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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Thirteen (Spring 2019-Spring 2020)
Category:	University System of Georgia
Award Cycle:	Round 13
Submission Deadline:	01/14/2019 at 11:59 PM

Application Information

Submitted By:	Cathy Hakes
Application ID:	2681
Application Title:	403
Date Submitted:	01/15/2019 at 7:30 AM

Personal Details

Institution Name(s):	Georgia Gwinnett College
Applicant First Name:	Hyesung
Applicant Last Name:	Park
Applicant Email Address:	hpark7@ggc.edu
Applicant Phone Number:	617-586-6982
Primary Appointment Title:	Assistant Professor
Submitter First Name:	Cathy
Submitter Last Name:	Hakes
Submitter Email Address:	chakes@ggc.edu
Submitter Phone Number:	678-407-5875
Submitter Title:	Executive Director, Office of Research and Sponsored Programs

Application Details

Proposal Title

403

Final Semester of Project

Spring 2020

Requested Amount of Funding

\$30,000.00

Type of Grant

Scaling Up OER

Course Title(s)

Programming Fundamentals

Course Number(s)

ITEC 2140

Team Member 1 Name

Hyesung Park

Team Member 1 Email

hpark7@ggc.edu

Team Member 2 Name

Wei Jin

Team Member 2 Email

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Team Member 3 Name

Na'el Abu-Halaweh

Team Member 3 Email

nabuhala@ggc.edu

Team Member 4 Name

Tacksoo Im

Team Member 4 Email

tim@ggc.edu

Additional Team Members (Name and email address for each)

Sonal S. Dekhane, sdekhane@ggc.edu

Richard W. Price, rprice@ggc.edu

Robert Lutz, rlutz@ggc.edu

Sponsor Name

Thomas Mundie

Sponsor Title

Dean

Sponsor Department

School of Science and Technology, Georgia Gwinnett College

Original Required Commercial Materials (title, author, price)

Introduction to Java: Programming and Data Structure, Y. Daniel Liang, \$175.00

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

24

Average Number of Sections Affected by Project in One Academic Year

26

Total Number of Students Affected by Project in One Academic Year

624

Average Number of Students Affected per Summer Semester

48

Average Number of Students Affected per Fall Semester

288

Average Number of Students Affected per Spring Semester

288

Original Total Cost per Student

\$175.00

Post-Project Cost per Student

0.00

Post-Project Savings per Student

\$175.00

Projected Total Annual Student Savings per Academic Year

\$109,200.00

Using OpenStax Textbook?

No

Project Goals

A. Reduce the cost of learning materials in 26 sections of ITEC 2140 (Programming Fundamentals), thereby increasing the utilization of learning materials by approximately 624 students during the life-cycle of the project.

B. Improve students' academic performance through low-cost open learning materials that are easy to access and well- organized.

The ITEC 2140 "Programming Fundamentals" is a key course for the ITEC major at GGC. Providing multiple types of well-organized low-cost learning materials will likely lead to improved student performance and will greatly improve the programming skills of ITEC students.

C. Increase enrollment in ITEC 2150 (Intermediate Programming) in following semesters as a result of improved learning experience through the adoption of the new learning materials.

ITEC 2140 is considered as a gateway course for ITEC majors. Improvements to this course will be reflected in subsequent ITEC courses in that such enhancements will likely lead to lower number of students switching majors from ITEC to other majors or withdrawing from college altogether.

D. Improve instructional practices through the transformed curriculum.

Statement of Transformation

Overview of the Transformation

Textbooks are expensive. A Cengage study published on July 26, 2018, found that textbooks are a major stress factor for many students, with students making major trade-offs such as on housing, travel to visit their family, and on skipping meals to accommodate textbooks. When students do not opt to purchase textbooks, their grades often suffer. As Sheila Liming of the University of North Dakota stated in a July 26, 2018, Inside Higher Ed article, "I give periodic, scheduled quizzes in some of my classes and, last semester, more than two-thirds of the class failed one of the quizzes, which I later learned was because most of them hadn't purchased the book that it was on." She said that "students often perform a cost-benefit analysis and weigh potential hits to their grades against the cost of a necessary textbook."

The textbook currently used to teach ITEC 2140 "Programming Fundamentals" at Georgia Gwinnett College is no exception in that it is costly. While it is a given that a new edition of a book will likely come out each year, this occurrence is particularly true of information technology textbooks. IT textbooks need to be updated more frequently given the fast evolving and changing nature of the information technology field, which impacts their resale and personal value to the students.

