Fall 2018

College Algebra (ASU)

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Grants Collection
Albany State University

UNIVERSITY SYSTEM OF GEORGIA

Zephyrinus Okonkwo, Anilkumar Deverapu, Anthony Smith, Taylor Wars, Vijay Kunwar, Laxmi Paudel

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 Ten

Award Cycle:	Round 10
Internal Submission Deadline:	Friday, September 29, 2017

Application Title:	345
Application ID:	001889
Submitter First Name:	Melisa
Submitter Last Name:	Widner
Submitter Title:	Grants Management Coordinator
Submitter Email Address:	melisa.widner@asurams.edu
Submitter Phone Number:	229-420-7040
Submitter Campus Role:	Sponsored Programs Office
Applicant First Name:	Zephyrinus
Applicant Last Name:	Okonkwo
Co-Applicant Name(s):	Anilkumar Devarapu
Applicant Email Address:	zephyrinus.okonkwo@asurams.edu
Applicant Phone Number:	229-430-1833
Primary Appointment Title:	Professor
Institution Name(s):	Albany State University
Submission Date:	Monday, October 2, 2017

Proposal Title:	345
Proposal Category:	No-Cost-to-Students Learning Materials
Are you using an OpenStax textbook?:	Yes
Final Semester of Instruction:	Fall 2018

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

Zephyrinus C. Okonkwo, Ph.D.

Professor of Mathematics, Department of Mathematics and Computer Science

zephyrinus.okonkwo@asurams.edu

Anilkumar Devarapu, Ph.D.

Associate Professor of Mathematics, Department of Mathematics and Computer Science

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Anthony Smith, MAT

Assistant Professor of Mathematics, Department of Mathematics and Computer Science

anthony.smith@asurams.edu

Vijay Kunwar, Ph.D.

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Laxmi Paudel, Ph.D.

Assistant Professor of Mathematics, Department of Mathematics and Computer Science

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Taylor Wars, M.S.

Assistant Professor of Mathematics, Department of Mathematics and Computer Science

taylor.wars@asurams.edu

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

Robert S. Owor, PhD.

Professor and Chair of the Department of Mathematics and Computer Science

Albany State University

robert.owor@asurams.edu

Course Names, Course Numbers and Semesters Offered:

MATH 1111 College Algebra, Spring/Summer/Fall of each Year

List the original course materials for students (including title, whether optional or required, & cost for each item):	College Algebra by Larson, 8th/10th Edition, Cengage LearningThis book is require at a cost of $150 per student.
Average Number of Students per Course Section:	30
Number of Course Sections Affected by Implementation in Academic Year:	90

Average Number of Course Sections Per Semester:

There is an average of 80 course selections during the academic year and 10 during the summer term, totaling an average of 90 course selections each year.

Total Number of Students Affected by Implementation in Academic Year:	2700
Requested Amount of Funding:	30800
Original per Student Cost:	$150/student
Post-Proposal Projected Student Cost:	$0/student
Projected Per Student Savings:	$150
Projected Total Annual Student Savings:	$405,000

Project Goals:

1. PROJECT GOALS

To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and free online textbook.
To improve student engagement in learning of MATH 1111-College Algebra, and enhance student success and achievement in the course.
To motivate student interest in the use of online based technology to solve real-life problems encountered in College Algebra
To increase enrollment of students in College Algebra through the provision of no-cost textbook and learning materials.
To create a standardized online College Algebra course by incorporating innovative pedagogy, enriched learning resources, and assessments which is scalable on an instructional delivery platform.

Statement of Transformation:

1.1 STATEMENT OF TRANSFORMATION

For more than twenty years, most of our students have been finding it difficult to purchase class textbooks due to rising cost of textbooks and learning materials. The MATH 1111 – College Algebra textbook is very expensive and many of our students are unable to purchase the textbook due to the excessive cost. In many sections of the College Algebra course, less than 15% of students or five out of thirty-five in one class are able to buy the textbook, with the remaining 85% of students not having real-time active engagement during most class activities. This has reduced student success rate in the classes as well as students' ability to engage in productive learning outside the classroom. Hence, students are unable to garner deep content knowledge of the concepts learned in the course and the applications of such concepts to real life. Textbook cost has also reduced the number of students taking the course. The development of this no-cost OER textbook will improve student understanding, engagement, achievement, and interest in the course.

Our team will develop about 80 pages of course support/supplemental materials; together with the adopted open resources textbook, will enhance pedagogy and learning in the course.. This way every student taking the course will be able to read the most essential course material and do the appropriate course assessments and practice problems. At the present time, the textbook we are using is 674 pages long, with students required to cover more than 400 pages of the textbook for this single course.

MATH 1111 requires substantial coverage of topics and concepts while still allowing instructors the flexibility to adapt certain materials and innovative pedagogical techniques to meet the outcomes. Student success in College Algebra has wider ramification on student retention, progression, and degree completion across all majors at Albany State University (ASU). During fall 2017, ASU scheduled fifty sections of the College Algebra course and with about one-thousand four-hundred students enrolled in the course. About ninety percent of these students are first time freshmen.

During our preparation of support course materials, we shall consult colleagues within our department and other faculty members in other departments, seek their input and recommendations, and adopt their recommendations. We will do this in order to adopt more concepts dealing with applications since the majority of College Algebra takers are non-STEM majors.

We plan to adopt the best practices in pedagogy, assessment, and learning. Our team will adequately explore and develop seamless learning and assessment materials, including developing and adopting certain problem-solving and simulation software, which will attract students' engagement and interest. All faculty members who will use the textbook will have the

freedom to use pedagogical methods that most fit their teaching styles as well as the learning styles of their students. All students will have seamless access to the course materials, including having access on their mobile devices any time, any day.

Transformation Action Plan:

1.2 TRANSFORMATION ACTION PLAN

This project will not require any changes in the syllabus; the course description, goal of the course, course learning outcomes, and specific objectives of the course will remain unchanged. However, there will be an alignment of pedagogy and assessment with the adopted Open Stax textbook. The team members and other faculty members using the course materials developed through this project will have collaboration, including meeting regularly to examine project activities and associated data. Collaboration will lead us to develop measures which will ensure success of the project as well as effectiveness of the project. MATH 1111-College Algebra is presently taught through on campus and online options. The support materials developed through this project as well as all assessment materials and other course materials will be placed in D2L. Some assessments, including some tests, will be placed in D2L as deemed necessary and convenient by individual instructors. All College Algebra sections will be enriched by developing and placing additional learning resources on D2L with exportable capabilities, that is, any faculty can “Copy Course” and customize the course within and outside Albany State University. The finished products will be in Word, Latex, and pdf.

Dr. Anilkumar Devarapu, Dr. Vijay Kunwar, Professor Anthony Smith, Professor Taylor Wars, Dr. Laxmi Paudel, and Dr. Zephyrinus Okonkwo will discuss the outline of the textbook and project implementation plan with other faculty members within the department. Faculty members will be invited to suggest possible college algebra projects which could enhance course quality. Such projects will be included in the learning materials we will develop through this grant.

Dr. Li Feng will serve as the project reviewer. He is a Professor of Mathematics. He has taught undergraduate and graduate courses in Mathematics for more than twenty-two years. He will examine the appropriateness and relevance of the content, pedagogy, and adequate alignment of the content of the textbook with the course learning outcomes.

Quantitative & Qualitative Measures:

1.3 QUANTITATIVE AND QUALITATIVE MEASURESThe development of OER provides the instructors and students the opportunity to take complete control of the course. More students will enroll in the course due to the fact that the course is no-cost textbook course. More importantly, the textbook will be available on D2L before the first day of class. This will enable the instructors to give reading assignments and out-of-class activities from the book. Furthermore, more instructors teaching College Algebra will adopt the textbook thereby saving the students enormous amount of money.instructors are unable to receive appropriate pedagogical and assessment support from textbook publishers. In case one receives such support, editing such materials is not allowed. This project will give us an opportunity to develop a stand-alone OER course material which will provide flexibility in instruction, learning, and assessment. Furthermore, we will also develop the course material guide which will provide easy guidance for instructors. Our department will provide hard copies to instructors. The course guide will also be reposed on D2L.We will use both quantitative and qualitative approaches for the assessment of our OER materials. We will collect the data during spring 2018 prior to the launch of OER material. This will be our control group. The data obtained from project implementation semesters/periods will be compared with the data from control group and will be analyzed. The results will be used for continuous project improvement.The team members will teach at least 18 sections of College Algebra in spring 2017, eight sections in summer 2018, and twenty-five sections in fall 2018. We will invite other instructors of College Algebra to use the materials as well during the above mentioned semesters and subsequently. We will collect both qualitative and quantitative data, as outlined below, from all College Algebra sections during spring 2018 (control group) and at least 3 subsequent OER implementation groups.Quantitative Measures: The following

quantitative data will be collected, compared, and analyzed (control group vs. OER implementation group):Number of students enrolled in the College Algebra course (total and average)Number of students impactedNumber of course sections offeredRetention rates (both in individual sections and aggregate)Early drop-out ratesWithdrawal ratesStudent success rates (pre-test, mid-term test, final test, and end of each semester.Mean GPA of studentsCollected data will be organized, compared, and analyzed using graphs, descriptive and inferential statistical tools. Appropriate significance tests such as z-test, t-test, ANOVA etc. will be done for comparative data analysis.Qualitative Measures: We will use both formative and summative survey questionnaires, and open ended interview questions among participant faculty and students to collect qualitative data. The following qualitative data will be collected, compared, and analyzed (control group vs. OER implementation group):Quality of the course materialsUsefulness of the course materialsAccessibility of the course materialsPreference or further recommendation of the course materialsAs stated earlier, the formative assessments is aimed at receiving feedback from participants, which in turn will enable project improvement.

