

Application Details

Manage Application: ALG Textbook Transformation Grants Round Five

Award Cycle: Round 5

Internal Submission Deadline: Tuesday, December 15, 2015

Application Title: 210

Submitter First Name: Tricia

Submitter Last Name: Brown

Submitter Title: Associate Professor

Submitter Email Address: patricia.brown@armstrong.edu

Submitter Phone Number: 912-344-3244

Submitter Campus Role: Proposal Investigator (Primary or additional)

Applicant First Name: Tricia

Applicant Last Name: Brown

Co-Applicant Name(s): Joshua Lambert

Applicant Email Address: patricia.brown@armstrong.edu

Applicant Phone Number: 912-344-3244

Primary Appointment Title: Associate Professor

Institution Name(s): Armstrong State University

Team Members (Name, Title, Department, Institutions if different, and email address for each. Include the applicant in this list.):

Dr. Tricia Muldoon Brown, Associate Professor of Mathematics,
patricia.brown@armstrong.edu

Dr. Joshual Lambert, Associate Professor of Mathematics, joshua.lambert@armstrong.edu

Sponsor, (Name, Title, Department, Institution):

Dr. James Brawner, Professor and Head, Department of Mathematics

Proposal Title: 210

Course Names, Course Numbers, and Semesters Offered:

Quantitative Skills and Reasoning, MATH 1001, Spring 2016, Fall 2016, Spring 2017

Final Semester of Instruction (This is your final semester of the project): Spring 2017

Average Number of Students per Course Section: 20.2

Number of Course Sections Affected by Implementation in Academic Year: 27

Total Number of Students Affected by Implementation in Academic Year: 545

List the original course materials for students (including title, whether optional or required, & cost for each item): Using & Understanding Mathematics (w/NewMyMathLab) Edition: 6th, Required - \$227.50

Proposal Categories: Specific Top 50 Lower Division Courses

Requested Amount of Funding: \$10,800

Original per Student Cost: \$227.50

Post-Proposal Projected Student Cost: \$0

Projected Per Student Savings: \$227.50

Plan for Hosting Materials: Other

Project Goals:

The project goal is to create and adopt an open-source, multimedia textbook and online homework system for the mathematics core course, Quantitative Skills and Reasoning. This interactive textbook aims to engage students, alleviate financial burden, and promote academic success.

Statement of Transformation:

For this proposed project we intend to apply a textbook transformation to the text used by Armstrong State University in its core mathematics class for non-science majors. In a typical academic year approximately 545 Armstrong State University students take Quantitative Skills and Reasoning also known as MATH 1001. This one-semester course satisfies the essential skills mathematics requirement for non-science majors and provides core mathematics credit across the University System of Georgia. The current text, including the accompanying

MyMathLab online homework system, costs \$227.50 at the campus bookstore. While students may be able to rent a book or buy a used book at a reduced price, the online homework is non-transferable so students must always pay full price for the MyMathLab access code. Selling for \$127.50, an online access code from the bookstore is still quite expensive. At Armstrong, many of our students find the cost of textbooks a burden. In Fall 2014, 30% of the student body were nontraditional students over 24 years of age. Many of these students are already struggling to balance academic life and family obligations and the further financial pressure can have an impact on their academic achievement. Armstrong also hosts a large percentage of first-generation college students; 31% in Fall 2014. These students often come from working-class families who are unable to provide extra financial support. Anecdotally, we have had students in our classes who have failed to purchase required course materials and consequently underachieved in the classes. In these cases, the cost of a textbook can make the difference between academic success and failure.

Textbook costs and fees to access to online homework continue to grow and increase the burden upon students. While these resources are necessary to the education, the cost is not. An open-source textbook for Quantitative Skills and Reasoning would help relieve the hardship on the over 500 students taking this course each year. The economic effect will be great; even with a conservative estimate it would save Armstrong students well over \$60,000 in the first year of implementation alone. Within the department, we hope the proposal would also have a positive effect. There is some dissatisfaction with the current text and a new textbook designed specifically for the needs of the Armstrong students should produce more faculty contentment as well as a better product in the classroom.

