Application Details

Manage Application: Textbook Transformation Grants: Round Eleven

Award Cycle:	Round 11
Internal Submission Deadline:	Tuesday, January 23, 2018

Application Title:	359
Application ID:	002078
Submitter First Name:	Joel
Submitter Last Name:	Caughran
Submitter Title:	Senior Academic Professional
Submitter Email Address:	caughran@uga.edu
Submitter Phone Number:	706-542-1906
Submitter Campus Role:	Proposal Investigator (Primary or additional)
Applicant First Name:	Norbert
Applicant Last Name:	Pienta
Applicant Email Address:	npienta@uga.edu
Applicant Phone Number:	706-542-6559
Primary Appointment Title:	Professor and Director of Freshman Chemistry
Institution Name(s):	University of Georgia
Co-Applicant(s):	--
Submission Date:	Tuesday, January 23, 2018

Proposal Title:	359
Proposal Category:	Specific Top 50 Lower Division Courses
Final Semester of Instruction:	Summer 2018
Are you using an OpenStax textbook?:	Yes

Team Members (Name, Email Address):

Norbert Pienta, npienta@uga.edu
Joel Caughran, caughran@uga.edu
Sara Blankenship, sara.blankenship@uga.edu
Vince Du, wd84746@uga.edu

Suzanne Ellenberger, sre13137@uga.edu
Daphne Norton, dnorton2@uga.edu
Wayne Suggs, dwsuggs@uga.edu
Ana West, ana.west@uga.edu

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

Rahul Shrivastav, Ph.D.
Vice President for Instruction
University of Georiga

Course Names, Course Numbers and Semesters Offered:

Basic of Chemistry – CHEM 1210 – Fall, Spring
Freshman Chemistry I – CHEM 1211 – Fall, Spring, and Summer
Freshman Chemistry II – CHEM 1212 – Fall, Spring, and Summer

List the original course materials for students (including title, whether optional or required, & cost for each item):	Mindtap General Chemistry by Vinning (textbook and pre-lecture assignments), required, $130 for four semesters WebAssign (homework, weekly quizzes, and exams), required, $28 per semester TurningPoint (student response system), required, $50 for five years TI-30 calculator, required, $25
Average Number of Students per Course Section:	280
Number of Course Sections Affected by Implementation in Academic Year:	24
Average Number of Students Per Summer Semester:	5,800
Average Number of Students Per Fall Semester:	3,000
Average Number of Students Per Spring Semester:	2,400
Total Number of Students Affected by Implementation in Academic Year:	400

Requested Amount of Funding:	$30,000
Original per Student Cost:	$261 for CHEM 1211 and 1212
Post-Proposal Projected Student Cost:	~$135 for CHEM 1211 and 1212
Projected Per Student Savings:	~$130 for CHEM 1211 and 1212
Projected Total Annual Student Savings:	$350,000 for CHEM 1211 and 1212

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

We will be investigating several engines to host the content created: WebAssign, Tophat, TurningPoint, as well as any other platforms that become available. The proposal uses WebAssign because it is the only engine currently available that meets the needs of the project.

Project Goals:

Build supplemental/ancillary resources to facilitate the adoption of an OER textbook.
Pre-lecture assignments
Reading Assignment
Getting started exercises and tutorials
Pre-lecture quizzes
In-lecture activities
Case studies to foster student discussion
In-lecture questions to confront students with common misconceptions
Post-lecture activities
Homework assignments with tutorials and immediate feedback
Weekly quizzes so students can assess mastery
Exams that better assess student competency rather than memorization of facts
Redesign CHEM 1211 and CHEM 1212 curriculum to cover topics in a way that better supports other courses (BIOL 1107 & 1108) that students may take concurrently or subsequently.
Provide students with access to instructions resources that allow them to better engage in the flipped-classroom pedagogy used in CHEM 1211 and 1212.

Statement of Transformation:

Faculty in the freshman chemistry program at UGA use a flipped-classroom approach in lecture. Instructor expect students to arrive with a basic understanding of the material. Lectures are designed to engage students with more complex examples to help develop the student’s conceptual understanding of the material. After lecture, students work on end-of-chapter problems with tutorials to develop the critical thinking skills necessary for success in a

STEM discipline. Each week, students take a progress check (quiz) to assess their level of mastery and identify topics that need further review before exams.

