Mathematics Grants Collections   Mathematics

Summer 2017

Foundations for College Algebra

Da'Mon Andrews
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UNIVERSITY SYSTEM
OF GEORGIA

Da'Mon Andrews and Antre' Drummer

Foundations for College Algebra

Affordable Learning Georgia

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

Initial Proposal

Application Details

Manage Application: Textbook Transformation Grants Round Seven

Award Cycle:	Round 7
Internal Submission Deadline:	Sunday, September 4, 2016

Application Title:	270
Application ID:	#001172
Submitter First Name:	Da'Mon
Submitter Last Name:	Andrews
Submitter Title:	Assistant Professor of Mathematics
Submitter Email Address:	dandrews@ega.edu
Submitter Phone Number:	912-623-2444
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Damon
Applicant Last Name:	Andrews
Applicant Email Address:	dandrews@ega.edu
Applicant Phone Number:	912-623-2444
Primary Appointment Title:	Assistant Professor
Institution Name(s):	East Georgia State College
Proposal Category:	No-or-Low-Cost-to-Students Learning Materials
Submission Date:	Tuesday, September 6, 2016

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

Mr. Da'Mon Andrews, Ed.S., Assistant Professor of Mathematics; dandrews@ega.edu

Mr. Antre' Drummer, M.S., Assistant Professor of Mathematics; amdrummer@ega.edu

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

Dr. Jimmy Wedincamp, PhD, Dean of School of Mathematics and Science, Professor of Mathematics, East Georgia State College; wedincamp@ega.edu

Final Semester of Instruction:	Summer 2017
Proposal Title:	270

Course Names, Course Numbers and Semesters Offered:

Foundations for College Algebra; MATH 0989; offered every Fall, Spring, Summer

Average Number of Students per Course Section:	35
Number of Course Sections Affected by Implementation in Academic Year:	23
Total Number of Students Affected by Implementation in Academic Year:	805
List the original course materials for students (including title, whether optional or required, & cost for each item):	Prices from EGSC Online Bookstore:Introductory Algebra with MyMathLab, 7th edition, Robert Blitzer, Pearson Prentice Hall [hardcover optional] @ $ 240.00Introductory Algebra with MyMathLab, 7th edition, Robert Blitzer, Pearson Prentice Hall [loose-leaf optional] @ $174.00StandaloneMyMathLab Access Code. [required] @ $121.25
Requested Amount of Funding:	10,800
Original per Student Cost:	$121.25 to $240.00
Post-Proposal Projected Student Cost:	$0
Projected Per Student Savings:	$121.25 to $240.00
Projected Total Annual Student Savings:	$97606.25 to $193,200

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

D2L

LibGuides (with Creative Commons Open License)

Project Goals:

* **Student Savings**

Replace the current textbook with Beginning and Intermediate Algebra, 2nd Edition by Tyler Wallace a free open-source textbook.

Replace the MyMathLab online homework platform with MyOpenMath, a free installation of an Internet Mathematics Assessment System (IMATHAS).

Provide students with free access to course materials on day one of each semester.

* Faculty Flexibility and Course Uniformity

Create tailor-made course materials including textbook, syllabus, slideshows, video library, and online assessments that correspond to course objectives defined by the mathematics learning support curriculum committee.

Create a master course in D2L with all course materials that can be shared with all EGSC Math Faculty.

Share all course materials with colleagues at other institutions via LibGuides.

Statement of Transformation:

* Describe the transformation

The Pearson textbook will be replaced with a no-cost-to-student textbook that provides coverage of the curriculum as defined by the mathematics learning support curriculum committee. This transition would eliminate a major barrier to academic success for many students. Particularly, as 32 percent of students who attended East Georgia State College in 2013-2014 received Pell Grant recipients (NCES, 2016). Additionally, faculty will have the opportunity to create a custom textbook package that specifically designed for EGSC's developmental mathematics students as opposed to an "off the rack" package developed by textbook publishers.

* Identify stakeholders affected by the transformation

Students are the major stakeholders. Additionally, institutional faculty and staff are stakeholders as well.

* Describe the impact of this transformation on stakeholders and course success.