A related problem is that online practices offered by the publisher become less and less usable over time. Students use online searches to find the posted answers to these online practices and short-cut the time needed to work out the answers on their own. This is observed with MyProgrammingLab, an interactive practice and assignment tool packaged with the current textbook from Pearson.

The good news is that many low-cost resources pertaining to programming are publicly available on the world wide web. Through this project, the team of ITEC faculty will be afforded the time, resources, and expertise from library staff to design and create low-cost online learning and course materials that will enable our students to achieve greater student academic success while transforming the teaching of Information Technology in Georgia Gwinnett College. The final product is expected to be a well-organized collection of text, embedded with videos, quizzes, programming exercises, animations, and such in the form of a digital textbook. We also plan to address the issue of student posting answers to exercises online by creating a collection of exercises and quizzes that we will use on a rotation basis.

Project's transformative impact on the course and department

About 624 students are registered for ITEC 2140 each year. Among the participating faculty members, it is estimated that approximately 20% of our students do not buy or delay buying the current textbook due to its cost. The lack of textbook has negatively affected student performance and retention in our classes. For instance, approximately 40% of our ITEC 2140 students received D, F, and W in spring 2017. It is our aspiration that having a low-cost alternative will allow students to have access to the textbook on the first day of class. This will hopefully decrease the percentage of IT students failing or withdrawing from the class and spur our students to continue to improve in their academic performance in the course. In addition, a number of students do not use the current textbook because it is either too heavy to carry around or it is difficult to use as an e-text format. The current textbook, either online or in hardcopy form, is external to Desire to Learn (D2L), the learning environment that students are in most of the time. Assembling resources in one place and embedding it with interactive components will improve the utilization. The interactive components can also be utilized in the classroom, increasing student engagement with the material. In other words, we would like to make the "textbook" alive and more integrated with student learning in and outside of the classroom.

Culled from prior experience teaching in the field and working with our student population, we will incorporate effective practices into the development of our learning resources. This development phase includes the selection, adaption, and arrangement of learning materials and resources. All of our resources will be tailored to our ITEC 2140 Programming Fundamentals students and may be very useful for similar courses at other institutions.

These efforts will lead to better student experiences and learning outcomes. They may lead to other positive outcomes. Since ITEC 2140 is the first programming course offered to the ITEC students, the project's enhanced curriculum will positively impact the performance of these students and lead to better performance in subsequent ITEC courses. The result is improved knowledge retention and student success; higher retention among ITEC students; and better learning outcomes for the entire ITEC program.

Project's transformative impact on the institution

Studies conducted by Bennedsen and Caspersen (2007) and Watson and Li (2014) have explored the high failure rates in introductory programming courses. As Watson and Li stated, the U.S. labor statistics suggest the continued growth of computing careers, and "that various computing skills will be in strong demand for the foreseeable future. To address these future labor demands, governments throughout the world are in the process of bringing programming into the classroom environment, so that students can be better prepared to work within a digital economy." While these two studies have varying sample sizes and cover multiple countries, both found that the pass

rate in the introductory programming course is about 67.7%. No conclusive findings on precisely which internal characteristics of certain students influence their ability to acquire programming skills; however, Watson and Li suggested that the best approach for teaching the course may be teaching small groups, replacing traditional lectures with classroom-based instruction, and the use of pair programming to improve performance.

The proposed project plans to further improve on these recommendations by:

- Creating and/or assembling interactive learning materials such as videos, online exercises, online assessment, and effective open source materials.
- Organizing the learning materials in a central location to improve engagement and accessibility.
- Organizing the learning materials in a way to make it easier for the instructors to utilize them for group discussions and collaborations.
- Analyze and update the online learning materials to keep up with up-to-date resources based on students' learning progress and feedback through the learning material evaluation process.

By introducing these changes, the team hopes to transform not only the curriculum but also the ITEC pedagogy. Moreover, the outcome of the proposed project supports the mission of GGC, which emphasizes the innovative use of technology and interactive learning environment to improve student success and retention.

Transformation Action Plan

Team members' roles

There are three deliverables for this project. They are:

- A. Online learning materials for ITEC 2140 (Programming Fundamentals);
- B. Quizzes, assignments, and projects to be used with the learning materials; and
- C. Assessment (midterm and final exam) materials.

