Affordable Learning Georgia Affordable Materials Grants  
Transformation Grants Final Report

*(or Textbook Transformation Grants, if R17 or earlier)*

Once you have completed this template, to submit your Final Report, go to the [Final Report submission](https://survey.zohopublic.com/zs/xTCCvG) form.

The final report submission form allows you to submit the following:

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

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

* Qualitative/Quantitative Measures data files (optional, as needed)

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

* Photo of your team or a class of your students for future ALG promotions (optional)
* Invoice for the second half of the grant’s award amount (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 16th, 2025**

**Grant Round: 25**

**Grant Number:714**

**Institution Name(s): Georgia State University**

**Project Lead: Kelvin Rozier, Senior Lecturer, Mathematics and Statistics, krozier3@gsu.edu**

**Team Members:**

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**Course Name(s) and Course Numbers:**

**Math 2211 – Calculus of One Variable I**

**Math 2212 – Calculus of One Variable II**

**Math 2215 – Multivariate Calculus**

**Semester Project Began: Summer 2024**

**Final Semester of Implementation: Spring 2025**

**Total Number of Students Affected During Project: 461**

# Narrative

* 1. *Describe the key outcomes, whether positive, negative, or interesting, of your project. Include:*
* *Summary of your transformation experience, including challenges and accomplishments*
* *Transformative impacts on your instruction*
* *Transformative impacts on your students and their performance*
  1. *Describe lessons learned, including any things you would do differently next time.*
  2. *Describe any materials you created or revised/remixed that will be shared with the public. 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.*

Instructors, students, and administration have been keenly aware of the rising cost of course materials and the impacts it may potentially have on student success. The goal of our project was to explore and select an Open Educational Resource and accompanying homework platform to address this issue and making an impact to lower the cost for the over 2000 students enrolled in Calculus I, II, and III courses at Georgia State University annually. We also sought to develop additional resource materials to aid in student learning.

Our ALG team began the process of reviewing OER text and homework platforms in the Summer of 2024. We wanted to utilize a text that was similar in readability and arrangement to the current text being used. After considering several text options, the collective decision was made to utilize OpenStax as the textbook since it provided content that aligned with our curriculum and provided continuity as students moved through the course series. Simultaneously, we sought to find a low-cost homework platform that had features that were easily used by students and faculty and was also compatible with OpenStax. We previewed a few different low-cost platforms and decided to use Lumen OHM as it already was designed with adaptations from OpenStax and cost less than $40 to purchase for our calculus students. The platform also was able to be integrated directly into our learning management system, iCollege, preventing the need for students to navigate to other sites and allowing all additional resources to be contained in one place and grades to be seamlessly imported directly into iCollege.

After selecting a text and homework platform the team began creating homework exercises for the pilot courses that were as similar as possible to the homework exercises that were used in our previous text. These homework problems came largely from the database of questions already available in Lumen OHM, however there were areas where questions were not available and/or not available in a sufficient quantity to meet the desires of our team. Some questions had to be written and coded to augment what was already available. We also embarked on the task of creating a set of introductory videos for each section of our curriculum as well as worksheets that provided notes and additional practice problems that aligned with the OpenStax text and our curriculum.

During the piloting of the materials, we were able to conclude that the materials created were useful to the students and gain insights into how to improve on the created resources. Students overwhelmingly indicated that the worksheets were useful in understanding the concepts presented in all three calculus courses, but also desired solutions to practice problems to be added. Most students also indicated that the videos were useful as well.

Students that were retaking the course commented that the way OpenStax approached the concepts helped overcoming the struggles that they had previously since the new textbook lessened the learning curve in early sections. This was more evident to us in the Calculus I course where the sections involving Derivatives as Rates of Change was introduced earlier, so students were more focused on learning the material and techniques since they related to the section rather than overcoming the hurdle of having to deal with “new” complicated derivatives for the trigonometric functions and the different derivative properties.

Students in the Calculus II courses appreciated the pace slowing down versus Calculus I and/or retakes of Calculus II since the schedule allows us to do roughly a section a day rather than about 1.5 sections that the current textbook utilized.