Transformation Action Plan:

After completing an extensive search for open-source textbooks in Quantitative Skills and Reasoning from resources such as OpenStax CNX, Merlot, and the American Institute of Mathematics' Open Textbook Initiative, we recently found that no such textbook completely encompasses the learning objectives outlined by our department and the University System of Georgia. As a result, we shall create a text that adheres to the guidelines set forth by our department. Currently, such a course calls for between 70% and 90% of the material to come from sets and set operations, logic, basic probability, data analysis, and modeling from data. We shall create a textbook that not only adopts these measures as a central focus, but also embeds videos into the text so students with a visual and auditory learning style can see how the aforementioned topics are incorporated into problem solving. The videos mentioned above shall be recorded using Camtasia Studio 8 along with a wide array of mathematical software (including Mathematica, Sage, Beamer (LaTeX), etc.) and shall also be uploaded to YouTube in order to provide accessibility across multiple platforms.

Alongside the aforementioned material, there exists at most 15% of class time dedicated to review and up to 20% of class time given for special topics such as mathematics and the arts, mathematics and politics, mathematics and business, and mathematics and finance. The review material shall be created in the same vein as the uniform requirements for the course

where we shall equally divide creation of the textbook's written and video portion. However, the difference shall lie when Dr. Brown creates all of the content coinciding with mathematics and the arts and mathematics and politics, while Dr. Lambert shall focus his efforts on mathematics and business and mathematics of finance.

With academic freedom a valued practice at our institution, the provided material will be made available along with the associated TeX file, allowing instructors to include, exclude, or reorder the material in order to fit the needs of the individual. This freedom of design allows for those choosing to emphasize those different parts in the optional topics to adopt the text while making it fit the needs of their own classroom.

Upon completion of the text, we shall use the free online homework system WebWork to create a series of homework sets that coincide with the learning objectives outlined for the course. With several other instructors within the department currently teaching Quantitative Skills and Reasoning, we expect to help them implement WebWork if they so desire.

Quantitative & Qualitative Measures: With this core course stemming from the mathematics department, measuring the quantitative impact can be easily gathered and compared to previous data collection from our department for the DFW rate, final course grades, and the Quantitative Skills and Reasoning Basic Skills Exam (this assessment was created and used by our department to measure the student learning outcomes in Quantitative Skills and Reasoning). The comparisons between these sets of data shall be made using demographic data such as race, gender, traditional/non-traditional, along with a series of other quantitative data obtained prior to admittance into the institution. Our expectations coincide with an improvement in all of the aforementioned quantitative metrics, but in a worst-case scenario we would want the open-source text to result in similar results to that prior to the texts implementation.

In terms of the qualitative impact that the open-source resources have on our students, we shall seek student feedback on a variety of questions. A small sample of the questions included will be

1. Are you satisfied with the quality of the textbook for this course?
2. If implemented, are you satisfied with the quality of the online homework system for this course?
3. Are you satisfied with the quality of the videos associated with the text?
4. Do you think the text distracted from your ability to learn the required material for the course?

Alongside these aforementioned measures, we will compare the university faculty and course evaluation survey before and after the adoption of the text.

While collecting the data from students along with feedback from other faculty members, we shall listen to their needs to decide if further edits to the text will be required.

Timeline:

January 2016 - Create text for Sets and Set Operations section.

February 2016 - Create text for Logic section.

March 2016 - Create text for Basic Probability section.

April 2016 - Create text for Data Analysis section.

May 2016 - Create text for Modeling from Data section.

June 2016 - Create text for review materials.

July 2016 - Create text for optional topics.

August 2016 - Create videos for Sets and Set Operations, Logic, Basic Probability, Data Analysis, and Modeling from Data sections and incorporate those videos into the text.

September 2016 - Create videos for the review materials and optional topics sections and incorporate those videos into the text.

October 2016 - Create homework sets associated with the uniform requirements into WebWork.