As we begin the project, we anticipate that there will be several phases in the transformation action plan, with all members participating and contributing throughout the phases. These phases will include the:

- Evaluation of our current instructional materials;
- Inventory of existing online educational resources;
- Identification of resources and materials;
- Selection of materials;
- Creation and/or adaptation of new course materials; and
- Adoption of the new course materials.

The proposed online learning materials will consist of seven chapters targeting the ITEC 2140 course goals. Each member will be responsible for writing one chapter. Learning materials will be either created, adopted from freely available sources, or a combination of both. Some parts will rely on materials that are freely available as technical documentation from a vendor or other open resources. The chapters of the textbook will consist of the following:

1. Getting Started (Pseudo code, flow charts, computing mathematics, etc.)
2. Datatype, Variables, and Expressions
3. Conditions
4. Loops
5. Methods
6. Arrays and ArrayLists
7. Object Oriented Programming

The author of each chapter is identified below:

- Hyesung Park- Chapter 1 & 2 author, instructional designer, instructor of record
- Wei Jin- Chapter 2 author, instructional designer, instructor of record
- Na'el Abu-Halaweh- Chapter 3 author, instructional designer, instructor of record
- Sonal S. Dekhane- Chapter 4 author, instructional designer, instructor of record
- Richard W. Price- Chapter 5 author, instructional designer, instructor of record
- Robert Lutz- Chapter 6 author, instructional designer
- Tacksoo Im- Chapter 7 author, instructional designer

Some members are instructors of record for ITEC 2140 and others have taught the course in the past. All members are subject matter experts.

The actions we are planning to take are listed below in chronological order:

January-February: Evaluate current instructional material, identify existing material, and select appropriate existing material. All team members.

March-April: Write chapters of the textbook and organize appropriate OER content.

May-June: Create assignments, quizzes, exams, and other assessment materials.

July-August: Deploy textbook and organize learning management system with materials.

Starting with the Fall 2019 semester, students will not need to purchase a textbook.

Plan for providing access

The learning materials will be available on GALILEO, but it will also be hosted on Github Pages. Furthermore, in order to provide students with a convenient and easy access to the learning materials, a URL will be embedded in the Learning Management System.

To develop and write the learning materials, our team will use the tool AsciiDoc and AsciiDocFX. The team will utilize Github to coordinate writing activities.

Each member will also be responsible for creating at least six quizzes and six assignments for the chapter they are assigned. These quizzes and assignments will be short and cover the concepts elaborated on the chapter. An end-of-chapter project will be created by each member as well. There will be common assessment (midterm and final) materials, along with the learning materials. Each member will contribute eight problems for the midterm and eight problems for the final. These problems will be used as a test bank of future midterms and finals.

Quantitative & Qualitative Measures

The evaluation plan will be designed and administered by every project team member to ensure the effectiveness of the learning materials and resource materials, and to ensure that the project goals and objectives are achieved. The project principal, Dr. Park, will serve as lead in the evaluation plan.

GOAL 1: Reduce the cost of learning materials in 26 sections of ITEC 2140 (Programming Fundamentals), thereby increasing the utilization of learning materials by approximately 624 students during the life-cycle of the project.

Evaluation:

- Historical cost information of the textbook will be gathered from the bookstore and compared with the cost of the learning materials during the project life-cycle.
- Students will self-report the frequency of usage of learning materials in an end-of-semester survey.

Qualitative Measure, Methods, and Tools

- Utilize questionnaire and create open-ended questions on how the student feels about having low-cost learning materials and resources.

Quantitative Measure, Methods, and Tools

- Track number of students through the class roll and contact the bookstore for the price of the textbook in order to track the actual savings.

GOAL 2: Improve students' academic performance through low-cost open learning materials that are easy to access and well-organized.

Qualitative Measure, Methods, and Tools

- Utilize a questionnaire and create open-ended questions to find out if the students think that the materials were more accessible (if they have issues accessing it online) and interactive (e.g. videos, online exercises, online assessment).

