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Application Summary

Competition Details

Competition Title:	Textbook Transformation Grants, Round Fourteen (2019-2020)
Category:	University System of Georgia
Award Cycle:	Round 14
Submission Deadline:	04/09/2019 at 11:59 PM

Application Information

Submitted By:	Aubrey Dyer
Appplication ID:	3371
Application Title:	445
Date Submitted:	04/09/2019 at 8:22 AM

Personal Details

Institution Name(s):	CLAYTON STATE UNIVERSITY
Applicant First Name:	Aubrey
Applicant Last Name:	Dyer
Applicant Email Address:	aubreydyer@clayton.edu
Applicant Phone Number:	6784664894
Primary Appointment Title:	Assistant Professor
Submitter First Name:	Aubrey
Submitter Last Name:	Dyer
Submitter Email Address:	aubreydyer@clayton.edu
Submitter Phone Number:	6784664894
Submitter Title:	Assistant Professor

Application Details

Proposal Title

445

Final Semester of Project

Summer 2020

Requested Amount of Funding

\$25,800

Type of Grant

Course Title(s)

Principles of Chemistry I and Principles of Chemistry II

Course Number(s)

CHEM 1211 and CHEM 1212

Team Member 1 Name

Aubrey L. Dyer

Team Member 1 Email

aubreydyer@clayton.edu

Team Member 2 Name

Augustine Agyeman

Team Member 2 Email

augustineagyeman@clayton.edu

Team Member 3 Name

Cass Parker

Team Member 3 Email

cassparker@clayton.edu

Team Member 4 Name

John Meyers

Team Member 4 Email

johnmeyers@clayton.edu

Additional Team Members (Name and email address for each)

Courtney DuBois, courtneydubois@clayton.edu

Sponsor Name

Nasser Momayezi

Sponsor Title

Dean

Sponsor Department

College of Arts and Sciences

Original Required Commercial Materials (title, author, price)

- Text: Chemistry—Structures and Properties, 2nd Edition/ Nivaldo Tro
- Online Homework System: Modified MasteringChemistry

Average Number of Students per Course Section Affected by Project in One Academic Year

38

Average Number of Sections Affected by Project in One Academic Year

12

Total Number of Students Affected by Project in One Academic Year

440

Average Number of Students Affected per Summer Semester

68

Average Number of Students Affected per Fall Semester

183

Average Number of Students Affected per Spring Semester

189

Original Total Cost per Student

\$233.32 average (range from \$119.99 for e-text to \$319.99 hardcover)

Post-Project Cost per Student

\$40/semester

Post-Project Savings per Student

\$193.32 average (\$79.99 to 279.99)

Projected Total Annual Student Savings per Academic Year

\$85,060.80 average

Using OpenStax Textbook?

Yes

Project Goals

This project aims to increase accessibility of a core science course offered to over 400 students a year as a year-long sequence in chemistry for science majors. Clayton State University enrolls a large number of non-traditional students who rely heavily on financial aid and often cannot afford large purchases associated with science course materials out-of-pocket. Since this course is a traditionally difficult course that sees high D/W/F rates across the nation to begin with, this grant will be used to lower the cost barrier that limits students from obtaining the course material in a timely manner that ultimately sets them behind.

The goals for this textbook transformation grant project are as follows:

Goal 1: Reduce higher education costs for students through offering a no-cost textbook and low-cost online homework system (\$40 per semester).

Goal 2: Have course materials accessible on the first day of class, thereby ensuring students are off to the most successful start to their semester.

Goal 3: Develop foundational workshop lessons for students who lack the predictors of success in the course to bridge the gap between what they know and what they are expected to know and understand. This will allow those students to start the semester off on the right foot.

Goal 4: Allow team members to 1) collaborate with an instructional designer to develop measureable learning objectives that align with departmental goals for the course sequence and 2) to ensure that course activities and assessments align with those learning objectives.

Goal 5: Develop course materials (PowerPoint slides, worksheets, active learning activities, and assessments) that align with the learning objectives and utilize open access content.

Goal 6: Assess student gains in understanding through quantitative evaluation of student performance on a common final exam, decrease in D/F/W rates, and improvement in B and C grades. Additionally, qualitative evaluations of student and faculty satisfaction with the OpenStax textbook content, low-cost homework system effectiveness, and accessibility of content will be completed.

