includes instructional design, curriculum alignment, accessibility, etc.*
- *The plan for providing open access to the new materials.*
    - o *GALILEO Open Learning Materials will host any newly created materials. Please indicate if you are using other platforms in addition to the repository.*

To successfully achieve the goals established for this grant, the team implement the following plan:

Phase 1. <u>Understanding of Copyright Law and Open Licensing:</u> Each of the team members will acquire the necessary knowledge about copyright law and the different options when releasing material under the Creative Commons licensing to adapt new materials. Personnel in charge: all team members.

Phase 2. <u>Search and Catalog of Available Open Materials</u>: Faculty responsible for the grant will document and search current materials available in the Internet under open licenses to be used for the transformation. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106).

Phase 3. <u>Adaptation, Transformation and Creation of Open Materials</u>: In this phase, the faculty will work along with the instructional designer to adapt and transform the materials found in phase 2. The faculty will create new open materials for the classes to be transformed as needed. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

Phase 4. <u>Deployment and Evaluation</u>: In this phase, the team will use the materials developed/adapted in phase 3 in our course deliveries. the team will collect data during this phase according to the evaluation plan described in this proposal. Since materials will be deployed in the Fall 2019 semester, the faculty will use feedback gathered in this semester to improve the materials for delivery during the Spring 2020 semester. The team will prepare and apply for the IRB approval in this phase. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

Phase 5. Final Report: The team will prepare and deliver the final report of the transformation of the materials to the sponsoring agency. The faculty will also publish the adapted materials as required by the agency in the corresponding databases/systems. Personnel in charge: Dr. Ray and Dr. Carroll (CPSC 1302); Dr. Hodhod and Dr. Perez (CPSC 2108); Dr. Ray and Dr. Peker (CPSC 2106); Instructional Designer: Dr. Koech.

4. Quantitative and Qualitative Measures
All Textbook Transformation Grant projects must measure student satisfaction, student performance, and course-level retention (drop/fail/withdraw rates), but teams and institutions will do this in varied ways. Outstanding applications will include measures beyond the minimum to gain meaningful insights into the impact of the project. Include the following:

- *Each quantitative or qualitative measure to be used, along with a description of the methods and/or tools used to gather and analyze data.*
- *If the team needs IRB (Institutional Review Board) approval, please indicate this here. Each institution's IRB functions differently and teams will need to know how their institution's IRB evaluates and approves of institutional research.*

Quantitative Measures:

Past research has established that there is a strong correlation between student engagement and academic achievement [8].   Based on the research, the team has developed the following hypotheses:

- The no-cost OERs will increase student engagement, motivation and interest towards gaining knowledge in these three courses and acquiring programming skills.

- The newly deployed OERs will be effective in increasing student retention and student success in the three target courses;

- The newly deployed OERs will be effective in improving overall academic performance of students.

The team plans to test these hypotheses based on the following data collected for all students enrolled in the three target courses during the Fall 2019 and the Spring 2020 semesters:

- Demographic information such as gender, ethnicity and age - from CSU Banner Student Information System (SIS) that holds institutional student data.

- GPA (semester, mid-term and institutional GPA) - CSU Banner SIS.

- Credit hours attained towards degree completion (both institutional and transfer since most students in these courses are transfers) - CSU Banner SIS.

- Number of credit hours remaining for graduation - CSU Banner SIS.

- Student engagement surveys that will ask students to rate their engagement in a class with OERs on a scale of 1 to 5 - Qualtrics online survey.

In order to compare student performance with traditional textbook requirements, the team will collect the following data for these three target courses from the Fall 2016 till the Spring 2020 semesters:

- Number of students enrolled in each of these courses - from CSU Banner SIS.

- D/F/W rates of each of the three required courses - CSU Banner SIS.

- Grade earned by each student in the three required courses - CSU Banner SIS.

