­­­Affordable Materials Grants, Round 19:

Transformation Grants

(Spring 2021-Spring 2022)

Proposal Form and Narrative

# Applicant and Team Information

|  |  |
| --- | --- |
| Requested information | Answer |
| Institution(s) | Georgia Gwinnett College |
| Applicant name | Janice Alves |
| Applicant email | [jalves@ggc.edu](mailto:jalves@ggc.edu) |
| Applicant position/title | Math Instructor |
| Submitter name | Cathy Hakes |
| Submitter email | [chakes@ggc.edu](mailto:chakes@ggc.edu) |
| Submitter position/title | Executive Director, ORSP |

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

|  |  |  |
| --- | --- | --- |
| Team member | Name | Email address |
| Team member 1 | Vinavtee Kokil | vkokil@ggc.edu |
| Team member 2 | Alvaro Ortiz | aortizlugo@ggc.edu |
| Team member 3 | Kendrick Savage | ksavage@ggc.edu |
| Team member 4 | Kelli Slaten | kslaten@ggc.edu |

If you have any more team members to add, please enter their names and email addresses in the text box below.

|  |
| --- |
| Team member 5: Jenny Kerven jkerven@ggc.edu |

# PROJECT TITLE: Quantitative Skills and Reasoning

# Project Information

|  |  |
| --- | --- |
| Requested information | Answer |
| Priority Category / Categories  *Projects in these categories will receive three extra points in the final score for fitting a priority of these particular rounds of Transformation Grants. The type of funding for the project is determined by the funding categories criteria above. As of Round 18, projects can be a part of more than one category. Note that the below categories only indicate priority, not which applications qualify for a grant. Select all that apply.* | *Priority categories:*   * *Collaborative Projects with Professional Support* |
| Requested Total Amount of Funding  *$30,000 maximum total award per grant* | *$30,000* |
| Final Semester of Project | *Spring 2022* |
| Using OpenStax Textbook?  *This is to indicate to OpenStax that they can provide additional support and resources to your team during the adoption process.* | *Yes* |

# Impact Data

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
| N/A | Course instructor: | Janice Alves |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Title: Using and Understanding Mathematics (Book and Homework platform)  Author: Jeffrey Bennett and William Briggs  Price: $135.70  Link:  <https://www.ggc.edu/student-life/student-services/bookstore/> |
| 8 | Original cost per student section enrollment  *Add up the cost of all materials in row 7.* | $135.70 |
| 9 | Average post-project cost per student section enrollment | $20 |
| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $115.70 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $10,181.60 |

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
|  | Course Instructor | Vinavtee Kokil |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Title: Using and Understanding Mathematics (Book and Homework platform)  Author: Jeffrey Bennett and William Briggs  Price: $135.70  Link:  <https://www.ggc.edu/student-life/student-services/bookstore/> |
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| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $115.70 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $10,181.60 |

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
| N/A | Course Instructor | Kendrick Savage |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Title: Using and Understanding Mathematics (Book and Homework platform)  Author: Jeffrey Bennett and William Briggs  Price: $135.70  Link:  <https://www.ggc.edu/student-life/student-services/bookstore/> |
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| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $115.70 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $10,181.60 |

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
| N/A | Course Instructor | Alvaro Ortiz |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
| 7 | Original required commercial materials  *Include each title, author, price for a new copy purchased from either your campus bookstore, the publisher, or Amazon, and a URL to the book showing the price.* | Title: Using and Understanding Mathematics (Book and Homework platform)  Author: Jeffrey Bennett and William Briggs  Price: $135.70  Link:  <https://www.ggc.edu/student-life/student-services/bookstore/> |
| 8 | Original cost per student section enrollment  *Add up the cost of all materials in row 7.* | $135.70 |
| 9 | Average post-project cost per student section enrollment | $20 |
| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $115.70 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $10,181.60 |

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
| N/A | Course Instructor | Kelli Staten |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
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| 9 | Average post-project cost per student section enrollment | $20 |
| 10 | Average post-project savings per student section enrollment  *Subtract row 9 from row 8.* | $115.70 |
| 11 | Projected total annual student savings per academic year  *Multiply row 10 and row 6.* | $10,181.60 |

## Course 1

|  |  |  |
| --- | --- | --- |
| Row # | Requested information | Answer |
| N/A | Course | Math 1001 Quantitative Reasoning |
| N/A | Course Instructor | Jenny Kerven |
| 1 | Average number of students enrolled per section | 22 |
| 2 | Average number of affected course sections scheduled in a summer semester | 0 |
| 3 | Average number of affected course sections scheduled in a fall semester | 2 |
| 4 | Average number of affected course sections scheduled in a spring semester | 2 |
| 5 | Total number of course sections scheduled in an academic year  *Add up rows 2-4.* | 4 |
| 6 | Total number of student section enrollments per academic year  *Multiply row 1 and row 5.* | 88 |
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# Narrative Section