Now, students must purchase publisher-developed materials to complete the pre-lecture reading and practice assignments as well as the post-lecture end-of-chapter work. We propose adopting an OER textbook, like OpenStax Chemistry or Chemistry LibreTexts, and then developing the pre-lecture and post-lecture activities in a third-party engine, like WebAssign, TopHat, or TurningPoint. Doing so would eliminate the need for students to purchase a textbook and reduce their course costs by ~$130 for the two semesters.

An additional benefit will be the opportunity to redesign the freshman chemistry curriculum offered by the adoption of an OER textbook. The Vice President for Instruction established a taskforce this past summer to investigate restructuring the traditional freshman STEM courses to better support student learning. While this taskforce's work is still ongoing, it has already identified several topics in the chemistry curriculum (intermolecular forces, chemical equilibrium) that are covered after they are needed in the biology courses students may be taking concurrently with chemistry. The flexibility provided by an OER textbook will allow faculty to design a course that better integrates with the other freshman STEM courses.

Funding from this ALG Grant will begin development of the question banks needed for the various assignments in the freshman chemistry program. This funding will allow the department to identify other funding opportunities (internal resources, NSF grants) that can be used for further development and possibly establish revenue streams from the materials (use at other institutions) to continue support of the project.

Transformation Action Plan:

February-April – Identify an OER textbook that has the basic materials need for CHEM 1211 and CHEM 1212 and the flexibility to be rearranged to meet the curriculum redesign. All team members.
March-May – Identify an electronic engine that can host the assignments and provide the tutorials and immediate feedback needed for student success in the course. All team members.
April-August – Reorganize OER content to meet curriculum redesign expectations. All team members with assistance from OER provider.
April-August – Write content and tutorials for pre-lecture and post-lecture assignments, weekly quizzes, and exams. All content will be written in simple text documents to facilitate adoption of a different electronic engine in the future. Pienta, Blankenship, Ellenberger, Du, and West.
May-December – Code all content into selected electronic engine. Caughran, Suggs.

Beginning in the fall of 2018 students in CHEM 1211 will not purchase a textbook but will still need to pay a nominal fee for access to the electronic engine selected. If WebAssign is

selected, students will still need to purchase access to a student response system, TurningPoint or TopHat. If TopHat is chosen, students will not need to pay an additional fee for a student response system increasing the course savings.

Quantitative & Qualitative Measures: The freshman chemistry program uses a standardized exam produced by the American Chemical Society's Exams Institute as the final exam in CHEM 1211 and CHEM 1212. We will continue this practice and compare student performance with past semesters.

Timeline:

Date	Milestone
March 6, 2018	Possible OER Textbooks identified
April 2, 2018	Slate of electronic engines identified
April 27, 2018	OER Textbook identified
May 25, 2018	Electronic Engine identified
June 15, 2018	New organization of OER materials decided
July 10, 2018	OER materials reorganized for CHEM 1211 in the fall
July 28, 2018	Ancillary materials coded into electronic engine for first half of CHEM 1211
September 14, 2018	Ancillary Materials coded into electronic engine for second half of CHEM 1211
October 19, 2018	OER materials reorganized for CHEM 1212 in the spring
Nov 24, 2018	Ancillary materials coded into electronic engine for first half of CHEM 1212
December 15, 2018	Survey data collected and compiled from student users in CHEM 1211
February 15, 2019	Ancillary materials coded into electronic engine for second half of CHEM 1212
May 24, 2019	Survey data collected and compiled from student users in CHEM 1211 and 1212

Budget:

Total budget requested: $30,000

Funds will be used to provide one month of summer support for eligible team members (maximum of $5,000 support to any individual). Mr. Caughran is a 12-month employee so is not eligible for summer support. Dr. Pienta is not requesting summer support.

Sustainability Plan:

The ancillary content will be developed independent of any electronic engine that might be selected during this development. This will provide the opportunity to move to a different engine at a later date as new opportunities become available without having to recreate the content. The content will simply need to be coded or exported to the new engine.

Our plan is to establish an independent revenue stream by selling the content to other institutions to cover summer support for various team members to continue development of the ancillary materials.

When possible, team members will get reduced teaching loads in the spring when demand is decreased and use this time to continue development of course materials.