MATH 0989 students' textbook costs will be reduced to $0. Also, the number of students who fall behind in the course due to not purchasing the textbook or software will be eliminated as students will access to all of the course materials on the first day of class.

Faculty teaching MATH 0989 will gain more control over instructional content and have the ability to create more uniformity across multiple course sections. Additionally, instructional materials created for the course will be made available to colleagues internal and external to the institution via D2L and LibGuides, respectively. Additionally, academic support services will have greater access to course materials and provide more effective academic support for students enrolled in MATH 0989.

* Describe the transformative impact on the course, program, department, institutions, access institution, and/or multiple courses.

East Georgia State College offers 23 sections with an average of 35 students of Foundations of College Algebra each academic year. This equates to a cost saving to students that ranges from $80,460 to $188,909. This particular textbook transformation could serve as a catalyst within the mathematics department to engage and encourage other faculty members to implement no-cost-to-student textbooks for other mathematics course offerings which will impact every student enrolled at the institution because all students are required to complete at least one mathematics course as a degree requirement.

Transformation Action Plan:

Project Completion has three phases:

Phase One, Fall 2016: Both Mr. Andrews and Mr. Drummer will develop (i.e. syllabus, course schedule, assessments, study guides, slideshows, and video library) a pilot course using the Wallace textbook and myOpenMath website. Mr. Drummer will obtain IRB approval to conduct research related to this project.

Phase Two, Spring 2017: Mr. Andrews will pilot sections of the course using the new textbook/online homework platform. Mr. Drummer will administer a survey regarding the quality/access/ease of use (or lack thereof) of the course materials. Mr. Andrews will calculate course pas rates for the semester.

Phase Three: Summer 2017: Mr. Andrews and Mr. Drummer will analyze course pass rate, student satisfaction survey results, and course evaluations for the Spring 2017 pilot course. Course materials will be modified based on these results and course materials will be made available to colleagues at EGSC via D2L and LibGuides for colleagues external to EGSC for implementation in the Fall 2017 semester.

Quantitative & Qualitative Measures:	Quantitative Measuresa) Success RatesThis project will evaluate the Spring 2017 semester Success rates for Foundations of College Algebra versus the Spring, Summer, and Fall 2016 semesters Success rates for Foundations of College Algebra. A success in Foundations of College Algebra is defined as a student earning a grade of A, B, or C. Students can additionally earn grades of IP, F, W, or WF which all constitute an unsuccessful attempt. b) Pretest-Posttest ScoresEGSC administers a pretest and posttest to all students for all courses. Thus, an ANOVA analysis will be conducted for both the pretest and posttest scores for students who took MATH 0989 in Spring 2016, Summer 2016, Fall 2016, and Spring 2017. Qualitative MeasuresQualitative measures from Student Course Evaluations will be compared for MATH 0989 before and after implementation. Additionally, at the start and end of the project a survey will be conducted to determine students' opinions of course material including, but not limited to, organization, availability, difficulty, clarity, and cost of course material. Before and after implementation mathematics faculty teaching MATH 0989 will be surveyed to determine faculty members' in regards to, but not limited to, willingness to use open-source resources for current course, willingness to extend the use of open-source resources to other course, quality of current and textbook package, and suitability of current textbook to meet established departmental course objectives.

Timeline:

Fall Semester 2016 (August – December) – IRB Approval, Pilot Course Development, Satisfaction Survey, and Course Evaluation

October/November – Obtain IRB approval to conduct research related to this project. Develop pilot course using the Wallace textbook and myOpenMath website.

December – Have students complete a survey about the quality/access/ease of use (or lack thereof) of the course materials and course evaluations. Have faculty complete textbook survey. Determine baseline MATH 0989 course pass rates for the fall semester and gather pre-posttest data and course evaluation data.

Spring Semester 2017 (January – May) – Implementation of Textbook and Online Learning Platform

January/February/March/April/May – Pilot sections of the course using the new textbook/online homework platform. Have students complete a survey about the quality/access/ease of use (or lack thereof) of the course materials and course evaluations. Have faculty complete textbook survey. Determine pass rate for the spring semester and gather pre-posttest data.

Summer Semester 2017 (June – August) – Analysis of Fall and Spring Semester Course Pass Rates and Faculty, Student Satisfaction Survey, and Course Evaluations

June – Analyze course pass rates, pre-posttest data, course evaluations, and faculty and student satisfaction surveys.

