

Affordable Learning Georgia Textbook Transformation Grants (Round 2)

Institution Name(s)	Albany State University				
Team Members (Name, Title, Department, Institutions if different, and email address for each)	Wanjun Hu, Professor of Math/CS, Department of Math &CS, Albany State University, Wanjun.hu@asurams.edu Li Feng, Professor of Math, Department of Math & CS, Albany State University, li.feng@asurams.edu				
Sponsor, Title, Department, Institution	Seyed Roosta, Department of Math and Computer Science, Albany State University				
Course Names, Course Numbers and Semesters Offered (Summer 2015, Fall 2015, or Spring 2016)	MATH 1113, Pre-calculus, Summer 2015, Fall 2015, Spring 2016.				
Average Number of Students Per Course Section	35	Number of Course Sections Affected by Implementation in Academic Year 2016	10	Total Number of Students Affected by Implementation in Academic Year 2016	350
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)	<i>Precalculus by Larson, 8th edition, Brooks/Cole, Cengage Learning, required</i>		\$228 Total Cost		
Plan for Hosting Materials	<input type="checkbox"/> OpenStax CNX <input checked="" type="checkbox"/> D2L <input type="checkbox"/> LibGuides <input type="checkbox"/> Other <hr style="border: 0; border-top: 1px solid black; margin-top: 5px;"/>				
Projected Per Student Cost	\$10	Projected Per Student Savings (%)	100%		

1. PROJECT GOALS

The proposed project will re-design the learning modules in association with the online textbook from OpenStaxCollege.com. At the meantime, a separate pamphlet of concepts, skills and list of problem types will be created as a useful study guide for students. That pamphlet will be around 60 pages. Students can print it by themselves at a cost of \$10.

1.1 STATEMENT OF TRANSFORMATION

Pre-calculus at Albany State University is required for all science majors. Each semester, four section of pre-calculus are offered, with a total of about 120 students. However, majority of students do not purchase textbooks, which, combined with other factors, results in a very high failing rate at about 40%. Because of the hierarchy of course preparations in science degree programs, high failing rate in this course also contributes to low retention and graduation rate (about 65%) in Math and Science majors. Recently, the department of math and computer science negotiated a tailored version of textbook with Cengage. However that requires students to register with WebAssign, which does not reduce the total cost for students. For instance, students need pay \$75 for an ebook plus the extra cost for accessing the WebAssign.

Both proposers received their college education in China in 1980s, where a totally different education system was prevailing. In that system, textbooks are usually thin and inexpensive. Textbook contents are very succinct, usually in less than 100 pages. Organization of course materials flows as learning modules. Both proposers also have extensive experience in teaching in American education system. Textbooks in that system are very thick, usually in 400 pages or more. They are very costly. Textbook contents are very extensive. These two different types of textbooks are very complementary to each other. We feel a good combination of both can be a solution to textbook problem.

Our approach will use free online textbook and a pamphlet to reduce the textbook cost. We will use the free OpenStax College textbook of pre-calculus and align required course work with chapters in that (American style) book. Meanwhile, a printable (Chinese style) pamphlet of the basic concepts, important formulas, problem types and problem-solving techniques will be developed. Students can use the pamphlet as a reference book or as a handy study guide for tests and exams. The pamphlet will be freely available in D2L. If a student chooses to print out a hard copy, he or she may print it in less than \$10.00.

The transformation will produce several benefits: (1) reduce the cost of textbook to less than \$10; (2) establish a better connection of lecture contents, test materials and students' preparation; (3) easy instructor's burden on closing the gap between teaching and students' learning; (4) potentially improve the passing rate and retention rate in the STEM (Science, Technology, Engineering and Mathematics) programs.

1.2 TRANSFORMATION ACTION PLAN

OpenStatCollege textbook adoption: All course contents for MATH 1113 Pre-Calculus required at ASU can be found in an online free textbook at OpenStax College. For this project, we will separate that textbook into several small files. Each file will cover one topic and it will be provided in our D2L as part of a learning module.

Supplemental Pamphlet: A mini-book of about 60 pages will be created to include all learning modules for this Pre-calculus course. Each learning module will start with concepts, the very basic calculations related to those concepts, the typical calculative and logical skills used in those calculations, and basic problem types. Students can use it as a reference textbook, or a study guide for tests. Students shall find almost all basic problem types in the book. Furthermore, we will integrate the pamphlet with the online free textbook. We will provide links to exercises and sample tests from the online textbook.

Course Structure Redesign: Other than the regular chapter and section structures, we will redesign the course structure to following the learning module structure. For each learning module, we will use the successful model developed and tested in the countries such as former Soviet Unions, China. Each learning module will include definition, typical examples, typical calculation, typical problem solving techniques and list of problem types. Then a set of exercise and sample tests will be created based on the online textbook.

Roles of Team Members: Dr. Hu has been teaching College Algebra, Precalculus using Blackboard, Vista, D2L, Moodle, WebAssign for more than 10 years. He is also an expert on educational technology. He will take care of the online math content delivery such as online tests, pamphlet preparation and learning module designs.

Dr. Feng has been teaching math courses for more than 15 years. He has worked with students with extreme diverse background. He will be responsible for course contents, pamphlet material selections, and test problems.

Open Access Plan: All materials will be freely available in D2L during summer 2015. Starting Fall 2015, the pamphlet will be posted to the department website at <http://www.asurams.edu/academics/college-of-science-health-professions/mathematics-computer-science/> for public access. We will also present our study to Georgia Academy of Science Annual Meeting.

