

**Affordable Learning Georgia Textbook Transformation Grants  
Rounds Three, Four, and Five  
For Implementations Beginning Summer Semester 2015  
Running Through Spring Semester 2017**

**Proposal Form and Narrative**

- *The proposal form and narrative .docx file is for offline drafting and review. Submitters must use the CompetitionSpace online form for proposal submission.*
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***Affordable Textbook Transformation for Principles of Chemistry***

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<b>Team Members</b>	<i>(Name, Title, Department, Institutions if different, and email address for each)</i>				
<b>Sponsor, Title, Department, Institution</b>	Dr. Hua Zhao, Chair and Professor, Department of Chemistry & Forensic Science				
<b>Proposal Title</b>	Affordable Textbook Transformation for Principles of Chemistry				
<b>Course Names, Course Numbers and Semesters Offered</b>	The proposal is for Principles of Chemistry, CHEM 1211 & 1212. The courses are taught over two semesters and are scheduled throughout the academic year including the fall, spring and summer semesters.				
<b>Final Semester of Instruction</b>	<i>Select: Fall 2015, Spring 2016, <b>Summer 2016</b>, Fall 2016, Spring 2017</i>				
<b>Average Number of Students Per Course Section</b>	37	<b>Number of Course Sections Affected by Implementation in Academic Year</b>	18	<b>Total Number of Students Affected by Implementation in Academic Year</b>	666
<b>Award Category (pick one)</b>	<input type="checkbox"/> No-Cost-to-Students Learning Materials <input checked="" type="checkbox"/> OpenStax Textbooks <input type="checkbox"/> Specific Top 50 Lower Division Courses				

<b>List the original course materials for students (including title, whether optional or required, &amp; cost for each item)</b>	<p>Current text materials include the textbook: Chemistry 11<sup>th</sup> Edition; Reymond Chang and Kenneth A. Goldsby.</p>
<b>Original Per Student Cost</b>	<p>\$277.33</p>
<b>Post-Proposal Projected Per Student Cost</b>	<p>0</p>
<b>Projected Per Student Savings</b>	<p>\$277.33</p>
<b>Plan for Hosting Materials</b>	<p> <input type="checkbox"/> <a href="#">OpenStax CNX</a>  <input checked="" type="checkbox"/> D2L  <input type="checkbox"/> <a href="#">LibGuides</a>  <input type="checkbox"/> Other _____ </p>
<b>Requested Amount of Funding</b>	<p>\$10,800.00</p>

## **1. PROJECT GOALS**

An increasing number of students are apparently unable or unwilling to purchase the freshman chemistry textbook. Chemistry concepts are nearly impossible to grasp in the absence of the guides and exercises provided by an accompanying textbook. Consequently, the number of students to successfully complete these courses are declining drastically. The key objective of this project is to substantially improve student performance in the freshman chemistry courses, Principles of Chemistry (CHEM 1211 & 1212). The broader impact of this proposal is to improve student retention and ultimately the graduation rates particularly in the STEM disciplines directly impacted by freshman chemistry.

### **1.1 STATEMENT OF PROBLEM**

#### *Required Elements:*

A significant percentage of students enrolled in the Principles of Chemistry courses are attending classes without the critical aid of a textbook. Students are consistent in their complaints about the high cost of the required textbook and have decided to try the courses without its purchase. Consequently, an increasing percent of students in these courses are under-performing. This decline in academic performance negatively impacts students' morale and causes them to give up, submitting to underachievement and stagnation in career aspiration.

Many of our students are surviving by meager means even after governmental support and student loans. It would be ideal if there were more affordable ways for students to obtain the materials that would enable them to perform better in these courses. Such materials are becoming increasingly abundant on-line and readily available to students. Investigations show that students rank OERs as #1 on their wish list for instructors' use of technology (1, 2).

The immediate stakeholders include the students, their financial supporters and the university. The textbook problem places a financial burden on students that causes a substantial decrease academic performance and the likelihood of high withdrawal rates. Academic withdrawals in turn leads to decreased retention and lower university graduation rates.

The solution to this problem is for students to have access to a low or no-cost text that can be used in both sections of this course. One of the key benefits for the textbook transition is immediate access to on-line study materials which enable the students to become engaged from the first day of classes (3). Many students fall behind awaiting the arrival of financial aid to purchase textbooks that consumes a significant percent of this aid. Immediate access to on-line texts decreases the probability of student withdrawal from class with the subsequent decline in retention and graduation rates.

### **1.2 TRANSFORMATION ACTION PLAN**

Supportive web materials are currently being incorporated into "Desire-to-Learn, D2L" that will provide assessment data for the chemistry courses as well as the transformation underway. This material include documents associated with the fundamental concepts of chemistry and carefully

selected exercises that reinforce these concepts. An on-line text has been evaluated by our Principles of Chemistry Committee (PCC) and is currently being compared to others for spring 2015 adoption.