Qualitative Measures:

The main goal of a qualitative measure is to obtain a deeper understanding of students' perception of the effectiveness of a custom-designed OERs on their own learning. In order to fulfil this goal, the team plan to conduct an asynchronous discussion forum in each of the three required courses. The discussion forum will seek student feedback on the following four aspects of the required OERs:

- 1) Organization (usefulness, consistency, accuracy, format, examples);

- 2) Content (coherence, clarity, alignment to standards and learning objectives, integration, appropriateness, diversity, depth of knowledge, assessment tools used to test content knowledge, range and quality of material, enhancement of creative thinking, collaboration, and problem solving skills);

- 3) Inclusion (differentiation, sensitivity, and diversity);

- 4) Alignment (course objectives, unit objectives, and assessments).

Some sample discussion forum questions are:

- Please provide elaborate responses supported by relevant examples:

    1. How do you feel about the overall course content?

    2. What are your thoughts about the lesson contents in relation to the length of the course?

    3. How do you feel about the online platform for the programming assignments?

    4. What do you think about the essential skills and knowledge that you have acquired after reading the suggested materials?

    5. How confident are you in applying the skills and concepts you learned in the next level CS courses?

6. What differences do you find in traditional CS textbooks and the open educational resources (OERs) used in the course in terms of lesson contents, clarity, accuracy and development of CS concepts and skills?

7. What are your thoughts on the organization of the OERs?

8. What differences do you find in general computer science textbooks and the OERs used in the course in terms of organization, consistency and summary of key points?

9. In what ways did the cost savings from not purchasing a textbook in this course help you?

10. How effective were the supporting material, activities, and videos in covering the learning and course objectives?

11. In your opinion, how could the supporting material and activities be improved to better support student learning?

Data Analysis
The quantitative data will be analyzed using mixed method approach in order to:
- Compare performance of current students in OER courses to previous non-OER courses
- Measure and compare D/F/W rates in non-OER sections of the target courses (in previous semesters) vs OER sections (Fall 2019 and Spring 2020)
- Measure the impact of OERs in student involvement and motivation from the student engagement survey

The team will conduct the following types of statistical analysis to measure the impact of OERs from various aspects:
- First the team will conduct *descriptive (univariate) statistical analysis* to understand the impact of OERs separately on student learning, success, and overall academic performances.
- For inferential analysis, the team will use *linear regression and multivariate statistical analysis*. These techniques will help us obtain a deeper understanding of the causal relationship among various variables such as gender, age, GPA, number of credit hours and engagements scores.

Qualitative data analysis will be conducted in NVivo (Version 11) by following the guidelines for analyzing qualitative data outlined by [7]. Using NVivo the team will conduct *narrative analysis* and *discourse analysis* to obtain causal explanations of the impact of OERs in the three target courses.

Data Management Plan:

- **Data Collection**: Student data (described above) will be collected from SIS Banner and will be stored in a password protected Excel file. Survey data will be collected from the Qualtrics online system (which employs TLS encryption for data transmitted over the Internet). The qualitative data from discussion boards will be collected and stored in the CougarVIEW learning management system, thereby being accessible only to the faculty and staff members of the project.

- **Data Sharing:** No student data with personally identifiable features will be shared with anyone outside the team members. Data will be analyzed and anonymized and then shared with the publications of projects findings to ALG site, articles, book/chapter, research conferences, and other scholarly publications. To ensure that no identifiable data is released, a number of precautions will be undertaken such as: aggregations of data and anonymizing data.

- **Ethics and Privacy:** The following measures will be undertaken in order to ensure privacy and ethics:
  - Survey participants will be given an informed consent statement.
  - Data will be anonymized before data is shared and stored.

- **Data Organization and Storage Duration:** Data will be anonymized before long-term storage. The project team will be responsible for cataloging and storing all final forms of data, analysis and representation. All project data will be stored for two years after the Summer 2020 semester. The data will be permanently deleted from the computer's hard drive after the Summer 2022 semester.
- Yes, the team will need IRB approval.

