Application Details

Manage Application: ALG Textbook Transformation Grants

Award Cycle:	Round 6
Internal Submission Deadline:	Monday, August 1, 2016

Application Title:	246
Application ID:	#001140
Submitter First Name:	Samuel
Submitter Last Name:	Cartwright
Submitter Title:	Associate Professor
Submitter Email Address:	cartwris@fvsu.edu
Submitter Phone Number:	(478) 825 6997
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Samuel
Applicant Last Name:	Cartwright
Applicant Email Address:	cartwris@fvsu.edu
Applicant Phone Number:	4788256997
Primary Appointment Title:	Associate Professor of Mathematics
Institution Name(s):	Fort Valley State University
Submission Date:	Monday, August 1, 2016

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

Dr. Patcharin T. Marion, Associate Professor of Mathematics, Department of Mathematics and Computer Science, Fort Valley State University, tragoonsirisakp@fvsu.edu

Ms. Bhavana Burell, Lecturer of Mathematics and Computer Science, Department of Mathematics and Computer Science, Fort Valley State University, burellb@fvsu.edu

Dr. Jianmin Zhu, Professor of Mathematics, Department of Mathematics and Computer Science, Fort Valley State University, zhuj@fvsu.edu

Dr. Samuel Cartwright, Associate Professor of Mathematics, Department of Mathematics and Computer Science, Fort Valley State Unversity, cartwris@fvsu.edu

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

Dr. Dawit Aberra, Ph.D., Department Chair, The Department of Mathematics and Computer Science, Fort Valley State University

Proposal Title: 246

Course Names, Course Numbers and Semesters Offered:

Calculus I (MATH 1154) Fall and Spring

Calculus II (MATH 2164) Fall and Spring

Calculus for Business and Economics (MATH 1150) Fall and Spring

Differential Equations (MATH 3233) Fall

Final Semester of Instruction:	Fall 2017
Average Number of Students per Course Section:	30
Number of Course Sections Affected by Implementation in Academic Year:	9
Total Number of Students Affected by Implementation in Academic Year:	270
List the original course materials for students (including title, whether optional or required, & cost for each item):	Briggs W. L., Cochran L. (2010). Calculus for Scientists & Engineers: Early Transcendental, Pearson. This book is packaged with MyMathLab (MML). MML is required. The cost at the bookstore to the students in $306.25 (new textbook + MML)Barnett, Ziegler, Byleen. (2015). Calculus for Business , Economics, Life Sciences, and Social Sciences, Pearson. This book is packaged with MML. MML is required. The cost at the bookstore to students is 225.50 (new textbook + MML)Dennis G Zill. (2013). A first Course in Differential Equations with Modeling Applications 10th Edition. Cengage Learning. The cost at the bookstore to students is $234.00.
Proposal Category:	No-or-Low-Cost to Students Learning Materials

Requested Amount of Funding:	$30,000
Original per Student Cost:	MATH 1154: $306.25 per student; MATH MATH 1150: $225.50 per student; MATH 2164: $306.25 per student; MATH 3233: $234 per student
Post-Proposal Projected Student Cost:	MATH 1154: $0.00 per student; MATH 1150: $0.00 per student; MATH 2164: $0.00 per student; MATH 3233: $0.00 per student
Projected Per Student Savings:	MATH 1154: $306.25 per student; MATH 1150: $225.50 per student; MATH 2164: $306.25 per student; MATH 3233: $234.00 per student
Projected Total Annual Student Savings:	$64,860

Creation and Hosting Platforms Used ("n/a" if none):

The Department of Mathematics and Computer Science Webpage
BrightSpace

Project Goals:

The primary goal of this project is to provide and maintain high quality effective no-cost learning materials to students enrolled in differential equations, calculus for business and economics as well as calculus I and calculus II in both electronic and printable format. The purpose is to explore whether the free resources will effect the performance and attitudes of these students in attaining their academic goals. Quantitative data will be compared between two groups-- the experimental group that will be provided with the free resources and the control group which had to purchase the materials. Qualitative data will be collected in the form of interviews to compare the results of both groups. This project is anticipated to impact both STEM majors enrolled in early entry level courses and differential equations, along with business majors enrolled in calculus for business and economics. We expect that the cost savings will have a positive impact on student progression and retention for a large student population at this institution.

Statement of Transformation:

The transformation from high cost materials to no-cost materials will take place over the course of several months leading to and continuing through Spring 2018. Replacing the initial materials for our students enrolled in calculus courses and differential equation courses will be a team effort. Our team will find and adapt free materials as well as create online materials to place on departmental webpage and on BrightSpace to ensure that students have access to these high quality materials.

The **stake-holders** (differential equations, calculus for business and economics, calculus I and calculus II students) come from a student population that is 88% reliant on financial aid with many not receiving a book-voucher to make the book purchase. Even with the book-voucher, students have complained in the past that it was not enough to pay for more than half their books. The **impact of this transformation on stakeholders** will be immediate.

