Affordable Learning Georgia Textbook Transformation Grants

Final Report

To submit your Interim Final Report, go to the [Final Report submission page](http://affordablelearninggeorgia.org/site/final_report_submission) on the ALG website: http://affordablelearninggeorgia.org/site/final\_report\_submission

The interim final report submission form allows up to five files:

* This completed narrative document (required)
* Syllabus or syllabi (required)

*If multiple files, compress into one .zip folder*

* Qualitative/Quantitative Measures data files (required)

*If multiple files, compress into one .zip folder*

* Photo of your team or a class of your students for future ALG promotions (optional)

Follow the instructions on the webpage for uploading your documents. Based on receipt of this report, ALG will process the final payment for your grant. ALG will follow up in the future with post-project grantee surveys and may also request your participation in a publication, presentation, or other event.

# General Information

**Date: May 10, 2021**

**Grant Round: 17**

**Grant Number: 524**

**Institution Name(s): Georgia Gwinnett College**

**Project Lead: Hyesung Park**

**Team Members (Name, Title, Department, Institutions if different, and email address for each):** Cynthia Johnson, Sonal Dekhane, Tacksoo Im, Wei Jin, Yan Zong Ding (alphabetical order by first name)

**Course Name(s) and Course Numbers: Intermediate Programming, ITEC 2150 (Java Programming Course II)**

**Semester Project Began: Fall 2020**

**Final Semester of Implementation: Spring 2021**

**Total Number of Students Affected During Project: 525**

# Narrative

* 1. *Describe the key outcomes, whether positive, negative, or interesting, of your project. Include:*
* *Summary of your transformation experience, including challenges and accomplishments*

In this project, we created and implemented no/low-cost open textbook/materials for ITEC 2150 (Intermediate Programming Online Textbook: http://itec2150.gitlab.io/ , Exercise Questions, an Exam question bank, and Instructor Course PowerPoint Slides) with success.

As faculty, we had a more in-depth understanding of the ITEC 2150 outcomes and ensured the developed book and accompanying resources align with the course outcomes and are relevant, accessible, and engaging. Also, the development process of writing the customized textbook helped us targeting the needs of our students.

Accomplishments:

* + - It was good to be able to create a no/low-cost open textbook/material for students that benefitted them so many savings
      * Having the open textbook and instructors' resource available to faculty members and our students align with course outcomes of ITE 2150. Moreover, make these resources available to our students at no charge and on the first day of the class.
      * It is considerably reducing the cost of the class material.
    - They were having examples and exercise questions helped the students better understand the presented examples and improved the students' learning experience.
    - A major accomplishment is to compose an open textbook together with colleagues and update chapters to the best possible based on the feedback.
    - Another accomplishment is that this textbook is the sequel of the previous fundamental programming course.
    - We had a great team that came together and produced something of significant value to our students.

Challenges:

* + - Since we got granted in Summer 2020, we had to finish the first pilot version before the fall 2020 semester. However, we manage the time very well and complete the first version before Fall, so we implemented the first version in fall 2020. Then, we fully implemented it from Spring 2021. This is challenging, but we made this challenge an excellent opportunity to make the almost complete version.
    - Due to COVID 19, all class formats tuned in to an online class format from the middle of Spring 2020. We believe this caused a higher than usual DWF rate due to the disruption of class formats from Spring 2020 and many students’ family finances. This was not a situation unique to our institution during that time frame.
* *Transformative impacts on your instruction*

The textbook is well organized, so it is straightforward to teach and show the syntax and concepts, and it is interactive. It can be directly used in class (in place of PPT instructor files) and is very convenient for teaching.

* *Transformative impacts on your students and their performance*

Every student has access to the free open textbook anytime that they have Internet access. It is very convenient for learning, and they will continually use the open textbook. The benefits of using no/low-cost open textbooks/materials are invaluable both in teaching and learning.

From the survey, students’ attitudes toward the textbook are very positive because more students could access the resource we provided.

While student's perception of their ability to succeed in programming decreased, students are more motivated to attend the class.

* 1. *Describe lessons learned, including any things you would do differently next time.*

ITEC 2150. The open textbook initiatives succeed in improving access but does not guarantee the successful achievement of learning outcomes. In future work, we will continue with the open textbook initiative but we also plan to address the issue of motivation depletion in students and investigate how to form good study habits to improve the attitudinal outcomes.

# Quotes

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

* It help me understand the concepts a little better. Also, its a good way to review topics tough in class.
* Great explanations and straight to the point especially with the examples. The examples are the best part about it
* It was free and easily available

# Quantitative and Qualitative Measures

## Uniform Measurements Questions

*The following are uniform questions asked to all grant teams. Please answer these to the best of your knowledge.*

**Student Opinion of Materials**

**Was the overall student opinion about the materials used in the course positive, neutral, or negative?**

Total number of students affected in this project: 525

Chart, bar chart

Description automatically generated

This figure provides the mean pre-survey and post-survey scores for all questions and hypotheses of the textbook usage category. On average students’ preference for an online textbook increased and their usage of PowerPoint slides decreased. It is consistent with and likely a cause of the decrease in the usage of slides. The most important metrics is students’ preferences for an online textbook vs. that for a printed textbook. The result is that students’ preference for an online book over a printed book is 1.37 (4.25-2.88) in post-survey, while for pre-survey, it is 1.1 (3.93-2.83). We can see that not only the project met the students’ preference by providing the free online textbook but also students’ preference for an online textbook over a printed version increased as a result of using the online book.

