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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Sixteen (Spring 2020 - Spring 2021)
Category:	University System of Georgia
Award Cycle:	Round 16
Submission Deadline:	01/13/2020 at 11:59 PM

Application Information

Submitted By:	Anilkumar Devarapu
Application ID:	4005
Application Title:	518
Date Submitted:	01/14/2020 at 8:16 AM

Personal Details

Institution Name(s):	Albany State University
Applicant First Name:	Zephyrinus
Applicant Last Name:	Okonkwo
Applicant Email Address:	Okonkwo.Zephyrinus@asurams.edu
Applicant Phone Number:	229-500-2121
Primary Appointment Title:	Professor of Mathematics and Dean, College of Art and Sciences
Submitter First Name:	Anilkumar
Submitter Last Name:	Devarapu
Submitter Email Address:	anilkumar.devarapu@asurams.edu
Submitter Phone Number:	229-500-2281
Submitter Title:	Associate Professor of Mathematics

Application Details

Proposal Title

518

Requested Amount of Funding

\$30,000.00

Priority Category (if applicable)

Scaling Up OER

Final Semester:

Spring 2021

Course Title(s)

Introduction to Statistics

Course Number(s)

MATH 2411

Team Member 1 Name

Zephyrinus C. Okonkwo

Team Member 1 Email

zephyrinus.okonkwo@asurams.edu

Team Member 2 Name

Anilkumar Devarapu

Team Member 2 Email

anilkumar.devarapu@asurams.edu

Team Member 3 Name

Anthony Smith

Team Member 3 Email

Anthony.smith@asurams.edu

Team Member 4 Name

Laxmi Paudel

Team Member 4 Email

Laxmi.paudel@asurams.edu

Additional Team Members (Name and email address for each)

Li Feng; Li.Feng@asurams.edu

Vijay Kunwar; vijay.kunwar@asurams.edu

Eric benson; eric.benson@asurams.edu

Chinenye Ofodile; Chinenye.ofodile@asurams.edu

Sponsor Name

Robert S. Owor

Sponsor Title

Professor and Chair

Sponsor Department

Mathematics and Computer Science

Total Number of Student Section Enrollments Affected by Project in One Academic Year

Average Number of Student Section Enrollments Affected per Summer Semester

5

Average Number of Student Section Enrollments Affected per Fall Semester

16

Average Number of Student Section Enrollments Affected per Spring Semester

13

Original Required Commercial Materials (title, author, price, and bookstore or retailer URL showing price)

Title: Elementary Statistics :A step by step approach-10th Edition

Author: Allan Bluman

Price: \$190.74 for the loose-leaf purchase.

URL: <https://www.mheducation.com/highered/product/elementary-statistics-step-step-approach-bluman/M9781259755330.html#textbookCollapse>

ISBN10: 1260152820 | ISBN13: 9781260152821

Copyright: 2018

Original Total Cost per Student

\$190.74

Post-Project Cost per Student

Zero Dollars

Post-Project Savings per Student

\$190.74

Projected Total Annual Student Savings per Academic Year

\$181,584.48

Using OpenStax Textbook?

Yes

Project Goals

1. To eliminate the cost of textbook and other course related materials to students by providing no-cost course materials, software, and a free online textbook.
2. To strengthen student engagement in learning of MATH 2411, Introduction to Statistics, and to enhance student success and achievement in the course.
3. To motivate students' interest in the use of online based technology to solve real-life problems encountered in Statistics, including large scale data analysis using R-Studio.
4. To increase enrollment of students in the course with the provision of no-cost textbook and learning materials.
5. To create a standardized online course by incorporating student-centered pedagogy, enriched learning resources, and assessments on a scalable instructional delivery platform.

Statement of Transformation

The past three years has seen an increase in the number of students enrolling in MATH 2411-Introduction to Statistics at Albany State University for the following reasons. First, due to the consolidation of old Albany State University and Darton State College, MATH 2411 has been attracting more students. Secondly, MATH 2411 could be taken by students to fulfill the math requirement for Area A2. Thirdly, as an alternative math pathway, non-STEM majors can take it to fulfill the math requirement in the core. Most non-STEM freshmen majors are being put in the Introduction to Statistics course.

