

Affordable Learning Georgia Textbook Transformation Grants Proposal Form

Institution Name(s)	Fort Valley State University				
Team Members (Name, Title, Department, Institutions if different, and email address for each)	Dr. Josephine D. Davis, Professor, Dept. Math& Comp. Sci. davisj@fvsu.edu Mrs. Bhavana Burell, Lecturer, burellb@fvsu.edu Dr. Samuel Cartwright, Assistant Prof., Dept. Math, cartwris@fvsu.edu Dr. Shadreck Chitsonga, Assistant. Prof., Dept. Math , chitsongas@fvsu.edu Dr. Ian Toppin, Director, Center for Teaching & Learning, toppini@fvsu.edu Mr. James Scott, Library Tech/Digital Support Specialist, scottj@fvsu.edu				
Sponsor, Title, Department, Institution	Dr. Dawit Aberra, Chair, Department of Mathematics and Computer Sciences, Fort Valley State University.				
Course Names, Course Numbers and Semesters Offered (Summer 2015, Fall 2015, or Spring 2016)	MATH 1113 Pre-Calculus Spring 2016 MATH 1111 College Algebra – Spring 2016				
Average Number of Students Per Course Section	25	Number of Course Sections Affected by Implementation in Academic Year 2016	College Algebra – 20 Pre-Calculus - 10	Total Number of Students Affected by Implementation in Academic Year 2016	MATH 1113 – 500 MATH 1111 – 250 TOTAL 750
Award Category (pick one)	<input checked="" type="checkbox"/> No-Cost-to-Students Learning Materials <input type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Course Pack Pilots <input type="checkbox"/> Transformations-at-Scale				
List the original course materials for students (including title, whether optional or required, & cost for each item)	Required: <i>College Algebra and Trigonometry</i> by G. Rockswold, Pearson Publisher And MyMathLab(MML)			\$ 175 \$ 120.00(when students only purchase MML separately) Total Cost \$ 175	
Plan for Hosting Materials	<input type="checkbox"/> OpenStax CNX <input checked="" type="checkbox"/> D2L <input checked="" type="checkbox"/> LibGuides <input type="checkbox"/> Other _____				
Projected Per Student Cost	\$ 175.00		Projected Per Student Savings (%)	100%	

1. PROJECT GOALS

1. To develop and adopt for use, no-cost textbooks, LibGuides, and related learning resources for pre-calculus and college algebra students at Fort Valley State University.
2. To improve students' mastery of pre-calculus and college algebra content by:
 - 2a. infusing critical thinking concepts into these on-line text resources;
 - 2b. producing videos (Video-Lecture Capture (VLC)) to provide multiple opportunities for students to master traditionally challenging topics; and
 - 2c. identifying other free, online tutorial and laboratory resources to engage students in a deeper understanding of the topics and concepts covered in these courses.
3. To provide professional development opportunities for faculty to adopt innovative pedagogies (such as the "Flipped" Classroom approach) for maximizing student learning in using these integrated technologies.

1.1 STATEMENT OF TRANSFORMATION

The Need: More than 88% of FVSU students are on financial aid. Because of limited finances, far too many students are either delayed in purchasing their pre-calculus and college algebra textbooks or, ultimately, not able to afford the purchases. These courses also have a required MyMathLab (MML) component. There is a noticeable increase in student absentee rates once the 17-day, free, MML trial period ends. Because many students are not immediately able to purchase the required MML access codes, achievement and retention rates are adversely impacted.

The Stakeholders: As the primary stakeholders, students will benefit most significantly from having ready access to no-cost, high quality text resources. Higher pass rates and student retention rates meet the university's cost-effectiveness goals. Therefore, the university stands to benefit from budget increases that are linked to higher student retention and graduation rates. Faculty, staff, parents, community and, ultimately, national stakeholders will benefit from the production of increased number of minority graduates, particularly in STEM careers.

The Transformative Impact: With access to no-cost, online resources, and focused instructional videos, student achievement and cost-savings will be sizeable. Ready access to curricular resources will enhance students' self-confidence, self-image and attitudes towards learning (Harley et al., 2003). Equipped with the proper resources, all students in the classroom will be on a level field, prepared to engage the mathematics course content in greater depth. The proposed Video Lesson Captures (VLC) will feature FVSU faculty teaching traditionally challenging topics. Flipped classroom pedagogy will be used (Bergmann, et al., 2012). Students will be able to replay these videos as often as needed outside the classroom, freeing the faculty to cover the range of prescribed content for these courses. In short, the free and open access to multimedia learning resources will transform the students' intellectual experiences in these courses from a dominant, skills-based approach to a more engaging quantitative reasoning program of study (Zupanic et al., 2002). The mathematics degree program and STEM disciplines on campus will benefit substantially in that college algebra and pre-calculus will no longer be dubbed "gatekeeping courses" to STEM careers.