Quantitative Measure, Methods, and Tools

- Collect aggregate data on grades (particularly DFW), GPA, and number of students who plan to return to GGC.
- Administer student satisfaction questionnaire at the end of each semester. Survey in spring 2019 when using the same textbook as now and survey in fall 2019 when adopting ALG resources. Examples of questions are: How easy is it to access the learning materials? How often do you use the learning materials? How easy is it to understand the learning materials? How organized are the learning materials? Are the provided materials sufficient for studying and reviewing?
- Student Performance Assess by utilization of a common pool of final exam questions. Each faculty members uses the same final exam across two semesters, with one semester using the original textbook and one using the ALG resources. We will compare also the overall ITEC 2140 student performance (final exam grades, ABC rate, and DFW rates) from one semester to the other. The minimum measure of success is that student performance does not decrease. If student performance improves, it is a clear sign of success for the project.
- Student Retention This is partially addressed by Student Performance, which is the rate of ABC (or on the contrary DFW). In addition to the rate, we would like to study the correlation between student satisfaction and performance to gain insight into the reasons for the retention. Since we have a large number of students taking ITEC 2140, statistical analysis tools or data mining tools can be used.

GOAL 3: Increase enrollment in ITEC 2150 (Intermediate Programming) in following semesters as a result of improved learning experience by adoption of the new learning materials.

Qualitative Measure, Methods, and Tools

- Create and analyze open-ended questions to find out if students plan to enroll in the next programming course; if they feel more confident about their next level programming course; and why they feel more confident.

Quantitative Measure, Methods, and Tools

- Collect aggregate data on the number of students planning to go into the next programming course; ask Yes/No

questions if having access to low-cost online resources improved their skills and built up their confidence to enroll in the next level course.

GOAL 4: Improve instructional practices through the transformed curriculum.

There are several ways in evaluating instructional practices that go beyond student ratings. For this project, we will be focused on process and summative evaluation as they pertain to pedagogical transformation.

Qualitative Measure, Methods, and Tools

- Questionnaires will be administered to each team member to assess (1) success or challenges that they may have encountered in the process of developing the curriculum; (2) challenges or successes in teaching the transformed curriculum; and (3) effectiveness of the curriculum in general.
- The team will meet also to discuss the success of the overall project. The Project lead will ask each member to share what worked and what did not work, and our plans moving forward to accomplish our sustainability plan.

Timeline

For implementation in the **Spring 2019 semester**

February 25, 2019: Kickoff meeting, Middle Georgia State University

Spring 2019

Team members will focus on identifying open educational resources appropriate for ITEC 2140 and start cataloging them in the Spring 2019 semester. Resources will be classified as reading materials, in-class activities, or out of class practice activities. In addition, team members will create quizzes for the chapters they create. Lastly, the team will create a questionnaire to evaluate the content created and used in classes.

Summer 2019

In summer 2019 semester, team members will refine and structure the material collection to make it easy to access and use. This will result in a collection of online learning materials created using AsciiDoc and AsciiDocFX Book Editor. In addition, team members will create other supporting materials such as PowerPoint slides, assignments, pool of exam questions, and two projects.

The team members will pilot the materials created in spring and summer in their summer 2019 classes. Survey data will be collected and the first report will be submitted.

Fall 2019

In the fall, the collection and organization of material are expected to be complete. Team members will use all the materials in their classes in fall 2019 and spring 2020. Minor changes to the collection are expected to occur on a regular basis. The main content is not expected to change drastically. However, quiz and exam questions and projects are expected to change frequently to maintain the integrity of these activities. Moreover, content is expected to change as new materials get added to the open education resources or as new members are added to the teaching community at GGC.

Spring 2020

Team members will continue to use all the transformed materials in their classes in spring 2020. The team will continue to make such changes also as noted in fall 2019, and monitor student progress through quizzes and exams.

Survey data from summer 2019 and fall 2019 will be analyzed in late fall 2019, and a final report will be created for submission at the end of spring 2020.

Budget

A. **Type of Grant:** Scaling Up OER (Large Scale Transformation)

B. **Budget Request:** \$30,000

C. **Budget Justification.** Funds are requested for the following direct costs:

(a). Personnel: \$29,200

Project Lead, Dr. Hyesung Park, will serve as chapter author and instructional designer. She will be responsible also for teaching one section of the transformed ITEC 2140 textbook and course materials. In addition, Dr. Park will oversee the project evaluation and analysis of the survey results. She will take the lead in submitting the semester and annual reports. Total Request for compensation and fringe: \$4,171.48

Six Project Team Members, Drs. Wei Jin, Na'el Abu-Halaweh, Tacksoo Im, Sonal S. Dekhane, Richard W. Price, and Robert Lutz request \$4,171.42 each to cover their pay and fringe. Total Request for compensation and fringe \$25,028.52

Each project team member will be responsible for and assigned a specific chapter and will serve as that chapter's author and instructional designer. In addition, each will be responsible for teaching one section of the transformed ITEC 2140 learning materials. The member will be expected to administer and collect course evaluation forms also. Finally, the member will assist in compiling the semester and final reports; and participate in the project evaluation design, collection, and, if required, its analysis.