**1. Project Goals**

* Improve student success rates in Math 1001 (Quantitative Reasoning) by creating a low-cost online textbook with a wealth of examples, exercises, and projects with real-world topics relevant to our student population. Furthermore, student engagement will improve with the in-book class activities, projects, and other active learning activities.
* Students will have access to their textbooks the first week of class, regardless of financial situations. GGC students, for multiple reasons, do not purchase their required books even though this hinders their ability to perform well at early and subsequent stages of the class, affecting overall grade scores. A study done by faculties at University of Toronto in 2015 (Michelle et al.,) showed that around three quarters of the students surveyed got better grades by referencing their textbook. Students will also have access to a variety of problems for extra practice from the textbook.
* Provide transformed materials aligning with course objectives and USG requirements while also providing a clear idea to instructors on exact course sections to teach, the depth of each topic and the pacing of topics to be covered. Utilize the freedom for editing, sharing, and changing open educational resources to construct class-tailored notes. Our book will take advantage of the instructional framework of project-based learning that instructors at our institution favor for this class.
* Research online homework and assessment platforms that will provide a low or no/cost feature for the students. This will relieve the students of the financial impact that starts the first day of class. Currently, students often purchase a temporary code for 14 days, but then are unable to pay for the code to continue the rest of the semester. Meanwhile, students get farther behind in the material and grades drop since many of the grades are taken from these platforms.

**2. Statement of Transformation**

Quantitative Skills and Reasoning (Math 1001) is a three credit class that is an optional math class for students entering into the School of Business, College of Liberal Arts, School of Education (except for middle grades majors), and School of Health Sciences. When a student is given a choice to take College Algebra (Math 1111) or Quantitative Skills and Reasoning, students tend to take Math 1001. At Georgia Gwinnett College there are approximately 1,600 students that take Math 1001 during the fall and spring semesters. The statistics show the passing rate for students in the spring 2019 was 64% and for the fall 2019 it was 66%.

The teaching of Math 1001 is not solely based on lecture and homework, but also by using class activities and projects. There are very few choices for textbooks and the current one in use at GGC is “Using and Understanding Mathematics” by Jeffrey Bennett and William Briggs, which is published by Pearson. This textbook contains 50 sections but only 22 of them (44%) are utilized by the class. Supplemental information must be sought by math faculty so that these topics can be enhanced through activities and projects. Most of the students enrolled in Math 1001 do not purchase a physical textbook, but they are required to purchase access codes to work on their homework and take assessments online. The books are embedded into these access codes but many students do not use the book and rely only on the learning aids that are built into the program. Students can purchase a book with their access code, but that comes with a higher cost. Recently, students have been given the option of purchasing an 18 week or 24 month subscription to MyMathLab when they purchase the code online. Students who have financial aid must purchase their code through the bookstore, where the code is almost 30% higher than purchasing it online. Every student has the intention of passing the class in one semester so many students purchase the least expensive code option. If a student is unsuccessful in the class, then they are paying more money because they have to purchase another code for the next semester. Although MML allows for a 14 day temporary code, some students do not purchase a code when the temporary code has expired, which tends to contribute to a failing grade in the class.

The cost for a MyMathLab code from the bookstore (includes etext) is $135.70.

The cost for a MyMathLab code and book rental from the bookstore is $174.85.

The cost for a MyMathLab code and a new book from the bookstore is $257.15.

The cost for a MyMathLab code from the Pearson site (includes etext) is $104.99 for 24 months.

The cost for a MyMathLab code from the Pearson site (includes etext) is $69.99 for 18 weeks.

Math 1001 is a very unique math class as it is intended to teach students quantitative reasoning skills, including logic, basic probability, data analysis, and modeling from data, to comprehend the world around them. Teaching students how math relates in the world can build confidence in their math abilities. Baker et al., (2004) suggested that liberal arts math courses should be designed to serve many purposes such as engaging students in positive experiences, increasing reasoning ability, strengthening math ability, and improving quantitative communication.

The focus of the math curriculum is geared towards STEM majors but we cannot overlook the students that are skilled in other areas where the need for algebra and pre-calculus are not required. Students in non-STEM majors are often quite anxious when enrolling for the required math class since they are generally not confident in their math skills. These attitudes may be a result of unfavorable past experiences with math, be it with a math teacher or a particularly difficult concept, or just a feeling of having “fallen off the wagon" and being unable to ever get back on. For many of these students, this is the last formal exposure that they will have with mathematics. As educators, this is one of the last settings that we have to expose students to the beauty of mathematics, its relevance to daily life regardless of career choice, and the joy that can be found in problem solving. The impressions and perceptions formed by students in such a terminal course in a bachelor's degree program may influence their attitude towards mathematics for the rest of their lives, and in turn, the lives of their children (Clinkenbeard, 2015).

Many students are currently facing enormous student loan debt. As the cost of tuition increases so does the cost of textbooks. Currently the student loan debt in the United States is $1.56 trillion. This can be attributed to the continued increase in tuition, fees, textbooks, room and board. A survey done by LendEDU found that 55% of students struggled to find the money to pay for college and 51% dropped out of college because of financial issues. This increases the anxiety students experience because they have loans to repay but they have not achieved their goal of obtaining their degree. Students that are unsuccessful in their coursework will have the added stress of knowing that they will have to retake a class and may carry a preconceived perception that they will not be successful.

