Mathematics Grants Collections   Mathematics

Fall 2015

Support for College Algebra

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UNIVERSITY SYSTEM
OF GEORGIA

Michael Goodroe, Berhanu Kidane, Julian Allagan,
John Williams

Support for College Algebra

Affordable
Learning Georgia

Georgia's Virtual Library
GALILEO
An Initiative of the University System of Georgia

Affordable Learning Georgia

Grants Collection

Affordable Learning Georgia Grants Collections are intended to provide faculty with the frameworks to quickly implement or revise the same materials as a Textbook Transformation Grants team, along with the aims and lessons learned from project teams during the implementation process.

Each collection contains the following materials:

- Linked Syllabus
  - The syllabus should provide the framework for both direct implementation of the grant team's selected and created materials and the adaptation/transformation of these materials.
- Initial Proposal
  - The initial proposal describes the grant project's aims in detail.
- Final Report
  - The final report describes the outcomes of the project and any lessons learned.

Syllabus

SUPPORT FOR COLLEGE ALGEBRA

MATH 0999, FALL 2015

University of North Georgia

CRN # 10484; 11:00 a.m. – 11:50 a.m. MWF, Room 320

INSTRUCTOR

Name	Michael Goodroe
Office	311 B
Phone	(706) 310 - 6334
Email	michael.goodroe@ung.edu
Hours	T 01:00 PM – 03:00 PM

Important Dates			
	1.)	Add/Drop	August 17 - 21
	2.)	Withdrawal	October 12
	3.)	Final Exam	December 7
			@ 10:20 a.m. – 12:20 p.m.
	4.)	Math Jam Fridays 12:00pm – 2:00pm	
		Room 320	

UNG Supplemental Syllabus Links:

COURSE

DESCRIPTION

A course designed to allow students to simultaneously satisfy their LS requirements and take Math 1111, an Area A math course. The course will cover the Beginning or Intermediate Algebra topics needed for the student to be successful in College Algebra. The course allows the instructor to assist the students with any deficiencies they may have while attempting the College Algebra topics. The material covered in MATH 0999 is meant to provide background information or just-in-time remediation of the topics covered in MATH 1111. Topics to be covered include: polynomial, rational, and radical expressions and equations, quadratic functions and their graphs, and systems of equations.

Credit: 3 hours.

Course Pre-requisites: Admission requirements will be determined on a semester to semester basis. Admission is dependent upon the student's MPI score. Completion of MATH 0989, Foundations of College Algebra, with a grade of "C" or higher is required if the student initially places in Foundations of College Algebra.

Course Co-requisite: MATH 1111 College Algebra, CRN 9073

COURSE OBJECTIVES

After completion of the course the student will be able to:

 a. Apply Introductory Algebra concepts
 b. Solve Linear Inequalities
 c. Find and Graph Equations of Lines, Understand and Apply Knowledge of Functions
 d. Algebraically Solve Systems of Linear Equations

e. Simplify and Solve Rational Expressions and Equations
f. Solve Radical Equation and Apply Properties of Complex Numbers
g. Algebraically Solve Quadratic Equations and Graph/Translate Quadratic Functions

Additionally, Students will be able to:

- Apply the order of operations
- Perform operations on fractions
- Use exponential notation, apply rules of exponents and negative exponents
- Solve linear equations
- Solve linear inequalities
- Perform operations on polynomials
- Factor polynomials
- Perform basic operations on radical expressions
- Solve quadratic equations using variety of methods including the quadratic formula
- Perform basic operations on rational expressions
- Simplify complex fractions
- Solve radical equations
- Solve rational equations
- Solve and classify systems of linear equations
- Apply function concepts and notation
- Graph a linear function
- Write an equation of a line given variety of conditions
- Solve and classify systems of linear equations

MATERIALS

Course Website: http://faculty.ung.edu/mgoodroe/index.html

Text: 1.) eTextbook - College of the Sequoias - Intermediate Algebra (**Main**)
https://www.cos.edu/Faculty/jonb/Pages/Math-230-Intermediate-Algebra.aspx

2.) eTextbook – College of the Redwoods – Intermediate Algebra (Supplemental)
http://msenux2.redwoods.edu/IntAlgText/

3.) eTextbook – College Algebra – **(Main Text for Math 1111 by Dr. Kidane)**
http://www.stitz-zeager.com/szca07042013.pdf

4.) Desmos Graphing Site (**Log on and Create an Account for *FREE*)**
https://www.desmos.com

GRADING

Your final grade will be determined as follows:

Assignments/Quizzes	70%
Final (Cumulative)	30%

EXAMS

Students need to be in the classroom and prepared to take the exam <mark>five minutes prior</mark> to the scheduled class start time. If you will be late, please notify me via email as soon as possible prior to the start of the exam. <mark>If you miss the exam or come late without prior notification and re-scheduling, a grade of zero will be recorded</mark> (see make - up policy below).

