Affordable Learning Georgia Textbook Transformation Grants

Final Report

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Grant Number: 42

Institution Name(s): Southern Polytechnic State University/Kennesaw State University

Team Members:

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Project Lead: Dr. Guangzhi Zheng

Course Name(s) and Course Numbers: IT 5302 Introduction to Web Development (IT 5443 Web Technologies and Application Development)

Semester Project Began: Fall 2014

Semester of Implementation: Fall 2014/Spring 2015

Average Number of Students Per Course Section: 20

Number of Course Sections Affected by Implementation: 4

Total Number of Students Affected by Implementation: 62

1. List of Resources Used in the Textbook Transformation

All of the following resources provide free open access links and can be viewed and used by users without registration. All resources are provided as links without any content reproduce and redistribution.

Instructor created materials

- Study guides, lecture notes, labs, and code examples: http://facultyweb.kennesaw.edu/gzheng/IT5302%20201501.zip
- Instructional video clips: https://www.youtube.com/playlist?list=PLdiVex6HxQcvIQ2SQA5W_hirIGa1OQkHk

Resources from W3schools.com - http://www.w3schools.com

- http://www.w3schools.com/html
- http://www.w3schools.com/css/
- http://www.w3schools.com/js/
- http://www.w3schools.com/php/

Resources from Codecademy - http://www.codecademy.com

- http://www.codecademy.com/tracks/web
- http://www.codecademy.com/tracks/javascript
- http://www.codecademy.com/tracks/php

Resources from Slideshare

- Randy Connolly, CSS: Introduction: http://www.slideshare.net/randyconnolly/css-introduction-16532261
- Randy Connolly, HTML: An Introduction: http://www.slideshare.net/randyconnolly/html-an-introductin
- Kaushal Kishore, Content Management System: http://www.slideshare.net/adhouraacademy/content-management-system-23092247

Other free open access web resources

- Rich Tebb, Introduction to the Web as a Platform: http://msdn.microsoft.com/library/bb330932.aspx
- JavaScript Form Handling: http://www.javascript-coder.com/javascript-form
- Daniel O'Neil, Web Content Management Explained, https://www.youtube.com/watch?v=7W46dxG_R1U
- James Stafford, WordPress CMS: https://www.youtube.com/watch?v=GSPp2OiPvos

2. Narrative

The transformation has been a smooth experience. Students in the sections with the implementation have generally meet class performance expectations, and achieved better performance than students in sections without the implementation. Students in the IT program are generally aware of the fast pace nature of the information technology industry. They understand that technologies are ever changing and things like textbooks can become obsolete the minute they are published. Most of them have already gotten used to the idea of searching the Internet for instructions, tutorials, and other learning resources. Some students are already aware of W3Schools, which is one of the primary open resources used for this transformation project, before taking the class. Substituting textbooks with free open online resources only comes as natural and logical to the students. Both of the two primary open online resources used in this transformation project, W3Schools and Codecademy, provide interactive features

for students to practice online as they learn. Compared to traditional non-interactive content such as a textbook, this is a huge plus for students and is widely appraised by the students.

Using open online resources has certainly had an impact on the instruction. Instead of spending large amount of time preparing class notes and PowerPoint slides, the instructor was able to focus the energy more on student interaction, facilitation, and providing feedback to the students. It also allowed the instructor to allocate more time for students to do hands-on practices during the face-to-face sessions, which is essential for a programming class such as this one.

One of the challenges encountered during this transformation project had something to do with the different modalities of each section taught. In the face-to-face or hybrid section, students embraced the idea of being able to learn the concepts and materials from the different variety of online resources provided, and practice with them. While in the class, they have the opportunity to do hands-on practice and seek immediate guidance when they have questions or need help. However, in the fully online section, the class was taught asynchronously, which means online students did not receive the same type of immediate guidance or help as face-to-face students did. One-on-one sessions, virtual office hours, and over the phone consultations were held to help those students who reached out to the instructor, but generally the interactions are not as immediate as they would in the classroom. Although the challenges are not directly related to the open online resources used, providing students with more specific and customized instructions may potentially help mitigate the challenges facing the online students.

Overall, the success of this transformation project can largely attribute to the fact that today's students, especially the ones in the IT program, are open and accustomed to the idea of finding and utilizing online resources. Also, the primary resources used in this project are well maintained and are kept up-to-day in a fashion that a traditional textbook cannot compete. They also offer interactivities for students to do hands-on practices, which is essential for a class such as web development.