Statement of Transformation

The courses identified in this project, CHEM 1211 and 1212—Principles of Chemistry 1 and 2—are two courses that make up a two-semester sequence in general chemistry for science majors. The students who enroll in these courses include majors in chemistry, biology, health sciences, computer science, pre-engineering, mathematics, and pre-pharmacy, in addition to dual enrollment students. This course is a gateway course for many STEM majors and success in this sequence lays the foundation for eventual success in their chosen major. Unfortunately, for many students, success in this sequence is elusive for many reasons that include, for example, poor math and science foundational learning (at the high school or early college level), outside distractors such as job requirements and family care restraints, and lack of engagement with the course and content. One of the major predictors of student success in this sequence is their readiness on day 1 of CHEM 1211 and engagement with the material. However, for many students, they come in ill-prepared and lack the resources to gain access to the costly course materials until well after the second week of class—after the foundational review of material has passed. As the rest of the semester progresses, the students are playing catch-up while attempting to learn new material that builds on earlier, missed, content. Over the last 4 years, the average D/F/W rates for 1211 and 1212 hover around 40% and 45%, respectively. The reason for the higher D/F/W rate for CHEM 1212 is the increased math requirements, and a number of the students transfer into Clayton State and lack the proper foundation. In addition, the average Clayton State University student is a minority female student (69% female, 69% African American or Hispanic/Latino for the 2018 academic year), who receives a large portion of their financial aid as a Pell Grant or student loans.

We propose to replace the costly textbook and online homework system currently in use for both CHEM 1211 and 1212 with an open access textbook and low-cost homework system. This will lower the barrier to success for many students by making the course more affordable and by allowing students to gain access to the textbook as early as possible. The project team will evaluate several low-cost homework platforms and work with the instructional designer to develop course learning objectives for the course. The team will also work together to develop student practice worksheets, self-assessment quizzes, active learning content, and a common final exam for both semesters. Faculty will create course materials tailored to the course and the dynamic subject matter, rather than to a specific textbook adopted, so that modern elements can be added at any time without conflict. Additionally, a series of workshops will be offered and recorded with topics focusing on the foundational concepts that students need to succeed in both courses, but may be lacking knowledge or confidence in. These workshops and videos will be made available as early in the semester as possible, and before the semester begins in some cases. The expectations are that these efforts will improve alignment of course content with the assessments, improve student understanding and retention, and improve student perceptions about the general chemistry sequence. The impact will be reduced D/F/W rates, increased retention from the CHEM 1211 course to CHEM 1212 course, and increase retention in the STEM majors as a whole.

Transformation Action Plan

The team is composed of four faculty members within the department of chemistry and an instructional designer within the Center for Excellence in Learning and Teaching at Clayton State University. All four faculty members hold Ph.D. degrees in chemistry and teach the freshman courses for science majors, in addition to upper-division elective and major courses within the department. In addition, Dr. Dyer currently offers an online course in general chemistry for allied health majors (CHEM 1151) and is a Quality Matters peer reviewer. The fifth team member, Courtney DuBois, is an instructional designer in the university's Center for Excellence in Learning and Teaching and is also a Quality Matters Peer Reviewer and acts as the campus coordinator.

The responsibilities of the team are outlined as follows:

- 1. Drs. Dyer, Agyeman, Meyers, and Parker:** Selection of low-cost homework system to accompany the OpenStax atoms first general chemistry textbook. Systems to be evaluated include TopHat, Sapling, and Knewton Alta.
- 2. Drs. Dyer, Agyeman, Meyers, and Parker in collaboration with Courtney Dubois:** Develop measurable learning objectives for both courses.
- 3. Drs. Parker, Agyeman, and Meyers:** Designing practice worksheets and self-assessment quizzes.
- 4. Drs. Dyer and Meyers:** Develop active learning content for in-class engagement.
- 5. Drs. Dyer, Agyeman, Meyers, and Parker:** Develop common final exam that aligns with learning objectives.
- 6. Drs. Dyer, Meyers, and Courtney DuBois:** Develop workshops covering early essential concepts for CHEM 1211 and 1212. Work with the CELT to record workshops and load content on website.
- 7. Drs. Dyer and Meyers:** Pilot textbook, content, and assessments in all CHEM 1211 sections of the Fall 2019 semester.
- 8. Drs. Parker and Agyeman:** Pilot textbook, content, and assessments in all CHEM 1212 sections of the Spring 2020 semester.
- 9. All:** Assessment evaluation.