According to the NBC New analysis of Bureau of Labor Statistics data, (as cited in Burke, 2015, para. 2), “Textbook prices increased 1,041% from January 1977 to June 2015, more than three times the rate of inflation. As student loan debt continues to rise above the $1 trillion mark, the cost of a college education and all of its trappings is becoming increasingly unaffordable.”

MarketWatch, an online periodical platform, stated textbook prices have all been going up at a much faster rate than any other consumer product. According to Mark Perry, a finance and business economics professor at the University of Michigan-Flint, (as cited in Burke, 2015, para. 3), “It’s directly tied to the fact that students get financial aid.” Rising tuition leads to more financial aid for students, and publishers know this, so they raise book prices, Perry said.

The concerns that need to be addressed to the current Math 1001 class are the following:

1. Students who are not STEM majors are required to take a math class. These students are very apprehensive because they are not confident in their math skills. Math 1001 can help restore students’ confidence by learning about topics that relate to real world experiences through activities and projects.
2. The textbook choice for Math 1001 is very limited. The book GGC currently requires uses only 44% of the information. Supplemental information is required and faculty have to search on their own for these resources.
3. The cost to purchase an access code with or without a book is very expensive. The amount of money students have to pay in tuition and books is constantly growing. Students become stressed and many withdraw from college without obtaining their degree and that debt remains with the students for years irrespective of whether or not they complete the degree.

The impact on this course and math department will be beneficial to the students who take Math 1001 and the faculty who teach it. The students will benefit because they will have a textbook that is free and available on the first day of class. The assessment platform will save the students money since it will be a no-cost or lower than $40. The faculty will benefit because they will have a textbook that aligns more closely with the USG guidelines and the resources will be available to them as they prepare for their class/es. The curriculum will also be more cohesive within the math department.

The purpose of this transformation grant has four goals to help the students and faculty at GGC:

1. Create a Math 1001 (Quantitative Skills and Reasoning) textbook that aligns with the USG requirements and GGC’s objectives for this math class. There are currently very few books that have been published for this class. *Using & Understanding Mathematics* (Bennett and Briggs 2019) with the MyMathLab homework platform from Pearson is the current material that is being used at GGC. Math 1001 is the only math class that uses this book and only 44% of the material is used in the textbook, **which means that 56% of the material is not needed to teach the required objectives but it is an expensive investment for students to take the class.** Aside from that, the book is very difficult to follow, even for the faculty. Besides, instructors have to go and look for supplemental materials to make the topics more relevant to the students. Because of these reasons, the current textbook needs to be transformed to make it relevant, engaging, and specific.

Books that may be considered for this transformation will come from a variety of resources, such as:

1. OER Commons

2. Merlot

3. Open ALG

4. Open Stax

These books include the following, but are not limited to:

A Course in Quantitative Literacy by Azar Khosravani and Mark Beintema.

Quantitative Reasoning and Skills Workbook by April Abbott, Elwanda Coston, Gary Dicks, Jan Gregus, Sheila McLendon, Amanda Urquhart.

The creation of the textbook will include examples, activities, and projects relating to real-world topics that are relevant to the majors of the student population who take this course at GGC. Students will have access to this textbook the first day of class, which will eliminate any hardships for students that are financially unable to purchase the required materials for this course.

2. Creating the materials for Math 1001 will allow the course to be aligned with the course objectives and USG requirements. Faculty who teach this class will be given a guideline on what to teach and the pacing of the topics. The ancillary materials will allow the faculty to teach the same material allowing the class to be more consistent within the math department.

3. Allow project-based learning which the math faculty support for this type of class. The activities for this class will use technology that is free, such as:

1. Desmos Teacher

2. Geogebra

3. Quizziz

4. Poll everywhere

5. Kahoots

6. Mathmatice

7. Simiode

8. EdPuzzle

These will benefit students as it will actively engage them in the learning process.

4. Research to provide the best free or low-cost homework and assessment grading system that can be aligned to the Math 1001 course objectives. Concepts learned in class must be practiced by the students and the best option is a grading system that can give immediate feedback. The main benefit for faculty is the grading is completed automatically and students do not have to wait for feedback.

1. Edfinity (maximum cost of $20/student)

2. MyOpenMath (there is no cost to students)

3. OHM (maximum cost of $25/student)

In a study by Doorn et al., (2010), they found that students reported online homework was beneficial in understanding material and preparing for exams. According to a New York Times article (Carrns, A., 2016) , “Student advocates say they worry that the proliferation of digital access codes may make it harder for students to use cost-cutting alternatives, like sharing — or even skipping the textbook purchase entirely. The move to unique digital codes essentially rules out sharing, they said, since the codes are usually attached to an individual student account and, once activated, cannot be reused.”