There were 300 students enrolled in twelve sections of MATH 2411-Introduction to Basic Statistics course in fall 2018, and 355 enrolled in 14 sections of the course in spring 2019. 90 students took the course in summer 2019. Hence in 2018-2019, 745 took the course. During the fall of 2019, 407 students were enrolled in 16 sections of the course, and in spring 2020, 425 were enrolled in 13 sections of Instruction to Basic Statistics. It is projected that about 120 students will enroll in five sections of MATH 2411 in summer 2020. Consequently, 952 students were expected to enroll in the course in 2019-2020 year.

The MATH 2411, Introduction to Statistics textbook is very expensive. Most students are unable to purchase the textbook that makes attaining the course learning outcomes very difficult. Lack of access to a standard textbook for the course has made in-depth learning of the course material very difficult. It has also negatively affected students' ability to engage in productive and quality learning inside and outside the classroom. Hence, students are unable to achieve deep content knowledge of the concepts in the course and the applications of such concepts to real life. The development of MATH 2411, Introduction to Statistics, no-cost textbook course would enhance student understanding, engagement, achievement, and interest in the course.

Our team consists of the core faculty members who teach Introduction to Statistics every semester. The team will develop quality support/supplementary material; together with OER textbook. This will enhance pedagogy and learning in the course. This way every student taking the course will be able to read the most essential course materials, do the appropriate course assignments, and practice problems. Furthermore, the project will enable the team to develop a common unified syllabus, and will align the syllabus with the textbook used in every course section. This will also enhance faculty engagement, course standardization, assessment, and overall course quality.

MATH 2411 requires that instructors show substantial coverage of topics and concepts while still allowing instructors the flexibility to adapt certain materials and innovative pedagogical techniques to meet course outcomes. Research results indicate that students who take and pass their Math and English courses required in the core during their first year, and also able to pass nine credits in their focus areas, have a better chance of graduating in four years than those who do not succeed in the Math and English courses in their first year. ASU data indicates that the Introduction to Statistics course has a higher pass rate than College Algebra. Consequently, student success in Introduction to Statistics has a broader ramification on student retention, progression, and degree completion across all majors at Albany State University (ASU).

During our preparation of support course materials, our team will consult and work with colleagues in the social sciences and business and seek input and recommendations, and adopt their recommendations. We will do this in order to adopt and address more concepts dealing with applications of Statistics in various fields and majors taken by non-STEM majors.

Guided by our experience in the previous successful Affordable Learning Georgia Textbook grants we had garnered, we will adopt the best practices in pedagogy, assessment, and learning. Our team will explore and develop seamless learning and assessment materials, including developing and adopting certain problem-solving and simulation software (for example, R), and handheld technology which will enhance student engagement and interest. All instructors teaching the Introduction to Statistics course will use a common syllabus which will be redesigned through this grant. The Open Education Resource Textbook (OER) we adopt will be used in the syllabus redesign. Instructors will have the freedom to adopt pedagogical techniques that most suited for 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. This is because all instructors will be required to place all learning material on the GeogiaVIEW platform.

Transformation Action Plan

This project will not require any major changes in the syllabus. The course description, goal of the course, course learning outcomes, and specific objectives of the course will remain unchanged. However, a common revised syllabus will be adopted. There will be an alignment of pedagogy and assessment with the adopted OER textbook. There would be a renewed emphasis on collaboration of project team members, and other faculty members who teach this course. Team members would meet regularly to examine project activities and progress. Through collaboration the team will develop measures which will ensure success of the project as well as effectiveness of the project activities. The support materials developed through this project, as well as all assessment materials and other course materials will be placed on GeorgiaVIEW, the ASU learning platform. Some course assignments, including tests, will be placed in GeorgiaVIEW as deemed necessary and convenient by individual instructors. All Introduction to Statistics sections will be enhanced by the availability of the additional learning resources on GeorgiaVIEW with exportable capabilities, that is, any faculty member can "Copy Course" and customize the course

within and outside Albany State University. The final products will be available in Word, LaTeX, and pdf formats.

Dr. Anilkumar Devarapu, Dr. Laxmi Paudel, Dr. Vijay Kunwar, Professor Anthony Smith, Dr. Li Feng, Dr. Eric Benson, Dr. Chinenye Ofodile, 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 Introduction to Statistics projects which could enhance course quality. Such projects will be included in the learning materials we will develop through this grant.

Dr. Arun Saha will serve as the project reviewer. He is a Professor of Physics and Engineering and has taught undergraduate and graduate courses in Mathematics for more than fifteen years. He will examine the appropriateness and relevance of the content, pedagogy, and adequate alignment of the content of the OER textbook with the course learning outcomes.