Quantitative & Qualitative Measures

The success of this project will be measured both qualitatively and quantitatively. The qualitative assessment will be completed through student satisfaction surveys. These will be administered through Qualtrics and will address student perceptions on textbook and homework system cost, access to the textbook and homework system, overall satisfaction with the textbook material and homework system, and effectiveness in improving understanding for the workshops and video lessons.

Quantitative assessment of the project will be performed by looking at overall student success and retention as well as student gains in understanding of specific course objectives. Overall student success will be evaluated by analysis of D/F/W rates in the affected courses and compared to previous semesters. Additionally, the student scores on the common final exam will be evaluated. Student gains in understanding will be assessed by mapping questions on the common final exam to course learning objectives. Student success on these specific course objectives will be analyzed for previous semesters and compared to the semesters in which the OER content will be utilized. Specific attention will be paid to those objectives covered early in the semester in which we have found that students delay purchasing access to the traditional textbook due to budgetary constraints.

In order to gather and assess student scores and evaluated student surveys, IRB approval will need to be obtained. The IRB application will be submitted in the late Summer 2019 semester and approval sought early in the Fall of 2019. Approval will be sought for the duration of the grant period.

Timeline

Major milestones over the Summer 2019 – Summer 2020 grant period:

- May 2019: Select low-cost homework system
- May 20, 2019: Attend ALG kick-off meeting
- May – July 2019: Revise course materials for CHEM 1211
- August – December 2019: Implement use of OER textbook and low-cost homework system in CHEM 1211
Assess student learning and satisfaction in CHEM 1211
- January – May 2020: Implement use of OER textbook and low-cost homework system in CHEM 1212
Continue use of OER textbook and homework system in CHEM 1211
Assess student learning and satisfaction in CHEM 1211 and 1212
- Summer 2020: Continue use of OER textbook and homework system in both CHEM 1211 and 1212
Assess student learning and satisfaction in CHEM 1211 and CHEM 1212
Submit final report summarizing findings of impact for all sections

Budget

- Overload stipend for 5 team members = $5 \times \$5,000 = \$25,000$
- Travel = \$800
- Total = \$25,800

Sustainability Plan

Each of the faculty on the grant application are the primary instructors for CHEM 1211 and CHEM 1212. As a team, the faculty will re-evaluate the need for updating and maintaining the course material on a bi-annual basis. This includes evaluating the effectiveness of the OpenStax textbook chosen, the low-cost homework system, worksheets, and the final summative assessment common across all sections.

In addition, following the assessment of this project on the effectiveness in student learning and student satisfaction, the availability of low-cost course materials will be evaluated for other high-enrollment chemistry courses such as Survey of Chemistry 1 and 2 (CHEM 1151/1152).

Future plans for this work includes the presentation of the department experience in adoption and implementation of the course material at conferences and presentation on campus to inspire others at Clayton State University to adopt low-to-no cost materials to better benefit our students.

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.



April 1, 2019

Re: Letter of Support for the Affordable Learning Georgia Grant Proposal, round 14

Dear Committee Members,

As the Dean of the Colleges of Arts and Sciences, I enthusiastically support the application for the Affordable Learning Georgia low-cost-to-students textbook transformation large scale department grant submitted by Aubrey Dyer as lead for her team of faculty members in the Department of Chemistry and Physics. The remaining faculty members on the team are Drs. Augustine Agyeman, Cass Parker, and John Meyers. This grant proposal is designed to replace the existing course textbook with a no-cost book and low-cost supplemental materials. The significant reduction in the textbook costs will benefit a large number of students per year. The annual cost savings to students is around \$ 50,000. A large proportion of our students come from low income households and are Pell Grant recipients. The consequent decrease in the cost of learning materials will lead to sustainability for reducing financial impediments to students' ability to complete their degree and it has the potential to increase the students' likelihood of graduation. This will enhance the Colleges' retention, progression, and graduation of successful students.