This ALG grant will benefit the Math 1001 students, math faculty, and GGC in several ways. By using a textbook that has been created specifically for this class, the GGC objectives will be merged with the USG requirements. The students will have no or little expense and will have access to the book on the first day of class. The math faculty will benefit since the material will be clearly defined and the activities and projects will be available to everyone in the department. With a no or low-cost assessment platform, students will be able to begin the assignments immediately and not worry about their code expiring after a 14-day window or having to repurchase a code if they are not successful in the class. Math faculty will not have to worry whether students will be able to purchase a code to continue with the class. Since this class is an activities- and projects-based class, the students will be able to relate topics to real-life situations. Though students may argue that computers and calculators can do everything for you, the Math 1001 class enables students to develop more profound thinking skills, something computers are unable to do. This class also helps students learn to analyze problems and to become critical thinkers.

A primary reason that students dropout of school is they can no longer afford the tuition and textbooks. This is very discouraging because the goal of GGC is to help fulfill students’ goals of obtaining a Bachelor’s degree and entering their career of choice. The creation of a free textbook and online assessment platform will align with GGC graduation goals and help with student retention.

This grant is only addressing the Math 1001 stand-alone class. There are two access classes (Math 0997A and 0997B) which would be candidates in future ALG grants in order to address the access portion of this class. Likewise, the optional topics can be created for all of the faculty to use, if desired.

**3. Action Plan**

Every member of the team has substantial experience teaching Math 1001. After working with many sections with the class, the shared sentiment is that the current textbook does not fully cover all the course objectives as per USG guidelines and does not go through the topics in a natural sequence that could facilitate student understanding.

The available material needed to teach Math 1001 is not very comprehensive. The team will be searching or creating these materials to fulfill the requirements of the USG system. The books to be considered to extract information include the following, but are not limited to:

1. Prealgebra by Lynn Marecek, MaryAnne Anthony-Smith, and Andrea Honeycutt Mathis in OpenStax. This book will support the review topics.
2. Math in Society by David Lippman. This textbook is supported by MyOpenMath. This book will provide information in Logic, Probability, Data Analysis, and Modeling topics.
3. Lumen OHM for Liberal Arts. These have modules that are built into the Lumen OHM system that relate the topics to real-world examples.
4. Quantitative Reasoning Workbook by April Abbott, Elwanda Coston, Gary Dicks, Jan Gregus, Sheila McLendonAmanda Urquhart. This workbook will give guidance on examples and activities relating to the topics in Logic, Probability, Data Analysis, and Modeling. This workbook is located in OpenALG.

While the transformed textbook and materials will be used in Math 1001 (3-credit hour course), they can also be used to support Math 1001/0997A (with a 2-credit hour Learning Support class) or 1001/0997B (3-credit hour Learning Support class).

Janice Alves, Math Instructor, will take on the role of team leader. She will be in charge of mapping the content so that the information will fall into a sequence. She has worked on previous grants in College Algebra and Pre-Calculus where guided notes and projects were developed for students to better understand math in the surrounding world. She has extensive experience with MyOpenMath and will research other online platforms for this class. Her main area to transform will be the review sections for this class. These topics will cover 10-20% of the semester and will include the following topics: sets and set operations, geometry, ratio and proportion, approximation, percentages, relative value and computations with formulas. She will create the review chapter, which will include explanations, exercises, activities, power points, video lecture, and a project to combine these topics together. Janice will be responsible for uploading all of the materials into D2L for the math faculty to access. The course materials will also be available in GALILEO Open Learning Materials and at the GGC’s Library Research Guides. The amount of time devoted to creating these materials will be 150 hours.

Team member: Vinavtee Kokil, Lecturer of Mathematics, has taught this course for the past few years. She is currently working on a Course-Embedded Research Experience (CURE) grant for Precalculus where students can explore real world applications of mathematical concepts in the form of a research project. She will administer consent forms and surveys and collect and analyze data. She will assist in developing course materials, exercises, activities, power point, video lectures and a project. Her main focus will be on the Probability & Fundamentals of Statistics chapter. The amount of time devoted to creating these materials will be 150 hours.

Team member: Alvaro Ortiz, Assistant Professor of Mathematics, will serve as a subject matter expert and instructional designer in the course. He has taught Quantitative Reasoning at GGC over several semesters. Dr. Ortiz has been a Project NExT Fellow and has insight into new pedagogical techniques that foster active learning. His background in applied mathematics will enhance the real-world approach to the topics in our textbook. His primary role will be to assist in the instructional design as needed and will oversee deploying the technical elements of software and web design necessary for the book implementation; he will also help develop practice problems, course materials, and projects, and will be in charge of a statistics chapter. The amount of time devoted to creating these materials will be 150+ hours.

Team member: Kendrick Savage, Assistant Professor Mathematics, will be in charge of listing quantitative and qualitative measures for outcome goals. Having benefited from teaching the Math 1001 content for a number of years he will assist in creating content and making sure it is organized and falls into sequence. He will also make sure the content has a sense of relevance and relatedness for student interest. He will assist with the creation of course materials, exercises, activities, power points, video lectures and a project, which will pertain to the Modeling chapter, concentrating on Quadratic and Exponential Models. The amount of time devoted to creating these materials will be 150 hours.