Timeline:

1.4 TIMELINE

Dr. Zephyrinus C. Okonkwo will be the manager of the project. He will oversee that the timelines and deadlines are met. Dr. Anilkumar Devarapu will be in-charge of all data collection. Data Analysis will be done by the team.

November 6, 2017: Attend the required Kick-Off meeting

December 5, 2017: Search for open source textbook for College Algebra courses and select the book to be adopted.

December 30, 2017: Revise existing syllabi for College Algebra course and prepare necessary redesigning/modifications.

January 8, 2018: Share and discuss the project plans with mathematics faculty within the department. Introduce open source textbook and syllabi. Collect instructors' feedback.

May 25, 2018: Develop appropriate course materials; concepts, worked out examples, unit/section/benchmark prototype tests will also be included. Review and test all developed components to check if they are accurate, appropriate, and adequate. By this time, the first sets of data from the control group as outlined should have been collected.

July 25, 2018: Develop and incorporate projects, necessary software implementations, and more intuitive examples, practice problems, and tests.

August 3, 2018: Introduce and discuss the OER materials developed with fellow mathematics instructors. Collect participants' feedback. Encourage all College Algebra course instructors to adopt the material for fall 2018.

August 10, 2018: Organize workshops on "OER materials for College Algebra and software implementation" for colleagues. Collect participants' feedback.

August 24, 2018: Data collection and analysis of students' performance on pre-test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.

October 15, 2018: Data collection and analysis of students' performance on midterm term test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials. Collect students' feedback about their feeling and usefulness of the new material and analyze the data.

October 20, 2018: Prepare and submit the mid semester report.

November 10, 2018: Share and discuss the data analysis on students' performance on pre-test, mid-term test, and students' feedback on new material with the faculties within the department. Collect their feedback.

December 10, 2018: Data collection and analysis on students' performance on the final test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.

December 17, 2018: Data collection and analysis on students' semester end grades and their mean GPA. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.

December 20, 2018: Prepare and submit the final report.

Budget:

1.5 BUDGET

Supplemental compensation is being requested for the project services being performed by the following faculty members:

Dr. Zephyrinus Okonkwo, $4,600
Dr. Anilkumar Devarapu, $4,600
Dr. Vijay Kunwar, $4,600
Professor Anthony Smith, $4,600
Professor Taylor Wars, $4,600
Dr. Laxmi Paudel, $4,600
Dr. Li Feng, $1,600

In addition, travel funds are being requested for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.

Travel, $800

Sustainability Plan:

1.6 SUSTAINABILITY PLAN

1111-College Algebra is offered every semester at Albany State University. Data indicates that during the fall 2017, 50 sections of this course were offered, with about 1,400 enrolled students. Implementation of this project will accomplish the delineated goals, and yet accomplish the predetermined course outcomes. It will also have a broader impact. The OER textbook will be offered to faculty members in the format they choose. The learning and all support materials will be placed on a link for our faculty members. Students will be availed the opportunity to download the pdf version on D2L. Furthermore, our instructors can download the instructional materials and textbook from D2L or “Copy Course.”

Albany State University

MATHEMATICS & COMPUTER SCIENCE

September 29, 2017

Re: Affordable Learning Georgia Textbook Transformation Grant

Dear Sir/Madam:

I am very glad to write this letter in support of our faculty members who are applying for the Affordable Learning Georgia Textbook Grant. The team from Albany State University Department of Math and Computer Science in the College of Science and Technology consists of Zephyrinus Okonkwo, Anilkumar Devarapu, Anthony Smith, Laxmi Paudel and Vijay Kunwar. They wish to develop a no-cost textbook for our students taking the MATH 1111-College Algebra course at Albany State University. The cost of textbooks have continued to rise, and today the cost of a mathematics, statistics, or computer science textbook is more than fifty percent above what it was ten years ago. Since coming on board at Albany State University, I have negotiated textbook cost reduction with several publishers, yet the cost continuous to rise unhindered. By developing a no-cost textbook, the committee will be making available to our students, much needed support which ultimately contributes towards greater student success. Most students who enroll will be able to have the resources they need to succeed in MATH 1111-College Algebra, as they will have access to a free textbook and associated learning materials.

The committee has consulted with other faculty members who teach College Algebra in the Department of Mathematics and Computer Science.

The College of Science and Technology supports this no-cost textbook development objective, and we will also help disseminate the textbook. It is our goal to share this textbook with faculty members in the other departments. Essentially, students at Albany State University could save several thousand dollars a year once this project is fully implemented.

I strongly support their application and subsequent award of an Affordable Learning Georgia Grant.

Sincerely yours,

Seyed Roosta

Dr. Seyed Roosta
Professor and Dean

Albany State University

DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
Albany, GA 31705
September 27

Re: Affordable Learning Georgia Textbook Transformation Grant
Date: September 27, 2017

Dear Sir/Madam:
I am most pleased to write this letter in support of six of our faculty members, Zephyrinus Okonkwo, Anilkumar Devarapu, Anthony Smith., Vijay Kunwar, Laxmi Paudel, and Taylor Wars, who have applied for the Affordable Learning Georgia textbook Transformation Grant to develop a no-cost textbook for students taking MATH 1111-Colege Algebra at Albany State University. As you are aware, the cost of textbooks have continued to rise, and mathematics books are the most expensive textbooks used by our students, with College Algebra being the most expensive of books at the freshman level. Students taking five courses a semester sometimes spend about $1200 on textbooks each semester. Essentially, the cost of textbooks have continued to hinder student enrollment and success in College Algebra.

During the fall of 2017, ASU has fifty sections of College Algebra scheduled with about one-thousand four-hundred students enrolled.

By developing this no-cost textbook College Algebra course for our students, Dr. Zephyrinus Okonkwo, Dr. Anilkumar Devarapu, Professor Anthony Smith., Dr. Vijay Kunwar, Dr. Laxmi Paudel, and Professor Taylor Wars will be doing an enviable job for our students and university. The course, which will be developed through this project, will save a lot of money for many of our students, and could lead to enhanced student achievement in the course.

I support this grant proposal and I recommend very strongly the funding of this proposal.

Yours sincerely

Robert S. Owor, Ph.D.
Professor and Chair

Affordable Learning Georgia Textbook Transformation Grant

Round 10

Spring 2018, Summer 2018, Fall 2018

Proposal Form and Narrative

Level of Funding Requested: Large-Scale textbook Transformation Project

Institution	Albany State University				
Team Members (Name, Title, Department, Institutions if different, and email addresses of each)	Zephyrinus C. Okonkwo, Ph.D., Professor of Mathematics, Department of Mathematics and Computer Science, zephyrinus.okonkwo@asurams.edu Anilkumar Devarapu, Ph.D., Associate Professor of Mathematics, Department of Mathematics and Computer Science, anilkumar.devarapu@asurams.edu Anthony Smith, MAT, Assistant Professor of Mathematics Department of Mathematics and Computer Science anthony.smith@asurams.edu Vijay Kunwar, Ph.D. Assistant Professor of Mathematics Department of Mathematics and Computer Science vijay.kunwar@asurams.edu Laxmi Paudel, Ph.D., Assistant Professor of Mathematics Department of Mathematics and Computer Science laxmi.paudel@asurams.edu Taylor Wars, M.S., Assistant Professor of Mathematics Department of Mathematics and Computer Science taylor.wars@asurams.edu				
Sponsor, Title, Department, Institution	Robert S. Owor, PhD., Professor and Chair of the Department of Mathematics and Computer Science robert.owor@asurams.edu				
Course Names, Course Numbers, and Semesters Offered (Spring 2018, Summer 2018, Fall 2018)	MATH 1111 College Algebra, Spring/Summer/Fall of each Year				
Average Number of Students per course Section	30 per regular year 30 per Summer	Number of Sections Affected by Implementation in Academic Year 2018	80 per regular year 10 per summer	Total Number of Students Affected by Implementation in Academic Year 2017	2,700
Award Category	• No-Cost-to-Students Learning Materials				
List the original course materials for students (including title, whether optional or required, & cost	College Algebra by Larson, 8th /10th Edition, Cengage Learning	BUY NEW: $150.00 Total Savings: $405,000			

for each item			
Plan for Hosting Materials	• **D2L**		
Projected Per Student Cost	ZERO DOLLARS	Projected Per Student Savings (%)	100%

1. PROJECT GOALS

1. To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and free online textbook.
2. To improve student engagement in learning of MATH 1111-College Algebra, and enhance student success and achievement in the course.
3. To motivate student interest in the use of online based technology to solve real-life problems encountered in College Algebra
4. To increase enrollment of students in College Algebra through the provision of no-cost textbook and learning materials.
5. To create a standardized online College Algebra course by incorporating innovative pedagogy, enriched learning resources, and assessments which are scalable on an instructional delivery platform.