**Student Learning Outcomes and Grades**

**Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?**

*Student outcomes should be described in detail in Section 3b.*

Choose One:

* \_\_\_ Positive: Higher performance outcomes measured over previous semester(s)
* \_x\_\_ Neutral: Same performance outcomes over previous semester(s)
* \_\_x\_ Negative: Lower performance outcomes over previous semester(s)

**Student Drop/Fail/Withdraw (DFW) Rates**

**Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?** Neutral toward negative

**Drop/Fail/Withdraw Rate:**

*Depending on what you and your institution can measure, this may also be known as a drop/failure rate or a withdraw/failure rate.*

20.7 % of students, out of a total 525 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **ITEC 2150** | **Sum 2019** | **Fall 2019** | **Spring 2020** | **Sum 2020** | **Fall 2020** | **Spring 2021** |
| **TOTAL** | 22 | 111 | 116 | 18 | 119 | 139 |
| **DWF** | 4 | 24 | 22 | 6 | 21 | 33 |
| **DWF RATE** | 18% | 22% | 19% | 33% | 18% | 24% |

Choose One:

* \_\_ Positive: This is a lower percentage of students with D/F/W than previous semester(s)
* \_x\_ Neutral: This is the same percentage of students with D/F/W than previous semester(s)
* \_x\_\_ Negative: This is a higher percentage of students with D/F/W than previous semester(s)

## Measures Narrative

*In this section, summarize the supporting impact data that you are submitting, including all quantitative and qualitative measures of impact on student success and experience. Include all measures as described in your proposal, along with any measures developed after the proposal submission.*

*[When submitting your final report, as noted above, you will also need to provide the separate file (or .zip with multiple files) of supporting data on the impact of your Textbook Transformation, such as surveys, analyzed data collected, etc.]*

* *Include measures such as:*
  + *DFW Rates*

Overall DFW rate was between 18 % and 24 % (overall 20.7 %)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
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Student Grade Distribution Between Summer 2019 and Spring 2021

* + *Average GPA*  
    This table shows the average of class GPA.

|  |  |  |
| --- | --- | --- |
| Semester | Average of Class GPA | Improvement Rate (%) Compare to Fall 2019 |
| Fall 2019 | 2.27 | 0.00 |
| Spring 2020 | 2.79 | An increase of 22.91 |
| Summer 2020 | 2.68 | An increase of 18.06 |
| Fall 2020 | 2.19 | A decrease of 3.52 (-3.52) |
| Spring 2021 | 2.66 | An increase of 17.18 |

Student Average of ITEC 2150 (Intermediate Programming) GPA Between Fall 2019 and Fall 2020 and Improvement Rate Since Fall 2019.

* + *Surveys, interviews, and other qualitative measures*
    - Student Pre-Post survey

In the ALG project, besides collecting aggregate data on DWF, GPA of students who took ITEC 2150, we administered a student satisfaction survey (pre-post). The survey was using the Likert scale, and questions are like "I prefer using online textbook if it is available"," I used the no-cost textbook this semester", "I was able to access the textbook easily every time I used it," etc.

* *Indicate any co-factors that might have influenced the outcomes.* 
  + - *Reduced cost of learning materials: 525 students \* $138.66 (unit price of the textbook) = $72,796.50*

# Sustainability Plan

*Describe how your project team or department will offer the materials in the course(s) in the future, including the maintenance and updating of course materials.*

The learning materials are always available in D2L and open textbook websites ([http://itec2150.gitlab.io/](http://itec2140.gitlab.io/) ) and shared among all ITEC programming course teaching faculties.

The learning materials are updated based on research, publications, and feedback from faculty members and students, and the materials will be updated periodically by the teaching faculty.

Once the learning materials are available under the Creative Commons for public access, we share our library's information.

Students who take ITEC 2150 will use the current ALG project- an open textbook. They will receive the benefit of using the open textbook.

# Future Affordable Materials Plans

*Describe any impacts or influences this project has had on your thinking about or selecting learning materials in this and other courses that you will teach in the future.*

We will continue to create the learning materials from ITEC 3150 (advanced programming).

# Future Scholarship Plans

*Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.*

Status of scholarship:

2022 Using an Open Source Textbook in Programming Class: Exploring Student Perception and Performance, SIGCSE TS 2022 (Submitted)

We will continue to publish or present our work on this project.

# Description of Photograph (optional)

*This is where a team can list the names of the people shown in this separately uploaded photograph, along with their roles, if applicable.*

