**Affordable Learning Georgia Affordable Materials Grants  
Continuous Improvement Grants Final Report**

*(or Mini-Grants, for R17 and earlier)*

# General Information

Date: **12/20/ 2021**

Grant Round: **18**

Grant Number: **M 146**

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

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

* **Anca Doloc-Mihu, Dr., Assistant Professor of Information Technology, School of Science and Technology,** [**adolocmihu@ggc.edu**](mailto:adolocmihu@ggc.edu)
* **Cengiz Gunay, Dr., Associate Professor of Information Technology, School of Science and Technology,** [**cgunay@ggc.edu**](mailto:cgunay@ggc.edu)

Project Lead:

* **Anca Doloc-Mihu, Dr., Assistant Professor of Information Technology, School of Science and Technology,** [**adolocmihu@ggc.edu**](mailto:adolocmihu@ggc.edu)

Course Name(s) and Course Numbers: **Software Development II, ITEC 3870**

Final Semester of Project: **Fall 2021**

***If applicable to your project:***

Average Number of Students Per Course Section: 17

Number of Course Sections Affected by Implementation of Revised Resources: 4

Total Number of Students Affected by Implementation of Revised Resources: 68

# Project Narrative

*Describe the course of your revision or ancillary creation project, including*

* *Summary of your project’s purpose, plan, and timeline.*

The project team had originally received Round 15 ALG funding to transform their ITEC 3870 textbook into OER materials by the end of Fall 2020. The current continuous improvement grant aimed at creating new ancillary materials to the existing OER textbook that were inspired by the student and the library staff input, accessibility improvements, and that consists of 12 hands-on workshops to drill down into the concepts and skills learned in the classroom, and of a new chapter on Programming for Software Security. The textbook aims at improving the class experience and learning of many tools and software for software development students while remaining at zero cost. The continuation of the textbook development aimed at adding hands-on workshop slides and video demonstrations for students to access, in one place, updated materials that they can use when they are developing real-world applications using a set of technologies of their choice. These workshops were to be created by students themselves, who were hired as assistants using grant funding.

The authors had planned to develop the hands-on workshops and videos, at the beginning of the grant period, during Spring and Summer 2021, and then have them used, tested, and corrected during the Fall 2021 semester in the classroom by the Software Development II students.

* *The original works which were revised or added to, with links. For example, if you revised an open textbook, give the title, author, and link.*

The original textbook is:

# **Intermediate Agile Software Development**

by Cengiz Gunay and Anca Doloc-Mihu

And it is available [here](https://soft-eng-practicum.github.io/softdev2-resources/student/). Its instructor materials are available [here](https://soft-eng-practicum.github.io/softdev2-resources/instructor/).

* *A narrative description of how the project’s plan was carried out.*

This project plan and timeline were changed from its original proposal because neither one of the authors was allocated to teach the course in Spring 2021. The following updated plan was carried out successfully:

Spring 2021: A team of 6 student assistants were hired to build hands-on workshops for the textbook. These were students from the Software Capstone Projects class who had been successful in their Software Development II course. They have built several workshops and videos described in the next section. Many of these workshops were delivered to live audiences before being video recorded.

Summer 2021: We were not able to hire any student assistants who finished their Software Development II coursework to build workshop materials during Summer 2021. Instead, this period was allocated to video editing and textbook corrections.

Fall 2021: A team of 3 student assistants were hired to build more workshops and videos from topics non-existent in the textbook. A team was formed to build up the Chapter on Programming for Software Security. Team includes the two co-PIs, Mr. Charles H. Leggett, Collaborator, GGC – Director of Information Security, Ms. Jessica Walker, Collaborator, GGC – System Administrator II, and Shaun Mitchell, ITEC Alumnus.

* *Lessons learned, including anything you would do differently next time.*

Overall, this was an extraordinary and very successful experience for the Co-PIs. There were lessons to learn. The first lesson was that students learn technology very well by seeing it hands-on during a live workshop in the class. In contrast, they struggle with new technology when it is presented to them via steps as in a typical textbook style. As nowadays there are many web resources presenting new technology, students face difficulty in identifying up-to-date and appropriate sources for their computer setup. We believe that this is the primary reason why our ancillary materials built via this grant received good feedback from students taking the ITEC 3870 class. The textbook was used during the Fall 2021 semester by Dr. Doloc-Mihu in her ITEC 3870 class. At the end of the semester, students submitted feedback evaluating the textbook and particularly the newly added workshops/videos. All of the students agreed that the no-cost textbook including hands-on workshops of working technology and programming knowledge were extremely useful to help them find and utilize the technology appropriate for their class project.

Second lesson that we learned was that students are eager to help their peers. This was particularly awesome to observe in the classroom. Workshops were developed by student assistants and then presented during a class or other public live event, where participants could ask questions, and where the presenter and the teacher could attend to individual participants to help them with technology. All participants enjoyed these events: teachers saw immediate student interest and learning, presenters enjoyed showcasing their tools and knowledge, and participants learned from doing and most importantly, they left the classroom with a working product, which became a starting point on the respective technology to help them with their class project. Another observation is that if a student assistant enjoyed a topic (PIs let them choose their own topic) then they spent many hours developing up the materials.

Three of our student assistants presented their workshops at UGA Hacks online event in Spring 2021, and the audience liked them (workshops on Website Testing with Selenium WebDriver, Angular Services, and Python for Beginners).