2.

2.1. STATEMENT OF TRANSFORMATION

3. For more than twenty years, most of our students have been finding it difficult to purchase class textbooks due to rising cost of textbooks and learning materials. The MATH 1111 – College Algebra textbook is very expensive and many of our students are unable to purchase the textbook due to the excessive cost. In many sections of the College Algebra course, less than 15% of students or five out of thirty-five in one class are able to buy the textbook, with the remaining 85% of students not having real-time active engagement during most class activities. This has reduced student success rate in the classes as well as students' ability to engage in productive learning outside the classroom. Hence, students are unable to garner deep content knowledge of the concepts learned in the course and the applications of such concepts to real life. Textbook cost has also reduced the number of students taking the course. The development of this no-cost OER textbook will improve student understanding, engagement, achievement, and interest in the course.
4. Our team will develop about 80 pages of course support/supplemental materials; together with the adopted open resources textbook, will enhance pedagogy and learning in the course.. This way every student taking the course will be able to read the most essential course material and do the appropriate course assessments and practice problems. At the present time, the textbook we are using is

674 pages long, with students required to cover more than 400 pages of the textbook for this single course.

5. MATH 1111 requires substantial coverage of topics and concepts while still allowing instructors the flexibility to adapt certain materials and innovative pedagogical techniques to meet the outcomes. Student success in College Algebra has wider ramification on student retention, progression, and degree completion across all majors at Albany State University (ASU). During fall 2017, ASU scheduled fifty sections of the College Algebra course and with about one-thousand four-hundred students enrolled in the course. About ninety percent of these students are first time freshmen.

6. During our preparation of support course materials, we shall consult colleagues within our department and other faculty members in other departments, seek their input and recommendations, and adopt their recommendations. We will do this in order to adopt more concepts dealing with applications since the majority of College Algebra takers are non-STEM majors.

7. We plan to adopt the best practices in pedagogy, assessment, and learning. Our team will adequately explore and develop seamless learning and assessment materials, including developing and adopting certain problem-solving and simulation software, which will attract students' engagement and interest. All faculty members who will use the textbook will have the freedom to use pedagogical methods that most fit their teaching styles as well as the learning styles of their students. All students will have seamless access to the course materials, including having access on their mobile devices any time, any day.

8.

9. **1.2 TRANSFORMATION ACTION PLAN**

10. This project will not require any changes in the syllabus; the course description, goal of the course, course learning outcomes, and specific objectives of the course will remain unchanged. However, there will be an alignment of pedagogy and assessment with the adopted Open Stax textbook. The team members and other faculty members using the course materials developed through this project will have collaboration, including meeting regularly to examine project activities and associated data. Collaboration will lead us to develop measures which will ensure success of the project as well as effectiveness of the project. MATH 1111- College Algebra is presently taught through on campus and online options. The support materials

developed through this project as well as all assessment materials and other course materials will be placed in D2L. Some assessments, including some tests, will be placed in D2L as deemed necessary and convenient by individual instructors. All College Algebra sections will be enriched by developing and placing additional learning resources on D2L with exportable capabilities, that is, any faculty can "Copy Course" and customize the course within and outside Albany State University. The finished products will be in Word, Latex, and pdf.

11. Dr. Anilkumar Devarapu, Dr. Vijay Kunwar, Professor Anthony Smith, Professor Taylor Wars, Dr. Laxmi Paudel, and Dr. Zephyrinus Okonkwo will discuss the outline of the textbook and project implementation plan with other faculty members within the department. Faculty members will be invited to suggest possible college algebra projects which could enhance course quality. Such projects will be included in the learning materials we will develop through this grant.

12. Dr. Li Feng will serve as the project reviewer. He is a Professor of Mathematics. He has taught undergraduate and graduate courses in Mathematics for more than twenty-two years. He will examine the appropriateness and relevance of the content, pedagogy, and adequate alignment of the content of the textbook with the course learning outcomes.

13.

14. **1.3 QUANTITATIVE AND QUALITATIVE MEASURES**

15. The development of OER provides the instructors and students the opportunity to take complete control of the course. More students will enroll in the course due to the fact that the course is no-cost textbook course. More importantly, the textbook will be available on D2L before the first day of class. This will enable the instructors to give reading assignments and out-of-class activities from the book. Furthermore, more instructors teaching College Algebra will adopt the textbook thereby saving the students enormous amount of money.

16. Several instructors are unable to receive appropriate pedagogical and assessment support from textbook publishers. In case one receives such support, editing such materials is not allowed. This project will give us an opportunity to develop a stand-alone OER course material which will provide flexibility in instruction, learning, and assessment. Furthermore, we will also develop the course material guide which will provide easy guidance for instructors. Our department will provide hardcopies to instructors. The course guide will also be reposed on D2L.

17. We will use both quantitative and qualitative approaches for the assessment of our OER materials. We will collect the data during spring 2018 prior to the launch of OER material. This will be our control group. The data obtained from project implementation semesters/periods will be compared with the data from control group and will be analyzed. The results will be used for continuous project improvement.

18. The team members will teach at least 18 sections of College Algebra in spring 2017, eight sections in summer 2018, and twenty-five sections in fall 2018. We will invite other instructors of College Algebra to use the materials as well during the above mentioned semesters and subsequently. We will collect both qualitative and quantitative data, as outlined below, from all College Algebra sections during spring 2018 (control group) and at least 3 subsequent OER implementation groups.

19. **Quantitative Measures:** The following quantitative data will be collected, compared, and analyzed (control group vs. OER implementation group):

- Number of students enrolled in the College Algebra course (total and average)
- Number of students impacted
- Number of course sections offered
- Retention rates (both in individual sections and aggregate)
- Early drop-out rates
- Withdrawal rates
- Student success rates (pre-test, mid-term test, final test, and end of each semester.
- Mean GPA of students

20. Collected data will be organized, compared, and analyzed using graphs, descriptive and inferential statistical tools. Appropriate significance tests such as z-test, t-test, ANOVA etc. will be done for comparative data analysis.

21. **Qualitative Measures:** We will use both formative and summative survey questionnaires, and open ended interview questions among participant faculty and students to collect qualitative data. The

following qualitative data will be collected, compared, and analyzed (control group vs. OER implementation group):

- Quality of the course materials
- Usefulness of the course materials
- Accessibility of the course materials
- Preference or further recommendation of the course materials

22. As stated earlier, the formative assessments is aimed at receiving feedback from participants, which in turn will enable project improvement.

23.

24. **1.4 TIMELINE**

25. Dr. Zephyrinus C. Okonkwo will be the manager of the project. He will oversee that the timelines and deadlines are met. Dr. Anilkumar Devarapu will be in-charge of all data collection. Data Analysis will be done by the team.

26. **November 6, 2017:** Attend the required Kick-Off meeting
27.
28. **December 5, 2017:** Search for open source textbook for College Algebra courses and select the book to be adopted.
29.
30. **December 30, 2017:** Revise existing syllabi for College Algebra course and prepare necessary redesigning/modifications.
31.
32. **January 8, 2018:** Share and discuss the project plans with mathematics faculty within the department. Introduce open source textbook and syllabi. Collect instructors' feedback.
33.
34. **May 25, 2018:** Develop appropriate course materials; concepts, worked out examples, unit/section/benchmark prototype tests will also be included. Review and test all developed components to check if they are accurate, appropriate, and adequate. By this time, the first sets of data from the control group as outlined should have been collected.
35.
36. **July 25, 2018:** Develop and incorporate projects, necessary software implementations, and more intuitive examples, practice problems, and tests.
37.

38. **August 3, 2018:** Introduce and discuss the OER materials developed with fellow mathematics instructors. Collect participants' feedback. Encourage all College Algebra course instructors to adopt the material for fall 2018.
39.
40. **August 10, 2018:** Organize workshops on "OER materials for College Algebra and software implementation" for colleagues. Collect participants' feedback.
41.
42. **August 24, 2018:** Data collection and analysis of students' performance on pre-test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.
43.
44. **October 15, 2018:** Data collection and analysis of students' performance on midterm term test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials. Collect students' feedback about their feeling and usefulness of the new material and analyze the data.
45.
46. **October 20, 2018:** Prepare and submit the mid semester report.
47.
48. **November 10, 2018:** Share and discuss the data analysis on students' performance on pre-test, mid-term test, and students' feedback on new material with the faculties within the department. Collect their feedback.
49.
50. **December 10, 2018:** Data collection and analysis on students' performance on the final test. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.
51.
52. **December 17, 2018:** Data collection and analysis on students' semester end grades and their mean GPA. Use both descriptive and inferential statistics to compare students' performance: formal textbook versus OER materials.
53.
54. **December 20, 2018:** Prepare and submit the final report.
55.

56. **1.5 BUDGET**

57. Supplemental compensation is being requested for the project services being performed by the following faculty members:

- Dr. Zephyrinus Okonkwo, $4,600
- Dr. Anilkumar Devarapu, $4,600
- Dr. Vijay Kunwar, $4,600
- Professor Anthony Smith, $4,600
- Professor Taylor Wars, $4,600
- Dr. Laxmi Paudel, $4,600
- Dr. Li Feng, $1,600

58. In addition, travel funds are being requested for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.

- Travel, $800

59. **1.6 SUSTAINABILITY PLAN**

60. MATH 1111-College Algebra is offered every semester at Albany State University. Data indicates that during the fall 2017, 50 sections of this course were offered, with about 1,400 enrolled students. Implementation of this project will accomplish the delineated goals, and yet accomplish the predetermined course outcomes. It will also have a broader impact. The OER textbook will be offered to faculty members in the format they choose. The learning and all support materials will be placed on a link for our faculty members. Students will be availed the opportunity to download the pdf version on D2L. Furthermore, our instructors can download the instructional materials and textbook from D2L or "Copy Course."