(b). Travel: \$800

Funds will be used for two members to attend the kick-off event. Should there be any remaining funds, we will utilize the funds to disseminate the results of the project at SIGCSE conference in Spring 2020, for example.

(c) Total Request: \$30,000

Sustainability Plan

Our sustainability plan will include the following:

- After completion of this project, no additional costs are required.
- The learning materials will be available in D2L and will be shared among all ITEC programming course teaching faculties. We will make an announcement of its availability during the ITEC faculty discipline meetings.
- The learning materials will be updated every semester and periodically (three times per an academic year: January, May, September) by the teaching faculty.
- Any needed updates will be made based on research, publications, and feedback from faculty members and students.
- We will share the information with our library so that they can share the information with others and make the materials accessible under the Creative Commons license for public access and usage.
- The team members will disseminate information regarding the online learning materials and its impact on student learning at regional and national conferences.
- We have strong support from the dean of the School of Science and Technology (SST) to pilot and sustain the project. Moreover, two of our members (Dr. Sonal Dekhane and Dr. Robert Lutz) serve as IT chairs in SST. Their participation in and commitment to the project ensure the sustainability of our transformation efforts.

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.



To: Grant Review Committee

Affordable Learning Georgia, University System of Georgia

Re: Textbook Transformation Grant

Dear Committee,

I am pleased to write this letter to support Drs. Hyesung Park, Wei Jin, Na'el Abu-halaweh, Tacksoo Im, Sonal S. Dekhane, Richard W. Price, and Robert Lutz's application for the ALG Textbook Transformation Grant.

The proposal focuses on the creation of no-cost-to-students learning materials to replace current textbook for our IT required course Programming Fundamentals (ITEC 2140). GGC has over 1300 IT majors and all of them will take this course. This grant will help lower costs of students taking this course and will most likely increase our retention and success rates in the course.

Each project team member has been teaching ITEC 2140 and upper level programming courses for several semesters. They have the knowledge, skills and experiences needed to successfully perform the action plan and meet the obligations of the grant. If awarded the grant, I will work with them to coordinate the distribution of their award and provide necessary resources to facilitate their activities in developing the proposed learning materials.

Please let me know if you have any questions or need additional information.

Thomas Mundie
Dean, School of Science and Technology
Georgia Gwinnett College



Textbook Transformation Grants, Round Thirteen
 (Spring 2019–Spring 2020)
 Proposal Form and Narrative

APPLICANT, TEAM, AND SPONSOR INFORMATION

Institution(s)	Georgia Gwinnett College
Applicant Name	Hyesung Park
Applicant Email	hpark7@ggc.edu
Applicant Phone #	617-586-6982
Applicant Position/Title	Assistant Professor
Submitter Name	Cathy Hakes
Submitter Email	chakes@ggc.edu
Submitter Phone #	678-407-5875
Submitter Position	Executive Director, Office of Research and Sponsored Programs

All Team Members

	Name	Email Address
Team Member 1	Hyesung Park	hpark7@ggc.edu
Team Member 2	Wei Jin	wjin@ggc.edu
Team Member 3	Na’el Abu-Halaweh	nabuhala@ggc.edu
Team Member 4	Tacksoo Im	tim@ggc.edu
Team Member 5	Sonal S. Dekhane	sdekhane@ggc.edu
Team Member 6	Richard W. Price	rprice@ggc.edu
Team Member 7	Robert Lutz	rlutz@ggc.edu

Sponsor’s name, title, department, and institution.

Thomas Mundie, Dean, School of Science and Technology, Georgia Gwinnett College

PROJECT INFORMATION AND IMPACT DATA

Title of Grant Project	Programming with Java
Type of Grant	Scaling up OER (Large-Scale Transformation)
Requested Amount of Funding	\$30,000.00
Course Names and Course Numbers	ITEC 2140: Programming Fundamentals
Final Semester of Project	Spring 2020
Average Number of Students Per Course Section Affected by Project	24
Average Number of Sections Affected by Project in One Academic Year	26

Total Number of Students Affected by Project in One Academic Year	624
Average Number of Students Affected per Summer Semester	48
Average Number of Students Affected per Fall Semester	288
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Title/Author of Original Required Materials	Introduction to Java: Programming and Data Structure / Y. Daniel Liang
Original Total Cost Per Student	\$175.00
Post-Project Cost Per Student	\$0.00
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Using OpenStax Textbook?	No

NARRATIVE SECTION

1. PROJECT GOALS

- A. Reduce the cost of learning materials in 26 sections of ITEC 2140 (Programming Fundamentals), thereby increasing the utilization of learning materials by approximately 624 students during the life-cycle of the project.
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- Creation and/or adaptation of new course materials; and
- Adoption of the new course materials.