Calculator use: you may use a hand-held calculator for exams. However, you will not be permitted to use the calculator function on your cell phone.

If you need to leave the classroom during the exam, please do so quietly and respectful of other students.

MAKEUP WORK

<mark>No make-up of exams/quizzes/homework assignments will be given</mark>. If you miss <u>one</u> of the exams, then your Final Exam score will replace the missed exam. If you take all exams, then the Final Exam score will replace your <u>single</u> lowest score, assuming your final exam score is greater than your lowest exam score.

If you know in advance that you will not be present during an exam, please notify me via email as soon as possible to schedule taking the exam prior to the actual exam date. No exams will be scheduled **after** the actual exam date, only prior.

POLICIES

UNG Student Attendance Policy: http://ung.edu/academic-affairs/faculty-handbook/3-faculty-responsibilities/3.7-class-attendance-policies/3.7.1-student-attendance-policy.php

Data support the fact that when students regularly attend their mathematics courses, they are much more likely to succeed. Learning mathematics requires students to engage and actively participate in mathematics. Being absent from class greatly reduces your chances to be involved in your own learning. Though attendance in this course is not an element of your cumulative score, students who regularly miss class tend to have very low scores. Therefore, I will record your attendance daily.

Below is a linear graph from a recent class, which relates the percent of student absences with student's cumulative scores. All my classes have a similar graph! As you can see, as the percent of absences increases to the right on the horizontal axis, cumulative scores decrease on the vertical axis. Conversely, the less a student is absent, say between 0% and 20%, student scores increase. I encourage you to make a personal commitment to attend class regularly and to be proactive in your own education.

Please be aware that UNG policy states that a student who has missed 10% or more in a class can/wil be "WITHDRAWN" from class either receiving a grade of "W" or "WF" depending if absences occur before or after the withdraw date! I will be recording attendance everyday starting on the first day through the last day of classes. Therefore, you can miss 6 days during the semester.

$$y = -0.8564x + 0.7865$$
$$R^2 = 0.8168$$
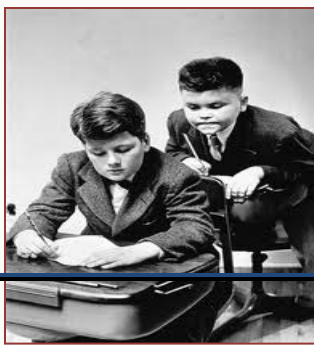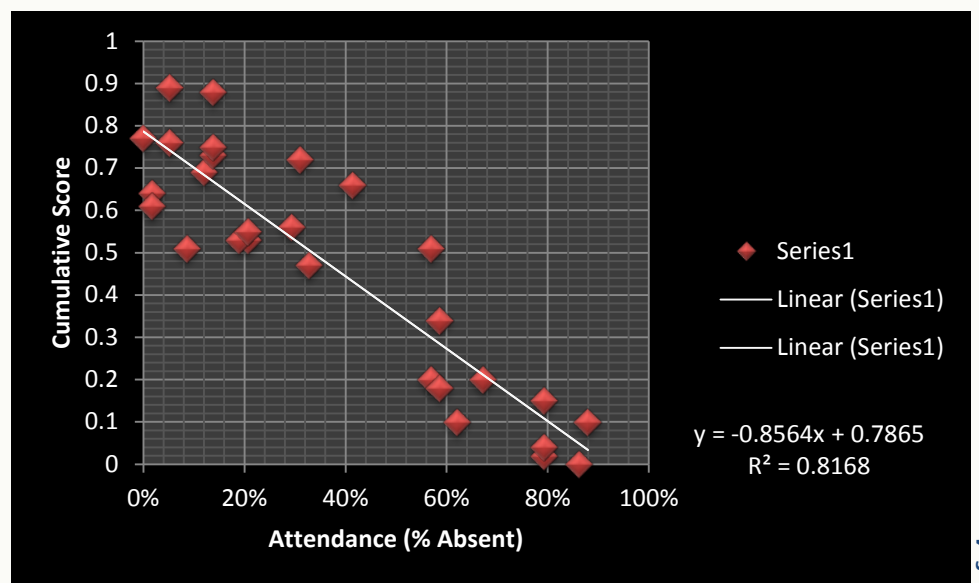
SCHOLASTIC DISHONESTY

See attached link of UNG's Student Conduct Code:

http://ung.edu/academic-affairs/policies-and-guidelines/supplemental-syllabus.phpb