61.

62. **1.7 REFERENCES AND ATTACHMENTS**

63. The following individuals have agreed to provide letters of support for our application:

1. Dr. Robert S. Owor, Chairperson, Department of Mathematics and Computer Science, Albany State University
2. Dr. Seyed Roosta, Dean, College of Sciences and Technology, Albany State University

64.

Syllabus

Exam	Topic	Chapter / Section	Learning Assessments	Learning Outcomes from BOR
1	• Review of Graphing • Intro to Functions • Linear Functions • Application of Linear Functions • Systems of Linear Equations	2.1, 2.2, 2.6, 3.1, 3.2, 3.3, 4.1, 7.1	Exam 1, Midterm, Final Exam	A8, A9, B1, B2, B3, B5, C1
2	• Quadratic Functions • Applications of Quadratic Functions	2.5, 5.1	Exam 2, Midterm, Final Exam	A1, B2, B4, C2
Additional Topics	• Absolute Value Inequalities • Quadratic Inequalities • Operations with Complex Numbers • Piece-Wise Functions	2.4, 2.7	Midterm, Final Exam	B1, B2, C1, C2
3	• Division of Polynomials • Remainder Theorem • Factor Theorem • Polynomial Functions of Higher Degree • Zeros of Polynomial Functions • Rational Functions	5.2, 5.3, 5.4, 5.5, 5.6	Exam 3, Final Exam	B6
4	• Composition of Functions • Algebra of Functions • Inverse Functions • Exponential Functions • Logarithmic Functions	3.4, 3.7, 5.7, 6.1, 6.2, 6.3, 6.4	Exam 4, Final Exam	B1, B7

Grading:
Assignments and quizzes – 20%
4 Unproctored Exams – 40% (Given through GaView)
Proctored Midterm – 20% (Given in-class)
Proctored Final Exam – 20% (Given in-class)

Final Report

Affordable Learning Georgia Textbook Transformation Project for College Algebra

At

Albany State University (Round 10, #345) Final Report

Date: December 16, 2018

Grant Number: 345

Institution Name(s): Albany State University

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

Name	Email	Department
Dr. Zephyrinus Okonkwo	Zephyrinus.Okonkwo@asurams.edu	Mathematics and Computer Science
Dr. Anilkumar Devarapu	Anilkumar.Devarapu@asurams.edu	Mathematics and Computer Science
Professor Anthony Smith	Anthony.smith@asurams.edu	Mathematics and Computer Science
Professor Taylor Wars	Taylor.wars@asurams.edu	Mathematics and Computer Science
Dr. Vijay Kunwar	Vijay.kunwar@asurams.edu	Mathematics and Computer Science
Dr. Laxmi Paudel	Laxmi.paudel@asurams.edu	Mathematics and Computer Science

Course Name(s) and Course Numbers: MATH 1111 College Algebra

Project Lead: Zephyrinus Okonkwo, Professor of Mathematics and Interim Dean, College of Arts and Sciences, Department of Mathematics and Computer Science
Zephyrinus.okonkwo@asurams.edu

Semester Project Began: Spring 2018

Semester(s) of Implementation: Fall 2018

Average Number of Students per Course Section: 25

Number of Course Sections Affected by Implementation: 35

Total Number of Students Affected by Implementation: 843

1. Narrative

A. Describe the key outcomes, whether positive, negative, or interesting, of your project.

The core goal of this project is to provide our students quality and affordable MATH 1111 College Algebra course. In particular, this project enables the provision of a no-cost textbook course for all our College Algebra Students at Albany State University.

Albany State University and Darton State College were consolidated in 2016, and became one University on January 1, 2017. During fall 2018 semester, about 6,400 students were enrolled at Albany State University. The team members mentioned above applied and received a major Affordable Learning Georgia Textbook transformation grant for MATH 1111/ College Algebra. Preliminary work on the project activities commenced in spring 2018, and team members started using learning materials from the OER textbook we adopted for the project. Furthermore, during spring 2018, team members collected information which showed that due to the cost of the MATH 1111 College Algebra we were using, less than 20% of students in most classes purchased the recommended textbook. Dr. Robert Owor, Chairperson of the Department of Mathematics and Computer Science, set up an Algebra Textbook Committee which was chaired by Dr. Anilkumar Devarapu. Subsequently, the Committee recommended that the OER textbook, adopted by the Affordable Learning Georgia Textbook Transformation Project team, should be adopted by our department. This decision strengthened our efforts on the project.

The following are the goals which were delineated in the grant proposal.

1. To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and online free textbook.
2. To improve student engagement in learning of MATH 1111-College Algebra, and enhance student success and achievement in the course.
3. To motivate student interest in the use of online based technology in the solution of real-life problems encountered in College Algebra.
4. To increase enrollment of students in College Algebra through the provision of no-cost textbook and learning materials.
5. To create a standardized online College Algebra course by incorporating innovative pedagogy enriched learning materials, and assessments on a scalable instructional delivery platform.

A total of 843 students enrolled in the no-cost textbook MATH 1111 College Algebra sections in fall 2018. Of the 843 students, 597 passed with C or better, making the pass rate 70.82%, with 29.18% as the {D, F, I, W, WF} rate. Furthermore, the {W, WF} rate was 2.85%. During the fall of 2017, purchase of a textbook was required in MATH 1111/College Algebra. A total of 1342 enrolled in College Algebra during fall 2017 semester. Of this number, 797 passed with a C or better, making the pass rate 59.39%, and with 40.61% as the {D, F, I, W, WF} rate. Furthermore, the {W, WF} rate was 5.51%. Anecdotal information collected by instructors during fall 2017 showed that only about 16% of students purchased textbook.

In order to examine the outcome of the grant project, the project team, consisting of six members (teaching a total of 10 sections of College Algebra) invited two other College Algebra instructors (teaching a total of 6 sections) to fully participate in the project. Hence the extended team consisted of eight faculty members teaching a total of 16 sections of College Algebra with a total enrollment of 392 students. Of this number, 289 students passed with C or better, making the pass rate 73.7%, and the {F, D, I, W, WF} rate 26.3%.

Let us examine two essential data points. First, the pass rate on the team section courses is 73.7%, which is greater than the overall pass rate in College Algebra. Second, the overall pass rate in College Algebra during fall 2018 is significantly greater than the College Algebra pass rate during fall 2017.

In the sequel, we discuss why this transformation experience was very successful and how this courses have been redesigned and enhanced to meet the goals and outcomes of the project.

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

This Affordable Learning Georgia Project enabled enhanced collaboration and faculty engagement. The team members and the chairperson of the department worked assiduously together to provide environment for success of the project. The team was able to delineate project activities based on the outlines of the grant proposal document. The required data, including qualitative data, were collected and used to guide project implementation. In order to measure project impact, we used fall 2017 data points as the benchmark.

2. TRANSFORMATION EXPERIENCE

Guided by the advantages and the experience gained by Dr. Zephyrinus Okonkwo and Dr. Anilkumar Devarapu, who received the Affordable Learning Georgia Textbook Transformation Grant for Basic Statistics Course in 2015, our team consisting of Dr. Zephyrinus Okonkwo, Dr, Anilkumar Devarapu, Dr. Vijay Kunwar, Dr. Laxmi Paudel, Professor Anthony Smith, and Professor Taylor Wars, wrote and submitted this grant proposal in the fall 2017. This Affordable Learning Georgia Textbook Transformation Grant for College Algebra was funded in the fall of 2017.

Due to the consolidation of Albany State University and Darton State College, the New Albany State University has, as part of its core mission, an access mission. Moreover, there are two major University System of Georgia wide mandates which must be implemented by Albany State University (ASU). They are Momentum Year and G2C. The goals of these two mandates are in sync with the goals of the Affordable Learning Georgia Textbook Transformation Grant. Essentially, the goal of the Momentum Year is to unleash a deliberate and focused faculty and student engagement in learning, assessment, and advising, and the placing of freshmen in the foundation courses, including in their first Math course (College Algebra or Quantitative Reasoning), English, and other foundation courses in their first year. Included in this effort is the use of innovative pedagogy in instruction. Some of the College Algebra and Quantitative Reasoning Sections had to have appended Co-Requisites, two-hour courses which enabled

increased instructor-student contact time and enhanced problem-solving sessions. The major challenge faced by these mandated activities was the fact that most students did not have textbooks. There was also the need to be more deliberate in implementation, including the need to have increased faculty collaboration and engagement. Consequently, during fall of 2017, there were fifty sections of College Algebra enrolling 1342 students. Of this number 797 students passed and 545 students failed. That is, {A, B, C} passing rate was 59.39% and {D, F, W, WF, I} rate was 40.61%.