From a Supplemental Instruction leader – the OpenStax approach to the inverse trigonometric derivatives made more sense than the current textbook approach, some with strong backgrounds in mathematics appreciated the new text and its approach.

The greatest difficulty incurred was the time constraint. Reviewing and selecting a text and homework platform coupled with creating ancillary materials in such a short time frame proved to be challenging, particularly as some faculty also had teaching responsibilities during this time. Additionally, ensuring that content formatting and presentation were consistent as team members all have their individual styles of presenting material.

Engaging in the project with the additional materials has reinforced the importance of collaboration among colleagues and students in not only the development of resources, but the development of resources that students will readily use. While piloting the materials and homework platform in Calculus I, Calculus II and Calculus III courses, students were able to engage with the materials and provide feedback. Students’ comments regarding the resources were helpful in gauging the effectiveness of the materials created as well as where improvements needed to be made. Worksheets were provided as study aids for students to either use independently and/or as instruction material for instructor lead recitations.

Materials created will be available on the ALG Website. These materials include the notes/practice problems and brief introductory videos correlating to each section of the OpenStax text used in our curriculum. The notes were created in tandem with OpenStax and thus carry the CC BY-NC-SA 4.0 license required by OpenStax.

# Quotes

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

*“This class is hard but there are a lot of resources available to help students.”*

*“*The fact that the resources were free made me happy.”

*“*I liked the practice worksheets that were provided on iCollege. These worksheets greatly improved my performance in the class.”

# 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: \_\_461\_\_\_\_\_\_

* Positive: \_\_78\_\_\_ % of \_\_76\_\_\_\_ number of respondents
* Neutral: \_\_22\_\_\_ % of \_\_76\_\_\_\_\_ number of respondents
* Negative: \_\_0\_\_\_ % of \_\_76\_\_\_\_\_\_ number of respondents**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:

* \_**X**\_\_ Positive: Higher performance outcomes measured over previous semester(s)
* \_\_\_ Neutral: Same performance outcomes over previous semester(s)
* \_\_\_ 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?**

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

\_\_\_19.8\_\_\_\_% of students, out of a total \_\_461\_\_\_\_ students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

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

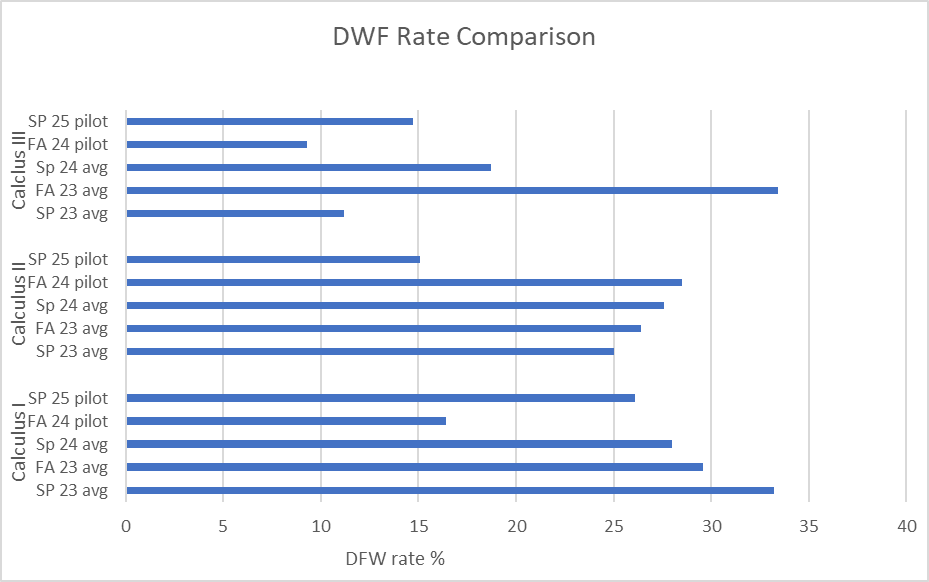
## Measures Narrative

*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:*
  + *Drop, fail, withdraw (DFW) delta rates*
  + *Course retention and completion rates*
  + *Average GPA*
  + *Pre-and post-transformation DFW comparison*
  + *Student success in learning objectives*
  + *Surveys, interviews, and other qualitative measures*
* *Indicate any co-factors that might have influenced the outcomes.*