This proposal is being submitted for CHEM 1211 (Principles of Chemistry I) and CHEM 1212 (Principles of Chemistry II). The aggregate student enrollment in these classes this past year was 422 students. These courses are required for any STEM major including chemistry, biology, pre-pharmacy, mathematics, pre-engineering, and many health science majors. The courses are offered every semester, enrollment is strong, and it is expected to continue. We believe the project is highly sustainable. The enrollment supports the grant project and the faculty have developed a plan to review and update the resources that will ensure the resources remain current.

The team of faculty members working on this project are both capable and motivated to pursue the goals of Affordable Learning Georgia. These faculty members are extremely dedicated to serving the students in the Department of Chemistry and Physics. They have a strong and consistent record of scholarly achievements, service to the University, and teaching performance and accomplishments.

I sincerely hope that the University is awarded this very important grant to help us execute on our long-term commitment to a successful transformation to free and online texts. Thank you for your consideration of this proposal.

Sincerely,


for
Nasser Momayezi
Dean, College of Arts and Sciences

2000 Clayton State Boulevard. Morrow. Georgia 30260-0285

www.clayton.edu

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Textbook Transformation Grants, Round Fourteen (Summer 2019 -Summer 2020)

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 14 RFP Page](#).
- The italic text we provide 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)	Clayton State University
Applicant Name	Aubrey L. Dyer
Applicant Email	aubreydyer@clayton.edu
Applicant Phone #	678-466-4894
Applicant Position/Title	Assistant Professor of Chemistry
Submitter Name	
Submitter Email	
Submitter Phone #	
Submitter Position	

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	Aubrey L. Dyer	aubreydyer@clayton.edu
Team Member 2	Augustine O. Agyeman	augustineagyeman@clayton.edu
Team Member 3	Cass D. Parker	cassparker@clayton.edu
Team Member 4	John J. Meyers	johnmeyers@clayton.edu
Team Member 5	Courtney DuBois	Courtneydubois@clayton.edu

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

N/A

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

Nasser Momayezi, Dean of College of Arts and Sciences, Clayton State University

Project Information and Impact Data

Title of Grant Project	Principles of Chemistry I & II Textbook Transformation Grant
Type of Grant	No-or-Low-Cost-to-Students Learning Materials
Requested Amount of Funding	\$25,800
Course Names and Course Numbers	CHEM 1211 (Principles of Chemistry I) and CHEM 1212 (Principles of Chemistry II)
Final Semester of Project	Summer 2020
Average Number of Students Per Course Section Affected by Project	38 (over 4 year period)
Average Number of Sections Affected by Project in One Academic Year	12
Total Number of Students Affected by Project in One Academic Year	440 (average over 4 year period)
Average Number of Students Affected per Summer Semester	68
Average Number of Students Affected per Fall Semester	183
Average Number of Students Affected per Spring Semester	189
Title/Author of Original Required Materials	<ul style="list-style-type: none">• Text: Chemistry—Structures and Properties, 2nd Edition/ Nivaldo Tro• Online Homework System: Modified MasteringChemistry
Original Total Cost Per Student	Ranges from \$119.99 for the eText with Mastering to \$319.99 for hardcopy text with Mastering. Many students choose loose-leaf text with Mastering at a cost of \$233.32, which will be used as the “typical” cost
Post-Project Cost Per Student	\$40/semester for low-cost homework system
Post-Project Savings Per Student	\$193.32 (\$233.32 - \$40)
Projected Total Annual Student Savings Per Academic Year	\$85,060.80 (440 students x \$193.32)

Using OpenStax Textbook?

Yes

Narrative Section

1. Project Goals

This project aims to increase accessibility of a core science course offered to over 400 students a year as a year-long sequence in chemistry for science majors. Clayton State University enrolls a large number of non-traditional students who rely heavily on financial aid and often cannot afford large purchases associated with science course materials out-of-pocket. Since this course is a traditionally difficult course that sees high D/W/F rates across the nation to begin with, this grant will be used to lower the cost barrier that limits students from obtaining the course material in a timely manner that ultimately sets them behind.

