**Affordable Learning Georgia Textbook Transformation Grants**

**Final Report for Mini-Grants**

# General Information

Date: May 11, 2021

Grant Round: Round 16

Grant Number: M118

Institution Name(s): Georgia Highlands College

Team Members (Name, Title, Department, Institutions if different, and email address for each): Camille Pace, Division Chair of Business and Professional Studies and Associate Professor of Mathematics, [cpace@highlands.edu](mailto:cpace@highlands.edu); Laura Ralston, Professor of Mathematics, [lralston@highlands.edu](mailto:lralston@highlands.edu); Tara Suswal, Instructor of Mathematics, [tsuswal@highlands.edu](mailto:tsuswal@highlands.edu)

Project Lead: Initially Tara Suswal but shifted to Laura Ralston

Course Name(s) and Course Numbers: MATH 0996 Support for Elementary Statistics

Final Semester of Project: Spring 2021 (initially Fall 2020)

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

Average Number of Students Per Course Section: For Fall 2020, Georgia Highlands offered three fully web-based sections of MATH 0996 with an average of 8.3 students. In Spring 2021, Georgia Highlands offered two entire semester web-based sections and one eight-week web-based section with an average of 12.7 students.

Number of Course Sections Affected by Implementation of Revised Resources: For the academic year 2020-2021, **six** course sections were affected by the implementation.

Total Number of Students Affected by Implementation of Revised Resources: For Fall 2020, there were 25 students enrolled in MATH 0996, while in Spring 2021, there was a total of 38 students enrolled in MATH 0996. Thus, for the academic year 2020-2021, **63 students** were affected by the implementation.

# 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.*

Since 2019, the University System of Georgia has been working towards developing a viable Statistics pathway for non-STEM students. In Spring semester 2019, Georgia Highlands College volunteered to pilot teaching its Elementary Statistics, MATH 1401, course for entering freshman without prerequisites. As part of this pilot, Georgia Highlands College was charged with developing a corequisite course for Elementary Statistics, MATH 1401. The funds from mini-grant M118 were used to support the creation of MATH 0996, Corequisite for Elementary Statistics using the *OpenStax Introductory Statistics,* and other course resources to supplement current MATH 1401 Elementary Statistics course materials. As stated in the grant application, the primary objective was to design a corequisite course that is "student-centered and project-based." Unfortunately, due to unforeseen circumstances, the initial project lead could not complete the development of MATH 0996, Corequisite for Elementary Statistics. In December 2020, Laura Ralston was asked to revise and develop additional course content for MATH 0996, Corequisite for Elementary Statistics, in preparation for teaching the course during Spring semester 2021. While Mrs. Ralston did create a "student-centered" course, at least for Spring semester 2021, the course was not "project-based." Mrs. Ralston incorporated activities related to Growth Mindset and Metacognition into MATH 0996, Corequisite for Elementary Statistics. MATH 0996 was created with three different categories of student-centered materials: practice problems, discussions (required for any web-based course at Georgia Highlands), and learning or study skill strategy assignments.

The practice problems were initially created for the MATH 1401, Elementary Statistics, course, but are optional for the student to complete. These practice problems were incorporated into MATH 0996, Corequisite for Elementary Statistics, where students must complete as part of their overall course grade. Power points and accompanying videos are available to the student through MATH 1401, Elementary Statistics, course.

The significant development of the discussions and learning or study skill strategy assignments occurred during December 2020. The original works that were added to the course to supplement *OpenStax Introductory Statistics* under this grant include:

**High Impact Discussions including Growth Mindset and Metacognition:**

* Discussion #1— Students are asked to answer the following questions: what techniques have you found successful in learning the statistics vocabulary and other introductory content? With what have you struggled---time management, learning/applying vocabulary, or other content issues? Additionally, students must reply to at least two classmates' initial posts.
* Discussion #2---Students are asked to answer the following questions: As the course introduces concepts you may not have seen before, **consider how has this course is different from other Math courses you have taken in high school or college? Have you developed new ways to understand the concepts?** Additionally, students must reply to at least two classmates' initial posts.
* Discussion #3—Students are asked to answer the following: the topic of Hypothesis Testing, is often a challenging, yet important, concept in Statistics.  Hypothesis Testing is the ultimate procedure used to verify your proposed answer to a research question, much like an experiment in a Chemistry class.   Using the problem assigned based on the first letter of your last name, demonstrate how you would dissect the problem.   What roadblocks or issues do you encounter?   Think about which test you should conduct, the necessary information, stating the hypothesis, making a decision, and the final conclusion. Additionally, students must reply to at least two classmates' initial posts.