Comparing DFW rates in the pilot courses to historical DFW rates, we observed that the DFW rate for the Fall 24 Calculus I and Calculus III courses were significantly lower than the DFW rates observed in the three semesters prior to the project (SP23, FA23, SP24). In Calculus II the DFW Rates were slightly higher than previous semesters. by 0.9 to 3.5 percentage points. In the Spring 2025 pilots, the transformation resulted in DFW rates being significantly lower than the historical data for Calculus I and Calculus II. In Calculus III, however, the transformation resulted in a lower DFW rate than Fall 2023 and Spring 2024 but did not result in a lower DFW rate than Spring 2023.



Comparison of final exam data is more difficult as final exams are written by individual instructors and may vary in scope and difficulty level for individual questions. We also note that final exam grades don’t necessarily correlate to passing the course. However, a simple comparison of average final exam grades for courses taught by individual pilot instructors compared to average final exam grades of the same instructor for final exams administered in a semester prior to the project shows a slight increase in grades ranging from 1% to 4.5%. There was one instance where the final exam grade decreased by 1.4% and notably, the Fall 2024 calculus I final exam average increased by 10%. Additionally, based on the overall reduction in DWF rates, we can confidently ascertain that general student performance in these courses did increase because of the transformation. Also, this statement is supported by the high level of student engagement in the pilot courses, which can be attributed to the lower cost of the homework platform and the free textbook used in the pilots.

For all pilot courses, the data collected supported the quantitative findings in this project. Most respondents to the midterm survey indicated that they were able to successfully engage with the content in the online environment (e.g. D2L Brightspace LMS) and the selected homework platform (e.g., Lumen Learn). Many students either Agreed or Strongly Agreed that they “Had access to the technologies needed to complete the course and links to support for those technologies”. Students also overwhelmingly agreed that they regularly engaged with the content of the course in the online environment and that their ability to engage with the content was due in large part to the ease of use on the platform selected and the low cost of the course materials. Students were particularly pleased with the no-cost textbook that was available to them and stated that they were able to readily engage with the homework platform due to the low cost of this service. This information was supported by student data collected on the mid-term surveys in the pilot courses and on the end-of-course evaluations from pilot courses. This student feedback was also consistent between both pilot semesters.

Student engagement data was collected from the D2L Brightspace platform by looking at Class Progress Reports. Additional engagement data was collected by looking at the homework completion rates from the homework platform. Missed homework assignment percentages were calculated for all pilot courses. In only one pilot course (MATH 2211, SP25) did the percentage of homework assignments not completed exceed 10% and this missed percentage was only 11%. This data supports the feedback from the students that they were able to access the homework assignments in the Lumen platform due in part to the low cost of the platform to the students. This data also supports the overall improvement in DFW rates for all courses in this project as it is known that students tend to persist in courses and be more successful in those courses when course cost is lowered. Student engagement data is also included in the files attached.

# 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 newly created materials (videos and notes/practice problems) are included in all D2L Brightspace templates used for calculus courses. Instructors teaching these courses copy the template for their individual courses and thus all materials are available to all students taking calculus and instructors teaching calculus.

With the input from students, and with further collaboration with colleagues, the worksheets will be continuously enhanced to meet student and instructor needs.

# Future Affordable Materials Plans

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

As a result of the success of the project, and the adoption of OpenStax, students taking Calculus courses at Georgia State University will have a lower cost of materials. These savings amount to a total of over $130,000 in annual savings for students. It is clear from our findings that utilizing Open Educational Resources provides a benefit to students not only financially, but also by means of being able to readily access course materials.

Our project has already had impacts within our department in that faculty teaching courses other than calculus are investigating the use of OERs for their courses. Additionally, one colleague was inspired by our project and applied for and received an ALG transformational grant.

This project impacts calculus students on the Atlanta campus of GSU, however the University is comprised of several Perimeter campuses with whom we will share our work and encourage them to adopt the lower cost materials as well.

# 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.*

The work done and data collected through this project will be further investigated and expanded to other courses. We are looking at different venues to present our findings such as the Open Education conference.