July – Submit final report to the mathematics learning support committee and ALG committee. Share course materials with colleagues at EGSC via D2L and LibGuides for colleagues external to EGSC.

August – Based on approval of the mathematics learning support committee and dean of the School of Mathematics and Sciences, implement the new textbook/online homework platform for all remedial mathematics courses campus-wide.

Budget:

Personnel - $10,000
Travel - $800
Equipment - $0.00
Supplies - $0.00
Consultants/Contracts - $0.00
Other Costs - $0.00
Indirect Costs - $0.00
Total - $10,800

Mr. Andrews and Mr. Drummer will be compensated $5000 each for the extra time required to complete the project.

Project staff is required to attend the Affordable Learning Georgia Kickoff Event held on the campus on Middle Georgia State University in Macon, GA. Travel cost associated with this event is $800.

There is no additional costs associated with equipment, supplies (all materials are will be in digital format), consultants/contracts (free training and resources are provided by the grantor), office space, or indirect costs.

Sustainability Plan:

Once funding for the project has ended no additional cost will be required as the course materials can be readily shared with colleagues because of the following:

Internal to EGSC
1) D2L courses can be copied from the master D2L course and modified as needed.
2) The selected textbook is open-source, thus any changes to a newer edition could be easily modified or excluded to meet the curriculum goals of the institution.

External to EGSC
1) External colleagues can access the course materials via LibGuides.
2) The selected textbook is open-source, thus any changes to a newer edition could be easily modified or excluded to meet the curriculum goals of any institution.

East Georgia State College
THE UNIVERSITY SYSTEM OF GEORGIA

Office of the Dean, School of Mathematics and Natural Sciences
131 College Circle
Swainsboro, Georgia 30401-2699
Phone (478) 289-2166 • Fax (478) 289-2080
Email • wedincamp@ega.edu

July 14, 2016

Affordable Learning Georgia Textbook Transformation Grants
GALILEO
University System of Georgia
270 Washington Street, S.W.
Atlanta, GA 30334

Dear ALG members,

It is my pleasure to write this letter of support for the ALG Open Mathematics in Action Project submitted by Da'mon Andrews. The ALG project will provide an ideal solution to the rising costs of textbooks and will result in significant savings for students. The faculty teaching the courses targeted in this proposal have significant experience and a willingness to participate. The goal of providing less expensive learning materials for our students is noble and has my full support. I believe this project will be sustainable long term and hopefully the knowledge acquired here will be applied to other courses at EGSC.

The EGSC Business Affairs Office will be responsible for the receipt and distribution of award funds. If the project is successful, EGSC School of Mathematics and Natural Sciences will act to encourage the project in other academic areas.

Thank you for this opportunity to assist our students in obtaining an affordable learning opportunity through participation in the ALG project.

Sincerely,

Jimmy Wedincamp

Dean and Professor

School of Mathematics and Natural Sciences

East Georgia State College

LET'S GET ASSOCIATED.

East Georgia State College

LET'S GET ASSOCIATED.

Affordable Learning Georgia Textbook Transformation Grants
Rounds Six, Seven, and Eight
For Implementations beginning Fall Semester 2016
Running Through Fall Semester 2017

Proposal Form and Narrative

Submitter Name	Da'Mon Andrews
Submitter Title	Assistant Professor of Mathematics
Submitter Email	dandrews@ega.edu
Submitter Phone Number	912-623-2444
Submitter Campus Role	Da'Mon Andrews
Applicant Name	Da'Mon Andrews
Applicant Email	dandrews@ega.edu
Applicant Phone Number	912-623-2444
Primary Appointment Title	Assistant Professor
Institution Name(s)	East Georgia State College
Team Members	**Mr. Da'Mon Andrews, Ed.S., Assistant Professor of Mathematics; dandrews@ega.edu** **Mr. Antre' Drummer, M.S., Assistant Professor of Mathematics; amdrummer@ega.edu**
Sponsor, Title, Department, Institution	Dr. Jimmy Wedincamp, PhD, Dean of School of Mathematics and Science, Professor of Mathematics, East Georgia State College; wedincamp@ega.edu