DISTRUPTIVE BEHAVIOR

Students who exhibit behaviors which are considered to obstruct or disrupt a class or its learning activities will be considered under the Board of Regents Policy on Disruptive Behavior. **Behaviors which will be considered to be inappropriate in our classroom include sleeping, eating, coming in late/leaving early, interrupting others, talking out of turn, cell phone use of any kind, inappropriate behavior during group work, verbal or nonverbal behavior that is disrespectful of other students or the teacher.** Students who exhibit disruptive behavior will be given a verbal warning for the first infraction. If the behavior continues, the student will be asked to leave the classroom. Prior to returning to our classroom, the student will need to make an appointment to see me during office hours. Any further infractions would be referred to the Disciplinary Committee of the College.

Cell phones:

1. Should be **turned off** or in **silent mode** during all classes.
2. Should be put away and not visible during class.
3. Any use of a cell phone, including but not limited to, sending/receiving calls, texting, checking the Internet is not permitted during class, with the exception of Instructor permitted use.

Computers or Tablets:

1. Are not permitted unless prior arrangements are made with your Instructor.

MISCELLANY

USEFUL LINKS

http://ung.edu/learning-support/academic-resources.php

| KHAN Academy | http://www.khanacademy.org/ |
| Pearson's Intermath | http://interactmath.com/ChapterContents.aspx |

MathTV YouTube Channel	http://www.youtube.com/user/MathTV
Purplemath	http://www.purplemath.com/
UNG-Oconee Math	https://web.ung.edu/media/MathHelp

Class Files – All in-class notes using the Smartboard will be posted daily after each class. Additionally, exam keys will be posted after each exam has been taken.

ACADEMIC SUPPORT
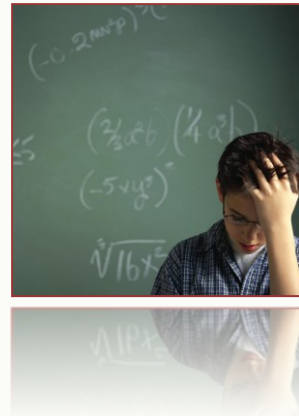
You are strongly encouraged to go to the SLC or LS Math Lab, study in groups, and see me for help outside of class. All of these are free! Students that get help outside of class are typically much more successful than those that do not.

SLC hours are: (Math Tutoring)

Monday-Friday   8:00 AM – 9:00 PM

http://www.gsc.edu/academics/labs/oconee/Pages/Math.aspx

Initial Proposal

Affordable Learning Georgia Textbook Transformation Grants
Round 2, Fall 2015
Proposal Form and Narrative

Institution Name(s)	University of North Georgia – Oconee Campus			
Team Members (Name, Title, Department, Institutions if different, and email address for each)	1) Mr. Michael Goodroe, M.Ed., Lecturer of Mathematics and Learning Support Liaison of Mathematics; michael.goodroe@ung.edu 2) Mr. Berhanu Kidane, PhD, Assistant Professor of Mathematics; berhanu.kidane@ung.edu 3) Mr. Julian Allagan, PhD, Associate Professor of Mathematics; julian.allagan@ung.edu 4) Mr. John Williams, Med, eLearning and Media Services; John.williams@ung.edu			
Sponsor, Title, Dept., Institution	Mr. John Cruthirds, PhD, Department Chair of Mathematics, University of North Georgia; john.cruthirds@ung.edu			
Course Names, Course Numbers and Semesters Offered (Summer 2015, Fall 2015, or Spring 2016)	Introductory Algebra; Math 0097; Fall 2015, Spring 2016, Summer 2016 Intermediate Algebra; Math 0099; Fall 2015, Spring 2016, Summer 2016 College Algebra; Math 1111; Fall 2015, Spring 2016, Summer 2016 Precalculus Math 1113; Fall 2015, Spring 2016, Summer 2016 Calculus 1 Math 1450; Fall 2015, Spring 2016, Summer 2016			
Average Number of Students Per Course Section	30	**Number of Course Sections Affected by Implementation in Academic Year 2016** 28	**Total Number of Students Affected by Implementation in Academic Year 2016**	840
Award Category (pick one)	☐ No-Cost-to-Students Learning Materials ☐ OpenStax Textbooks ☐ Course Pack Pilots ☒ Transformations-at-Scale			
List the original course materials for students (including title, whether optional or required, & cost for each item)	*Beginning & Intermediate Algebra* , Martin-Gay, 5th Ed. Required *Algebra and Trigonometry*, Stewart, Redlin and Watson, 3rd Ed. Required *Calculus Early Transcendental Functions* 6th Ed. Larson & Edwards	*$188.33(New)* *$206.08(New)* *$211.20(New)* ***Total Cost = $605.61***		
Plan for Hosting Materials	☐ OpenStax CNX ☒ D2L ☐ Lib Guides ☒ Other: **UNG Faculty Webpage**			
Projected Per Student Cost	*Beginning & Intermediate Algebra , $188.33* *College Algebra & Precalculus, $206.08* *Calculus, $211.20*	**Projected Per Student Savings (%)**	100% 100% 100%	