Unexpectedly, our students did not want to accept a student assistant job during the summer since they prefer to take classes. Summer courses are more compact than those during a regular semester and require a bigger effort in a shorter time.

It is worth to mention that we intended to build materials for usage in the Software Development II course, which requires students to use advanced technologies that they learn during the class and apply their knowledge by building an advanced app. However, students from the Capstone Projects course also benefited from the textbook, since this class is a project-based class and many of them use the technologies from our textbook in their projects.

Finally, we learned that some of the technologies are very advanced, and we resorted to limit presenting only parts of them that are most interesting to our students, while still including real-world examples.

The part we would do differently would be to try to hire the student assistants to develop all the workshops during the first semester of the grant. We would allocate the 2nd semester of the grant to editing the workshop materials and then the 3rd semester to testing it during the classroom and if necessary to adjust these materials. Also, it is very important for the PIs of a grant to have access to teach the course that the grant builds up a textbook for, which could not be guaranteed at our institution.

# Materials Description

*Describe all the materials you have created or revised as part of this project. These descriptions may be used in the* [OpenALG](https://alg.manifoldapp.org/) *repository description field. Include the* [*open license your materials will be shared under*](https://creativecommons.org/share-your-work/)*—for most materials, this will be an Attribution 4.0 License (CC BY) as required in the Grants Request for Proposals.*

**The newly created textbook materials for this project are available** [**here**](https://ggc-sd.github.io/softdev2-resources/)**.**

Materials are offered with the license: [CC BY-SA 4.0](http://creativecommons.org/licenses/by-sa/4.0/).

Materials are freely available on our [Github repository](https://github.com/GGC-SD/softdev2-resources).

Materials developed during this continuation project:

* Workshops - consists of step-by-step slides explaining the topic, how to set the technology up and then how to use it in simple example(s):
  1. JQuery. jQuery is a widely used JavaScript library that provides easy DOM and CSS manipulation, event handling, AJAX requests, animation for websites.
  2. Bootstrap. Bootstrap is a widely used CSS framework that can be used to easily and consistently style HTML elements (like buttons, cards, dropdowns, navigation bars, etc.) using CSS and (optionally) JavaScript.
  3. Git Branching and Github Pages. An intermediate workshop on Git and Github Pages tool and technology for free collaborative repositories.
  4. Angular Beginner. Angular is a new technology widely used to build web apps.
  5. Angular Services.
  6. Angular Components.
  7. Angular Routing.
  8. React for Beginners. React is a JavaScript library for building user interfaces for web as well as mobile applications.
  9. REST API with ExpressJS. REST is a technology that allows separating backend data store from frontend logic.
  10. Security of Software. Introduces some main security issues and how to deal with them when programming software apps.
  11. Docker. Docker is an OS-level virtualization software that is used to build and run isolated software environments called containers.
  12. Azure Cloud. Technology for hosting apps on the cloud.
  13. Selenium WebDriver for Beginners. Selenium is a testing tool for software applications.
  14. Python for Beginners. Introduction to Python Programming.
  15. Intermediate Python. More advanced Python commands.
* Videos for hands-on Workshops – recordings of live presentations, which includes detailed explanations of different situations and answers to audience questions:
  1. Git branching and Github Pages
  2. Angular Services
  3. React Authentication with Firebase
  4. Docker
  5. Selenium WebDriver for Beginners
* New Chapter: Programming for Software Security

# Materials Links

*If you are hosting your materials in places other than OpenALG, please provide these links in this section. Otherwise, leave blank. Note: we cannot access D2L or Canvas links.*

**The above newly created textbook materials for this project can be used** [**here**](https://ggc-sd.github.io/softdev2-resources/)**.**

Materials are freely available on our [Github repository](https://github.com/GGC-SD/softdev2-resources) via “forking”, an operation that allows anyone to make their own copy of the entire textbook that they can modify freely.

# Future 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.*

We plan to add a few more videos to the textbook soon. So far, we have collected data from only one semester (Fall 2021). We plan to collect data for another semester and then present our findings at a conference and share it with other faculty.

We also started a collaboration with Prof. Rich Halstead-Nussloch from Kennesaw State University on improving OER materials provided on Github. We are discussing strategies to build OER materials and disseminate the instructor materials on Github. We target a conference paper maybe at SIGITE to publish this work. The OER conference is another venue for presenting this work. The authors are also involved with OERcamp.global event, which is a venue for everyone in the world interested in OER materials.

* *Describe any plans to revise or add to these materials in the future.*

Our textbook is entirely hosted on Github, which is an open and free platform so there is no paid software required for using and maintaining our materials. Authors will update periodically these materials to reflect feedback from students and instructors and newly emerging topics in the SD industry. A Qualtrics survey is available for everyone to leave us their feedback about the textbook. The website will be hosted on a public platform that allows “forking”, which means instructors from our and other institutions can make their own customized versions of the materials. This way, many versions of the materials can exist and could help sustainability of the effort. If there is a need to make significant improvements to the materials or add ancillary materials, authors will apply for another ALG grant in the future.

# 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.*

Dr. Anca Doloc-Mihu, PI



Dr. Cengiz Gunay, Co-PI



Mr. Charles H. Leggett, Collaborator, GGC – Director of Information Security



Ms. Jessica Walker, Collaborator, GGC – System Administrator II



GGC, ITEC Software Development students:



Safiyullah Khan, Shaun Mitchell, Ryan Consentino

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Roberto Salas Montoya, Keyvan Shabani, Alex Abraham

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Chris Martinez, Kris Hendricks