At more affluent academic institutions, students are expected to obtain their course syllabus and start reading the first few chapters prior to the first day of class. By comparison the students that cannot afford their books are discouraged and left behind before they even start the academic semester. At the same time for the instructors this can create a sensitive issue in the teaching process which is now delayed and as a result puts a heavier burden on the later part of the semester to complete the required substantive materials for their courses. The no-cost resources will allow instant access to materials that will have taken days or weeks well into the academic semester because of the lack of finances. This transformation in turn also allows students the foundation for their pathway to success.

The **transformative impact on the course, program, department, institution** will be positive. The location and creation of materials will be selected based on course curriculum and easy student-access to resources. The program will allow students' access to course materials at the beginning of the semester. Through our team's experience, the department would benefit in the short term and long term. That is, more students will have access to course materials from day-one and would make the course more affordable otherwise because of lack of funds. In the long term, the gained experience of putting together materials will inspire and enhance faculty's ability to extending their creativity in that regard to locating and developing free materials for other departmental courses. Through the departmental website and the help of marketing and communications, the students will be informed of the awareness and accessibility of these free resources.

Transformation Action Plan:

All Mathematics faculty members are able to teach calculus for business and economics as well as both calculus I and calculus II courses; however, Dr. Marion and Dr. Cartwright have taught it for a number of years. Each team member will be active in the development and implementation of both printed and online materials needed for availability and accessibility.

Dr. Marion and Dr. Zhu, during spring 2017, will lead in the identification, review and the selection process for the open Calculus (as well as calculus for business and economics) and Differential Equations textbooks. They will also investigate any copyright issues as far as the availability of open source materials are concerned. Dr. Marion is the Calculus I and Calculus II Coordinator and Dr. Zhu is the chair of Mathematics Curriculum Committee. Dr. Marion and Dr. Zhu will find resources and bring them before the Mathematics Curriculum Committee for examination and review prior to making the selection. This will ensure that all content is vetted. Through their past experience and expertise, Dr. Marion will redesign the syllabus to be in

alignment with the calculus textbook and Dr. Zhu will redesign the syllabus to be in alignment with the Differential Equations textbook. During Spring 2017, Ms. Burell will lead the identification, review and selection process for the Calculus for Business and Economics textbooks.

Ms. Burrell, during spring 2017, will organize BrightSpace training on campus, for the team for the Summer 2017 construction of the online resources in BrightSpace. Ms. Burell redesign the syllabus to be aligned with the Calculus for Business and Economics textbook. Ms. Burell is also a Mathematics Curriculum member and will work along with Dr. Marion and Dr. Zhu in the textbook selection and review process.

Dr. Cartwright, during spring 2017, will get Institution Review Board for Human Subjects Research (IRB) approval to conduct the research examining the effectiveness of this project in meeting its goal. Dr. Cartwright will write all reports for all work completed for this project. As a member of the Mathematics Curriculum Committee he will work along with Dr. Zhu, Dr. Marion, Ms. Burell and the other committee members in the book selection process.

Summer 2017, we will work as a team in constructing all resources to be used in both respective calculus courses. That is, actively creating materials in BrightSpace: materials and activities for global use will be linked to our departmental website.

Quantitative & Qualitative Measures:	Quantitative measures such as students' grades, pre-test and post-tests will be compared to find whether the no-cost resources were effective in the performance of students. Surveys will also be given to students at the beginning and at the end of each semester to analyze information of each student's response such as age, student classification, previous mathematical background, study habits, use of resources etc. Qualitative measures such as interviews and class discussions will also be analyzed.The following are a set of specific questions for the students:1. Did the no-cost resources on Brightspace contribute to their understanding of the course materials?2. Was it easy to understand the online materials presented? Did it help with their understanding of these courses?3. Did they use any other supplemental materials other than the resources provided?4. Did they use the Openstax textbook frequently?5.Do they prefer the Openstax textbook compared to the traditional textbook?The following are a set of specific questions for the faculty teaching the course:-1. Did the pre-selected online assignments meet the needs of these courses?2. Were they able to easily create the homework assignments and lectures according to their needs as well as the needs of students?3. How does the quality of the Openstax textbook compare to the traditional textbooks for these courses?

Timeline:

January 2017 to March 2017

Open calculus I and II textbooks, Calculus for Business and Economics and Differential Equation books will be reviewed and vetted for selection. Training for D2L will be scheduled. Human Subjects Research form will be submitted for approval to examine the effectiveness of this project.

April 2017 to May 2017

Calculus I, Calculus II, Calculus for Business and Economics and Differential Equations course syllabi will be redesigned and adapted to the free textbook selected during the Spring 2017 semester.

June 2017 to July 2017

BrightSpace training and consulting will take place. After BrightSpace training as a team, and with the help of consultants, the project team will post assignments for students and have all materials aligned and ready by the end of July.

August 2017---------December 2017

Calculus I, Calculus II, Calculus for Business and Economics and Differential Equations will be piloted using the materials that were constructed and any adjustments to these materials will take place if needed to ensure that all materials for the courses are ready by Spring 2018.

January 2018 to May 2018

Calculus I, calculus II and Differential Equations will be completely ready and integrated.