This Affordable Learning Georgia Textbook Transformation Grant for College Algebra availed us the opportunity to become more focused and deliberate in our pedagogical practices and assessment of student learning outcomes of the course. More will be said on this in the sequel. Our project transformation could be summarized as follows.

	Goal	Status	
1	To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and free online textbook	(i)	College Algebra instructors have OER College Algebra e-book placed on the course's GeorgiaVIEW (D2L) platform. Students downloaded the pdf version of the book on their computers and smart phones. Instructors assigned reading materials, and homework problems. Instructors assigned problems to students in class during problem-solving sessions, whereby students could do individualized or collaborative work.
2	To improve student engagement in learning of MATH 1111-College Algebra, and enhance student success and achievement in the course.	(i)	There was increased student engagement in-class and out-of-class. Students did not have any excuses for not completing assigned work. Assigned work was completed more frequently than in the past, thereby giving the students opportunities to be graded on the assigned assessments.
3	To motivate student interest in the use of online based technology in the solution of real-life problems encountered in College Algebra	(i)	Many students complete assignments online and are able to upload their work online. Many faculty members gave more online exam and quizzes, thereby enhancing student and faculty engagement.
4	To increase enrollment of students in College Algebra through the provision of no-cost textbook and learning materials.	(i)	There was a refocus on creating additional math pathway for non-STEM students. This reduced the enrollment in College Algebra this fall.
5	To create a standardized online College Algebra course by incorporating innovative	(i)	Dr. Devarapu taught an online College Algebra course this fall. He has a fully developed online version of the course that

	pedagogy enriched learning materials and assessments on a scalable instructional delivery platform.	will be available to every College Algebra instructor upon request. Team members also contributed additional learning and assessment materials to enhance the online course.

The amount saved by students this fall from not purchasing College Algebra textbook is $126,450.

A Likert-Type Survey with measurement scales (with five columns, Strongly Agree=5, Agree=4, No Opinion=3, Disagree=2, and Strongly Disagree=1) was administered to students who were in the ALGT grant team members' course sections. The survey was designed to capture a significant amount of information which could be analyzed, and subsequently used to improve subsequent project implementation. Of the 392 students in these sections, 217 participated on survey questionnaire. The survey results (as will be discussed later in this report) showed that most students were satisfied with the outcome of this project.

Here is the Transformation Action Plan.

No.	Transformation Action Plan
1	**Identification:** The faculty team reviews Affordable Learning Georgia e-books provided during grant orientation, ALG website, and other Open Education Resources (OER) sites, identify the best adoptable textbook and other learning materials related to the course.
2	**Adoption:** Select the topics in the adopted OER text and align them with the course syllabi, goals, learning outcomes, and specific objectives of the course.
3	**Adaptation:** Select class assignments and assessments for students to complete using Open Education Resources (OER) sites, the text, as well as instructor-constructed materials.
4	**Syllabus:** The syllabus is revised and redesigned to align with the no-cost resources for course lectures. Also, the Instructional Schedule with assessment due dates, quizzes and exams are appended in the syllabus. Syllabus would describe how the lectures would be presented using OER. Students would be required to have one printed copy of syllabus. The syllabus is uploaded on GeorgiaVIEW as well.
5	**Course Redesign**: Students would complete assignments using Open Education Resources (OER) site and the GeorgiaVIEW. Students would be required to print minimal hard copies of selected course information from Open Education Resources (OER) sites for which quizzes and exams would be based. Students will also upload their assignments, including any given writing assignments on Dropbox.

6	**Instructor Design:** GeorgiaVIEW would be the primary online Learning Management System for downloading content from selected Open Education Resources (OER) and other instructor developed resources.

We were guided by the project outcomes as delineated in the grant proposal. There was effective communication between team members: team members met in person to discuss project activities, and also communicated via emails and telephone. Team members also shared assessment instruments which enabled us to understand what all other members are doing. The Chairperson of the department as well as the Interim Dean of the College of Arts and Sciences (who is also the PI of the project) participated actively. Other full time and part-time math instructors were aware of the project activities. Team members collected data and used formative assessment to guide project implementation. Hence, faculty engagement was very important for the success of the project.

The team created an assessment support guide which was uploaded on the GeorgiaVIEW platform accessible to all students. The course syllabus and the recommended eBook were also placed on GeorgiaVIEW.

Student engagement was excellent. Most students used smartphones and others brought laptop to class. They had the eBook and learning materials downloaded on their phones. Students were able to actively engage in problem-solving sessions. During a typical problem-solving session, the instructor would refer students to problems in section exercises in the book, and every student was required to solve the set of problems. Instead of the teacher copying a word problem on the board, students would individually read the problems before participating in class discussion or problem solving sessions. The same could be said about learning materials. Homework exercises were also assigned from the e-book. Hence, students could not give reasons why class work was not completed. Many faculty members placed assessment exercises on GeorgiaVIEW, thereby giving students with valid excuses another opportunity to complete them online. A combination of these activities had positive impact on student learning outcomes of the course as well as student success in the course as evidenced by College Algebra pass rate for fall 2018. Student achievement was excellent. The retention was very high with very few withdrawals. The project was very successful, as evidenced by analysis of participant survey.

3. CHALLENGES AND OUTCOMES

Most students had not taken a course without purchasing a textbook or a textbook with additional assessment materials such as WebAssign. It was a challenge to initially convince the students that they could take a quality course without spending a substantial amount of money on a textbook. Moreover, students believed that it was impossible to take a no-cost textbook course without having the downside of lowering instructional and learning quality. Hence the instructors had to convince the students that indeed the OpenStax e-book and associated materials were of good quality and were adequate for the course. Also that the minimum benchmark in terms of

course material quality was attained. There was internet access in all classrooms on campus, and all students were able to use their smartphones and computers to access GeorgiaVIEW during instruction and classroom activities.

The five project goals delineated above were accomplished. Successful transformation experience provided by the use of OER textbook and learning materials, as well as the materials constructed by the team has set a pathway for future implementation of College Algebra delivery at low cost to the students. Our goal is to utilize this accomplishment to propagate the immense advantages of having a well-developed no-cost textbook course, the appended course materials, and other associated learning materials. Furthermore, we will share this course and the project outcomes with deans, chairs, and other faculty members teaching ***College Algebra***.

Goal 1. *To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and free online textbook.*

College Algebra instructors had OER College Algebra e-book placed on the courses' GeorgiaVIEW (D2L) platform. Students downloaded the pdf version of the book on their computers and smart phones. Instructors assigned reading materials and homework problems. Instructors assigned problems to students in class during problem-solving sessions, whereby students could do individualized work or work in groups. This fall, 843 students took College Algebra with zero cost for textbook. At $150 per textbook, this saved $126,450 for the students.

Goal 2. *To improve student engagement in learning of MATH 1111-College Algebra, and enhance student success and achievement in the course.*

There was increased student engagement during class and out-of-class. Students did not present any excuses for not completing assigned work. Assigned work was completed more frequently than in the past, thereby giving the students opportunities to be graded on the assigned assessments.

Goal 3. *To motivate student interest in the use of online based technology in the solution of real-life problems encountered in College Algebra*

Many students completed assignments online and were able to upload their work online. Many faculty members gave more online exam and quizzes, thereby enhancing student and faculty engagement. Every Albany State University student has access to the GeorgiaVIEW learning delivery platform. The ease of navigation of this platform and its features enables faculty and students to have a seamless opportunity to learning materials, assessment instruments, syllabus, and other items required by the course placed on a single site. The OpenStax textbook and other course support materials were available before the first day of class. The availability and accessibility of the materials for students on the first day of class was very essential as it helped to build confidence between the instructor and the students.

Goal 4. *To increase enrollment of students in College Algebra through the provision of no-cost textbook and learning materials*.

There was a refocus on creating additional math pathway for non-STEM students. This reduced the enrollment in College Algebra this fall. While the number of students who were placed in the College Algebra in the fall of 2017 were more than 1300, this fall many non-STEM majors had to be placed in MATH 1001/Quantitative Reasoning Course. Hence, the number of students taking College Algebra actually decreased due to an institutional decision.

Goal 5. *To create a standardized online College Algebra course by incorporating innovative pedagogy enriched learning materials, and assessments on a scalable instructional delivery platform.*

Dr. Devarapu taught an online College Algebra course this fall. He has a fully developed online version of the course which will be available to every College Algebra instructor upon request. Team members also contributed additional learning and assessment materials to enhance the online course. This online course section is available to other faculty members within and outside ASU. Any interested instructor will be given the opportunity to "Copy Course."

4. TRANSFORMATIVE IMPACT ON OUR INSTITUTION AND STUDENTS

Several positive transformation impacts on instruction and learning evolved due to this project. This project avails instructors the opportunity to re-examine their pedagogical and assessment practices. Many faculty members used the opportunity of this project to transform their teaching, learning, and assessment practices. The following are notable impacts.

(i) **Student Engagement in Learning.** It is essential to note that due to the availability of the recommended free OpenStax textbook to students, all students were fully engaged in classroom activities, including problem-solving sessions and classroom discussion sessions. Instructors were able to give students individualized attention, as well as get the students to work in groups. Students were also allocated homework as well as online class activities. Students who missed quizzes and tests with valid excuses were given an opportunity to make them up online. This effort increased the number of students who completed their assessments and subsequently led to increased student achievement in College Algebra from 59.39% in fall 2017 to 70.8% in fall 2018. In an instructor opinion survey conducted after midterm submission, the use of OpenSTAX free textbook ranked as the number one factor which led to increased student success in College Algebra.