Quantitative & Qualitative Measures

Our previous Affordable Learning Georgia Textbook Grant experience indicates that the activities and materials outlined in this grant proposal will provide instructors and students with the opportunity to take complete control of the course. The emphasis on non-STEM majors taking Introduction to Statistics course as required for some majors, coupled with the advising center and BOR Momentum Year guidelines will ensure that more students will enroll in the course. This course will be a no-cost textbook course. More importantly, the pdf version of the textbook and syllabus will be available on GeorgiaVIEW at least a week before the classes begin. This will enable the instructors to give reading assignments and out-of-class activities from the course package. Instructors teaching Introduction to Statistics would be able to adopt the textbook and developed package to save a huge amount of money on behalf of students.

Many instructors were unable to receive appropriate pedagogical and assessment support from textbook publishers. In several cases, students were required to pay additional money in order to purchase access codes to do their homework. Moreover, in cases one received such support, editing such materials is not permitted. This project will give instructors an opportunity to develop a stand-alone OER course material which will provide flexibility in instruction, learning, and assessment. In addition, we will develop the course guide which will provide an easy guidance for instructors. Our department will provide hardcopies of the course guide to all instructors. The course guide will also be reposed on GeorgiaVIEW.

We will adopt both quantitative and qualitative approaches for data collection, assessment, and analysis. We will collect the data during the summer of 2020, and use fall 2020 for planning. We shall use the data collected in spring 2020 for benchmark and comparison purposes. During fall 2020, we will designate some sections of Induction to Statistics as Control Group while others will be in the Treatment Group. The subsequent quantitative and qualitative data collected will be analyzed and compared accordingly. The results will be used for continuous project improvement. We plan to have full project implementation in spring 2021.

The team members will teach at least 12 sections of Introduction to Statistics in spring 2021.

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

- Number of students enrolled in the Introduction to Statistics 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 in pre-test, mid-term, final, and at the end of each semester.
- Mean GPA of students

Collected data will be organized, compared, and analyzed using graphs, descriptive and inferential statistical tools. Other 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 participant Likert-Type surveys, 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
- Instructor Opinion Survey on project activities, collaboration, and impact

As stated earlier, the formative assessments will be aimed at receiving feedback from participants, which in turn will be used for project improvement.

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Timeline

Dr. Zephyrinus C. Okonkwo, Dr. Anilkumar Devarapu, and Dr. Eric Benson will manage the project. They will oversee that the timelines and deadlines are met. Dr. Anilkumar Devarapu will also be in-charge of all data collection. Data Analysis will be done by the team.

- **February 24, 2020:** Attend the required Kick-Off meeting at Middle Georgia State University, Macon, Georgia
- **June 20, 2020:** Search, select, and adopt the best open source textbook for Introduction to Statistics
- **July 15, 2020:** Revise existing syllabus for Introduction to Statistics and prepare necessary redesigning/modifications
- **August 5, 2020:** Share and discuss the project plans with mathematics faculty within the department. Introduce open source textbook and syllabus. Collect all instructors' feedback.
- **September 5, 2020:** Develop appropriate course materials; chapter notes, worked out examples, including unit/section/benchmark prototype tests. Review and test all developed components to make sure they are accurate, appropriate, and adequate. By this time, the first sets of data from the control group as outlined above should have been collected.
- **October 5, 2020:** Develop and incorporate projects, and implement necessary software. Prepare intuitive examples, practice problems, and tests.
- **November 5, 2020** Introduce and discuss the OER materials developed with fellow instructors in the University. Collect participants' feedback. Encourage all Introduction to Statistics course instructors to adopt the material in the fall and spring 2021.
- **December 10, 2020:** Organize workshops on "OER materials for Introduction to Statistics and software implementation" for colleagues. Collect participants' feedback.
- **December 15, 2020:** Collect data and analyze students' performance on pre-test. Use both descriptive and inferential statistics to compare students' performances with formal textbook versus OER materials. Present midpoint project report.
- **March 8, 2021:** Collect data and analyze students' performance on midterm test. Use both descriptive and inferential statistics to examine students' performances. Collect student's feedback about their feeling and usefulness of the new material and analyse the data.
- **March 20, 2021:** Prepare and submit the mid semester report.
- **April 2021:** 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 and collect their feedback.
- **May 15, 2021:** Data collection and analysis on students' performance on the final test. Use both descriptive and inferential statistics to compare students' performance on project.
- **May 17, 2021:** Data collection and analysis on students' semester end grades and their mean GPA. Use both descriptive and inferential statistics to compare students' performance.
- **May 20, 2021:** Prepare and submit the Final report