Budget:

Team Members

Each of the four team members, namely Dr. Patcharin T. Marion, Ms. Bhavana Burell, Dr. Jianmin Zhu and Dr. Samuel Cartwright will be compensated as follows. Upon successful completion of the course construction in Summer 2017, a stipend of $5000 will be paid to each team member in accordance with the applicable university policies and procedures. On an ongoing basis it is understood that the monitoring and the updating of the materials will be done throughout the duration of this grant period.

Adjunct Professor

An Adjunct professor will be compensated ($2000) to cover one of the classes for one of the faculty team members during Fall Semester 2017 and Spring Semester 2018 so that the no-cost to students resource materials are maintained and project reports are created in a timely manner.

BrightSpace Support Consultant

A BrightSpace support specialist or a professor with expertise using BrightSpace will be compensated to work as a part of our support staff. He/she will provide support technical assistance to the Project Team. This will ensure that all the materials and resources will be in place and ready.

Traveling and Lodging for Training

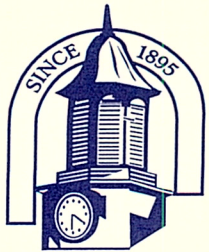Team members will set aside $800 to be used for travel expenses to attend the grant kick-off

meeting.

Item	Unit Cost	Number	Total
Faculty salary	$5,000	4	$20,000
Adjunct Professor Pay to cover Release Time	$2,000	2	$4,000
BrightSpace Support Consultant (To be determined)	$2,300	2	$4,600
Traveling and lodging for training	$800	Project Team	$800.00
Materials --paper, printing, pens etc.	$600	Project Team	$600.00
Total Cost			$30,000

Sustainability Plan:

Business Calculus, Calculus I and Calculus II courses are offered each semester throughout the year and Differential Equations is offered once a year. The department's full adoption of these transformed courses will ensure that they are reviewed annually for improvement and sustainability for students and faculty. Furthermore, future funding will be sought to enhance and improve other Mathematics courses such as Statistics and Quantitative Reasoning in order to increase the use of no-cost-to-student resources to ensure the stability and longevity of these benefits to our students' in the future.

Fort Valley State University

A State and Land-Grant University
University System of Georgia

Department of Mathematics and Computer Science

1005 State University Drive · Fort Valley, GA 31030-4313

July 7, 2016

Affordable Learning Textbook Transformation Grant
Review Committee

Dear Committee Members:

On behalf of the Department of Mathematics and Computer Science, I am pleased to support the proposal of "No Cost to Student Resources for Differential Equations, Business Calculus, Calculus 1 and II"

The Department of Mathematics and Computer Science at Fort Valley State University offers programs of study leading to the Bachelor of Science degrees, with majors in Mathematics and Computer Science. Additionally, the department offers minor concentrations in these same areas, in Applied Statistics and in Nuclear Science and Engineering. In collaboration with the school of Education, the department also offers courses leading to graduate and undergraduate degrees in Education with concentration in Mathematics. The department also participates in several 3+2 dual degree programs, in conjunction with FVSU's Cooperative Development Energy Program (CDEP). Through CDEP dual degree program, students obtain a B.S. degree in Mathematics from FVSU and a second B.S. degree in engineering, geosciences or health physics, from Georgia Tech (GT), the University of Nevada Las Vegas (UNLV), Penn State University (PSU), the University of Texas-Austin (UT-Austin), the University of Texas Pan American (UTPA), and the University of Arkansas (UARK).

Our Mathematics program, which is ranked top in the nation for producing African-American math graduates by Diverse Magazine (2015, 2014 and 2011), is well prepared to adopt the transformed courses.

We have the technology and laboratories required to facilitate student support for the on-line, free text resources. Dr. Cartwright and his team have all the qualifications and experience needed to meet the goals and objectives in the proposal. Their years of experience and expertise in the pedagogy and technology required for differential equations, calculus series courses and will ensure the success of the proposed transformation. I am excited about the potential financial savings this project would offer our students. Calculus I and Calculus II courses are offered each semester throughout the year and differential equations is offered every year. The department will review and assess these transformed courses annually and will seek funds as required to insure sustainability and improvement.

Sincerely yours,

Dawit Aberra, Ph. D., Chair
Department of Mathematics and Computer Science

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1.8 **REFERENCES & ATTACHMENTS**

References

Fischer, L., Hilton III, J., Robinson, J., & Wiley, D. (2015). A multi-institutional study of the
impact of open textbook adoption on the learning outcomes of post-secondary students. *Journal of Computing in Higher Education, 27*(3), 159-172. Retrieved November 17, 215, from
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Klymkowsky, M. (2007). Feature Point of View: Textbooks—Essential or Superfluous?
Teaching without a Textbook: Strategies to Focus Learning on Fundamental Concepts and Scientific Process. *CBE—Life Sciences Education, 6*, 190-193.
Senack, E. (2014). Fixing the Broken Textbook Market: How Students Respond to High Textbook Cost and Demand Alternatives. Center for Public Interest Research.

Attachments

1. Letter of Support