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1. **PROJECT GOALS**
   i) To provide lessons for five courses: Beginning and Intermediate Algebra, College Algebra, Precalculus and Calculus 1 at the University of North Georgia Oconee Campus beginning in the Fall of 2015, using the **Affordable Learning Georgia resources**, at no cost or minimum cost to students.
   ii) To determine options which closely match the curriculum guidelines set forth for each course in the University of North Georgia course catalogue or by individual instructors' course syllabi.

1.1 **STATEMENT OF TRANSFORMATION**

- *Describe the transformation*
  - Transformations-at-Scale: In the fall of 2015 we plan to offer five core courses for 16 classes to students at the University of Georgia using the ALG Textbook Grant. These courses are offered at no cost or low cost options. The transformation will have a significant impact on student's text book costs.
- *Identify stakeholders affected by the transformation*
  - Students are the primary stakeholders; however mathematics instructors, campus tutors and/or math lab staff, library staff, and IT staff are clearly major stakeholders as well
- *Describe the impact of this transformation on stakeholders and course success.*
  - Lowering textbook costs for students while at the same time providing high quality materials with no or low-cost options have the benefit of reducing the financial burdens students face. If on-line options provide the same level of quality as do hardcopy textbooks, then course success for students can focus on instructors and student engagements
- *Category 4 only: Describe the transformative impact on the program, department, institutions, access institution, and/or multiple courses.*
  - We won the spring 2015 ALG text book transformation grant. This grant will be used for three algebra courses for 5 classes. The fall 2015 ALG grant application will help extend our spring 2015 program, and it will impact five courses and 28 classes
  - Our experience with the spring 2015 ALG grant has inspired a number of colleagues to apply for the fall 2015 grant as they seek to apply this program to statistics courses on the local campus. As the new fall 2015 grant covers more courses, only one math course (MATH 2460) will be left uncovered on our campus. This will be equivalent to less than .01% of our students who might not benefit from this grant.

1.2 **TRANSFORMATION ACTION PLAN**

- *The identification, review, selection, and adoption/adaptation/creation of the new course materials.*

  - Identified courses: Introductory, Intermediate and College Algebra, Precalculus, Calculus 1
  - Comprehensive digital notes that have been created and have been used by the instructors thus far will be modified and incorporated into the Free Online Resources from **Affordable Learning Georgia**
  - The content of other free web based Internet resources such as: **Khan Academy, YouTube,** and **Desmos Graphing Calculator** that have been used so far will be reviewed. We will select the sections or videos that best reflect the course objectives listed on the instructor's course syllabus. The links to the appropriate source will be made available on the instructor's website for a wider community use

- *The course and syllabus instructional design/redesign necessary for the transformation.*
  - Syllabi that have been in use for teaching the courses will be modified by the course instructors; textbook will not be required for these courses and a list of acceptable online free textbooks will be given in addition to other supplemental resources
- *The activities expected from each team member and their role(s): subject matter experts, instructional designer, librarian, instructor of record, et al.*
  - Each member/instructor has full responsibility for creating a web page, researching the appropriate online free textbooks and lists them for each course he/she will be teaching. Each team member is responsible for modifying his/her syllabi accordingly, and posts on his/her website other supplemental resources that are available free online.
  - John Williams: website design (help create faculty webpages), facilitate technical support on eLearning and media services
- *The plan for providing open access to the new materials.*
  - We propose to adopt on-line texts and associated practice sets of problems and tutorials from Affordable Learning Georgia. In addition to providing the links to the web pages, we make available the learning resources to UNG students online through Shared Classes Files or D2L, and the public UNG Faculty web pages

1.3   QUANTITATIVE AND QUALITATIVE MEASURES

Learning Objective Success Measures *(Quantitative and Qualitative measures)*

i)   **Pass, Fail, Withdraw and Drop** (PFWD**) Rubrics** (Quantitative**)**

- **Spring 2014, Fall 2014 and Spring 2015 PFWD Rubric**

Course Text Book	Semester Year	Total No. Stud./class Registered	Pass %	Fail % A grade of D or less	Withdraw %	Drop %
Beginning & Inter. Algebra *Martin-Gay, 5th Ed.*	Spring 2014					
	Fall 2014					
College Algebra; Stewart, Redlin and Watson, 3rd ed.	Spring 2014					
	Fall 2014					
Precalculus; Stewart, Redlin and Watson, 3rd ed.	Spring 2014					
	Fall 2014					
Calculus I; *Larson & Edwards 6th Ed.*	Fall 2014					
	Spring 2015					