November 2016 - Create homework sets associated with the review and optional topics into WebWork.

December 2016 - Submission of final report.

Spring 2017 - Implement the new text and collect data from the classes.

Budget:

The budget for this proposal is \$10,800. We are requesting \$10,000 for release time for Dr. Brown and Dr. Lambert. Each professor would receive two course releases in the Fall of 2016, each costing \$2,500 per course per professor (amounting to the total cost of \$10,000). We also request \$800 for registration and travel expenses for professors Dr. Brown and Dr. Lambert. That amount would be split evenly with \$400 for each professor to cover expenses to attend conferences or workshops that either provide a forum for presenting the results of our open-source textbook project or include programming and training directly related to the creation or implementation of our open-source textbook.

Sustainability Plan:

The adoption of the open-source text will begin in Spring 2017 for all sections of Quantitative Skills and Reasoning. During the first and subsequent semesters in which the new text is used, other members of the department will be asked for feedback and suggestions for modifications to the text. One of the advantages to an open-source textbook is that these corrections can be implemented immediately. As the textbook continues to be used we will

also continue to seek input from the mathematics faculty and make changes as necessary. As this textbook will be interactive, we will annually check links and embedded files to be sure the quality is maintained. A similar process will occur with the online homework. Finally, as the qualitative and quantitative assessments show success, we will promote the textbook for use by other University System of Georgia institutions teaching the same core course.

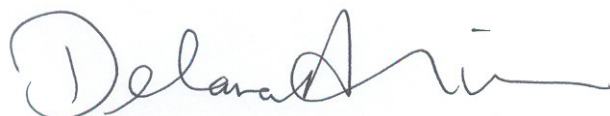
December 13, 2015

To whom it may concern,

The Office of Student Engagement and Success in Academic Affairs, wholeheartedly supports the proposal, by Drs. Brown and Lambert from the Department of Mathematics, to develop an open textbook and online homework for our calculus sequence. Funding this project will result in huge cost savings for our over 500 MATH 1001 students each year. This proposed project will have a high impact on students pursuing health professions and education degrees as those are the students who make up the majority in the Quantitative Skills and Reasoning courses. The Department faculty are interested in replacing the current text as it is not completely matched to the course content and the cost of the text and the online homework are high. The project directors will work to develop new materials for this course, as opposed to adapting other materials, due to the unique content in the course and the needs of the non-major audience. The two faculty involved in this project have a history of concern and commitment to improved student learning through their involvement in high impact pedagogy and professional development.

Armstrong is committed to the success and retention of our students. The Provost's office will assist this trailblazing campus team in any way possible and will work with the Department of Mathematics, as well as the rest of the campus, to broaden the university's adoption of open source materials wherever available. It is hoped that this team will develop a campus model that will assist other faculty and departments in their quest to develop open source material, leading to broader sustainability of the open textbook concept at Armstrong.

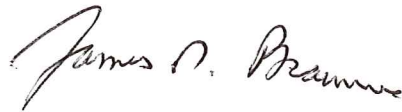
Thank you for your consideration of this proposal,



Dr. Delana A. Gajdosik-Nivens
Professor of Chemistry
Associate Provost for Student Engagement and Success
Armstrong ALG Champion

December 14, 2015

Drs. Tricia Brown and Joshua Lambert have written a proposal for a textbook transformation grant. In their proposal they will create an open-source multimedia textbook and accompanying online homework system for our Quantitative Reasoning course (MATH 1001). The text and homework system will be aligned with our student learning objectives and will be available to students at no cost. This will provide a tremendous benefit to our students, who often have to pay over \$200 for a text and the accompanying online homework system. In addition to easing the financial burden of our students, the open-source text can be fine-tuned after its initial run to meet any changes in the desired learning outcomes, and will be assessed to measure student improvement in Quantitative Reasoning. I heartily endorse this textbook transformation project.



James N. Brawner, Ph.D.
Professor and Head of Mathematics
Armstrong State University