Proposal Title	Transforming MATH 0989 Foundations for College Algebra				
Course Names, Course Numbers and Semesters Offered	Foundations for College Algebra; MATH 0989; offered every Fall, Spring, Summer				
Final Semester of Instruction	Summer 2017				
Average Number of Students Per Course Section	35	Number of Course Sections Affected by Implementation in Academic Year	23	Total Number of Students Affected by Implementation in Academic Year	805
Award Category (pick one)	☒No-or-Low-Cost-to-Students Learning Materials ☐OpenStax Textbooks ☐Interactive Course-Authoring Tools and Software ☐Specific Top 100 Undergraduate Courses				
List the original course materials for students (including title, whether optional or required, & cost for each item)	Prices from EGSC Online Bookstore: Introductory Algebra with MyMathLab, 7th edition, Robert Blitzer, Pearson Prentice Hall [hardcover optional] @ $ 240.00 Introductory Algebra with MyMathLab, 7th edition, Robert Blitzer, Pearson Prentice Hall [loose-leaf optional] @ $174.00 StandaloneMyMathLab Access Code. [required] @ $121.25				
Requested Amount of Funding	$10,800				

Original Per Student Cost	$121.25 to $240 depending on the option selected by student
Post-Proposal Projected Per Student Cost	$0
Projected Per Student Savings	$121.25 to $240
Projected Total Annual Student Savings	*$121.25 x 805 = $97606.25; $240 x 805 = $193,200* *$97606.25 to $193,200*
Creation and Hosting Platforms Used	*D2L* *LibGuides (with Creative Commons Open License)*

NARRATIVE

1.1   PROJECT GOALS

- Student Savings
  - Replace the current textbook with *Beginning and Intermediate Algebra, 2nd Edition* by Tyler Wallace a free open-source textbook.
  - Replace the MyMathLab online homework platform with MyOpenMath, a free installation of an Internet Mathematics Assessment System (IMATHAS).
  - Provide students with free access to course materials on day one of each semester.
- Faculty Flexibility and Course Uniformity
  - Create tailor-made course materials including textbook, syllabus, slideshows, video library, and online assessments that correspond to course objectives defined by the mathematics learning support curriculum committee.
  - Create a master course in D2L with all course materials that can be shared with all EGSC Math Faculty.

  o Share all course materials with colleagues at other institutions via LibGuides.

1.2 STATEMENT OF TRANSFORMATION

- Describe the transformation

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1.3 TRANSFORMATION ACTION PLAN

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1.4 QUANTITATIVE AND QUALITATIVE MEASURES

Quantitative Measures
a) Success Rates
This project will evaluate the Spring 2017 semester Success rates for Foundations of College Algebra versus the Spring, Summer, and Fall 2016 semesters Success rates for Foundations of College Algebra. A success in Foundations of College Algebra is defined as a student earning a grade of A, B, or C. Students can additionally earn grades of IP, F, W, or WF which all constitute an unsuccessful attempt.

b) Pretest-Posttest Scores
EGSC administers a pretest and posttest to all students for all courses. Thus, an ANOVA analysis will be conducted for both the pretest and posttest scores for students who took MATH 0989 in Spring 2016, Summer 2016, Fall 2016, and Spring 2017.

Qualitative Measures
Qualitative measures from Student Course Evaluations will be compared for MATH 0989 before and after implementation. Additionally, at the start and end of the project a survey will be conducted to determine students' opinions of course material including, but not limited to, organization, availability, difficulty, clarity, and cost of course material.

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source resources to other course, quality of current and textbook package, and suitability of current textbook to meet established departmental course objectives.

1.5 TIMELINE

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August – Based on approval of the mathematics learning support committee and dean of the School of Mathematics and Sciences, implement the new textbook/online homework platform for all remedial mathematics courses campus-wide.

1.6 BUDGET

Budget Category	Amount
1. Personnel	$10,000
2. Travel	$800.00
3. Equipment	$0.00

4. Supplies	$0.00
5. Consultants/Contracts	$0.00
6. Other Costs	$0.00
7. Indirect Costs	$0.00
8. **Total**	**$10,800**

Mr. Andrews and Mr. Drummer will be compensated $5000 each for the extra time required to complete the project.