Budget

Supplemental compensation is requested for the involved faculty members in the project as follows:

- Dr. Zephyrinus Okonkwo: \$5,000
- Dr. Anilkumar Devarapu: \$5,000
- Dr. Vijay Kunwar: \$3,000
- Professor Anthony Smith: \$3,000
- Dr. Li Feng: \$3,000
- Dr. Laxmi Paudel: \$3,000
- Dr. Eric Benson: \$3,000
- Dr. Chinenye Ofodile: \$3,000
- Dr. Arun Saha: \$1,600
- Travel**: \$800

Total: \$30,000

**The travel fund is requested for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.

Sustainability Plan

MATH 2411 (Introduction to Statistics) is offered every semester at Albany State University. As per the record, 16 sections of the course were offered in the fall of 2019, and more than 850 students were enrolled in the academic year 2019. Implementation of this project will accomplish the goals delineated above, 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, testing and support materials will be prepared and made available for our faculty members. Students will be availed the opportunity to download the pdf version of the course materials from GeorgiaVIEW. Furthermore, our instructors can download the instructional materials and textbook from GeorgiaVIEW or "Copy Course."

Acknowledgment

Grant Acceptance

[Acknowledged] I understand and acknowledge that acceptance of Affordable Learning Georgia grant funding constitutes a commitment to comply with the required activities listed in the RFP and that my submitted proposal will serve as the statement of work that must be completed by my project team. I further understand and acknowledge that failure to complete the deliverables in the statement of work may result in termination of the agreement and funding.



PROVOST & VICE PRESIDENT
FOR ACADEMIC AFFAIRS

January 13, 2020

Re: Affordable Learning Georgia Textbook Transformation Grant

Dear Sir/Madam:

I am most pleased to write this letter in support of eight of our faculty members, Zephyrinus Okonkwo, Anilkumar Devarapu, Li Feng, Anthony Smith, Vijay Kunwar, Laxmi Paudel, Eric Benson, and Chinenye Ofodile, who have applied for the Affordable Learning Georgia Textbook Transformation Grant to develop a no-cost textbook for students taking MATH 2411-Introduction to Statistics at Albany State University. As you are aware, the cost of textbooks has continued to rise, and mathematics books are one of the most expensive textbooks used by our students. Students taking five courses per semester will sometimes spend about \$1200 on textbooks each semester. Essentially, the cost of textbooks has continued to hinder student achievement and deeper understanding of concepts taught in Introduction to Statistics.

MATH 2411- Introduction to Statistics has recently been designated as an Area A2 course, and students can take it to fulfill their Area A2 requirement. Hence, students who have stronger background in Algebra and Precalculus from high school can add value to their education by taking MATH 2411 as their Area A2 Math course. The activities of this grant, including the enhancements which will be made through this grant, could lead to increased student achievement in the course. Dr. Okonkwo and his team will consult with other faculty members who teach Introduction to Statistics in the Department of Mathematics and Computer Science.

There were 300 students enrolled in twelve sections of MATH 2411-Introduction to Basic Statistics course in fall 2018, and 355 enrolled in 14 sections of the course in spring 2019. Ninety students took the course in summer 2019. Hence in 2018-2019, 745 students took the course. During the fall of 2019, 407 students were enrolled in 16 sections of the course, and in spring 2020, 425 students were enrolled in 13 sections of Instruction to Basic Statistics. It is projected that about 120 students will enroll in five sections of MATH 2411 in summer 2020. Consequently, 952 students were expected to enroll in the course in 2019-2020 year.

By developing this no-cost textbook Introduction to Statistics course for our students, Zephyrinus Okonkwo, Anilkumar Devarapu, Li Feng, Anthony Smith, Vijay Kunwar, Laxmi Paudel, Eric Benson, and Chinenye Ofodile 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 for the funding of this proposal.

Sincerely,

A handwritten signature in black ink, appearing to read "Angela Peters".