The proposed online learning materials will consist of seven chapters targeting the ITEC 2140 course goals. Each member will be responsible for writing one chapter. Learning materials will be either created, adopted from freely available sources, or a combination of both. Some parts will rely on material that is freely available as technical documentation from a vendor or other open resources. The chapters of the textbook will consist of the following:

1. Getting Started (Pseudo code, flow charts, computing mathematics, etc.)
2. Datatype, Variables, and Expressions
3. Conditions
4. Loops
5. Methods
6. Arrays and ArrayLists
7. Object Oriented Programming

The author of each chapter is identified below:

- Hyesung Park - Chapter 1 & 2 author, instructional designer, instructor of record
- Wei Jin - Chapter 2 author, instructional designer, instructor of record
- Na’el Abu-Halaweh - Chapter 3 author, instructional designer, instructor of record
- Sonal S. Dekhane - Chapter 4 author, instructional designer, instructor of record
- Richard W. Price - Chapter 5 author, instructional designer, instructor of record
- Robert Lutz - Chapter 6 author, instructional designer
- Tacksoo Im - Chapter 7 author, instructional designer

Some members are instructors of record for ITEC 2140 and others have taught the course in the past. All members are subject matter experts.

The actions we are planning to take are listed below in chronological order:

January-February: Evaluate current instructional material, identify existing material, and select appropriate existing material. All team members.

March-April: Write chapters of the textbook and organize appropriate OER content.

May-June: Create assignments, quizzes, exams, and other assessment materials.

July-August: Deploy textbook and organize learning management system with materials.

Starting in the Fall 2019 semester, students will not need to purchase a textbook.

Plan for providing access

The learning materials will be available on GALILEO, but it will also be hosted on Github Pages. Furthermore, in order to provide students with a convenient and easy access to the learning materials, a URL will be embedded in the Learning Management System.

To develop and write the learning materials, our team will use the tools AsciiDoc and AsciiDocFX. The team will utilize Github to coordinate writing activities.

Each member will also be responsible for creating at least six quizzes and six assignments for the chapter they are assigned. These quizzes and assignments will be short and cover the concepts elaborated on the chapter. An end-of-chapter project will be created by each member as well. There will be common assessment (midterm and final) materials, along with the learning materials. Each member will contribute eight problems for the midterm and eight problems for the final. These problems will be used as a test bank of future midterms and finals.

4. QUANTITATIVE AND QUALITATIVE MEASURES

The evaluation plan will be designed and administered by every project team member to ensure the effectiveness of the learning materials and resource materials, and to ensure that the project goals and objectives are achieved. The project principal, Dr. Park, will serve as lead in the evaluation plan.

GOAL 1: Reduce the cost of learning materials in 26 sections of ITEC 2140 (Programming Fundamentals), thereby increasing the utilization of learning materials by approximately 624 students during the life-cycle of the project.

Evaluation:

- Historical cost information of the textbook will be gathered from the bookstore and compared with the cost of the learning materials during the project life-cycle.
- Students will self-report the frequency of usage of learning materials in an end-of-semester survey.

Qualitative Measure, Methods, and Tools

- Utilize questionnaire and create open-ended questions on how the student feels about having low-cost learning materials and resources.

Quantitative Measure, Methods, and Tools

- Track number of students through the class roll and contact the bookstore for the price of the textbook in order to track the actual savings.

GOAL 2: Improve students' academic performance through low-cost open learning materials that are easy to access and well-organized.