Project staff is required to attend the Affordable Learning Georgia Kickoff Event held on the campus on Middle Georgia State University in Macon, GA. Travel cost associated with this event is $800.

There is no additional costs associated with equipment, supplies (all materials are will be in digital format), consultants/contracts (free training and resources are provided by the grantor), office space, or indirect costs.

1.7   SUSTAINABILITY PLAN

Once funding for the project has ended no additional cost will be required as the course materials can be readily shared with colleagues because of the following:

Internal to EGSC

1) D2L courses can be copied from the master D2L course and modified as needed.

2) The selected textbook is open-source, thus any changes to a newer edition could be easily modified or excluded to meet the curriculum goals of the institution.

External to EGSC

1) External colleagues can access the course materials via LibGuides.

2) The selected textbook is open-source, thus any changes to a newer edition could be easily modified or excluded to meet the curriculum goals of any institution.

1.8   REFERENCES & ATTACHMENTS

National Center of Educational Statistics (2016). College navigator: East Georgia State College. Retrieved from https://nces.ed.gov/collegenavigator/?q=east+georgia+state+college&s=all&id=139621#general

Syllabus

MATH 0989 Course Layout

Textbook: [Beginning and Intermediate Algebra](#) **by Tyler Wallace is licensed under a Creative Commons 3.0 License.**

Textbook Section	
Module 1 - Introduction to Algebra	
0.3	[Order of Operations](#)
0.4	[Properties of Algebra](#)
Module 2 - Linear Equations	
1.1	[One-Step Equations](#)
1.2	[Two-Step Equations](#)
1.3	[General Linear Equations](#)
1.4	[Solving with Fractions](#)
1.5	[Formulas](#)
Module 3 - Graphing Linear Equations and Inequalities	
2.1	[Points and Lines](#)
2.2	[Slope](#)
2.3	[Slope-Intercept Form](#)
2.4	[Point-Slope Form](#)
2.5	[Parallel & Perpendicular Lines](#)
3.1	[Solve and Graph Inequalities](#)
3.2	[Compound Inequalities](#)
Module 4 - Polynomials	
5.1	[Exponent Properties](#)
5.2	[Negative Exponents](#)
5.4	[Introduction to Polynomials](#)
5.5	[Multiply Polynomials](#)
5.6	[Multiply Special Products](#)
5.7	[Divide Polynomials](#)
Module 5 - Factoring	
6.1	[Greatest Common Factor](#)

Corresponding Video Library by Module (All available via YouTube)

Simplifying and Solving Linear Equations	Linear Equations and Inequalities	Graphing Linear Equations	Polynomials	Factoring	Rational and Radical Expressions
Order of Operations	**Linear Equations**	**Inequalities**	**Exponents**	**GCF and Grouping**	**Reduce Rational Expressions**
Introduction	One Step Equations	Graphing	Product Rule	Find the GCF	Evaluate
Parenthesis	Two Step Equations	Interval Notation	Quotient Rule	Factor the GCF	Reduce Fractions
Fractions	General	Solving	Power Rules	Binomial GCF	Reduce Monomials
Absolute Value	Fractions	Tripartie	Zero	Grouping	Reduce Polynomials
Simplify Algebraic Expressions	Distributing with Fractions	**Graphing and Slope**	Negative Exponents	Grouping with Order Change	**Simplify Radicals**
Evaluate	**Formulas**	Points and Lines	Properties	**Trinomials**	Prime Factorization
Combine Like Terms	Two Step Formulas	Slope from a Graph	**Polynomials**	a is not 1 (part 1)	Divide Exponent by Index (perfect roots)
Distributive Property	Multi Step Formulas	Slope from Two Points	Evaluate	a is not 1 (part 2)	Divide Exponent by Index (not perfect roots)
Distribute and Combine	Fractions		Add/Subtract	a is not 1 with GCF (part 1)	With Coefficient
		Equations of Lines	Multiply Monomial by Polynomial	a is not 1 with GCF (part 2)	With Variables
		Slope-Intercept Equation	Multiply Binomial by Binomial	a = 1	**Rational Exponents**
		Put Equation in Intercept Form	Multiply with Trinomials	a = 1 with GCF	Convert
		Equation from Graph	Multiply Monomial by two Binomials	**Special Products**	Evaluate
		Verticle/Horizontal Lines	Sum and Difference	Difference of Squares	Simplify (Part 1)