Angela Peters, Ph.D.
Provost and Vice President for Academic Affairs



DEPARTMENT OF MATHEMATICS AND COMPUTER SCIENCE
Albany, GA 31705

January 13, 2020

Re: Affordable Learning Georgia Textbook Transformation Grant

Dear Sir/Madam,

I am very glad to write this letter in support of our faculty members under the leadership of Dr. Zephyrinus Okonkwo, who have applied for an Affordable Learning Georgia Textbook Transformation Grant to develop a no-cost textbook course for our students taking MATH 2411-Introdcution to Statistics course at Albany State University. For many years, many students who took Introduction to Statistics were unable to purchase the textbook required for the course due to the cost of the textbook. 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. Yet textbook cost continues to rise unabated. 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 no-cost textbook course our students, Dr. Okonkwo and his team will be making available to our students a much needed help, and more students will be able to enroll in MATH-2411-Introdcution to Statistics, since every student taking the course will have access to a free textbook and associated learning materials.

MATH 2411- Introduction to Statistics has recently been designated as an Area A2 course, and students can take it to fulfill their Area A2 requirement. Students who have stronger background in Algebra and Precalculus from high school can add value to their education by taking MATH 2411 as their Area A2 Math course. The activities of this grant, including the enhancements which will be made through this grant, could lead to increased student achievement in the course.

. Okonkwo and his team will consult with other faculty members who teach Introduction to Statistics in the Department of Mathematics and Computer Science.

The Department of Mathematics and Computer Science will support this no-cost textbook development, 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 up-to one hundred thousand dollars a year once this project is fully implemented.

I am very glad that Dr. Okonkwo and his team are developing this no-cost textbook for Introduction to Statistics. I strongly support their application and subsequent award of an Affordable Learning Georgia grant. The department will provide the necessary resources to facilitate their activities. We will monitor the implementation process to assure its success.

Yours sincerely

Robert Steven Owor

Robert S. Owor, Ph.D.

Professor and Chair, Math and Computer Science

Textbook Transformation Grants, Round Sixteen (Spring 2020 – Spring 2021)

Proposal Form and Narrative

Notes

- The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.
- The only way to submit the official proposal is through the online form in Georgia Tech's InfoReady Review. The link to the online application is on the [Round 16 RFP Page](#).
- The italic text provided below is meant for clarifications and can be deleted.

Applicant, Team, and Sponsor Information

The **applicant** is the proposed Project Lead for the grant project. The **submitter** is the person submitting the application (which may be a Grants Officer or Administrator). The submitter will often be the applicant – if so, leave the submitter fields blank.

Institution(s)	ALBANY STATE UNIVERSITY
Applicant Name	Zephyrinus C. Okonkwo
Applicant Email	Zephyrinus.okonkwo@asurams.edu
Applicant Phone #	229-500-2121
Applicant Position/Title	Professor of Mathematics and Dean, College of Art and Sciences
Submitter Name	Anilkumar Devarapu
Submitter Email	Anilkumar.devarapu@asurams.edu
Submitter Phone #	229-500-2281
Submitter Position	Associate Professor of Mathematics

Please provide the first/last names and email addresses of all team members within the proposed project. Include the applicant (Project Lead) in this list. Do not include prefixes or suffixes such as Ms., Dr., Ph.D., etc.

	Name	Email Address
Team Member 1	Zephyrinus C. Okonkwo	Zephyrinus.okonkwo@asurams.edu
Team Member 2	Anilkumar Devarapu	Anilkumar.devarapu@asurams.edu
Team Member 3	Anthony Smith	Anthony.smith@asurams.edu
Team Member 4	Laxmi Paudel	Laxmi.paudel@asurams.edu
Team Member 5	Li Feng	li.feng@asurams.edu
Team Member 6	Vijay Kunwar	Vijay.kunwar@asurams.edu
Team Member 7	Eric Benson	eric.benson@asurams.edu
Team Member 8	Chinenye Ofodile	Chinenye.ofodile@asurams.edu

If you have any more team members to add, please enter their names and email addresses in the text box below.

None

Please provide the sponsor's name, title, department, and institution. The sponsor is the provider of your Letter of Support.