- **Fall 2015 PFWD Rubrics**
  - For fall 2015 semester a similar PFWD rubrics will be created and data will be collected and compared

ii) *Students Overall Performance (Quantitative)*
  - Percentage of Excellent A or Very good B grades

iii) Detailed analysis of the rate of success in spring/fall 2014 (pre-grant) compared to that of spring fall 2015 (post-grant) *PFWD Expected Outcomes (Quantitative)*
  - Percent pass greater than or equal to _____
  - Percent fail less than or equal to_____
  - Percent withdrawn strictly less than _____

iv) ***Technological Competency*** *(Survey feedback, Qualitative)*
- Internet skills, retrieving and managing information via technology
- Use available technology effectively and efficiently to locate, retrieve, and manage information

v) ***Student feedback through survey (****end of semester****)***

   Questionnaires reflecting qualitative measures http://www.surveymonkey.com

1.4   TIMELINE
- Initial effort will be on selecting the appropriate on-line textbooks, which includes determining whether the textbook meets the stated curriculum goals and the objectives of the specific syllabi. To be completed by the end of spring 2015.
- Survey will be given to students based on the adopted on-line texts at the end of spring 2015 and a similar survey will be given by the end of fall 2015
- Adopt on line text textbooks for Precalculus and Calculus end of spring 2015semester.

1.5   BUDGET
- ***Include Personnel & Projected Expenses as appropriate for the category.***
  - Material cost, survey-monkey gold plan $300 annually
  - Travel, workshops and conferences $800
  - Faculty/staff additional time spent on preparation of the material $5,000/person

1.6   SUSTAINABILITY PLAN
- ***What is plan for offering the course in the future, including maintenance of course materials?***
  - Continue to offer Introductory, Intermediate, and College Algebra courses using on-line texts.
  - Expand use of on-line texts to all mathematics courses offered on the UNG Oconee campus with a conservative projected student savings annually of $200,000 (See **Note** below)
  - Continue to enhance current digital support for all math courses
  - Explore development of course textbooks
  - Expand the program on a Department Level

1.7   REFERENCES & ATTACHMENTS

PROPOSAL SUBMISSION: ALL PROPOSAL DOCUMENTS, REFERENCES, AND ATTACHMENTS MUST BE SUBMITTED IN A SINGLE EMAIL TO ALG@GATECH.EDU.

DEADLINE FOR CATEGORIES 1-3: 5:00 PM, NOVEMBER 30, 2014

DEADLINE FOR CATEGORY 4: 5:00 PM, DECEMBER 8, 2014

Note: Number of Math classes:
        Summer 2014, 12 classes
        Fall 2014, 46 classes
        Spring 2015, 43 classes
The annual total number of Math classes is about 100, if we assume 20 students per class and $100 per math text. Total saving in math books is $200,000. (This is a conservative estimate)

December 8, 2014

Affordable Learning Textbook Transformation Grant
Review Committee

Dear Committee Members:

I am writing this letter in support of the proposal being submitted to you by Professors Michael Goodroe, Berhanu Kidane, and Julian Allagan from my department. I am in full support of this proposal because I believe the proposal has strong merit and because Professors Goodroe, Kidane, and Allagan are talented faculty members who are well qualified to accomplish the goals of the proposal.

Michael, Berhanu, and Julian all have significant experience teaching the courses that are targeted in the proposal. I am excited at the potential financial savings our students could experience, and I intend to lend full departmental support for the work of this proposal. Since we teach multiple sections of these courses every semester, including summer, the potential sustainability of the project will not be a concern. The expansion of the project to other sections of these classes on the Oconee campus and on our other three campuses can be accomplished by working through our existing departmental Curriculum Committee which has representation from faculty on all University of North Georgia campuses.

I am in full support of this proposal, and I hope that you will be able to give the proposal every possible consideration. I would be happy to comment further if you so like.

Sincerely,

John Cruthirds, Head
Department of Mathematics
john.cruthirds@ung.edu
706 864-1810

Cumming   Dahlonega   Gainesville   Oconee

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The University of North Georgia is designated as The Military College of Georgia and as a State Leadership Institution.