Final Report

Affordable Learning Georgia Textbook Transformation Grants

Final Report

Date: 8/11/2017

Grant Number: 270

Institution Name(s): East Georgia State College

Team Members (Name, Title, Department, Institutions if different, and email address for each): Da'Mon Andrews, Assistant Professor of Mathematics, School of Mathematics and Natural Sciences, dandrews@ega.edu; Antre' Drummer, Assistant Professor of Mathematics, School of Mathematics and Natural Sciences; amdrummer@ega.edu

Project Lead: Da'Mon Andrews

Course Name(s) and Course Numbers: MATH 0989 – Foundations for College Algebra

Semester Project Began: Fall 2017

Semester(s) of Implementation: Spring 2017; Summer 2017

Average Number of Students Per Course Section: Spring and Summer 2017: 161 students by 11 sections across three campuses = 15 students/section

Number of Course Sections Affected by Implementation: 4

Total Number of Students Affected by Implementation: 60 (37.3%)

1. Narrative

Overall the project was a success. Student outcomes were better than those of prior semesters and consistent with those of non-ALG courses during the implementation period. Based on this project, we have optimism that no-cost course materials can provide significant cost savings to students without diminishing course success rates. However, since our project took place during the spring and summer semesters the mathematics department must be aware of the challenges that may exist if the project was implemented at scale during a fall semester because of larger student enrollment in the course.

The major challenge was trying to integrate the MyOpenMath.com platform into D2L via Learning Tools Interoperability (LTI). Our initial goals were to use LTIs to provide students with a single sign-on experience and gradebook synchronization. This functionality would provide students with two major benefits: (1) they would not have to remember another set of username and password combinations; and (2) their D2L gradebooks would automatically update following the completion of assignments in the MyOpenMath.com platform providing real-time updates regarding their overall grade.

From an instructional perspective, this project allowed us the freedom to focus more on student learning and not become sidetracked by textbook coverage which is sometimes the case when dealing with textbook/software packages. We focused more on which textbook sections would supplement our instructional plan.

B. Describe lessons learned, including any things you would do differently next time.

The results on our data analysis indicate that MATH 0989 students benefited more from the free online course learning platform than from access to the open-access textbook. Additionally, the LTI integration was a major challenge as it is a laborious process as every assignment had to have its own link created. An additional complication arose when trying to make multiple copies of the course in the online learning platform for multiple sections as each section had to have its own set of links. A less frustrating alternative is just to provide students with the same username that use for D2L and allow them to log into MyOpenMath.com directly.

2. Quotes

"The experience with using free course materials this semester was very relieving. Along with the knowledge of Mr. Andrews gaining the tools necessary to do the assignments came along pretty easily."

"A good experience overall"

"The free course materials were a great bonus to the class. I didn't have to worry about finding, ordering and purchasing a book. "

3. Quantitative and Qualitative Measures

3a. Overall Measurements

Student Opinion of Materials

Was the overall student opinion about the materials used in the course positive, neutral, or negative?

Total number of students affected in this project: 60

Readability of the Textbook

- Positive: 40.6% of 32 number of respondents
- Neutral: 50% of 32 number of respondents
- Negative: 9.4% of 32 number of respondents

Utilization of the Textbook

- Consistent Use: 18.8% of 32 number of respondents
- Some Use: 31.2% of 32 number of respondents

- Did not Use: 50% of 32 number of respondents

Usefulness of Online Homework Platform for Course Assessments

- Positive: 90.6% of 32 number of respondents
- Neutral: 3.1% of 32 number of respondents
- Negative: 6.3 % of 32 number of respondents

Cost Comparison to Similar Credit Hours Course Materials

- Less Expensive: 68.8% of 32 number of respondents
- Similar: 18.8% of 32 number of respondents
- More Expensive: 12.5% of 32 number of respondents

Student Learning Outcomes and Grades

Was the overall comparative impact on student performance in terms of learning outcomes and grades in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Student outcomes should be described in detail in Section 3b.