(ii) **Faculty Collaboration and Deliberate Engagement.** Most of the instructors teaching College Algebra, especially the project team members, shared instruction and assessment instruments. They met in groups to discuss course coverage, assessment, best practices, and were able use each other's materials to enhance learning in their own classes. Communication among faculty members and other related collaborative activities contributed to greater student achievement in the course.

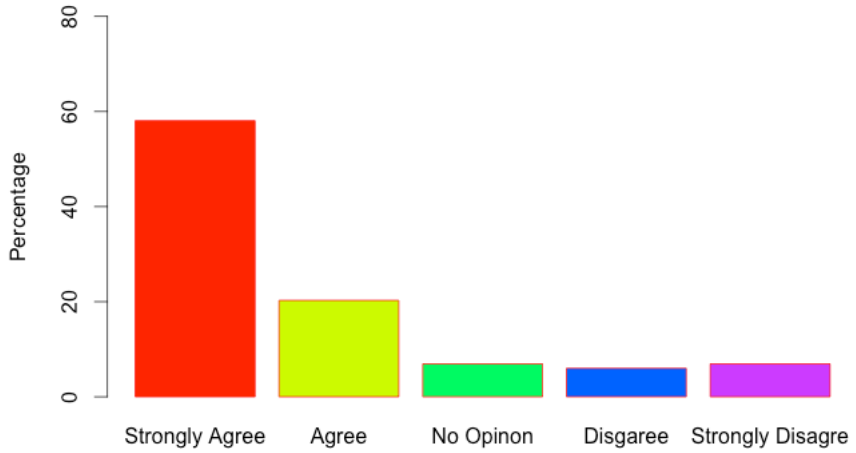
(iii) **New Leadership:** New leadership at the university and support for student centered activities played an essential role in the success of the project. Analysis of faculty opinion survey showed that leadership ranked second in terms of the reasons why we saw higher College Algebra pass rate this fall.

(iv) **Student Retention, Persistence, and Graduation**: College Algebra is a gatekeeper course. High FDWI rate has wider and deeper ramification on student retention. It turns out that when students pass College Algebra in their first year of College, they are more likely to persist and earn their college degrees from that college. ASU would like to retain all its students. Hence, increased student pass rate in College Algebra will have a positive impact on the student retention.

4B. Transformative impacts on your students and their performance

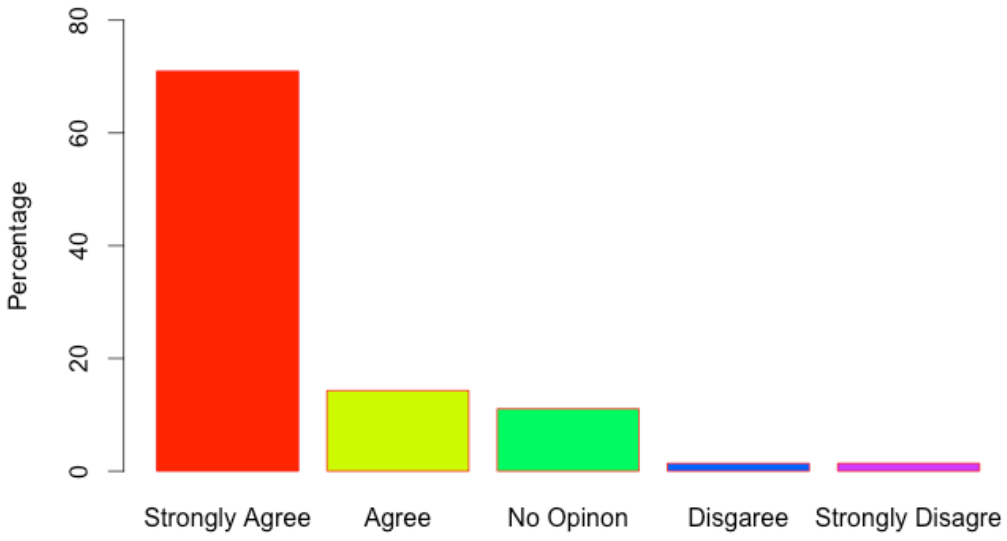
Two hundred and seventeen students completed the **Student Participant Survey.**
Below is the survey report.

Q1. ***This section of the course does not cost me money***



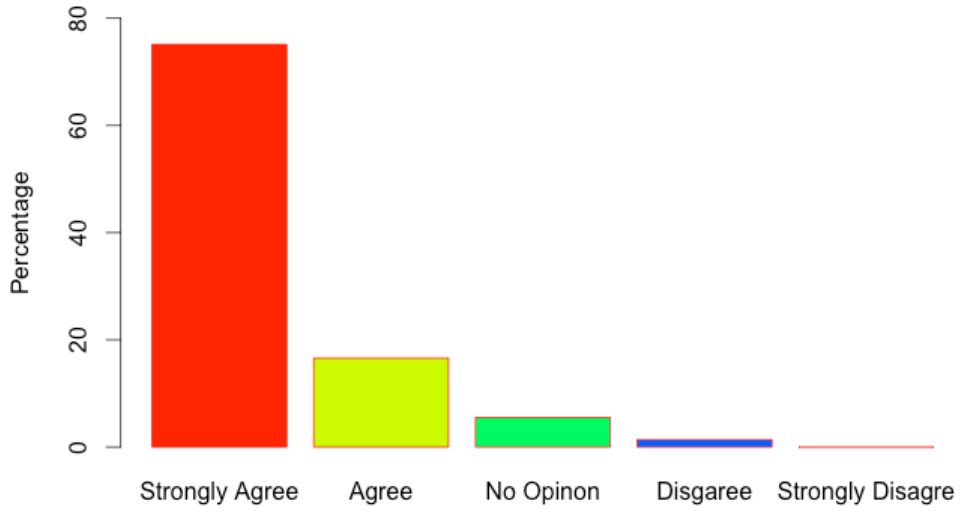
Two hundred and thirteen students completed this survey question. 170 or 79.81% agreed or strongly agreed with this statement. 15 or 7.04% of the students had no opinion, and 28 or 13.15% disagreed or strongly disagreed with this statement.

Q2. ***I have access to an online textbook***



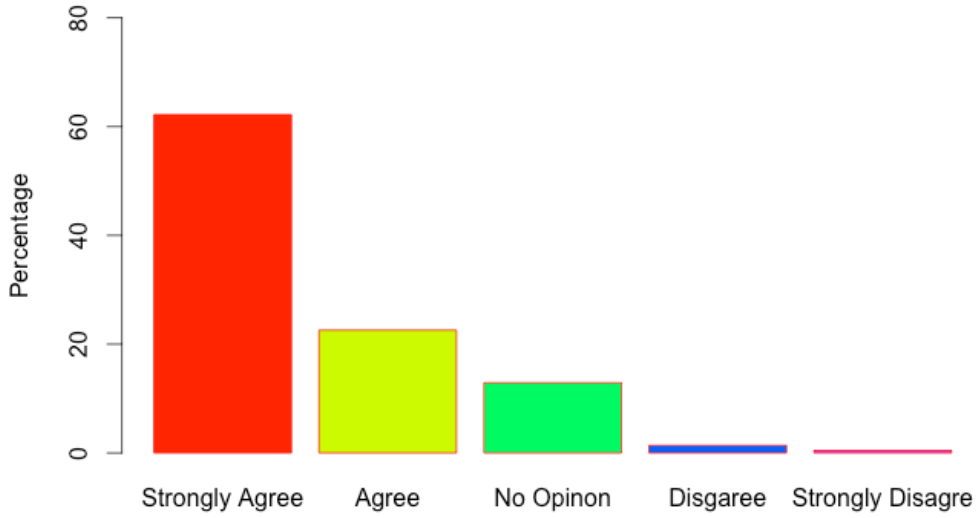
Two hundred and fifteen students completed this survey question. 185 or 86.05% agreed or strongly agreed with this statement. 24 or 11.16% of students had no opinion, and 6 or 2.79% disagreed or strongly disagreed with this statement.

Q3. ***I have access to other free instructional materials***



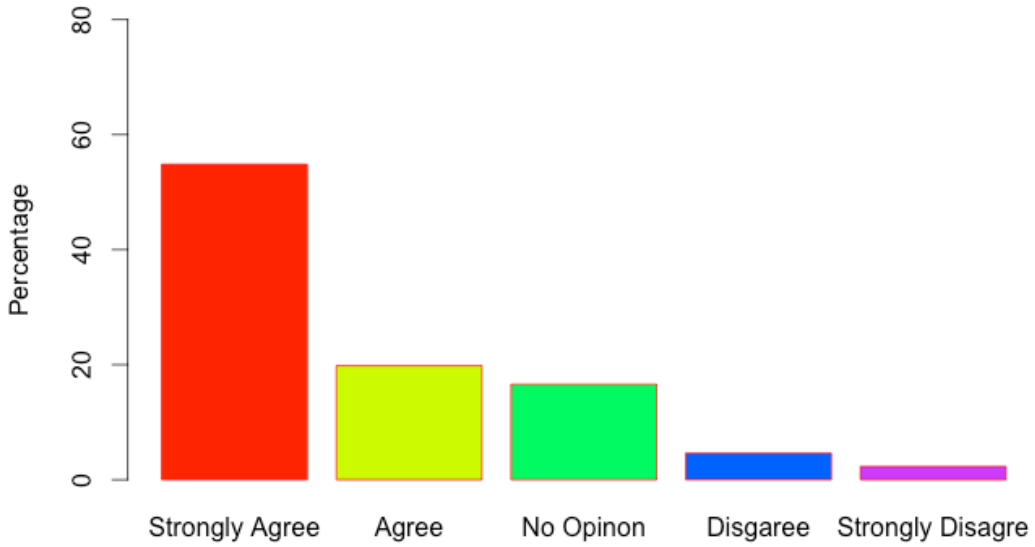
Of the two hundred and fourteen students who completed this survey question, 199 or 93% agreed or strongly agreed with this statement, 12 or 5.6% of students had no opinion, and 3 or 1.4% disagreed or strongly disagreed with this statement.