Dr. Robert Owor
Dr. Angela Peters

Project Information and Impact Data

Priority Category / Categories	<i>Priority categories: "Specific Core Curriculum Courses," MATH 2411 Introduction to Statistics</i>
Requested Amount of Funding	<i>Large Scale Project \$30,000 maximum for a large-scale project.</i>
Course Names and Course Numbers	<i>MATH 2411-Introduction to Statistics</i>
Final Semester of Project	<i>Spring 2021.</i>
Total Number of Student Section Enrollments Affected by Project in One Academic Year	<i>34 sections. 952 students (in an average of 28 students from each section).</i>
Average Number of Student Section Enrollments Affected per Summer Semester	<i>5 sections. (with an average of 28 students each).</i>
Average Number of Student Section Enrollments Affected per Fall Semester	<i>16 sections (with an average of 28 students each).</i>
Average Number of Student Section Enrollments Affected per Spring Semester	<i>13 sections (with an average of 28 students each).</i>
Original Required Commercial Materials	<i>Elementary Statistics A step by step approach 10th Edition by Bluman</i>
Average Price of Original Required Materials Per Student Section Enrollment	$\$190.74 * 28 = \5340.72
Average Post-Project Cost Per Student Section Enrollment	0.00
Average Post-Project Savings Per Student Section Enrollment	$= \$5340.72$
Projected Total Annual Student Savings Per Academic Year	\$181,584.48

Using OpenStax Textbook?	<i>Yes. This will be used during the adoption Process.</i>
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Narrative Section

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 a free online textbook.
2. To strengthen student engagement in learning of MATH 2411, Introduction to Statistics, and to enhance student success and achievement in the course.
3. To motivate students' interest in the use of online based technology to solve real-life problems encountered in Statistics, including large scale data analysis using R-Studio.
4. To increase enrollment of students in the course with the provision of no-cost textbook and learning materials.
5. To create a standardized online course by incorporating student-centered pedagogy, enriched learning resources, and assessments on a scalable instructional delivery platform.
- 2.

2.1. STATEMENT OF TRANSFORMATION

3. The past three years has seen an increase in the number of students enrolling in MATH 2411-Introduction to Statistics at Albany State University for the following reasons. First, due to the consolidation of old Albany State University and Darton State College, MATH 2411 has been attracting more students. Secondly, MATH 2411 could be taken by students to fulfill the math requirement for Area A2. Thirdly, as an alternative math pathway, non-STEM majors can take it to fulfill the math requirement in the core. Most non-STEM freshmen majors are being put in the Introduction to Statistics course.
4. There were 300 students enrolled in twelve sections of MATH 2411-Introduction to Basic Statistics course in fall 2018, and 355 enrolled in 14 sections of the course in spring 2019. 90 students took the course in summer 2019. Hence in 2018-2019, 745 took the course. During the fall of 2019, 407 students were enrolled in 16 sections of the course, and in spring 2020, 425 were enrolled in 13 sections of Instruction to Basic Statistics. It is projected that about 120 students will enroll in five sections of MATH 2411 in summer 2020. Consequently, 952 students were expected to enroll in the course in 2019-2020 year.
5. The MATH 2411, Introduction to Statistics textbook is very expensive. Most students are unable to purchase the textbook that makes attaining the course learning outcomes very difficult. Lack of access to a standard textbook for the course has made in-depth learning of the course material very difficult. It has also negatively affected students' ability to engage in productive and quality learning inside and outside the classroom. Hence, students are unable to achieve deep content knowledge of the concepts in the course and the applications of such concepts to real life. The development of MATH 2411, Introduction to Statistics, no-cost textbook course would enhance student understanding, engagement, achievement, and interest in the course.
6. Our team consists of the core faculty members who teach Introduction to Statistics every semester. The team will develop quality support/supplementary material; together with OER textbook. This will enhance pedagogy and learning in the course. This way every

student taking the course will be able to read the most essential course materials, do the appropriate course assignments, and practice problems. Furthermore, the project will enable the team to develop a common unified syllabus, and will align the syllabus with the textbook used in every course section. This will also enhance faculty engagement, course standardization, assessment, and overall course quality.

7. MATH 2411 requires that instructors show substantial coverage of topics and concepts while still allowing instructors the flexibility to adapt certain materials and innovative pedagogical techniques to meet course outcomes. Research results indicate that students who take and pass their Math and English courses required in the core during their first year, and also able to pass nine credits in their focus areas, have a better chance of graduating in four years than those who do not succeed in the Math and English courses in their first year. ASU data indicates that the Introduction to Statistics course has a higher pass rate than College Algebra. Consequently, student success in Introduction to Statistics has a broader ramification on student retention, progression, and degree completion across all majors at Albany State University (ASU).
8. During our preparation of support course materials, our team will consult and work with colleagues in the social sciences and business and seek input and recommendations, and adopt their recommendations. We will do this in order to adopt and address more concepts dealing with applications of Statistics in various fields and majors taken by non-STEM majors.
9. Guided by our experience in the previous successful Affordable Learning Georgia Textbook grants we had garnered, we will adopt the best practices in pedagogy, assessment, and learning. Our team will explore and develop seamless learning and assessment materials, including developing and adopting certain problem-solving and simulation software (for example, R), and handheld technology which will enhance student engagement and interest. All instructors teaching the Introduction to Statistics course will use a common syllabus which will be redesigned through this grant. The Open Education Resource Textbook (OER) we adopt will be used in the syllabus redesign. Instructors will have the freedom to adopt pedagogical techniques that most suited for 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. This is because all instructors will be required to place all learning material on the GeogiaVIEW platform.
- 10.