Choose One:
- _x_ Positive: Higher performance outcomes measured over previous semester(s)
- ___ Neutral: Same performance outcomes over previous semester(s)
- ___ Negative: Lower performance outcomes over previous semester(s)

Student Drop/Fail/Withdraw (DFW) Rates

Was the overall comparative impact on Drop/Fail/Withdraw (DFW) rates in the semester(s) of implementation over previous semesters positive, neutral, or negative?

Drop/Fail/Withdraw Rate:

38.3% of students, out of a total 60 students affected, dropped/failed/withdrew from the course in the final semester of implementation.

Choose One:

- _x_ Positive: This is a lower percentage of students with D/F/W than previous semester(s)
- ___ Neutral: This is the same percentage of students with D/F/W than previous semester(s)
- ___ Negative: This is a higher percentage of students with D/F/W than previous semester(s)

3b. Narrative

The supporting data file includes student survey results for Spring 2017 and Summer 2017 and MATH 0989 course grade outcomes from Spring 2015 to Summer 2017 where a success in Foundations of College Algebra is defined as a student earning a grade of A, B, or C. Students can additionally earn grades of IP, F, W, or WF which all constitute an unsuccessful attempt.

During semesters prior to implementation of the ALG project 836 students enrolled in MATH 0989. 458 (54.8%) students passed the course and 378 (45.2%) did not pass the course.

During the semesters of the project, 60 students were enrolled in the ALG project sections of whom 37 (61.7%) students passed the course and 23 (38.3%) did not. Additionally, there were 102 students enrolled in non-ALG project sections of whom 63 (61.8%) students passed the course and 39 (38.2%) did not. The results indicate that students performed just as well in ALG courses and non-ALG courses.

Survey results indicated that 65 percent of students enrolled in MATH 0989 prior to ALG project implementation accessed an e-text whereas 56.25 percent of students who participated in the ALG project used an e-text. However, there were large percentages, 31.25% and 22.50% respectively, of ALG and non-ALG students that did not access the textbook.

Also, the results indicate that most ALG and non-ALG students do not use the utilize the textbooks, 53.13% and 42.50%, respectively. This results could be skewed because of the large number of students who left the question blank which could indicate that wording of the questions was confusing (we had similar results regarding the readability of the textbook).

Results from both the ALG and non-ALG groups, 90.63% and 77.50% respectively, indicated that students feel MyOpenMath.com and MyMathLab.com adequately prepares them for course assessments. One potential reason for this difference is that ALG students had access to course materials at the start of the course and did not have to purchase an access code.

With respect to the cost of course materials, 87.50% of ALG students versus 42.50% of non-ALG groups indicated that the course materials cost the same amount or less than materials for a course of similar credit.

Mathematics faculty teaching MATH 0989 were invited to participating in a survey to determine faculty members' willingness to use open-source resources, quality of current software and textbook package, and suitability of current textbook to meet established

departmental course objectives. However, only two faculty members participated in the survey including the principal investigator of this study. Thus, those results were excluded from analysis to eliminate bias with respect to faculty perceptions, but are included in the attached data file.

4. Sustainability Plan

The open access textbook will continue to serve as an option for the MATH 0989 course. This will allow mathematics faculty a solid textbook that can be remixed to meet our department's needs in response to course level assessment data. Additionally, the MyOpenMath.com website will continue to be monitored as it currently serves as a free version of Lumen's Learning paid version of the same platform. Assuming the free version continues as an option for the foreseeable future, mathematics faculty can offer students no-cost course materials options.

5. Future Plans

This project has served as a catalyst to the investigation of no-cost course materials for other courses. However, it would be prudent to thoroughly investigate the course materials. Specifically, in cases where online assessment platforms are used. We would not recommend trying to implement advanced features such as Learning Tools Interoperability (LTI) to sync grades between the online platform and learning management system (D2L in our case) because there is a learning curve and the process can be extremely cumbersome and frustrating particularly when there is no technical support provided.

We currently do not have any plans to publish or present our findings at a state or national level. However, we are very interested in collaborating with colleagues who are interested in implementing no-cost materials in their courses.

6. Description of Photograph

- *(left-right) Antre' Drummer, Assistant Professor of Mathematics; Da'Mon Andrews, Assistant Professor of Mathematics*