UNIVERSITY OF GEORGIA

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January 19, 2018

To The Affordable Learning Georgia (ALG) Review Committee,

On behalf of the UGA Office of Instruction, I am pleased to offer support for the grant application for "Development of supplemental materials to support adoption of an OER textbook" for Basic Chemistry, Freshman Chemistry I and Freshman Chemistry II. This grant will dramatically lower the cost of textbooks for over 5800 students annually, resulting in an estimated cost savings of $350,000 for our students annually.

The project is a collaboration between Joel Caughran, Senior Academic Professional and Norbert Pienta, Professor and Director of Freshman Chemistry in UGA's Franklin College of Arts and Sciences. Dr. Pienta leads our general chemistry instruction and is actively pursuing or supporting a number of innovative initiatives to improve student learning and success in this area. These efforts include development of various support programs, including peer-learning support, co-requisite instructional programs, curricular redesign and curriculum mapping (in collaboration with other STEM courses, particularly Biology). The proposed effort to lower the cost of teaching materials dovetails with many of these other efforts to ensure overall student success.

This proposal will require a second software platform for publishing some of the open educational materials. As you know, UGA is exploring the use of on such program for a different low-cost or open educational resources. Following a technical needs evaluation, we should be able to use the same platform to support this proposal as well. Together, these will further enhance our ability to support faculty in developing more low-cost or open educational resources and result in significant cost savings for students.

Thank you for consideration of this project in the Affordable Learning Georgia grant program.

Sincerely,

Rahul Shrivastav, Ph.D.
Vice President for Instruction

Affordable Learning Georgia Textbook Transformation Grants
Round Nine
For Implementations beginning Summer Semester 2017
Running Through Spring Semester 2018

Proposal Form and Narrative

- *The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the InfoReady Review online form for proposal submission.*
- ***Note: The only way to submit the proposal is through the online form in Georgia Tech's InfoReady Review at:*** *https://gatech.infoready4.com/#competitionDetail/1757803*
- *Italicized text is provided for your assistance; please do not keep the italicized text in your submitted proposal. Proposals that do not follow the instructions may be returned.*

Submitter Name	Joel Caughran
Submitter Title	Senior Academic Professional
Submitter Email	caughran@uga.edu
Submitter Phone Number	706-542-1906
Submitter Campus Role	*Proposal Investigator, additional*
Applicant Name	*Norbert Pienta*
Applicant Email	npienta@uga.edu
Applicant Phone Number	706-542-6559
Primary Appointment Title	*Professor and Director of Freshman Chemistry*
Institution Name(s)	University of Georgia

Team Members	***Joel Caughran*, *caughran@uga.edu*** ***Sara Blankenship*, *sara.blankenship@uga.edu*** ***Vince Du*, *wd84746@uga.edu*** ***Suzanne Ellenberger*, *sre13137@uga.edu*** ***Daphne Norton*, *dnorton2@uga.edu*** ***Wayne Suggs*, *dwsuggs@uga.edu*** ***Ana West*, *ana.west@uga.edu***				
Sponsor, Title, Department, Institution	*Per sponsor letter of support*				
Proposal Title	Development of supplemental materials to support adoption of an OER textbook				
Course Names, Course Numbers and Semesters Offered	*Basic of Chemistry – CHEM 1210 – Fall, Spring* *Freshman Chemistry I – CHEM 1211 – Fall, Spring, and Summer* *Freshman Chemistry II – CHEM 1212 – Fall, Spring, and Summer*				
Final Semester of Instruction	*Select Fall 2017, Spring 2018*				
Average Number of Students Per Course Section	280	**Number of Course Sections Affected by Implementation in Academic Year**	**24**	**Total Number of Students Affected by Implementation in Academic Year**	5,800
Average Number of Students Per Summer Semester	*400*				
Average Number of Students Per Fall Semester	*3,000*				
Average Number of Students Per Spring Semester	*2,400*				

Award Category (pick one)	☒ No-or-Low-Cost-to-Students Learning Materials ☐ Specific Core Curriculum Courses
Are you planning on using an OpenStax textbook?	☒ Yes ☐ No
List the original course materials for students (including title, whether optional or required, & cost for each item)	*Mindtap General Chemistry by Vinning (textbook and pre-lecture assignments), required, $130 for four semesters* *WebAssign (homework, weekly quizzes, and exams), required, $28 per semester* *TurningPoint (student response system), required, $50 for five years* *TI-30 calculator, required, $25*
Requested Amount of Funding	$30,000
Original Per Student Cost	$261 for CHEM 1211 and 1212
Post-Proposal Projected Per Student Cost	~$135 for CHEM 1211 and 1212 • $60 for homework/quiz engine • $50 for student response system • $25 for calculator
Projected Per Student Savings	~$130 for CHEM 1211 and 1212
Projected Total Annual Student Savings	*$350,000 for CHEM 1211 and 1212*

NARRATIVE

1.1 PROJECT GOALS

List the goals you are trying to achieve with the transformation, including goals for student savings, student success, materials creation, and pedagogical transformation.