11. 1.2 TRANSFORMATION ACTION PLAN

12. This project will not require any major changes in the syllabus. The course description, goal of the course, course learning outcomes, and specific objectives of the course will remain unchanged. However, a common revised syllabus will be adopted. There will be an alignment of pedagogy and assessment with the adopted OER textbook. There would be a renewed emphasis on collaboration of project team members, and other faculty members who teach this course. Team members would meet regularly to examine project activities and progress. Through collaboration the team will develop measures which will

ensure success of the project as well as effectiveness of the project activities. The support materials developed through this project, as well as all assessment materials and other course materials will be placed on GeorgiaVIEW, the ASU learning platform. Some course assignments, including tests, will be placed in GeorgiaVIEW as deemed necessary and convenient by individual instructors. All Introduction to Statistics sections will be enhanced by the availability of the additional learning resources on GeorgiaVIEW with exportable capabilities, that is, any faculty member can “Copy Course” and customize the course within and outside Albany State University. The final products will be available in Word, LaTeX, and pdf formats.

13. Dr. Anilkumar Devarapu, Dr. Laxmi Paudel, Dr. Vijay Kunwar, Professor Anthony Smith, Dr. Li Feng, Dr. Eric Benson, Dr. Chinenye Ofodile, 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 Introduction to Statistics projects which could enhance course quality. Such projects will be included in the learning materials we will develop through this grant.
14. Dr. Arun Saha will serve as the project reviewer. He is a Professor of Physics and Engineering and has taught undergraduate and graduate courses in Mathematics for more than fifteen years. He will examine the appropriateness and relevance of the content, pedagogy, and adequate alignment of the content of the OER textbook with the course learning outcomes.

15.

16. 1.3 QUANTITATIVE AND QUALITATIVE MEASURES

17. Our previous Affordable Learning Georgia Textbook Grant experience indicates that the activities and materials outlined in this grant proposal will provide instructors and students with the opportunity to take complete control of the course. The emphasis on non-STEM majors taking Introduction to Statistics course as required for some majors, coupled with the advising center and BOR Momentum Year guidelines will ensure that more students will enroll in the course. This course will be a no-cost textbook course. More importantly, the pdf version of the textbook and syllabus will be available on GeorgiaVIEW at least a week before the classes begin. This will enable the instructors to give reading assignments and out-of-class activities from the course package. Instructors teaching Introduction to Statistics would be able to adopt the textbook and developed package to save a huge amount of money on behalf of students.
18. Many instructors were unable to receive appropriate pedagogical and assessment support from textbook publishers. In several cases, students were required to pay additional money in order to purchase access codes to do their homework. Moreover, in cases one received such support, editing such materials is not permitted. This project will give instructors an opportunity to develop a stand-alone OER course material which will provide flexibility in instruction, learning, and assessment. In addition, we will develop the course guide which will provide an easy guidance for instructors. Our department will provide hardcopies of the course guide to all instructors. The course guide will also be reposed on GeorgiaVIEW.

19. We will adopt both quantitative and qualitative approaches for data collection, assessment, and analysis. We will collect the data during the summer of 2020, and use fall 2020 for planning. We shall use the data collected in spring 2020 for benchmark and comparison purposes. During fall 2020, we will designate some sections of Introduction to Statistics as Control Group while others will be in the Treatment Group. The subsequent quantitative and qualitative data collected will be analyzed and compared accordingly. The results will be used for continuous project improvement. We plan to have full project implementation in spring 2021.
20. The team members will teach at least 12 sections of Introduction to Statistics in spring 2021.
21. **Quantitative Measures:** The following quantitative data will be collected, compared, and analyzed (control group vs. ALG implementation group):
- Number of students enrolled in the Introduction of Statistics 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 in pre-test, mid-term, final, and at the end of each semester.
 - Mean GPA of students
22. Collected data will be organized, compared, and analyzed using graphs, descriptive and inferential statistical tools. Other appropriate significance tests such as z-test, t-test, ANOVA etc. will be done for comparative data analysis.
23. **Qualitative Measures:** We will use both formative and summative participant Likert-Type surveys, 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
 - Instructor Opinion Survey on project activities, collaboration, and impact
24. As stated earlier, the formative assessments will be aimed at receiving feedback from participants, which in turn will be used for project improvement.
- 25.