1.3 QUANTITATIVE AND QUALITATIVE MEASURES

Quantitative measures: For the project, both team members will follow the same course work scheme and lecture schedule. While one follows the regular course design, the other will follow the new design. Students' performance on all tests and exams will be analyzed. In particular, data of students' usage of the online resources and the pamphlet will be collected.

At the end of semester, we will compare the grade distributions of both sections and the failing rate on each learning module. Further analysis will be on the students' performance on each problem type. The collected data will help us to update the course structure and the pamphlet.

Qualitative measures: Around midterm exam and at the end of the semester, a survey will be conducted. Among other questions, we will ask students' opinions on the usefulness of the pamphlet, the preparation for tests and exams, the cost of this new course structure.

1.4 TIMELINE

Summer 2015

- a. May 1-May 15 (before summer 2015 starts): Course structure will be redesigned and provided in D2L. The first part of the pamphlet will be handed out to students.
- b. May 15-June 15 (first month of summer 2015): Three sample tests and three actual tests (with respect to the first set of learning modules) will be provided online. Students' performance on those tests will be analyzed.
- c. June-12-June 15 (around midterm): a survey will be conducted. The other part of the pamphlet will be handed out to students.
- d. June 15-July 15(second month of summer 2015): Additional three sample tests and three actual tests (with respect to the second set of learning modules) will be provided online.
- e. July 12-July 15(around final exam): a survey will be conducted.
- f. Interim report

Fall 2015 & Spring 2016

- g. Update the course structure in D2L and each learning modules according to students' feedback and students' performance on each learning module.
- h. Update the pamphlet according to students' feedback and students' performance.
- i. Final report

1.5 BUDGET

BUDGET Personnel	Specifics	Expenses (\$)
Li Feng	Content, Instruction, Assessment, Data Analysis & Collection	5,000.00 (Overload)
Wanjun Hu	Report, D2L and Technology, Instruction	5,000.00
Subtotal		\$10,000.00
Project Items	Breakdowns	Subtotal
Paper	\$20x2	40.00
Ink Cartridges	\$38.75x4	155.00
Hard-copies of the Learning Materials	\$15x3	45.00
GERA 2015 Conference Registration	\$100x1 person	100.00
Travel to GERA Conference Mileage	380 miles x .25 cents/milex2	190.00
GERA Conference Hotel	135x2 nights	270.00
Subtotal		\$800.00
Total		\$10,800.00

1.6 SUSTAINABILITY PLAN

After we develop the new course materials, we will offer the Math 1113 Pre-calculus sessions using the new material along with the free textbook. In summer 2015, we will offer one such section. Before fall 2015, we will modify and improve the material accordingly using the result of the comparing data and students' feedback. In fall 2015, we will offer two such sections. After that, we will work with all the instructors of the course to update and improve the course module, after a year of modification and revision, only a minimal maintenance is required. Gradually, the old textbook system will be replaced by the new material along with the free online textbook and its D2L course design.

1.7 REFERENCES & ATTACHMENTS



DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE

From: Seyed Roosta
Professor & Chairperson
Department of Math & Computer Science
Albany State University
Albany GA 31705

To Who It May Concern,

I am writing this letter to support Dr. Feng and Dr. Hu's proposal for the Affordable Learning Georgia Textbook Transformation Grant.

High cost textbook has been a major problem in college education at Albany State University. Research has shown that students' success in the lower level math classes is closely related to their access to a textbook. Historical data in this department tells that the rate of student's possession of textbook is very low due to its very high cost, which subsequently becomes a major factor of students' failing rate in those classes at Albany State University. Both of the proposers have experience in two different education systems, i.e., American education system where textbooks are usually extensive and expensive, and the Chinese education system where textbooks are succinct and inexpensive. The proposed approach is a synthesis of both systems. It can be a good solution to the problem.

The department will provide necessary resources to facilitate their activities. We will monitor the implementation process, and recommend the same strategy to all sections of Pre-calculus.

Sincerely Yours,

A handwritten signature in black ink, appearing to read "Seyed Roosta".

Seyed Roosta, Ph.D.

Albany State University, 504 College Drive, Albany GA 31705. Tel: (229)430-4600



College of Sciences and Health Profession

November 28, 2014

From: Joyce Johnson
Dean and Professor
College of Sciences and Health Profession
Albany State University
Albany GA 31705

To: Affordable Learning Textbook Grant reviewers,

I am writing this letter to support Dr. Feng and Dr. Hu's proposal for the Affordable Learning Georgia Textbook Transformation Grant. Math courses are challenging and learner-friendly learning materials are critical to promoting student success.

High cost textbook has been a major problem in college education at Albany State University and institutions across the country. Students' success in lower level math classes is greatly impacted by their access to a textbook. Anecdotal data in the college reveals that the rate of students' possession of textbooks is low often due to the high cost of the books. The lack of a textbook subsequently becomes a major factor of students' failure rate in those classes.

Both of the proposers have experience with textbooks that are usually extensive and expensive, and textbooks that are succinct and inexpensive. The proposed approach to teaching materials for mathematics is a synthesis of both textbook types which may provide a solution to the problem.

The college and department will provide necessary resources to facilitate the activities of Drs Feng and Hu in developing the proposed packet. We will monitor the implementation process, and if successful will recommend use of the same materials and teaching strategy in all sections of Pre-calculus.

Thank you for your consideration.

A handwritten signature in cursive script that reads "Joyce Y Johnson".

Dr. Joyce Y Johnson, Dean and Professor
College of Sciences and Health Professions

Albany State University, 504 College Drive, Albany GA 31705. Tel: (229)430-4600