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The team is composed of four faculty members within the department of chemistry and an instructional designer within the Center for Excellence in Learning and Teaching at Clayton State University. All four faculty members hold Ph.D. degrees in chemistry and teach the freshman courses for science majors, in addition to upper-division elective and major courses within the department. In addition, Dr. Dyer currently offers an online course in general chemistry for allied health majors (CHEM 1151) and is a Quality Matters peer reviewer. The fifth team member, Courtney DuBois, is an instructional designer in the university's Center for Excellence in Learning and Teaching and is also a Quality Matters Peer Reviewer and acts as the campus coordinator.

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9. **All:** Assessment evaluation.

4. Quantitative and Qualitative Measures

The success of this project will be measured both qualitatively and quantitatively. The qualitative assessment will be completed through student satisfaction surveys. These will be administered through Qualtrics and will address student perceptions on textbook and homework system cost, access to the textbook and homework system, overall satisfaction with the textbook material and homework system, and effectiveness in improving understanding for the workshops and video lessons.

Quantitative assessment of the project will be performed by looking at overall student success and retention as well as student gains in understanding of specific course objectives. Overall student success will be evaluated by analysis of D/F/W rates in the affected courses and compared to previous semesters. Additionally, the student scores on the common final exam will be evaluated. Student gains in understanding will be assessed by mapping questions on the common final exam to course learning objectives. Student success on these specific course objectives will be analyzed for previous semesters and compared to the semesters in which the OER content will be utilized. Specific attention will be paid to those objectives covered early in the semester in which we have found that students delay purchasing access to the traditional textbook due to budgetary constraints.

In order to gather and assess student scores and evaluated student surveys, IRB approval will need to be obtained. The IRB application will be submitted in the late Summer 2019 semester and approval sought early in the Fall of 2019. Approval will be sought for the duration of the grant period.

5. Timeline

Major milestones over the Summer 2019 – Summer 2020 grant period:

- May 2019: Select low-cost homework system
- May 20, 2019: Attend ALG kick-off meeting
- May – July 2019: Revise course materials for CHEM 1211
- August – December 2019:
 - Implement use of OER textbook and low-cost homework system in CHEM 1211
 - Assess student learning and satisfaction in CHEM 1211
 - Revise course materials for CHEM 1212
 - Develop workshops for CHEM 1211 essential skills
- January – May 2020:
 - Implement use of OER textbook and low-cost homework system in CHEM 1212
 - Continue use of OER textbook and homework system in CHEM 1211
 - Assess student learning and satisfaction in CHEM 1211 and 1212
 - Develop workshops for CHEM 1212 essential skills
- Summer 2020:
 - Continue use of OER textbook and homework system in both CHEM 1211 and 1212
 - Assess student learning and satisfaction in CHEM 1211 and CHEM 1212
 - Submit final report summarizing findings of impact for all sections

6. Budget

- Overload stipend for 5 team members = $5 \times \$5,000 = \$25,000$
- Travel = \$800
- Total = \$25,800

7. Sustainability Plan

Each of the faculty on the grant application are the primary instructors for CHEM 1211 and CHEM 1212. As a team, the faculty will re-evaluate the need for updating and maintaining the course material on a bi-annual basis. This includes evaluating the effectiveness of the OpenStax textbook chosen, the low-cost homework system, worksheets, and the final summative assessment common across all sections.

In addition, following the assessment of this project on the effectiveness in student learning and student satisfaction, the availability of low-cost course materials will be evaluated for other high-enrollment chemistry courses such as Survey of Chemistry 1 and 2 (CHEM 1151/1152).

Future plans for this work includes the presentation of the department experience in adoption and implementation of the course material at conferences and presentation on campus to inspire others at Clayton State University to adopt low-to-no cost materials to better benefit our students.

Note: Letter of Support

A letter of support must be provided from the sponsoring area (unit, office, department, school, library, campus office of the Vice President for Academic Affairs, etc.) that will be responsible for receipt and distribution of funding. Letters must reference sustainability. In the case of

multi-institutional affiliations, all participants' institutions/departments must provide a letter of support.