* Discussion #4—Students are asked to answer the following: You are in the homestretch of the course, please reflect on and describe what strategies or activities have helped you learn the vocabulary, concepts, and/or procedures.   What would you do differently? Additionally, students must reply to at least two classmates' initial posts.

**Learning or Study Skill Strategy Assignments including Growth Mindset and Metacognition:**

* Learning or Study Skill Strategy Assignment #1—Students are asked to create a vocabulary study plan using the following guidelines: Your vocabulary study plan should be for a 4-5 day period (Monday through Thursday, Tuesday through Saturday).  Think about what days are best for you.  Please use complete sentences to describe what you plan to do each day.   Be as detailed as possible.  The plan should be at most 1 page in length.  Please use at least size 11 font.  (I am old and have bad eyes) Consider the following as you make your plan:

1. What strategies have you used in the past to learn vocabulary? Did those strategies work well for you?

2. What strategy or strategies are you going to try this time?

3. How much time will you devote to studying vocabulary before the first test? Keep in mind that there's a lot of vocabulary in Module 1.

4. Make time in your study plan to complete the Practice Problems for MATH 0996 and Homework for MATH 1401

* Learning or Study Skill Strategy Assignment #2—Students are asked to watch a short 2-minute video on Growth Mindset, <https://youtu.be/JfdoJxPjp1k> , and then create their own personal mantra using Padlet. This is the Padlet link for Spring 2021 <https://padlet.com/lralston4/p6rupv4zvhyv10qh>
* Learning or Study Skill Strategy Assignment #3—Students are asked to watch a short video on Note-Taking Strategies and Techniques, <https://youtu.be/ryTYn12g--0> . Examples of some of the techniques created Mrs. Ralston are provided: Guided Notes, Mind Maps-Graphic Organizer, Outlining, and Mind Maps-Flowcharts. A second video that discusses scientific study tips: <https://youtu.be/C2aigfiAFDA> is included. Students are required to complete a midterm exam practice that is formatted with questions similar to those on the MATH 1401, Elementary Statistics, midterm exam.
* Learning or Study Skill Strategy Assignment #4 focuses on reading comprehension skills as we begin the discussion of one of the main statistical concepts: Hypothesis Testing. Students are provided with a variety of strategies and asked to complete a Key Words Quiz. Students struggle with translating words to the appropriate mathematical symbols.
* Learning or Study Skill Strategy Assignment #5—Students are provided with some advice and information from Dr. Saundra McGuire's Metacognition Presentation at Georgia Highlands College in Fall 2020 and from Dr. McGuire's books, "Teach Students How to Learn" and "Teach Yourself How to Learn." Students are asked to reflect on their experience in MATH 0996 by answering the following two questions:

1.  Which of the students' actions have been YOUR actions throughout the semester---students who did not do well or students who made an A?

2. What learning or study skill strategy (discussed throughout this course) do you plan to use in other courses to help you be successful?

At least for Spring semester 2021, Laura Ralston, who developed the course, was one of two instructors for the three web-based sections; therefore, no training was necessary. Camille Pace taught the other Math 0996 and did not need training due to previous work on Math 1401 and 2401. As the number of sections offered grows and additional faculty are asked to teach the course, an outline of the course format and training will be provided. In addition, Laura Ralston will serve as a point of contact for any questions or concerns about the MATH 0996 course.