1.2 TRANSFORMATION ACTION PLAN

Adoption of Course Materials: Project faculty will review for adoption the free, on-line resources and align them with departmental goals and objectives for precalculus and college algebra. Among the open-sourced materials to be reviewed are: Khan Academy tutorials; free resources from Affordable Learning Georgia; content from stitz-zeager.com/; openstaxcollege.org; and collegeopentextbook.org and laboratory exercises from the West Texas A & M virtual math laboratory. Critical Thinking Modules previously developed by the faculty will be converted to digital notes and uploaded into D2L and the library tech specialist will develop libguides supportive of topics identified by the faculty. The department will review and adopt these well-designed, multimedia courses that will be structured to enhance student learning and access (Mayer, 2001).

Course and Syllabus Redesign: Syllabi will be revised to integrate the use of free library resources and free text support. Appropriate references and links to online resources will be identified according to the outlined topics and objectives of each course. There will be links to the library libguides and other free resources placed on reserve in the library. A checklist for navigating multimedia components of the course will be added.

Activities of Team Members: **Subject matter experts**, Professors Davis, Cartwright, Burell, and Chitsonga will review online course resources, develop the course content, infuse the Critical Thinking Modules into the content and prepare the video lectures. **The Librarian** will assist in creating libguides for courses and uploading videos and digital course content into D2L. **The Director of the Center for Teaching and Learning** will assist with the Video Lecture Capture process, ensure that the courses adhere to “Quality Matters” criteria and conduct the professional development of faculty with a focus on student learning (Barker, 2003). **The Departmental Chair** will ensure the full implementation and adoption of the transformed courses by departmental faculty.

Open Access Plan: All students who are officially enrolled in college algebra and precalculus courses will automatically have access to these free resources that will be offered via D2L. This access to the transformed courses will be immediate.

1.3 QUANTITATIVE AND QUALITATIVE MEASURES

Quantitative Data – The percentage of students evidencing gains from the pre-to the post tests, on the General Education Outcomes assessments and on the common final examinations (proficiency levels of 70% or better), and the percentage scoring above the norm on the Collegiate Assessment of Academic Proficiency (CAAP) in Critical Thinking and in Mathematics will provide evidence of success. The common final examination will be used to measure students’ mastery of the course content. Course grades will provide indirect measures of achievement. An annualized 15% or better decrease in end-of-course grades at the DWF rate will be used as an indicator of this project’s success. The noted 10 (2) percentage points increase in the college algebra (pre-calculus) ABC rates from 2011 to 2012 and beyond (Fig.1) is aligned with the critical thinking transformation of these courses. Analytics from the Video Lecture Capture will be correlated with student achievement in the interest to boost success especially in pre-calculus where students experience more rigorous and complex content.

Qualitative Data – Student surveys will be conducted using Survey Monkey and clickers to ascertain how the interaction with the on-line, technology resources is affecting their learning. Focused group discussions with randomly selected students from these transformed courses will be conducted by the Director of the QEP to determine how well the free resources are being use and students’ perceptions of their value.

Figure 1 Academic Year	ABC Rates		DWF Rates	
	N (%)	N (%)	N (%)	N (%)
	Coll. Alg.	Precalulus	Coll. Alg.	Precalculus
Fall 2010 – Spring 2011	348 (48%)	218 (57%)	370 (52%)	167 (43%)
Fall 2011 – Spring 2012	302 (58%)	172 (59%)	216 (42%)	122 (41%)
Fall 2012 – Spring 2013	272 (57%)	152 (57%)	206 (43%)	117 (43%)

1.4 TIMELINE

Summer 2015 Evaluation and selection of on-line textbook and supportive resources consistent with the required goals and objectives for the course. Syllabus revision begins and content is uploaded into D2L.

Fall 2015 – Faculty development workshops on topics such as “Flipped Classroom Approach,” using the transformed course resources. Finalize content and resources in. Pilot a sample lesson. Field test the surveys.

Spring 2016 – Full implementation of the transformed courses. Collect and analyze the data.