Qualitative Measure, Methods, and Tools

- Utilize a questionnaire and create open-ended questions to find out if the students think that the materials were more accessible (if they have issues accessing it online) and interactive (e.g. videos, online exercises, online assessment). -

Quantitative Measure, Methods, and Tools

- Collect aggregate data on grades (particularly DFW), GPA, and number of students who plan to return to GGC.
- Administer student satisfaction questionnaire at the end of each semester. Survey in spring 2019 when using the same textbook as now and survey in fall 2019 when adopting ALG resources. Examples of questions are:
 - How easy is it to access the learning materials?
 - How often do you use the learning materials?
 - How easy is it to understand the learning materials?
 - How organized are the learning materials?
 - Are the provided materials sufficient for studying and reviewing?
- *Student Performance*
 - Assess by utilization of a common pool of final exam questions. Each faculty member uses the same final exam across two semesters, with one semester using the original textbook and one using the ALG resources. We will compare also the overall ITEC 2140 student performance (final exam grades, ABC rate, and DFW rates) from one semester to the other. The minimum measure of success is that student performance does not decrease. If student performance improves, it is a clear sign of success for the project.
- *Student Retention*
 - This is partially addressed by Student Performance, which is the rate of ABC (or on the contrary DFW). In addition to the rate, we would like to study the correlation between student satisfaction and performance to gain insight into the reasons for the retention. Since we have a large number of students taking ITEC 2140, statistical analysis tools or data mining tools can be used.

GOAL 3: Increase enrollment in ITEC 2150 (Intermediate Programming) in following semesters as a result of improved learning experience by adoption of the new learning materials.

Qualitative Measure, Methods, and Tools

- Create and analyze open-ended questions to find out if students plan to enroll in the next programming course; if they feel more confident about their next level programming course; and why they feel more confident.

Quantitative Measure, Methods, and Tools

- Collect aggregate data on the number of students planning to go into the next programming course; ask Yes/No questions if having access to low-cost online resources improved their skills and built up their confidence to enroll in the next level course.

GOAL 4: Improve instructional practices through the transformed curriculum.

There are several ways in evaluating instructional practices that go beyond student ratings. For this project, we will be focused on process and summative evaluation as they pertain to pedagogical transformation.

Qualitative Measure, Methods, and Tools

- Questionnaires will be administered to each team member to assess (1) success or challenges that they may have encountered in the process of developing the curriculum; (2) challenges or successes in teaching the transformed curriculum; and (3) effectiveness of the curriculum in general.
- The team will meet also to discuss the success of the overall project. The project lead will ask each member to share what worked and what did not work, and our plans moving forward to accomplish our sustainability plan.

5. TIMELINE

For implementation in the **Spring 2019 Semester**

February 25, 2019: Kickoff meeting, Middle Georgia State University.

Spring 2019

Team members will focus on identifying open educational resources appropriate for ITEC 2140 and start cataloging them in the Spring 2019 semester. Resources will be classified as reading materials, in-class activities, or out of class practice activities. In addition, team members will create quizzes for the chapters they create. Lastly, the team will create a questionnaire to evaluate the content created and used in classes.

Summer 2019

In summer 2019 semester, team members will refine and structure the material collection to make it easy to access and use. This will result in a collection of online learning materials created using AsciiDoc and AsciiDocFX Book Editor. In addition, team members will create other supporting materials such as PowerPoint slides, assignments, pool of exam questions, and two projects.

The team members will pilot the materials created in spring and summer in their summer 2019 classes. Survey data will be collected, and the first report will be submitted.

Fall 2019

In the fall, the collection and organization of material are expected to be complete. Team members will use all the materials in their classes in fall 2019 and spring 2020. Minor changes to the collection are expected to occur on a regular basis. The main content is not expected to change drastically. However, quiz and exam questions and projects are expected to change frequently to maintain the integrity of these activities. Moreover, content is expected to change as new materials get added to the open education resources or as new members are added to the teaching community at GGC.

Spring 2020

Team members will continue to use all the transformed materials in their classes in spring 2020. The team will continue to make such changes also as noted in fall 2019, and monitor student progress through quizzes and exams.

Survey data from summer 2019 and fall 2019 will be analyzed in late fall 2019, and a final report will be created for submission at the end of spring 2020.