A handful of students reported challenges with time management through discussions in the asynchronous web-based sections of MATH 0996. Thus, one planned revision to change the focus of the first learning or study skill strategy assignment to time management. After conducting her research, Laura Ralston developed a PowerPoint and video on Time Management to use in the next iteration of the course. <https://www.youtube.com/watch?v=AGOa1QGbVNw>

For learning or study skill strategy #3, students must complete a midterm exam practice that is formatted like the actual MATH 1401 midterm exam, using different questions. The inclusion of this requirement seemingly benefited MATH 0996 students. Laura Ralston analyzed data to compare the average midterm exam score for students who completed the midterm exam review and the average midterm exam score for students who did not meet the midterm exam review. Although dealing with a small sample, using a two-sample t-test at the 95% confidence level, the mean midterm exam score for students who completed the midterm exam practice was greater than or equal to the mean midterm exam score for students who do not complete the midterm exam practice. With this result, Laura Ralston is considering adding a midterm exam practice into the actual MATH 1401, Elementary Statistics course. Why shouldn't all students benefit, not just those in MATH 0996?

At least one student complained that the practice problems in MATH 0996 were the same as the practice problems in MATH 1401, which is true. However, the practice problems are optional in MATH 1401 and are not included in the overall course grade calculation. Students in MATH 0996 are required to complete the practice problems, and the accuracy grade is included in the overall course grade calculation.

The overall grade distribution (Table 1) showed a disconnect between the course and student success. Students are dropping out or not completing the work in the course. The course is being offered as an online course to allow for more flexibility in the format and allow them to take various Math 1401 courses since the courses are not linked. We need to find ways to engage the students who are not completing the work with early intervention and more ways to have live or virtual interactions.

Table 1: Grades for Spring 2021

|  |  |
| --- | --- |
| ***GRADES*** | ***MATH 0996 Spring 2021*** |
| ***A$*** | ***9*** |
| ***B$*** | ***4*** |
| ***C$*** | ***5*** |
| ***F or F$*** | ***14*** |
| ***W or WF*** | ***6*** |
| ***TOTAL*** | ***N=38*** |
| ***DFW RATE*** | ***52.6%*** |
| ***AVERAGE on 4.0 scale*** | ***1.813*** |
| ***Standard Deviation*** | ***1.749*** |

# Materials Description

*Describe all the materials you have created or revised as part of this project. These descriptions may be used in the* [*GALILEO Open Learning Materials*](https://oer.galileo.usg.edu/) *repository in the official description field.*

Due to the shift in grant leadership, the materials created for the course were the additional discussions and learning or study skills assignments. We hoped to complete the projects but will plan to complete them in future revisions of the course. All the new materials are found above and will be added to the libguide for Math 1401.

# Materials Links

*If you are hosting your materials in places other than GALILEO Open Learning Materials, please provide these links in this section. Otherwise, leave blank.*

Here is the link to the discussions on the Math 1401 libguide for anyone to access: <https://getlibraryhelp.highlands.edu/c.php?g=1105623&p=8368700>

Here is the link to the Learning or Study Skill Strategy Assignments on the Math 1401 libguide for anyone to access: <https://getlibraryhelp.highlands.edu/c.php?g=1105623&p=8370016>

# 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.*

At this time, the team members do not have any plans for papers, presentations, publications, or other professional activities related to this mini-grant project, other than recognition as part of the annual self-evaluation and professional development process at Georgia Highlands College.

The grade distribution has caused us to rethink ways to engage the students and redesign the course. Here are the plans for future revision:

1. Instead of practice problems, we will build interactive video quizzes for each Module as a review of the material. The video will include analyzing a real-world dataset from Kaggle, where students can watch the video and then answer questions about a similar data set. For example, Module 1 explores topics like vocabulary and qualitative analysis. The video will show these topics explained with the Kaggle data set to allow students to understand the process. In addition, the video will pause to ask students questions about the similar dataset which records grades in the gradebook. This type of quiz will allow for more interaction than just written questions.
2. The discussion and assignments will remain the same. We will build extra credit opportunities for students to have additional interaction with other students and faculty. Using office hours, faculty will help staff these learning sessions where students can ask for help throughout the semester. If a student attends one or more of these sessions, bonus points will be awarded. If a student has not participated in a session in the first few weeks, the faculty will reach out and encourage them to attend.

The team members will continue developing and revising course materials for MATH 1401, Elementary Statistics, as we strive to promote student learning and student success.