One of the shortcomings of the two primary open resources used in this transformation project is that the knowledge points, or the concepts can appear to be scattered at times to the students. Part of the reason can be attributed to the website nature of these resources, as students can jump between different topics or concepts freely, thus loosing the "whole picture" or missing the "connection." Also, the open resources used in this project do not emphasize or pay special attention to some of the fundamental concepts or ideas such as fostering a good coding habit or how to properly debug an error. Based on the instructor's teaching experience, maintaining a good coding habit and skills to properly debug an error are fundamental and can benefit students more in the long term. For future semesters, additional instructional materials or tutorials may need to be created to help students "connect the dots" and help them develop debugging skills.

3. Quotes

- "I liked the setup for this course, being able to find the information you need on your own is becoming very important in most careers."
- "W3schools is an excellent website I just wished they had it for regular java programming."
- "The material provided was sufficient."

4. Quantitative and Qualitative Measures

Student performance comparison between sections with no-cost-to-students learning materials implemented and other sections.

A total of 10 sections since fall 2013 are included in the analysis. The sections with implementations are higher in pass rate and lower in fail rate and withdraw rate.

	# of sections	Pass Rate	Fail Rate	Withdraw Rate
Other sections	7	85.8%	7.7%	6.5%
Sections with implementation	3	88.9%	2.2%	2.6%

Student performance by grading items

The performance on each student work item meets the performance target (75%) except for Quiz 3 in spring 2015 (the online class).

Grading Items	Average Score	
	Fall 2014	Spring 2015
Final exam	89%	77%
Quiz 1	89%	90%
Quiz 2	91%	88%
Quiz 3	92%	69%
Assignment 1	88%	95%
Assignment 2	94%	99%
Assignment 3	91%	99%
Assignment 4	90%	91%
Assignment 5	91%	92%

Survey results

Students are asked rate the following statements on a 5 point Likert Scale (5 means very satisfied or strongly agree). The means are reported here and show very positive feedback.

Statements	Mean
In general, the course materials were well selected and relevant.	4.43
The code examples and exercises have assisted me in acquiring the knowledge and skills of fundamental web development.	4.48
The assignments are relevant and test my knowledge of the module's content.	4.59
Please rate your satisfaction with the learning materials at W3Schools.	4.59
Overall, compare to a potential paid textbook, open resource learning materials provided in this course offer:	
Overall, compare to a potential paid textbook, open resource learning materials provided in this course offer well-presented and rich content to assist learning.	4.43
Overall, compare to a potential paid textbook, open resource learning materials provided in this course offer better delivery format (such as interactive step-by-step instructions, and online live code practice).	4.49
I support using the selected open resource learning materials than a paid textbook in the course.	4.33
I would use open learning materials rather than a paid textbook for learning web development.	4.28

5. Sustainability Plan

The IT5302 course will be expanded into IT 5443 Web Technologies and Application Development, because of the recent consolidation of Kennesaw State University and Southern Polytechnic State University. IT 5443 has been developed and approved as a distant learning course in spring 2015, and it will be offered starting spring 2016.

Dr. Zheng will remain as the course architect of IT 5443. As a course architect, he develops and maintains the course materials and teaching plans. He also teaches the course at least once a year to make sure all resources are valid and make necessary changes. The co-PI Dr. Li is an adjunct professor who will teach this course every semester.

All course materials will be hosted in the learning management system Desire2Learn Brightspace for future enrolled students. They are also publicly accessible from Dr. Zheng's personal website.

6. Future Plans

The project will have a long lasting impact on my course development and teaching in the future. I am now fully embracing low or no cost learning materials. I plan to try my best to use them in my future courses. I have already participated in the ALG grant round 2 following the round 1, and hope to continue my experience and success.

More specific to this project, I plan to expand the materials used in this course to the introduction to web development course at the undergraduate level (IT3203) at an appropriate time. IT 3203 has an annual enrollment about 110.

The project also prompted me to utilize some new interactive delivery methods, beyond static articles, books, video clips, compressed files, etc. For example, some online code playgrounds such as jsFiddle provide direct and interactive environment for code demonstration and access; systems like Codecademy and Google Oppia provide interactive step-by-step training and lab capabilities.

7. Description of Photograph

Left - Dr. Guangzhi Zheng, team lead, subject matter expert, course developer.

Right - Dr. Zhigang Li, instructional designer, instructor of record.