26. 1.4 TIMELINE

27. Dr. Zephyrinus C. Okonkwo, Dr. Anilkumar Devarapu, and Dr. Eric Benson will manage the project. They will oversee that the timelines and deadlines are met. Dr. Anilkumar

Devarapu will also be in-charge of all data collection. Data Analysis will be done by the team.

28. **February 24, 2020:** Attend the required Kick-Off meeting at Middle Georgia State University, Macon, Georgia

29.

30. **June 20, 2020:** Search, select, and adopt the best open source textbook for Introduction to Statistics

31.

32. **July 15, 2020:** Revise existing syllabus for Introduction to Statistics and prepare necessary redesigning/modifications

33.

34. **August 5, 2020:** Share and discuss the project plans with mathematics faculty within the department. Introduce open source textbook and syllabus. Collect all instructors' feedback.

35.

36. **September 5, 2020:** Develop appropriate course materials; chapter notes, worked out examples, including unit/section/benchmark prototype tests. Review and test all developed components to make sure they are accurate, appropriate, and adequate. By this time, the first sets of data from the control group as outlined above should have been collected.

37.

38. **October 5, 2020:** Develop and incorporate projects, and implement necessary software. Prepare intuitive examples, practice problems, and tests.

39.

40. **November 5, 2020** Introduce and discuss the OER materials developed with fellow instructors in the University. Collect participants' feedback. Encourage all Introduction to Statistics course instructors to adopt the material in the fall and spring 2021.

41.

42. **December 10, 2020:** Organize workshops on "OER materials for Introduction to Statistics and software implementation" for colleagues. Collect participants' feedback.

43.

44. **December 15, 2020:** Collect data and analyze students' performance on pre-test. Use both descriptive and inferential statistics to compare students' performances with formal textbook versus OER materials. Present midpoint project report.

45.

46. **March 8, 2021:** Collect data and analyze students' performance on midterm term test. Use both descriptive and inferential statistics to examine students' performance. Collect students' feedback about their feeling and usefulness of the new material and analyze the data.

47.

48. **March 20, 2021:** Prepare and submit the mid semester report.

49.

50. **April 2, 2021:** 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 and collect their feedback.

51.

52. **May 15, 2021:** Data collection and analysis on students' performance on the final test. Use both descriptive and inferential statistics to compare students' performance on project.

53.

54. **May 17, 2021:** Data collection and analysis on students' semester end grades and their mean GPA. Use both descriptive and inferential statistics to compare students' performance.

55.

56. **May 20, 2021:** Prepare and submit the final report.

57.

58.

59.

60. 1.5 BUDGET

61. Supplemental compensation is requested for the involved faculty members in the project as follows:

- Dr. Zephyrinus Okonkwo: \$4,800
- Dr. Anilkumar Devarapu: \$4,800
- Dr. Vijay Kunwar: \$3,000
- Professor Anthony Smith: \$3,000
- Dr. Li Feng \$3,000
- Dr. Laxmi Paudel: \$3,000
- Dr. Eric Benson \$3,000
- Dr. Chinenye Ofodile \$3,000
- Dr. Arun Saha \$1,600
- Travel**: \$800
- Total \$30,000

62. ** The travel fund is requested for two team members to attend the Kickoff Meeting at Middle Georgia State University in Macon, GA.

63. 1.6 SUSTAINABILITY PLAN

64. MATH 2411 (Introduction to Statistics) is offered every semester at Albany State University. As per the record, 16 sections of the course were offered in the fall of 2019, and more than 850 students were enrolled in the academic year 2019. Implementation of this project will accomplish the goals delineated above, 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, testing and support materials will be prepared and made available for our faculty members. Students will be availed the opportunity to download the pdf version of the course materials from GeorgiaVIEW. Furthermore, our instructors can download the instructional materials and textbook from GeorgiaVIEW or "Copy Course."

65.

66. 1.7 REFERENCES AND ATTACHMENTS

67. 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. Angela Peters, Provost and Vice President for Academic Affairs, Albany State
University