Team member: Kelli Slaten, Associate Professor of Mathematics will serve as a content expert, instructional designer, and will assist with qualitative data analysis. She will help train and disseminate the materials to the math faculty since she is part of the Math 1001 Coordinator Team. She has worked on previous grants for middle grades students and teachers in which projects were created to help participants make sense of real-world data. She will assist with the creation of course materials, exercises, activities, power points, video lectures and a project, which will pertain to the Logic chapter. The amount of time devoted to creating these materials will be 150 hours.

Team member: Jenny Kerven, Mathematics Instructor, has taught this class extensively and collects the data for the end of semester reporting. She has used various activities and projects in her class which draws the connection between math and the real world. She will help train and disseminate the materials to the math faculty since she is part of the Math 1001 Coordinator Team. Jenny will develop course materials, exercises, activities, power points, video lectures and a project. Her main focus will be on the Data Analysis chapter. The amount of time devoted to creating these materials will be 150 hours.

In addition, each team member will be responsible for proofreading every chapter and making suggestions for edits and changes. They will test each of the online assessment platforms to give feedback before a decision is made to implement one of the platforms. The team members will develop videos with narrated slide presentations in the topics of the textbook, with the aim of helping both auditory and kinesthetic learners. These videos may include assessment tools embedded, and will be complementary to our textbook. To assure that the textbook is ADA Compliant, the team will request help from Ms. Christine Robinson, digital specialist and Technical Trainer/Writer in the Office of Information Technology. The revised or newly created materials (text and guided notes, in particular) will be developed with basic accessibility standards in mind with the assistance of Ms. Robinson. For example, we will ensure that the textbook will be in compliance so that any students who have a disability, such as the textbook color and font, will be in a format that will not hinder the students learning. We will work with Ms. Robinson at the beginning of our textbook transformation so that these items will be taken into account as we start the transformation. In addition, if videos are created or used from other sources, the team will guarantee that these will include closed caption so that students with a hearing disability will be able to read the material.

In the fall 2021, each team member will teach 2 sections of Math 1001. At this time, the team will use these sections to obtain student and faculty feedback on the textbook and homework system. The editing process will be a continuing process based on the feedback of the students and faculty.

In summary, the team will devote approximately 1200 hours during the academic year (spring 2021, fall 2022, and spring 2022) to complete the planning and creation of the transformed textbook and materials. In the summer, each team member will provide an average of about 150 hours.

The Team members will be using mathematical software LaTex to produce the chapters of the book. Images will be created via the package Tikz, or we will use open source images (<https://www.oercommons.org/>). The implementation of the website will be done using PreTeXt, a framework that allows TeX language to be translated to XML. Finally, we will be using Github to maintain the book elements and to provide a repository allocation for the GGC Weblink of the text and to make it accessible to students.

**4. Quantitative and Qualitative Measures**

The team members of this Affordable Learning Grant will administer a midterm survey during fall 2021 (pilot semester) in order to collect data on student feedback and suggestions. By collecting this data, the members can determine if the project goals are being met. Additionally, the members will develop small groups of sampled students to determine what impact the no-low-cost textbook and resources are having. Summer 2021, the team members will obtain the IRB approval, ensuring compliance with institutional requirements in administering student surveys and possible interviews. The data collection aspect will take place during the pilot fall 2021 and spring 2022. Each instructor will have a control group and a treatment group. At the beginning of fall 2021, pre-survey will be sent to each class to capture their experience and effectiveness of this new textbook and their feedback will be used to update the textbook. Given the permission of the mathematics Chair, we will request to survey mathematics faculty in the spring 2022 who are teaching Math 1001 to obtain optional topics for future development and criticisms.

***Goal 1: (Student Satisfaction and Material Effectiveness)***

* Improve student success in Math 1001 (Quantitative Reasoning) by creating a low-cost online textbook with a wealth of examples, exercises, and projects with real-world topics relevant to our student population.

Students will have access to their textbooks from the first week of class, regardless of financial situations. GGC students, for multiple reasons, do not purchase their required books even though this hinders their ability to perform well at early and subsequent stages of the class, affecting overall grade scores. By providing a low or no-cost textbook, we eliminate this issue.

**Quantitative Measures, Methods, and Tools**

The team members will survey students in fall 2021 during the middle and the end of each semester in order to evaluate the effectiveness, quality, and engagement of the resources. The questionnaire scales that we use will be on a Likert type scale where students can choose from Strongly Disagree to Strongly Agree and the following main ideas:

* The materials are well organized so that all information is quickly accessible
* The guided notes are useful and engaging.
* The materials are filled with a plentiful amount of exercises and examples that fulfill the needs of the students.
* The concepts within the materials are explained very well and useful to learn the content.

**Qualitative Measures, Methods, and Tools**

The survey will also have open-ended questions, such as:

* What, specifically, did you like about the new course materials?
* What, specifically, did you not like about the new course materials?
* What suggestions do you have for improving the course materials?
* What challenges did you experience when using the new course materials?

