

Affordable Learning Georgia Affordable Materials Grants Continuous Improvement Grants Final Report

(or Mini-Grants, for R17 and earlier)

General Information

Date: 12/19/2022

Grant Round: 20

Grant Number: M170

Institution Name(s): Georgia Southern University

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

Team member	Name	Email address
Team member 1	Beulah Narendrapurapu	bnarendrapurapu@georgiasouthern.edu
Team member 2	Dawn Cannon-Rech	dcannonrech@georgiasouthern.edu
Team member 3	Jeffrey Mortimore	jmortimore@georgiasouthern.edu
Team member 4	Deborah Walker	dwalker@georgiasouthern.edu
Team member 5		

Project Lead: Beulah Narendrapurapu

Course Name(s) and Course Numbers: Comprehensive General Chemistry (CHEM 1310)

Final Semester of Project: Fall 2022

If applicable to your project:

Average Number of Students Per Course Section: 148

Number of Course Sections Affected by Implementation of Revised Resources: 2

Total Number of Students Affected by Implementation of Revised Resources: 492 per year

1. Project Narrative

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

- A summary of your project's purpose, plan, and timeline.*
- 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.*
- A narrative description of how the project's plan was carried out.*
- Lessons learned, including anything you would do differently next time.*

During Summer 2019 and Fall 2019 semesters, as part of the ALG-Textbook Transformation Grant Round 14, our team has curated materials from OpenStax and other OER Chemistry textbooks and created a no-cost Libguide Textbook for Comprehensive General Chemistry (CHEM 1310) course—an introductory chemistry course for Engineering majors. The goal of this continuous improvement project was to create self-assessment multiple choice questions as ancillary materials for the chapters in the Libguide Textbook. We proposed that we will create questions for self-assessment for the chapters in the textbook and also carry out an assessment study on the learning gains made due to the ancillary materials.

We proposed that Spring 2022 will involve planning, writing and adding the self-assessment questions and use the self-assessments will be implemented in the Summer and Spring 2022 semesters. However, we needed Spring 2022 and Summer 2022 semesters to plan the assessment, create the questions and add the questions to the existing OER Libguide textbook. This was due to realizing that the Libguide tools did not support the formatting of equations or symbols that was needed. So, we used HTML code to embed all the questions. Additional time was needed to write HTML code for the purposes needed for the project and to find best ways to make the embedding process easier for the student worker.

Spring 2022 semester was used to plan the assessment part of the project. We wanted to assess the best ways to implement the self-assessment question and whether students make significant learning gains because of the implementation. We proposed that the self-assessment question will better serve students when they are accompanied by videos with embedded quizzes that test students' understanding of the topic and eliminate any misconceptions before the students are ready to work on the self-assessment questions. Also, since the LMS allows us to gather quiz data, additional self-assessment questions and video quizzes were created on Desire2Learn platform for data collection. Students will be required to complete the self-assessment quizzes and the video quizzes during the Fall 2022 semester. Student performance on the topics will be analyzed using the same Final exam that is administered during Fall 2022 semester and semesters before self-assessment implementation. IRB application was submitted, and the self-assessment questions were created by the end of the Spring 2022 semester. Some self-assessment questions were designed by the PI and some were remixed from OpenStax Chemistry 2e textbook, which was the original OER used to create our Libguide textbook.

During the Spring 2022 semester, the PI and the librarians also planned the best way to format the self-assessment questions within the Libguide and the best tools to import the self-assessments. Even though the LibWizard tool was promising, we realized that the formatting inside the LibWizard tool needed HTML coding. Moreover, the LibWizard tool did not offer flexibility for the formatting style that the PI envisioned. Therefore, it was necessary to use entirely HTML for embedding the self-assessment questions. The PI started with a standard HTML code for multiple choices template from the freecodecamp.org website and customized the code for the format we wanted.

A student worker was hired to embed the self-assessment questions into the Libguide textbook. We optimized the HTML code so that it can be easily modified by the student worker to embed the questions in the Libguide textbook. The student was trained how to use the HTML code and how to preserve the formatting of the questions and test them. Weekly meetings were held with the student to gauge the progress and help the student with any issues encountered while using the HTML code. By the end of the July 2022, 225 self-assessment questions were embedded as ancillary materials in the Libguide textbook.

In the Fall of 2022 semester, students in the CHEM 1310 sections were informed about the ancillary materials that are part of the Libguide textbook for the course and were encouraged to use them to prepare for the exams. For the PI's section, students also participated in the 5 self-assessment quizzes created on Folio for the assessment data. Due to IRB restrictions, the data could be analyzed only after the completion of the project (ie. after Fall 2022 semester). For this reason, student worker #2 could not be hired for data analysis. The assessment data will be analyzed in Spring 2023.

More time was spent in writing multiple choice questions than was expected. Instead of the initially planned 20 questions for each of the 13 chapters, we designed 25 questions in each of 9 chapters; the 9 chapters are the ones that are explicitly taught in CHEM 1310 lectures (the other 4 chapters are taught only during lab and we currently do not have self-assessment questions for these chapters). Moreover, for the first 4 chapters, feedback tailored to the answer choices was developed with the overarching goal to aid students with customized feedback. This was a necessary compromise given the time it took to create the questions and also to provide the tailored feedback. Since the creation of the self-assessment questions took significant amount of time than what was originally anticipated, in future, we think that projects that involve this order of time commitment from one personnel will be submitted for the original Textbook Transformation grant instead of the continuous improvement grant due to 2000\$ maximum per team member restriction.

2. Materials Description

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

Self-assessments were added to 9 chapters in the Libguide Textbook. Links to Chapter-1 self-assessments can be found here:

<https://georgiasouthern.libguides.com/c.php?g=943952&p=9104519>.

All other self-assessments can be found in the tabs named “Self-assessments” under each chapter. The self-assessments are under the CC BY 4.0 License as they are part of the Libguide textbook which is also under CC BY 4.0 License.

3. 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.

<https://georgiasouthern.libguides.com/chem1310>

4. 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.*
- *Describe any plans to revise or add to these materials in the future.*

The plan for the project was presented as a lightening talk at the USG Teaching and Learning Conference 2021. The work will be presented at the Scholarship of Teaching and Learning (SoTL) Commons Conference 2023 and USG Teaching and Learning Conference 2023. Data was collected in the Fall 2022 semester on learning gains made by assigning self-assessment questions supplemented by video quizzes. We plan to analyze this data in Spring 2023 and and publish any findings in SoTL related journals.

Depending on our observations about whether video quizzes help students, we anticipate adding supplementary video support at the beginning of each self-assessment topic in the future. Also, like for the first 4 chapters, we want to add feedback specific to answer choices for the other chapters in the future.