1.5 BUDGET

<i>Item</i>	<i>Unit Cost</i>	<i>N</i>	<i>Total</i>
Faculty salary and released time for course production	\$ 5,000	4	\$ 20,000
Clerical Support @ \$ 7/hr for 80 days (4hrs ea.)	\$ 7.00	320	\$ 2,240
Travel	\$ 400	2	\$ 800
Graphic Designer	\$ 1,320	1	\$ 1,320
Faculty Workshops and conferences	\$ 140	1	\$ 140
Video Lecture Capture System	\$ 3,000	1	\$ 3,000
Supplies	\$ 500	3	\$ 1,500
TOTAL			\$ 29,000

1.6 SUSTAINABILITY PLAN

College algebra and pre-calculus are offered each semester. The department’s full adoption of these transformed courses will ensure that they are reviewed annually for improvement and sustainability. Additional funding will be sought to broaden the free text resources to the calculus series and to statistics courses.

1.7 REFERENCES & ATTACHMENTS

References

Barker, A. (2003). Faculty development for teaching online: Educational and technological issues. *The Journal of Continuing Education in Nursing*, 34(6), 273-278.

Faculty development programs are essential for cultivating faculty competency to teach on-line courses. Such programs should focus on issues of quality and student learning. All development activities should be grounded in sound educational theory and principles with a priority focus on student learning and a secondary emphasis on technology usage.

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. Eugene, OR: International Society for Technology in Education.

The flipped classroom allows students to engage collaboratively and cooperatively in the teaching/learning process. Students have open and frequent access, beyond the classroom, to instructional resources that broaden their understanding and prepare them for in-class instruction. This model places students more actively in the learning process giving them diverse, hands-on experiences that are designed to increase their communications with other students. The priority feature of this model is the shift from students simply covering the classroom materials to mastering it.

Browne, E. (2005). Structural and pedagogic changes in further and higher education: A case study approach. *Journal of Further and Higher Education*, 29(1), 49-59.

This study examines the role of learning technologies in developing faculty's use of structure and innovative pedagogies. Learning more about the parameters, interests and issues impacting the technology-centered environment, faculty members are more readily able to transition away from a heavy reliance on traditional teaching methods.

Griffin, D. K., Mitchell, D., & Thompson, S. J. (2009). Podcasting by synchronizing PowerPoint and voice: What are the pedagogical benefits? *Computers & Education*, 53, 532-539.

Students used podcasts-lectures in their private study space. While many students benefit from notes taken in class, podcast lectures serve as reinforcing tools that enhance their learning.

Harley, D., Henke, J., Lawrence, S., McMartin, F., Maher, M., Gawlik, M., et al. (2003, March). *Costs, culture, and complexity: An analysis of technology enhancements in a large lecture course at UC Berkeley*. University of California Berkeley: Center for Studies in Higher Education Retrieved from: <http://escholarship.org/uc/item/68d9t1rm>

Using educational and technological resources provide cost-effective options for students, particularly considering projected enrollment growth. The quality of pedagogy and the economic impact of using on-line teaching materials will result in significant restructuring of staff time in laboratories and lectures, as well as increase the use of instructional facilities by

more students. Access to good technological resources enhances students' performance and/or attitudes.

Mayer, R. E. (2001). *Multimedia learning*. New York: Cambridge University Press.

Well-designed and implemented multimedia instruction can significantly enhance student learning.

Mayes, J. T. & Fowler, C. J. (1999). Learning technology and usability: A framework for understanding courseware. *Interacting with Computers*, 11, 485–497.

Learning goals, activities, assessments, and learner characteristics should be aligned with and adapted to the course content. Student feedback should drive the learning model. Factors such as: the presentation of design- whether audio or visual; the ease of navigation of the technology; and user accessibility and usability should accommodate students with different learning backgrounds.

Zupancic, B., & Horz, H. (2002). Lecture recording and its use in a traditional university course. *Proceedings of the 7th Annual Conference on Innovation and Technology in Computer Science Education*. New York: ACM Retrieved.

Live lecture recordings provide audio and video with slides over the web is very popular. The Authoring on the Fly system (AOF), which has been used in many different courses over the past years, allows us to automatically produce a multimedia document with an HTML overview. It was found that lecture recordings are a good supplement to course instruction, but should not replace it.

Support Letters (Attached)



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

December 4, 2014

Affordable Learning Textbook Transformation Grant Review Committee

Dear Committee Members:

Smaller colleges, community colleges, and Historically Black Colleges and Universities are often the primary vehicles for the professional growth and development of many first generation minority populations. Central to their educational advancement is the development of mathematical competency, given the intellectual, critical thinking and quantitative reasoning skills exacted of 21st Century careers. It is, therefore, important for faculty in departments of mathematics to identify and implement better ways of engaging these students in the content depth of mathematics. Such proficiency is an essential part of their professional growth and development. I am, therefore, pleased to lend my full support of this proposal to transform our department's college algebra and pre-calculus courses so that more deserving, but financially challenged students will be able to realize their educational aspirations. This proposal has significant intellectual merits owing to its innovative plan of action, the diverse academic team of professionals who will be engaged in its implementation, and the proven competency of the mathematics team, led by Professor Josephine D. Davis, to accomplish the project goals as stated.