- Build supplemental/ancillary resources to facilitate the adoption of an OER textbook.
    - Pre-lecture assignments
        - Reading Assignment
        - Getting started exercises and tutorials
        - Pre-lecture quizzes
    - In-lecture activities
        - Case studies to foster student discussion
        - In-lecture questions to confront students with common misconceptions
    - Post-lecture activities
        - Homework assignments with tutorials and immediate feedback
        - Weekly quizzes so students can assess mastery
        - Exams that better assess student competency rather than memorization of facts
- Redesign CHEM 1211 and CHEM 1212 curriculum to cover topics in a way that better supports other courses (BIOL 1107 & 1108) that students may take concurrently or subsequently.
- Provide students with access to instructions resources that allow them to better engage in the flipped-classroom pedagogy used in CHEM 1211 and 1212.

1.2 STATEMENT OF TRANSFORMATION

- *Describe the transformation.*
- *Identify stakeholders affected by the transformation.*
- *Describe the impact of this transformation on stakeholders and course success.*
- *Describe the transformative impact on the course, program, department, institutions, access institution, and/or multiple courses.*

Faculty in the freshman chemistry program at UGA use a flipped-classroom approach in lecture. Instructor expect students to arrive with a basic understanding of the material. Lectures are designed to engage students with more complex examples to help develop the student's conceptual understanding of the material. After lecture, students work on end-of-chapter problems with tutorials to develop the critical thinking skills necessary for success in a STEM discipline. Each week, students take a progress check (quiz) to assess their level of mastery and identify topics that need further review before exams.

Now, students must purchase publisher-developed materials to complete the pre-lecture reading and practice assignments as well as the post-lecture end-of-chapter work. We propose adopting an OER textbook, like OpenStax *Chemistry* or Chemistry LibreTexts, and then developing the pre-lecture and post-lecture activities in a third-party engine, like WebAssign, TopHat, or TurningPoint. Doing so would eliminate the need for students to purchase a textbook and reduce their course costs by ~$130 for the two semesters.

An additional benefit will be the opportunity to redesign the freshman chemistry curriculum offered by the adoption of an OER textbook. The Vice President for Instruction established a taskforce this past summer to investigate restructuring the traditional freshman STEM courses to better support student learning. While this taskforce's work is still ongoing, it has already identified several topics in the chemistry curriculum (intermolecular forces, chemical equilibrium) that are covered after they are needed in the biology courses students may be taking concurrently with chemistry. The flexibility provided by an OER textbook will allow faculty to design a course that better integrates with the other freshman STEM courses.

Funding from this ALG Grant will begin development of the question banks needed for the various assignments in the freshman chemistry program. This funding will allow the department to identify other funding opportunities (internal resources, NSF grants) that can be used for further development and possibly establish revenue streams from the materials (use at other institutions) to continue support of the project.

1.3 TRANSFORMATION ACTION PLAN

Action plans must address:

- *The identification, review, selection, and adoption/adaptation/creation of the new course materials.*
- *The course and syllabus instructional design/redesign necessary for the transformation.*
- *The activities expected from each team member and their role(s): subject matter experts, instructional designer, librarian, instructor of record, et al.*
- *The plan for providing open access to the new materials.*

- *February-April* – Identify an OER textbook that has the basic materials need for CHEM 1211 and CHEM 1212 and the flexibility to be rearranged to meet the curriculum redesign. All team members.
- *March-May* – Identify an electronic engine that can host the assignments and provide the tutorials and immediate feedback needed for student success in the course. All team members.
- *April-August* – Reorganize OER content to meet curriculum redesign expectations. All team members with assistance from OER provider.
- *April-August* – Write content and tutorials for pre-lecture and post-lecture assignments, weekly quizzes, and exams. All content will be written in simple text documents to facilitate adoption of a different electronic engine in the future. Pienta, Blankenship, Ellenberger, Du, and West.
- *May-December* – Code all content into selected electronic engine. Caughran, Suggs.