***Goal 2: (Expand Material Usage)***

* Encourage the broader use of the low/no cost textbooks within the GGC math program. Currently, the GGC math program subscribes to several costly commercial vendor textbooks and platforms. One of the project goals is to use the success in transforming the book in a multiple-section course like Math 1001, as a motivator to continue the transformation of materials to low/no-cost options and platforms in both Math 1001, Math Support 0997A and 0997B as well other high student enrollment courses like Math 1101 Math Modeling.

**Quantitative Measures, Methods, and Tool**

The team members will collect the following data regarding materials in the course:

* Extend a survey to other instructors piloting the course materials asking for their feedback and criticisms.

**Qualitative Measures, Methods, and Tools**

* Survey instructors in fall 2021 to receive feedback concerning the material usage and the content they prefer.

***Goal 3: Clear Guidelines and Pacing***

* Provide transformed materials aligning with the course objectives and USG requirements while also providing a clear idea to instructors on what to teach at 1001 and how and options in the introduction, depth to teach, and pacing of topics to work, both for regular and access sections.

**Quantitative Measures, Methods, and Tools**

* Survey questions for instructors regarding effectiveness of introduction, depth, and pacing topics.
* Survey questions for students regarding effectiveness of introduction, depth, and pacing topics.

**Qualitative Measures, Methods, and Tools**

* Team members will conduct interviews with students about the effectiveness of topics and delivery of those topics.

***Goal 4: Instructional Framework***

* Utilize the freedom for editing, sharing, and change open educational resources to construct class tailored notes. Our book will take advantage of the instructional framework of project-based learning that instructors at our institution favor for this class.

**Quantitative Measures, Methods, and Tools**

* Survey questions to instructors regarding the difficulty to adapt materials to their specific class.
* Survey questions to instructors regarding the effectiveness of a project-based framework.

**Qualitative Measures, Methods, and Tools**

* Interviews to students regarding their viewpoint on the project-based framework.
* Student interviews on effectiveness of project-based learning.

***Goal 5: Assessment***

* To lay the assessment base for adopting free or low-cost computerized homework delivery, quiz delivery, and grading system. (WeBWork, Edfinity, etc.), further reducing costs for students.

**Quantitative Measures, Methods, and Tools**

The team members will collect the following data regarding materials in the course:

* Student homework and quiz grades. The team members will have access to how well the students are doing on homework.
* Team members will analyze the grading system to see if it is fair for students.

**Qualitative Measures, Methods, and Tools**

* Team memberswill conduct interviews with the students regarding their thoughts on the homework delivery, quiz delivery, and grading system.

***Goal 6: (Student Engagement and Success)***

* To strengthen student engagement in Math 1001 with the in-book class activities, study guides, projects, and other active learning activities.

**Quantitative Measures, Methods, and Tools**

The team members will collect the following data regarding students’ performance in the course:

1. Students will answer survey questions rating how interesting, challenging, and relevant the activities, study guides, and projects were.
2. Student grades on activities and projects. This data will be gathered from faculty teaching the class.
3. A comparative analysis of grade distribution from all sections of the course. This data will be gathered from Banner.

**Qualitative Measures, Methods, and Tools**

Some of these open-ended questions on student success will be included in the above-mentioned survey students complete at the end of the semester.

* How did the availability of a free, online textbook contribute to your success in the course? How did it contribute to your learning of the concepts addressed in the course?
* Which activities/projects/other of the textbook were most interesting?

**5. Timeline**

Each team member will pilot the new material in the fall 2021 semester and full implementation will be in spring 2022. We will secure IRB approval before starting the project.

**March - May 2021**

March 1, 2021 the final application will be submitted through the ORSP office.

March 26, 2021 from 1:00 - 4:00 pm, ALG will hold their kickoff meeting online.

April 1, 2021 there will be an initial meeting with all the team members to better align the USG guidelines and allocate the learning materials.

USG guidelines state that 20% of the class will review topics, 50 - 90% are uniform topics and 10-30% are optional topics. The six team members will divide up the review and uniform topics, leaving the optional topics for another grant. A template and outline will be discussed so that the written material will be uniform in the book. Each team member will be responsible for his/her topics and activities. The projects will be discussed and developed as a group. The team members will explore the homework and assessment platforms to decide which platform will work best with GGC students.

**Summer 2021**

Prepare most of the learning materials and finalize which platform to use. The team members will have weekly meetings to keep up with the progress of the work and make recommendations and suggestions. By August 15, 2021 the online book should be ready to go with the classes.

**Fall 2021**

Team members will pilot the materials and will work collectively to review and update the content on a monthly basis. A pre survey and post survey will be given and all this information will be collected. Students will be encouraged to give feedback as the class progresses throughout the semester.

**Spring 2022**

Full implementation of with the final updated materials will be available to all faculty teaching Math 1001, 1001/0997A and 1001/0997B at the college.