6. BUDGET

A. **Type of Grant:** Scaling Up OER (Large Scale Transformation)

B. **Budget Request:** \$30,000

C. **Budget Justification.** Funds are requested for the following direct costs:

(a). **Personnel:** \$29,200

Project Lead, Dr. Hyesung Park, will serve as chapter author and instructional designer. She will be responsible also for teaching one section of the transformed ITEC 2140 textbook and course materials. In addition, Dr. Park will oversee the project evaluation and analysis of the survey results. She will take the lead in submitting the semester and annual reports. Total Request for compensation and fringe: \$4,171.48

Six Project Team Members, Drs. Wei Jin, Na'el Abu-Halaweh, Tacksoo Im, Sonal S. Dekhane, Richard W. Price, and Robert Lutz request \$4, 171.42 each to cover their pay and fringe. Total Request for compensation and fringe: \$25,028.52

Each project team member will be assigned a specific chapter and will serve as that chapter's author and instructional designer. In addition, each will be responsible for teaching one section of the transformed ITEC 2140 learning materials. The member will be expected to administer and collect course evaluation forms also. Finally, the member will assist in compiling the semester

and final reports; and participate in the project evaluation design, collection, and, if required, its analysis.

(b). Travel: \$800

Funds will be used for two members to attend the kick-off event. Should there be any remaining funds, we will utilize the funds to cover part of our expenses related to disseminating the project results at the SIGCSE conference in Spring 2020, for example.

(c) Total Request: \$30,000

7. SUSTAINABILITY PLAN

Our sustainability plan will include the following:

- After completion of this project, no additional costs are required.
- The learning materials will be available in D2L and will be shared among all ITEC programming course teaching faculties. We will make an announcement of its availability during the ITEC faculty discipline meetings.
- The learning materials will be updated every semester and periodically (three times per an academic year: January, May, September) by the teaching faculty.
- Any needed updates will be made based on research, publications, and feedback from faculty members and students.
- We will share the information with our library so that they can share the information with others and make the materials accessible under the Creative Commons license for public access and usage.
- The team members will disseminate information regarding the online learning materials and its impact on student learning at regional and national conferences.
- We have strong support from the dean of the School of Science and Technology (SST) to pilot and sustain the project. Moreover, two of our members (Dr. Sonal Dekhane and Dr. Robert Lutz) serve as IT chairs in SST. Their participation in and commitment to the project ensure the sustainability of our transformation efforts.

8. REFERENCES & ATTACHMENTS

1. Bennedsen, Jens and Michael Caspersen (2007). "Failure Rates in Introductory Programming." ACEC'04. Proceedings of the Australian Computers in education 2004 conference, Adelaide, Australia July 5-8, 2004. Retrieved from: <http://cs.au.dk/~mec/publications/journal/25--bulletin2007.pdf>
2. Cengage (2018, July 26). "New Survey: College Students Consider Buying Course Materials a Top Retrieved from of Financial Stress." Retrieved from: <https://news.cengage.com/corporate/new-survey-college-students-consider-buying-course-materials-a-top-Retrieved-from-of-financial-stress/>
3. Watson, Christopher and Li, Frederick W. B. (2014). "Failure rates in introductory programming revisited." Proceedings of the 2014 conference on Innovation technology in computer science education (ITiCSE '14). New York: Association for Computing Machinery, pp. 39-44. Retrieved from: <http://dro.dur.ac.uk/19223/1/19223.pdf?DDD10+d74ks0+dcs0lw>

4. Whitford, Emma (2018, July 26). "Textbook Trade-Offs." Insider Higher Ed. Retrieved from: <https://www.insidehighered.com/news/2018/07/26/students-sacrifice-meals-and-trips-home-pay-textbooks>

LETTER OF SUPPORT

(Original is provided in a separate attachment)



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To: Grant Review Committee

Affordable Learning Georgia, University System of Georgia

Re: Textbook Transformation Grant

Dear Committee,

I am pleased to write this letter to support Drs. Hyesung Park, Wei Jin, Na'el Abu-halaweh, Tacksoo Im, Sonal S. Dekhane, Richard W. Price, and Robert Lutz's application for the ALG Textbook Transformation Grant.

The proposal focuses on the creation of no-cost-to-students learning materials to replace current textbook for our IT required course Programming Fundamentals (ITEC 2140). GGC has over 1300 IT majors and all of them will take this course. This grant will help lower costs of students taking this course and will most likely increase our retention and success rates in the course.

Each project team member has been teaching ITEC 2140 and upper level programming courses for several semesters. They have the knowledge, skills and experiences needed to successfully perform the action plan and meet the obligations of the grant. If awarded the grant, I will work with them to coordinate the distribution of their award and provide necessary resources to facilitate their activities in developing the proposed learning materials.

Please let me know if you have any questions or need additional information.

A handwritten signature in black ink, appearing to read 'Thomas Mundie'.

Thomas Mundie
Dean, School of Science and Technology
Georgia Gwinnett College