5. Timeline

This section allows teams to describe how the project will progress from its inception to the final report (submitted at the end of the final semester of the project). Please provide a list of major milestones for the project here, aligning it with the Transformation Action Plan and your selected Final Semester of the project. Do not put this in the form of a table, as it will create issues within InfoReady Review for the official application – a bullet-point list is acceptable.

Phase 1: Understanding of Copyright Law and Open Licensing
===
April 25-30, 2019
* Institutional sign-off on Service Level Agreement (SLA) provided by the University System Office

May 1, 2019
* Start IRB application

* Notify students enrolled in CPSC 1302, CPSC 2108 and/or CPSC 2106 for the Fall 2019 Semester (and the CSU bookstore) that these courses will require only no-cost textbooks

May 20, 2019
* Attendance by at least two team members at the required kickoff meeting at Middle Georgia State University

May 21-24, 2019
* All project members will review and expand their knowledge of copyright law and open licensing

Phase 2: Search and Catalog of Available Open Materials
===
May 28, 2019
* Solidify evaluation criteria for textbooks (e.g., appropriate level for our students and course, completeness, helpful figures, meaningful examples, current (includes current technologies and techniques), long-term suitability (author's anticipated plans to keep material current))

May 29, 2019 - July 5, 2019
* Review and revise current courseware
* Conduct extensive research on all available free and open resources and make a collection of these resources
* Collect open and freely available textbooks that align with the course objectives, evaluate them based on established criteria and make a shortlist of them
* Store all these materials in a CSU LibGuide, and make the link available through MERLOT and other open databases

Phase 3. Adaptation, Transformation and Creation of Open Materials
==
July 8-12, 2019
* Finalize selection of free and open courseware from collected materials

July 15, 2019 - August 2, 2019
* Create additional materials as needed (new materials will be made accessible to the public through the GALILEO Open Learning Materials repository)

Phase 4: Deployment and Evaluation
==
August 5-9, 2019
* Modify syllabi
* Write and submit Summer 2019 Semester project status report

Fall Semester 2019: August 12, 2019 - December 7, 2019

August 19-23, 2019
* Write IRB application

August 26, 2019
* Submit IRB application for approval to CSU IRB

August 27-30, 2019
* Team members meet to share and discuss students' initial reactions to the OERs used in their courses

November 18-22, 2019
* Administer surveys (worth extra credit) to all students enrolled in CPSC 1302, CPSC 2108 and CPSC 2106

December 2-6, 2019
* Team members meet to share their experiences about using OERs in their courses

December 9-10, 2019
* Write and submit Fall 2019 Semester project status report

December 11, 2019 - January 10, 2020
* Evaluate the alignment between student learning outcomes of each course and the OERs
* Analyze student survey data
* Re-evaluate selected OERs
* Update course content using no-cost-to-students learning materials according to the evaluation results

Spring Semester 2020: January 16, 2020 - May 11, 2020

January 27-31, 2020
*Team members meet to share and discuss students' reactions to the OERs used in their courses (including modifications)

April 13-17, 2020
* Administer surveys (worth extra credit) to all students enrolled in CPSC 1302, CPSC 2108 and CPSC 2106

April 20-24, 2020
* Team members meet to share their experiences about using OERs in their courses and compare their experience with the updated OERs to their fall experience with the original OERs

Phase 5: Final Report
==
May 12-29, 2020
* Evaluate the alignment between student learning outcomes of each course and the OERs
* Analyze the data collected from the surveys
* Reflect on the whole text transformation process
* Make modifications as needed (including updating syllabi)

June 1-26, 2020
* Write and submit final project report

6. Budget

Include overall personnel & projected expenses. Be sure to include the $800 in travel funding, which is required for all Textbook Transformation Grants. Do not put this in the form of a table, as it will create issues within InfoReady Review for the official application – a bullet-point list is acceptable. Please keep all funding guidelines from the corresponding RFP in mind.