**6. Budget**

Type of Grant: Transformation grant, priority: ● Collaborative Projects with Professional Support

Amount Requested: $ 30,000

Period: Spring 2021 to Spring 2022

Justification:

**INDIVIDUAL AWARDS (Not to exceed $5,000 per team member):**

**Ms. Alves** will serve as Project Manager.Aside from directing the project and her corresponding content development part, she will lead the textbook course design, making sure we are complying with the USG alignment and identifying, gathering and mapping OER in consequence with the educational objectives. Ms. Alves will also lead the research and selection of a suitable and low-cost Online Homework System (Edfinity or MyOpenMath) and will structure and audit the creation of chapter-corresponding online assessments and activities consistent with our learning objectives by other team members.

* Summer Pay: $3,946.02
* Fringe: $1,053.98. This will cover employer’s portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and TRS 19.06% at the time of submission.

**TOTAL: $5,000**

**Ms. Kokil** will be primarily working content development, and will lead the continuous effort for editing, proofreading and re-contextualization of our textbook materials. Auditing and reviewing the structure and content of the chapters of the textbook created by other team members, and making sure the elements are ADA compliant by working closely with GGC advisors on the matter (Chris Robinson). In addition, Ms. Kokil will lead the logistic efforts necessary to accommodate for the piloting of the transformed textbook in the semesters indicated in the timeline.

* Summer Pay: $ 4,2733.53
* Fringe: $ 722.47. This will cover employer’s portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and ORP 9.24% at the time of submission.

**TOTAL: $5,000**

**Dr. Ortiz** will serve as Technology Advisor. Having experience with computer programming activities, he will support the team in the use of the LaTeX software needed to write high quality mathematical textbooks. Also in late stages of the project will be in charge of the online implementation of the book. As a secondary task, Dr. Ortiz will participate in content development, providing help at the end of section exercises and projects, blending his expertise in Applied Mathematics and Statistics for the topics that apply. In addition, he will be responsible for writing, editing, proofreading, assessment, and online homework systems of chapters as described in the action plan of the revised textbook and pilot the transformed textbook in the semesters indicated in the timeline.

* Summer Pay: $3,946.02
* Fringe: $1,053.98. This will cover the employer's portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and TRS 19.06% at the time of submission.

**TOTAL: $5,000**

**Dr. Savage** will be involved mainly in content development. His primary role will be the identification, gathering and mapping of OER resources to the course objectives. Additionally, he will be responsible for auditing curriculum materials to enhance the cultural relevance of topics and problems to aid student interest and engagement. In addition, he will be responsible for writing, editing, proofreading, assessment, and online homework systems of chapters as described in the action plan of the revised textbook and pilot the transformed textbook in the semesters indicated in the timeline.

* Summer Pay: $3,946.02
* Fringe: $1,053.98. This will cover the employer's portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and TRS 19.06% at the time of submission.

**TOTAL: $5,000**

**Dr. Slaten** will be primarily involved with developing content and designing the evaluation tools for this project. She will create the qualitative and quantitative assessment tools, obtain necessary consents, and administer surveys and collect data. She will also assist in the compilation and reporting of the data analysis. In addition, she will be responsible for writing, editing, proofreading, assessment, and online homework systems of chapters as described in the action plan of the revised textbook and pilot the transformed textbook in the semesters indicated in the timeline.

* Summer Pay: $3,946.02
* Fringe: $1,053.98. This will cover the employer's portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and TRS 19.06% at the time of submission.

**TOTAL: $5,000**

**Ms. Jenny Kerven** will be involved in content development. She will also be responsible for help in keeping the content within the guidelines of the USG description for the course. In addition, she will help in the compiling, coding and analysis from the data of our qualitative and quantitative assessment.Using her extensive experience as Math 1001 Course Coordinator, she will be responsible for the organization of materials that can be disseminated. Complementarily, she will be responsible for writing, editing, proofreading, assessment, and online homework systems of chapters as described in the action plan of the revised textbook and pilot the transformed textbook in the semesters indicated in the timeline.

* Summer Pay: $3,946.02
* Fringe: $1,053.98. This will cover the employer's portion at the rates of FICA SS 1.45%, FICA Med 6.2%, and TRS 19.06% at the time of submission.

**TOTAL: $5,000**

The digital specialist and Technical Trainer/Writer, Ms. Christine Robinson, will be assisting the project as a service to the institution, as per institutional guidelines.

**7. Sustainability Plan**

Math 1001: Quantitative Reasoning is a class that is taken for most students at GGC, as part of one of the core requirements from USG for any Georgia Students, per academic year more than 70 sections of Math 1001 are taught at GGC.

The PIs and team members plan to test the proposed open source learning materials in at least 12 of the sections taught each semester. The approval of this grant will provide enough backing to request and guarantee that the team members will be able and available to teach the sections needed for the implementation.

The result of this grant will help us create a textbook that aligns with the USG goals and will impact student achievement by eliminating textbook and software costs, increasing student engagement in and out of the classroom, and by consequence improving academic performance.