**Textbook Review & Selection:** PCC members are reviewing several textbooks in OER that are licensed to SSU. This review will identify at least 3 potential textbooks for adoption. The committee will consult with the American Chemical Society (ACS) Committee on Professional Training (CPT) to address the suitability of the 3 textbooks. After ACS approval, the faculty team member will meet with all chemistry faculty members to decide on the text favored for adoption in Chemistry 1211 and 1212.

**Course Materials:** The PI will Chair the PCC, which will focus on assessing the impact of affordable learning. The PCC will meet twice per semester to develop course materials associated with the adopted textbook. Learning outcomes will be assessed. The PI will work with the library to ensure training for chemistry faculty on SSU licensed OERs. All Principles of Chemistry course instructors will meet before any modifications are made following the establishment of course materials.

**Instructional Design:** A uniform syllabus will be established for all instructors of Principles of Chemistry sections implementing affordable learning materials. The PCC will meet to decide on course content ensuring an optimal foundation in chemistry as required for sustainable success in the higher-level courses. Methods to optimize active participation in the courses will be acquired and implemented to improve students' understanding of challenging concepts. This information will be included in the 1<sup>st</sup> status report.

**Assessment:** Instructors will require the completion of 4 course examinations at regular intervals during the semester. This will be arranged by the PCC Chairperson. Students will be informed of their performance and status throughout the semester. Instructors will be required to obtain student evaluations at midterm and at the end of a semester. Student evaluations will address the textbook, course materials and instructional design to ensure that the learning outcomes are reached. Students of all sections will take the examination certified by the ACS. Course sections assessments will be based on: (1) Overall student performance and (2) Performance/Retention in higher level chemistry courses. In addition to student evaluations, instructional assessments will be made based on a particular class's performance compared with the overall performance on the ACS final examination.

**Quantitative Evaluation:** The PCC is currently acquiring data that will show the current withdrawal and failure rates for the last two semesters. This data can be compared with rates following the adoption to a no-cost textbook. Measurements will then be correlated for textbook effectiveness.

**Qualitative Evaluation:** Instructors are collecting surveys this semester and will continue in effort to measure students' attitudes with regard to on-line materials. Attitudes toward these materials will be compared to the text currently required for the chemistry courses. The PCC will develop a list of questions that would adequately measure these attitudes during the spring 2015 semester. Instructors will hold discussions with students of varying performance after each examination to obtain a record of unbiased feedback. A plan will be formulated to improve performance and general attitudes toward course materials as needed based on feedback. A computer tablet with accessories designed for travel is requested for compiling all data and materials associated with the plan.

### 1.3 TIMELINE

Dates	Action
8/10/2015 – 11/20/2015	Evaluate and upload chemistry 1211 support materials to D2L, Develop student surveys
9/13/2015 – 10/5/2015	Evaluate and approve of pilot textbook for spring adoption in Chemistry 1211 & 1212
10/5/2015 -11/20/2015	Development of course assessment materials for chemistry 1211 &1212
9/7/2015- 3/11/2016	Develop assessment strategies & 1 <sup>st</sup> Status Report
01/4/2016 – 07/22/2016	Implementation, Evaluation & Preparation of Final Status Report

### 1.4 AMENDED BUDGET

Cecil Jones, PhD	1 course release	\$5,000
Supplies	Computer tablet	\$2,000
Academic Support	PCC Member	\$3,000
Travel (2)	Grant Meeting	\$800

Summer compensation of \$3,000.00 is requested for the PCC faculty support.

**Total Direct Cost = \$10,800**

### 1.5 SUSTAINABILITY PLAN

The initial PCC will evaluate the pilot textbook transformation courses (Chemistry 1211 & 1212) and identify areas for improvement to optimize student learning outcomes. The PCC will recommend and implement as needed OER adoptions for all sections of Chemistry 1211 & 1212. Recommendations will be driven continuously by assessment strategies and ACS expectations.

A PCC of rotating chemistry faculty members will be charged with yearly OER training and maintenance. They will monitor sites for new textbook editions and materials to promote student learning. The library has offered assistance with incorporating SSU licensed OERs into D2L. Library assistance is currently provided for the continuous OER training for faculty and students. Modification to assessment strategies will continuously be considered by the PCC to improve course effectiveness and student learning outcomes.

## 1.6 REFERENCES & ATTACHMENTS

- (1) B. L. Lindshield and K. Adhikari, **2013, Online and Campus College Students Like Using an Open Educational Resource Instead of a Traditional Textbook MERLOT Journal of Online Learning and Teaching**, 9(1), 26-38.
- (1) T. J. Bliss, R.T. Jared, J. Hilton and D.A. Wiley, **2013**, The Impact of Open Textbooks on Secondary Science Learning Outcomes, Educational Researcher, **yr:2014 vol:43 iss:7 pg:341-351**
- (2) E. Scanlon, **2012**, Distance Education, 33(2), 221–236.
- Scanlon, E et al 2015 Designing for Educational Technology to Enhance the Experience of Learners in Distance Education: How Open Educational Resources, Learning Design and Moocs Are Influencing Learning. Journal of Interactive Media in Education, 2015(1): 6, pp. 1-9