Final Report

Affordable Learning Georgia Textbook Transformation Grants
Final Report (Round 2)

Date: December 15, 2015

Grant Number: 125

Institution Name(s): University of North Georgia

Team Members (Name, Title, Department, Institutions if different, and email address for each): Mr. Michael Goodroe, M.Ed. (michael.goodroe@ung.edu), Mr. Berhanu Kidane, PhD. (berhanue.kidane@ung.edu), Julian Allagan, PhD. (julian.allagan@ung.edu), and Mr. John Williams, M.Ed. (john.williams@ung.edu). UNG – Oconee Campus Mathematics Department.
Project Lead: Mr. Michael Goodroe
Course Name(s) and Course Numbers:
   Foundations for College Algebra - Math 0989, Intermediate Algebra - Math 0099,
   College Algebra - Math 1111, Math 1113 – Pre-Calculus, Math 1450 – Calculus I
Semester Project Began: Fall 2015
Semester of Implementation: Fall 2015
Average Number of Students per Course Section: 19
Number of Course Sections Affected by Implementation: 8
Total Number of Students Affected by Implementation: 152

1. Narrative

- **Overall positive outcomes**

Accomplishments:

- Transitioned eight classes which formerly used hard-copy textbooks to on-line textbooks and course materials.
- Development of faculty websites which included all course materials, daily uploaded Smartboard notes, copies of quizzes/activities/assignments/exams, handouts, and syllabi.
- Use of UNG IT survey tool to gain student feedback.

Challenges:

- Creating faculty websites so students have a central on-line source to course materials.
- Developing a "content" outline for students to follow the progression of sections using the on-line textbooks
- Finding a "single" on-line textbook which was similar to the hard-copy textbook used on campus.
- No single on-line textbook has the materials needed as required by the university's course syllabi.
- Requiring students to use more than one source of on-line materials increased their confusion level and overall performance.
- Some students had difficulty "finding" materials on the website.

- Daily updating/maintenance of website is very demanding.
- Practice must be printed out, copied, and handed out during class for additional student practice sets.
- Class activities are graded and students are provided feedback constantly with solutions that are posted online daily.
- Raising students' expectations for a course after they learn that they are not required to buy a textbook for that course.

Transformative impacts on instruction:

- Generally positive acceptance by student.
- Once on-line textbooks were selected and faculty websites were completed, classes ran smoothly.
- No real issues brought to our attention from students by using on-line texts and materials.
- One on-line text, which resides on a college math departmental server, occasionally goes off-line causing access by students difficult.

Transformative impacts on students and their performance

- Mindset transition from hard-copy textbooks to on-line. There is a comfort level perceived by students using hard-copy textbooks.
- Some students expressed difficulty in "finding" various materials on faculty websites.
- General acceptance by most students of on-line materials.

Lessons Learned

- Given what was learned during our Round 1 grant trial, we tried using fewer on-line textbooks per course.
- Provide more "supportive" materials, which expand on the concepts covered in the textbooks.
- Continue to upload daily notes to course website for student reference.
- Conduct more feedback surveys to determine issues students may be having.
- Set student expectations toward learning from on-line recourses.

List of Resources Used in the Textbook Transformation

Math 0989 - Foundations for College Algebra: http://faculty.ung.edu/mgoodroe/CRN6964.html

- College of the Sequoias –Pre Algebra https://www.cos.edu/Faculty/rossr/Pages/Math-360-PreAlgebra.aspx
- College of the Redwoods - Intermediate Algebra (http://www.wtamu.edu/academic/anns/mps/math/mathlab/beg_algebra/
- West Texas A & M University - Beginning Algebra http://www.wtamu.edu/academic/anns/mps/math/mathlab/int_algebra/index.htm
- West Texas A & M University - Intermediate Algebra http://msenux.redwoods.edu/IntAlgText/
- Kuta Software – http://kutasoftware.com

Math 0099 - Intermediate Algebra: http://faculty.ung.edu/mgoodroe/CRN6967.html

- College of the Sequoias – Intermediate Algebra https://www.cos.edu/Faculty/jonb/Pages/Math-230-Intermediate-Algebra.aspx
- West Texas A & M University – Intermediate Algebra http://www.wtamu.edu/academic/anns/mps/math/mathlab/int_algebra/index.htm
- College of the Redwoods – Intermediate Algebra http://msenux.redwoods.edu/IntAlgText/
- Kuta Software – http://kutasoftware.com