Q4. ***The content of the free online textbook is very helpful***



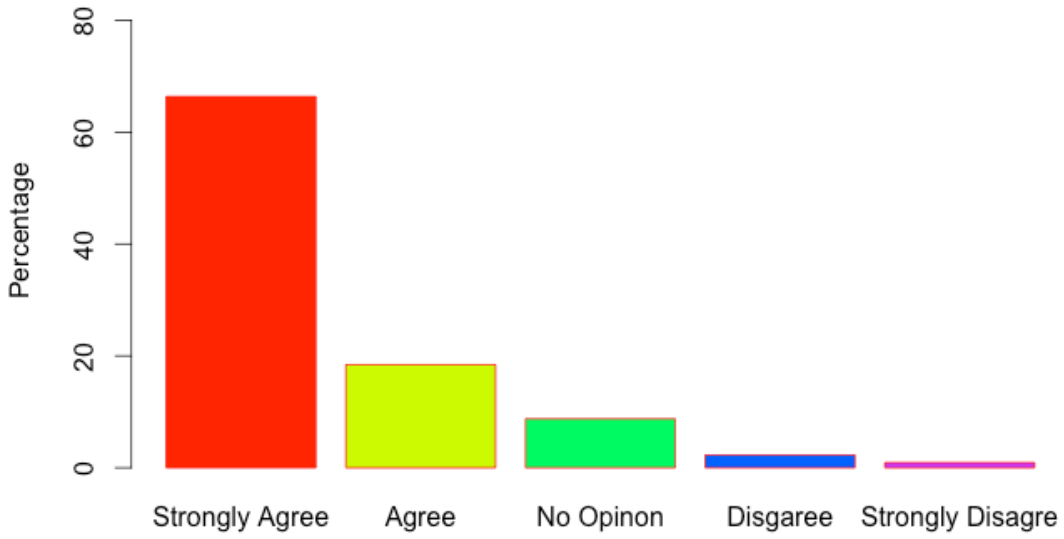
Two hundred and sixteen students responded to this survey question. 184 or 85.58% agreed or strongly agreed with this statement. 28 or 13.02% of students had no opinion, and 4 or 1.86% disagreed or strongly disagreed with this statement.

Q5. ***The no-cost textbook has enhanced my performance in this course***



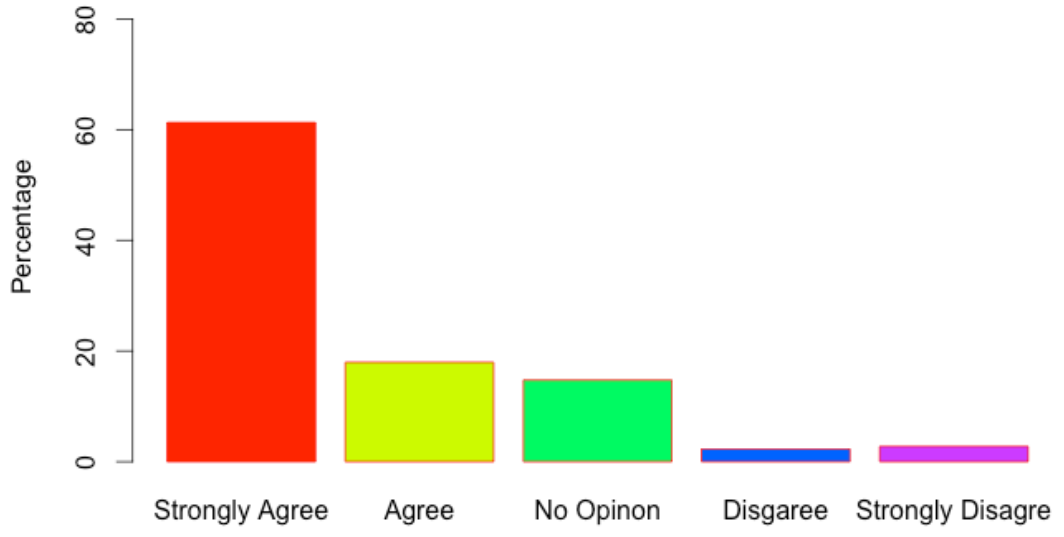
Two hundred and thirteen students responded to this survey question. 162 or 76.06% agreed or strongly agreed with this statement. 36 or 16.9% of students had no opinion, and 5 or 2.35% disagreed or strongly disagreed with this statement.

Q6. ***I find most materials placed on the course website (D2L) helpful***



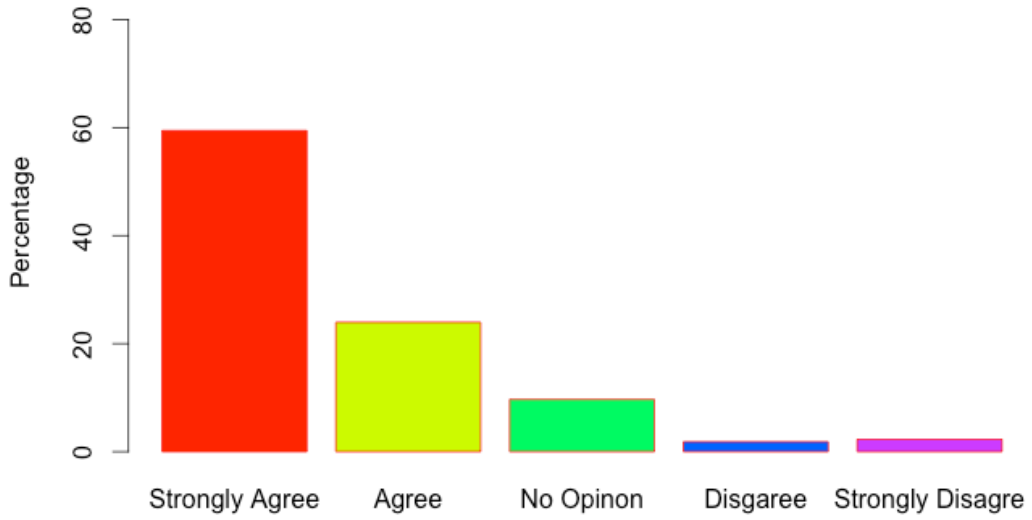
Of the two hundred and ten students who completed this survey question, 184 or 87.62% agreed or strongly agreed with this statement, 19 or 9.05% of students had no opinion, and 7 or 3.33% disagreed or strongly disagreed with this statement.

Q7. ***I am able to study everywhere due to the availability of the free e-book.***



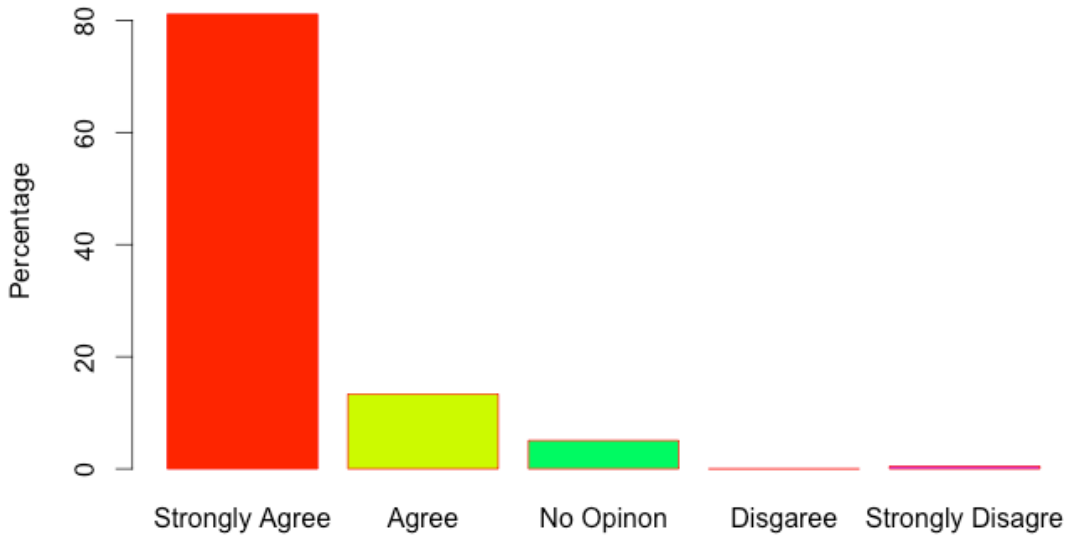
Of the two hundred and fifteen students completed this survey question, 172 or 80% agreed or strongly agreed with this statement, 32 or 14.88% of students had no opinion, and 11 or 5.12% disagreed or strongly disagreed with this statement.