The expected positive results both in student benefits as well in the qualitative and quantitative measures will help in our future proposal to standardize these resources for future sections of MATH 1001. Dr. Savage, Dr. Slaten, Ms. Kerven and Dr. Ortiz are the current course coordinators for the class, and will use the initial data collected in this project as a basis for making a case in adopting the project materials for long-term use.

A centralized online location will allow GGC and non-GGC faculty and students to access the materials easily. The team members also see an opportunity to request and use additional mini-grant funds in the future to add emerging technologies to the curriculum and continue the development of materials for the associated Quantitative Reasoning sequence Math 0997A and 0997B, and cover optional topics than can enrich and widen the possibilities of the class instructors.

Not only do we intend to provide our own faculty with materials, as described above, we also intend to discuss and share the results of the study to the greater education community. Present our work at regional and national conferences and if possible at the International Conference on Technology in Collegiate Mathematics (ICTCM) or other ALG featured speaker series. Time permitting publishing our results to appropriate open educational resources journals, such as the International Journal of Open Educational Resources and Open Learning: The Journal of Open Education, Online and Distance Learning.

**References:**

Abbott, A., Coston, El, Dicks, G. Gregus, J. McLendon, S., Urquhart, A. (2019). Quantitative Reasoning and Skills Workbook.

htt[ps://alg.manifoldapp.org/projects/quantitative-reasoning-workbook](https://alg.manifoldapp.org/projects/quantitative-reasoning-workbook)

Azar, K., Beintema, M. (2020) A Course in Quantitative Literacy.

<https://www.oercommons.org/search?f.search=Quantitative+Skills+and+Analysis&f.general_subject=mathematics&f.sublevel=community-college-lower-division&f.alignment_standard>=

Barker, W., Bressoud, D., Epp, S., Ganter, S. Haver, B., Pollatsek, H. (2004) Undergraduate Programs and Courses in the Mathematical Science: CUPM Curriculum Guide. Mathematical Association of America.

Burke, K. (2016, August 6). *How Financial Aid is Driving Up Textbook Prices*. Market Watch. <https://www.marketwatch.com/story/400-for-a-book-why-college-textbooks-are-going-the-way-of-the-dinosaur-2015-08-05>

Carrns, Ann. (2016, September 23). A New Cost at College: Digital Access Codes. New York Times. Section B, Page 5.

Clinkenbeard, J. "Attitudes and Experiences in Liberal Arts Mathematics," *Journal of Humanistic Mathematics*, Volume 5 Issue 2 (July 2015), pages 26-50. DOI: 10.5642/jhummath.201502.04 . Available at: <http://scholarship.claremont.edu/jhm/vol5/iss2/4>

Doorn, David J.; Janssen, Susan; and O'Brien, Maureen (2010) "Student Attitudes and Approaches to Online Homework," International Journal for the Scholarship of Teaching and Learning: Vol. 4: No. 1, Article 5.

<https://edfinity.com/products/5cc61a1d1adb6652f2303e0c>

<https://ggc.bncollege.com/shop/BNCBTBListView?catalogId=10001&langId=-1&storeId=54053>

LendEDU. “College Students Are Dropping Out Without Cosigners|Survey & Report, <https://lendedu.com/blog/college-students-dropping-out-without-cosigners>.” Accessed July 3, 2020

Michelle French, Franco Taverna, Melody Neumann, Lena Paulo Kushnir, Jason Harlow, David Harrison & Ruxandra Serbanescu (2015) Textbook Use in the Sciences and Its Relation to Course Performance, College Teaching, 63:4, 171-177, DOI: [10.1080/87567555.2015.1057099](https://doi.org/10.1080/87567555.2015.1057099)

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# Letter of Support

*The Department Chair from the corresponding project, or the Department Chair’s direct report such as the Dean or Provost, must provide a signed Letter of Support for the project. This letter should acknowledge the following:*

* *The department will provide support for fund disbursement in correspondence with the Grants/Business Office.*
* *The department approves of the work on the proposal by the applicant(s).*
* *The department acknowledges the sustainability of the use of these affordable resources after the grant work is complete.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide a letter of support.*

*Please provide the name and title of the department chair (or other administrator) who provided you with the Letter of Support.*

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| --- |
| Dr. Mohamed Jamaloodeen  Chair of Faculty Mathematics |

# Grants or Business Office Letter of Acknowledgment

*Institutional Grants/Business Offices will be responsible for fund disbursement, often in correspondence with the Department Chair, including expense and travel reimbursement. Applicants will need to provide a short Letter of Acknowledgment stating that the Grants/Business Office knows about the applicant’s intent to apply for an Affordable Materials Grant. Either the Department Chair or the Project Lead can work with the Grants/Business Office to get this signed letter.*

*In the case of multi-institutional affiliations, all participants’ institutions must provide a letter of acknowledgment.*

*Please provide the name and title of the grants or business office representative who provided you with the Letter of Acknowledgment.*

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| --- |
| Cathy Hakes, Executive Director, Office of Research, Sponsored Programs and Accreditation |