Beginning in the fall of 2018 students in CHEM 1211 will not purchase a textbook but will still need to pay a nominal fee for access to the electronic engine selected. If WebAssign is selected, students will still need to purchase access to a student response system, TurningPoint or TopHat. If TopHat is chosen, students will not need to pay an additional fee for a student response system increasing the course savings.

1.4 QUANTITATIVE AND QUALITATIVE MEASURES

- *The quantitative and qualitative measures of impact on student success and experience. The quantitative and qualitative data collected will be utilized in your final report as well as within ALG program communications.*
- *It is important to identify how the data is to be analyzed for each data source. In specific, the action plan must address the project's quantitative impact on student success (items such as Learning Objective success, Drop, Fail, Withdraw (DFW) delta rate, and any other critical factors) to measure impact on student experience.*
- *Qualitative measures can include student feedback through surveys, interviews, focus groups, or other means.*

The freshman chemistry program uses a standardized exam produced by the American Chemical Society's Exams Institute as the final exam in CHEM 1211 and CHEM 1212. We will continue this practice and compare student performance with past semesters.

1.5 TIMELINE

This is a timeline of milestone dates for your transformation project through the end of the first semester the transformed course(s) is/are offered to students. Your interim reports will utilize this timeline to indicate if the project is on schedule.

When submitting this timeline in InfoReady Review, be sure to use the Paste from Word button in order to correctly paste a table from Word. Otherwise, the document will be unreadable to reviewers.

Date	Milestone
March 6, 2018	Possible OER Textbooks identified
April 2, 2018	Slate of electronic engines identified
April 27, 2018	OER Textbook identified
May 25, 2018	Electronic Engine identified
June 15, 2018	New organization of OER materials decided
July 10, 2018	OER materials reorganized for CHEM 1211 in the fall
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December 15, 2018	Survey data collected and compiled from student users in CHEM 1211
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May 24, 2019	Survey data collected and compiled from student users in CHEM 1211 and 1212

1.6 BUDGET

Include Personnel & Projected Expenses as appropriate for the category.

Proposals must involve teams of at least teams of 2 or more of any of the following: faculty, faculty librarians, instructional designers, subject matter experts, editors, graphic designers, or others as needed. It is required to include the $800 for overall project expenses and travel in this section.

Two levels of funding are available based on the scale of the project proposed:

Standard-Scale Transformation: Textbook transformation projects within one or more courses or sections with under 500 students enrolled on average per academic year total.

$10,800 maximum award
$5,000 maximum per team member
$800 for travel and expenses

Large-Scale Transformation: Textbook transformation projects within one or more courses or sections or department-wide adoptions with 500 or more students enrolled on average per academic year total.

$30,000 maximum award
$5,000 maximum per team member
$800 for travel and expenses

*Funding is **not a direct stipend** to the team members, but rather goes **to the institution to cover the team member's time** (salary/release time/overload/replacement coverage), project expenses including related department needs, and travel expenses (up to $800 is specifically designated for at least two team members to attend the required in-person kickoff meeting).*

The proposing team must coordinate as necessary with their departments and institutional sponsors to determine how to handle the distribution, including amounts, release time/overload/salary/replacement as well as semester(s). This provides the maximum flexibility to the institution and the team in terms of how many people and what types of skills are needed, amount of compensation vs. replacement of teaching load, and timing in terms of semesters of preparatory work vs. semesters of adoption.

Total budget requested: $30,000
Funds will be used to provide one month of summer support for eligible team members (maximum of $5,000 support to any individual). Mr. Caughran is a 12-month employee so is not eligible for summer support. Dr. Pienta is not requesting summer support.

1.7 SUSTAINABILITY PLAN

What is your plan for offering the course in the future, including maintenance and updating of course materials?

The ancillary content will be developed independent of any electronic engine that might be selected during this development. This will provide the opportunity to move to a different engine at a later date as new opportunities become available without having to recreate the content. The content will simply need to be coded or exported to the new engine.

Our plan is to establish an independent revenue stream by selling the content to other institutions to cover summer support for various team members to continue development of the ancillary materials.

When possible, team members will get reduced teaching loads in the spring when demand is decreased and use this time to continue development of course materials.

1.8 REFERENCES & ATTACHMENTS

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.