Dr. Davis and her team successfully transformed our pre-calculus course by developing and infusing critical thinking modules pursuant to the university's Quality Enhancement Plan (QEP) for SACS accreditation. Students have subsequently shown significant gains on the Collegiate Assessment of Academic Proficiency (CAAP) in Critical Thinking and in course pass rates. This level of content expertise, access to the department's smart technology classrooms and campus computer laboratories will facilitate students' access to the on-line, free text resources. That the department approves the adoption of this project guarantees sustainability of the proposed initiative. I am excited about the potential financial savings this project will offer our students and the potential it holds for increasing the number of STEM majors.

The Fort Valley State University's Mathematics Degree Program was recently ranked by *Diverse Magazine* (2014 and 2011) as top in the nation for producing high numbers of African-American graduates. We believe that our productivity would be even more competitive were we able to offer free, on-line text resources to the number of entering freshmen, aspiring STEM majors, who are unable to pass college algebra and pre-calculus courses due to the lack of resources to purchase their textbooks and MyMathLab codes. This project answers our needs for change.

Sincerely yours,

Dawit Aberra, Ph. D.

Chair, Department of Mathematics and Computer Science



Fort Valley State University
Center for Teaching & Learning (CTL)
303 Hunt Memorial Library

Dear Dr. Davis,

I applaud your efforts and those of your colleagues in the Math Department in submitting a proposal for the Textbook Transformation Category-4 Grant, sponsored by the Affordable Learning Georgia (ALG) office of the University System of Georgia (USG). As the ALG campus champion for FVSU, and having worked with you for a few years now, I am aware of your efforts to implement strategies to make learning more affordable for our students without compromising the quality of instruction they receive. You have been responding to the struggles of our students to keep up with rising cost of class materials while financial resources continued to be severely limited. Therefore, this grant will provide added resources for you to advance what has already been a passion.

As Director for the Center for Teaching and Learning (CTL), I pledge our support in any way we can. We will provide ongoing training in effective pedagogies relating to implementing contextual learning strategies in order to make instruction relevant and interesting to students. We believe that students demonstrate greater interest in courses when they value them as having present or future relevance to their lives. The CTL will also provide training in effective strategies for implementing a Video Lecture Capture (VLC) System in the classroom, and for extracting data from the VLC, which would provide information about its effectiveness in impacting student performance.

We hope your proposal will result in a successfully funded project, and we look forward to working with you to implement those things which will lead to greater student success.

Sincerely,

Ian Toppin, Ed.D.
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Fort Valley State University

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LIBRARY**

1005 State University Drive - Fort Valley, Georgia 31030-3298

December 5, 2014

**Affordable Learning Transformation Textbook Grant
Grant Review Committee**

Dear Committee Members:

The implementation of the open electronic resources to reduce textbook and other cost benefits to students is a laudable undertaking. This USG initiative to reduce the cost of education across the system will allow for adoption of text books with ease.

The Hunt Library supports this proposal to provide free online course resources and textbooks, being offered by the Department of Mathematics and Computer Sciences. Mr. James Scott, the Library Technology and Digital Support Specialist, will be assisting with this project to support and facilitate the attainment of the following stated goals:

" 2b. Producing and using videos (Video-Lecture Capture (VLC)) to provide multiple opportunities for students to master traditionally challenging topics within these courses and

2c. Identifying other on-line tutorial and support resources to engage students in a deeper understanding of the topics and concepts covered in these courses."

The library has received topics of interest from the mathematics faculty for which students need a broader range of resources to advance their understanding and mastery. The college algebra and pre-calculus courses will have online course environments in D2L. Mr. Scott and staff will assist faculty to identify digital math course content from the textbook publishers and other resources and uploading them into D2L.

The library will also work collaboratively with personnel from the Center for Faculty Development who will use the Video Lecture Capture System to produce faculty videos.

We believe that this proposal will make a significant impact in providing students access to a successful learning experience in mathematics.

If you have any questions or need further clarification, please let me know. I can be reached at 478-825-6342 or by email at mahitabf@fvsu.edu.

Sincerely,

Frank Mahitab
Director of Library Services