Math 1111 - College Algebra: http://faculty.ung.edu/bkidane/courses.html

- Open Resource College Algebra free e-book link:
- http://www.stitz-zeager.com/szca07042013.pdf (Main Text Book: by Stitz and Zeager)
- West Texas A & M University – College Algebra http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/index.htm (free online resource **under fair use**)
- Larry Green's Applet Page http://www.ltcconline.net/greenl/java/index.html (licensed under a Creative Commons License)
- Khan academy at: http://www.khanacademy.org
- YouTube at: http://www.youtube.com
- Kuta Software – http://kutasoftware.com
- http://www.mathwarehouse.com/algebra/
- http://www.ltcconline.net/greenl/java/index.html
- http://flashytrig.com/intro/teacherintro.htm (Animations)

Math 1113 – Pre-Calculus: http://faculty.ung.edu/bkidane/courses.html

- Open Resource Pre-Calculus free e-book link:
- http://www.stitz-zeager.com/szct07042013.pdf (Main Text Book: by Stitz and Zeager)
- Trigonometry Open resource book by Michael Corral **(**Secondary Text**)**
- West Texas A & M University – College Algebra http://www.wtamu.edu/academic/anns/mps/math/mathlab/col_algebra/index.htm
- Larry Green's Applet Page http://www.ltcconline.net/greenl/java/index.html (licensed under a Creative Commons License)
- Khan academy at: http://www.khanacademy.org
- YouTube at: http://www.youtube.com
- Kuta Software – http://kutasoftware.com
- http://www.mathwarehouse.com/algebra/
- http://www.ltcconline.net/greenl/java/index.html
- http://en.wikibooks.org/wiki/Trigonometry
- http://flashytrig.com/intro/teacherintro.htm (Animations)
- http://www.sosmath.com/trig/trig.html

Math 1450 – Calculus I: http://faculty.ung.edu/jallagan/Current courses.html

- Open Resource Calculus free e-book link:

  http://faculty.ung.edu/jallagan/Courses%20materials/Math%201450%20Calculus%201/Syllabus%20and%20ebook/TextBook%20Active%20Calculus.pdf

- Supplemental material:

  - http://faculty.ung.edu/jallagan/Courses%20materials/Math%201450%20Calculus%201/Syllabus%20and%20ebook/problems%20and%20solutions%20for%20calculus%201.pdf

  - https://en.wikibooks.org/wiki/Calculus (Calculus Wiki-book)

  - http://tutorial.math.lamar.edu (Paul's Online Math Notes)

  - http://archives.math.utk.edu/visual.calculus/ (Tutorial)

  - http://www2.latech.edu/~schroder/animations.htm (Animations)

  - https://www.math.ucdavis.edu/~kouba/ProblemsList.html (Tutorial)

2. Selected Student Feedbacks

- My experience using online materials this semester has been great. I like using the online textbook because it is at no cost and it really helped me out for having to buy all the other books for my other classes. The online text material gave really good examples and clear instructions on how to do the math that I was taking. The only thing that I disliked was there was one time where I could not access the book because of a technical difficulty; however, this did not last long. I would actually prefer an online text book for math class because it helps me pay attention better. I would not prefer an online one for a class such as literature, because if I were to have to read something like a story, I would rather have a textbook.

- This semester, instead of using a textbook, I was allowed to use online resources provided by the teacher. With this, I believe I have learned as much (and possibly more) from the Internet than I could have with a book.

  However, because it is online, the only downside was that I had to have a computer to access the websites. But, because technology is available at my house and at the library, it was rarely a problem going to the online textbook.

  Additionally, since we are allowed to use an online textbook, I saved an amazing amount of money. For some classes, an expensive textbook is required, but the students rarely use it. I do not believe that is anyone's fault, but it is very nice to not have to pay money for a textbook.

  In conclusion, I believe having an online textbook is as efficient and possibly more than buying a textbook.

- Personally, I enjoyed having an online textbook and assignments. It took financial pressure off of me by not having to buy another book and it was very easily accessible. It was hard at times to use the online book to copy problems and such. I find it easier to do with a paper-back book. Overall, I would rather have an online textbook over a paperback.

3. **Quantitative and Qualitative Measures**

A. **Pass, Fail, and Withdrawal (*PFW*) *Expected Outcomes (This expectation is projected mainly based on students' performances prior to Grant implementations)***

- Percent pass greater than or equal to:
  o Beginning (Foundations) & Intermediate Algebra 50 %
  o College algebra 60%
  o Pre-Calculus 60%
  o Calculus 1 54%
- Percent fail less than or equal to:
  o Beginning (Foundations) & Intermediate Algebra 35%
  o College Algebra 25%
  o Pre-Calculus 19%
  o Calculus 1 18%
- Percent withdrawn strictly less than:
  o Beginning (Foundations) & Intermediate Algebra 15 %
  o College Algebra 15%
  o Pre-Calculus 21%
  o Calculus 1 28%