Q8. ***The design of this course helps me improve my grade***



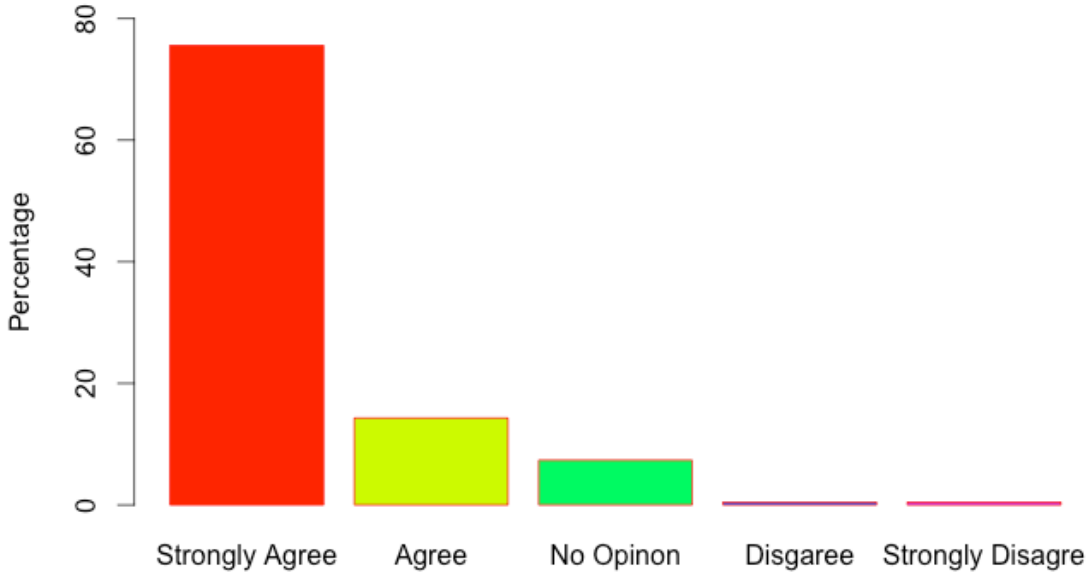
Of the two hundred and eleven students completed this survey question, 181 or 85.78% agreed or strongly agreed with this statement, 21 or 9.95% of students had no opinion, and 9 or 4.27% disagreed or strongly disagreed with this statement.

Q9. ***I would like to take another no-cost textbook course***



Two hundred and seventeen students responded to this survey question. 205 or 94.47% agreed or strongly agreed with this statement. 11 or 5.07% of students had no opinion, and 1 or 0.46% disagreed or strongly disagreed with this statement.

Q10. ***I will recommend this course to other students since it offers free online textbook and other learning materials***.



Two hundred and thirteen students responded to this survey question. 195 or 91.55% agreed or strongly agreed with this statement. 16 or 7.51% of students had no opinion, and 2 or 0.94% disagreed or strongly disagreed with this statement.

5. LESSONS LEARNED, CHALLENGES, AND STUDENT QUOTES

Several lessons were learned by the team members. First, the management of the project rested on the project team members. The team followed the timeline as delineated in the project. The team documented project activities. The team designed the data collection instrument including the participant survey. The survey was administered in class thereby realizing higher percentage of participants completing the survey. During fall 2018 semester, student performance, and faculty engagement and collaboration were monitored. Formative assessment was done using project data and relevant data sources. Faculty input was solicited throughout the semester. There was an effective communication on the importance of College Algebra.

Quotes

Here are three student's quotes:

"*I took a high school college algebra course. This time, it was more to learn in a short amount of time. More time was needed to study. The free online textbook, which I downloaded on my cell*

phone and other learning materials I could access easily were very helpful. The instructor, who did not miss a single class session, was very helpful to all the students."

"The free textbook was most helpful. In class, every student accessed the eBook, and it was easy to have on your phone instead of carrying a book around."

"I will recommend a course that uses the OER book to all my friends."

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: __392_____

- Positive: ___94.47____ % of ____217____ number of respondents
- Neutral: _____5.07__ % of ___217_____ number of respondents
- Negative: ___0.46____ % of __217_____ 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

Instructor	SEC	A	B	C	D	F	W	I	Total Enrolled	Number Passing	Number Failing (Including W and I)
TI	9	0	4	11	0	6	2	1	24	15	9
T2	7	4	7	7	2	6	0	0	26	18	8
	12	3	2	9	3	11	0	0	28	14	14
	33	6	4	5	1	4	1	0	21	15	6
T3	4	0	3	18	0	5	0	0	26	21	5
	30	3	3	19	1	3	0	0	29	25	4
	38	2	3	10	1	2	1	0	19	15	4
T4	11	4	5	11	0	4	2	0	26	20	6
	20	1	9	5	2	2	0	0	19	15	4
	42	9	3	8	0	5	0	0	25	20	5
T5	23	15	5	4	0	5	3	0	32	24	8
T6	90	8	9	4	3	2	0	0	26	21	5
T7	14	8	10	3	0	2	0	0	23	21	2
T8	18	5	8	6	3	0	1	0	23	19	4
	26	1	7	5	4	4	1	0	22	13	9
	39	3	8	2	4	5	1	0	23	13	10
Total		72	90	127	24	66	12	1	392	289	103

ABC Passing Rate: 73.7% **DFWI Failing Rate: 26.3%**

Grade	A	B	C	D	F	W	I
Percent	18.4	23.0	32.4	6.1	16.8	3.1	0.3

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:

_____26.3% of students, or 103 out of a total _392_____ 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)

  - *Drop, fail, withdraw (DFWI) delta rates*

  The DFW rate was 26.3%.

  - *Course retention and completion rates*

  The course retention rate was 96.90%.

  - *Average GPA*

  Pre—transformation DFW=40.61%.

  Post-transformation DFW= 29.18%.

  For grade distribution, please see the distribution above.

  - *Student success in learning objectives*

  All the course learning outcomes were met. The assessment instruments, including homework, tests, class work and technology-based exercises were aligned with the specific objectives. The overall student achievement was very good. Students showed immense satisfaction with the course.

  - *Surveys, interviews, and other qualitative measures*

- *Indicate any co-factors that might have influenced the outcomes for better or worse.*

New and supportive leadership contributed positively to increased student success.

- *When submitting your final report, as noted above, you will also need to provide the separate file of supporting data on the impact of your Textbook Transformation (surveys, analyzed data collected, etc.)*

Survey Questionnaire 9 statement, "**I will recommend to other students since it offer free online textbook and other learning materials."** *Two hundred and seventeen students responded to this survey question. 205 or 94.47% agreed or strongly agreed with this statement. 11 or 5.07% of students had no opinion, and 1 or 0.46% disagreed or strongly disagreed with this statement. The mean survey score was 4.75 out of 5.*

Please see appendix A

6. SUSTAINABILITY PLAN

- *Describe how your project team or department will offer the materials in the course(s) in the future, including the maintenance and updating of course materials.*

The Department of Mathematics and Computer Science has institutionalized the no-cost MATH 1111 College Algebra course. The success of this course is impressive since it was a no-cost textbook course. In order to have a wider dissemination, presentations of the results will be made at the USG at regional conference and at the Joint Mathematics Meetings 2019. Materials developed through this grant will be available in GeorgiaVIEW and other instructors will be given permission to "copy" course when such requests are made. Furthermore, we plan to continue to develop new course materials to enrich this course.

Most of the course materials associated with this project are placed on GeorgiaVIEW. All the course materials can be downloaded. The project team and other math instructors will continue to contribute to the ***instruction and learning materials guide***. This is a booklet initiated by project team and its development is under way. This booklet, which contains about 360 college algebra problems, will be placed on GeorgiaVIEW in spring 2019.

6. FUTURE PLANS

Describe any impacts or influences this project has had on your thinking about or selection of learning materials in this and other courses that you will teach in the future.

This project has availed us an opportunity to have access to the free OpenStax College Algebra textbook, *College Algebra Open Stax, By Jay Abramson, 2017 Edition @Rice University*, and associated course materials. Through this project, we have developed a version of the course which is placed on the GeorgiaVIEW platform. Consequently, this course can be taught offering it face-to-face in-class, online, or on hybrid format. In addition, we have developed additional learning materials including a significant number of solved problems which students and other instructors will find very useful. We will continue to develop and enrich the course by developing additional learning materials.

Describe any planned or actual papers, presentations, publications, or other professional activities that you expect to produce that reflect your work on this project.

We plan to write and present scholarly papers resulting from this project at several scholarly conferences and meetings. Some of the meetings include:

(i) The Joint Mathematics Meetings in Baltimore, Maryland, January 2019
(ii) USG Teaching and Learning Conference
(iii) G2C Conference
(iv) Albany State University Seminars.

Describe any impacts or influences this project has had on your thinking about or selection of learning materials in this and other courses that you will teach in the future.

Many of our colleagues teaching MATH 1001 Quantitative Reasoning find the OpenStax e-book we adopted and the learning materials we developed very useful for their courses. Hence they are using these materials.