PERSONNEL:

Lydia Ray............................$4,520.84

Rania Hodhod...................$4,520.82

Japheth Koech..................$4,520.82
Yesem Kurt-Peker.............$4,520.82
Alfredo Perez....................$4,520.82
Hyrum Carroll...................$4,520.82

Total Personnel..........$27,124.94

FRINGE BENEFITS:

6.20% (FICA) Ray.......................$280.29
1.45% (FICA Medicare) Ray....$65.55

6.20% (FICA) Hodhod....................$280.29
1.45% (FICA Medicare) Hodhod....$65.55

6.20% (FICA) Koech....................$280.29
1.45% (FICA Medicare) Koech....$65.55

6.20% (FICA) Kurt-Peker....................$280.29
1.45% (FICA Medicare) Kurt-Peker....$65.55

6.20% (FICA) Perez....................$280.29
1.45% (FICA Medicare) Perez....$65.55

6.20% (FICA) Carroll....................$280.29
1.45% (FICA Medicare) Carroll....$65.55

Total Fringe Benefits............$2,075.06

TRAVEL:

Mileage and Per Diem...............$800.00

Total Travel..............................$800.00

TOTAL PROJECT...............$30,000.00

7. Sustainability Plan

Textbook Transformation Grants should have a lasting impact on the course for years to come. In order for this to happen, a Sustainability Plan needs to be in place after the end of the project. Please include here your plans for offering the course in the future, including:

- *The maintenance and updating of course materials*
- *Any possible expansion of the project to more course sections in the future*
- *Future plans for sharing this work with others through presentations, articles, or other scholarly activities*

Grant team will work with librarians and instructional designers to establish a central location to maintain the compiled OERs using the following locations and resources:
- *LibGuides hosted by the CSU library to host links and any other web content on CSU Library site;*
- *SoftChalk Share OER to store and make it publicly available any compiled OER interactive artifacts such as lessons, course activities and SCORM contents on SoftChalk Share site;*
- *All grants artifacts, reports, and supporting applications will be hosted by the ALG and Galileo Open Learning Materials website ;*
- *Some resources may be shared via Merlot site or any other OER applicable site the team may find.*

Our sustainability plan aligns with the TSYS School of Computer Science's effort to continuously improve the quality of teaching. OERs are the most effective way to reduce textbook cost, in addition to providing flexibility on the students' side as they can have access these materials anytime anywhere.

All faculty teaching CS I, CS II, Data Structures, and Information Security are committed to collaborating to adopt, adapt and create freely available online learning materials that align with the courses' learning objectives and can promote student engagement, excellence and innovation in teaching, and lifelong learning for the students.

As part of the evaluation and sustainability process, the course coordinators will meet at the end of each semester after the conclusion of this project to review the OERs, evaluate student feedback and performance, and revisit the alignment between the OERs, activities and assessments in these courses.

This grant will develop free-to-use and open student-centered materials that will address the high-cost of the current materials used in these courses. OERs can be a powerful tool to lower the cost to the students while enhancing student learning and maintaining/improving course quality. The support and use of OERs will produce a significant return of investment for the students.

The success of this project will provide an incentive for the project team and other faculty at TSYS School of Computer Science to transform textbooks for more CS courses, eventually progressing to create no-cost or low-cost BS in CS and BS in IT degree programs.

The grant team plan to share their experience with textbook transformation through presenting this study and the results from their work to CS educational conferences such as ACM SIGCSE or CISSE to promote nationwide textbook transformation.

References:

[1] Survey Shows Students Opting out of Buying High-cost Textbooks. retrieved from: https://uspirg.org/news/usp/survey-shows-students-opting-out-buying-high-cost-textbooks [Accessed: 4/4/2019]

[2] Dichev, Christo, et al. "Trends and opportunities in computer science OER development." *Cybernetics and Information Technologies* 15.3 (2015): 114-126. Retrieved from: https://www.wssu.edu/profiles/dichevc/trends-opportunities-in-cs-oer.pdf [Accessed: 4/4/2019]

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