In the spring of 2015, compared to the projected Pass Fail and Withdrawal excepted outcomes:

- The percentage of pass in:

  o Foundations and Intermediate Algebra shows a drop of 19%.

  o College Algebra shows a drop of about 2%.

  o Pre-Calculus is about the same

  o Calculus 1 shows a drop of about 7%

- The percentage of fail in:

  o Foundations and Intermediate Algebra shows an increase of 11%.

  o College Algebra shows a decrease of about 8%.

  o Pre-Calculus shows a decrease of about 2%

  o Calculus 1 shows a decrease of about 11%

- The percentage of withdrawal in:

  o Foundations and Intermediate Algebra shows an increase of 8%.

  o College Algebra shows an increase of 10%.

  o Pre-Calculus shows an increase of about 1%

  o Calculus 1 shows an increase of about 20%

B. Students Overall Performance

Rubrics (**number** and **percentage** of students) for the **Pass/Fail and Withdrawal (PFW)** for Foundations and Intermediate Algebra, College Algebra, Precalculus and calculus

Course Text Book	Semester Year	Total No. Stud./class Registered	Pass in %	Fail a grade of D or less in %	Withdraw in %
Beginning & Intermediate Algebra	Fall 2013	**109**	**64.2%**	**31.2%**	**4.6%**
	Spring 2014	**63**	**41.3%**	**46.0%**	**12.7%**
	Spring 2015 (Free OER)	**51**	**41.2%**	**39.2%**	**19.6%**
Foundations & Intermediate Algebra	Fall 2015 (Free OER)	**75**	**30.7%**	**46.7%**	**22.7%**
College Algebra	Spring 2014	**31**	**67.7%**	**12.9%**	**19.4%**
	Fall 2014	**62**	**64.5%**	**27.4%**	**8.1%**
	Spring 2015 (Free OER)	**58**	**51.7%**	**29.3%**	**19.0%**
	Fall 2015 (Free OER)	**56**	**58.9%**	**16.1%**	**25%**
	Spring 2014	**62**	**58.1%**	**16.1%**	**25.8%**
	Fall 2014	**64**	**59.4%**	**31.2%**	**9.4%**
	Spring 2015	**64**	**59.4%**	**9.3%**	**31.3%**
	Fall 2015 (Free OER)	**23**	**60.9%**	**17.4%**	**21.7%**
Calculus I	Spring 2014	**31**	**71%**	**12.9%**	**16.1%**
	Fall 2014	**31**	**42%**	**16.1%**	**41.9%**
	Spring 2015	**30**	**50%**	**23.3%**	**26.7%**
	Fall 2015 (Free OER Combined)	**54**	**46.3%**	**5.6%**	**48.1%**

C. Student survey **feedback** using https://forms.ung.edu/view.php?id=183960

The main objective of the survey was to get some idea about:
- Student's mathematics textbook expenses
- How students meet their financial expenses
- Student's preference about books; hard copy (which always comes with a price tag) versus web based e-books which could come free of charge

Fall 2015 survey feedbacks collected from Foundations and Intermediate Algebra, College Algebra, Precalculus and calculus

Total number of students participated in the survey is **79**

Shown below are some results of the survey in **percent**:

Question	Yes	No
▪ Do you receive financial aid, which covers the cost of textbooks?	51%	48%

Question	Hard Copy Textbook	On-line Textbook
▪ Given the choice between using a required "hard" copy textbook which has a cost or using an "on-line" textbook which is free, I would prefer using	21.5%	77.22%

Question	Strongly Disagree	Disagree	Neither Disagree Nor Agree	Agree	Strongly Agree
▪ I would prefer using online course materials at no cost to me which would include the course textbook, practice sets, further infestations, etc. even though the sources may be contained on different websites on the Internet	3.8%	5.06%	11.39%	31.1%	48.1%
▪ I do not anticipate technical or access problems using online course materials.	3.8%	8.86%	27.85%	35.44%	24.05%

4. Sustainability Plan

- We will continue to offer Foundations, College Algebra, Pre-Calculus, and Calculus I courses currently taught by professors Allagan, Kidane , and Goodroe through the next academic year. We will also continue to update course materials and continually review on-line textbook options as appropriate.

5. **Future Plans**.

- We will consider creating on-line homework exercises using D2L(Desire to learn)
- In order to expand our ALG grant efforts, we note that our colleagues want the use of "Webassign" or "MyMathLab" for automatic grading of problem sets. Thus, there needs to be investigations done to determine the connection between on-line textbooks and publishers' propriety math support tools.

6. **Description of Photograph**

From Left to Right: **John Williams, Michael Goodroe, Julian Allagan**, and **Berhanu Kidane**