Round	14
Grant #	M91
Applicant Name	Michael J. Dancs
Applicant Position	Associate Professor of Mathematics
Applicant Institution	Clayton State University
Applicant Email Address	MichaelDancs@clayton.edu
Other Team Members	Catherine Matos, CatherineMatos@clayton.edu
Type of Project	Creation of ancillaries for pre-existing OER
Course Number(s) and Title(s)	Math1404: Introductory Statistics
Final Semester of the Project	Spring 2020
Proposed Grant Funding Amount:	$4,000.00
Currently-Existing Resource(s) to be Revised / Ancillaries Created	Introductory Statistics (OpenStax): https://openstax.org/details/books/introductory-statistics WeBWorK: http://webwork.maa.org/
Project Description	WeBWorK (http://webwork.maa.org) is a no-cost and open-source online homework system supported by the Mathematical Association of America and the National Science Foundation, currently used at hundreds of colleges and universities, including several USG institutions. WeBWorK is distributed with a large set of contributed problems (the Open Problem Library) and provides the means for instructors to edit existing problems and create completely new ones. Although the WeBWorK software is free to use, students sometimes struggle due to a lack of features available on commercial platforms, e.g.: guided solutions, similar examples, and personalized feedback. While WeBWorK does provide a framework for these features, individual problems must be specifically designed and written to leverage this functionality, and there are very few that currently do so. An issue particular to Introductory Statistics courses is the wide variety of technologies available to perform tedious computations; from traditional reference tables to scientific calculators to professional data analysis software. Final results often vary slightly depending on which technology is used, but many existing WeBWorK problems require a specific convention or technology to get the correct answer (often without explicit indication of what should be used). Instructors who

	prefer an alternate methodology or students who do not have access to the requisite technology will have difficulties using these problems. We propose to create a collection of enhanced Introductory Statistics problems and assignments to address the above deficiencies in the existing WeBWorK library by both revising existing OPL problems and creating new exercises. Content will roughly follow Chapters 8 through 12 in the OpenStax Introductory Statistics text but should be usable across a wide variety of texts (or with no text at all). Specifically: • Dynamically-generated examples with step-by-step solutions will be available. • Problems will provide more useful feedback, identify common errors when appropriate, and help students discover and correct their own mistakes. • Support for at least one no-cost technology (Geogebra) will be included. • Instructors who require that students use a particular technology (or set of technologies) will be able to do so more easily. • Clear and concise guides for using these resources will be included.
Timeline and Personnel	• June-July 2019: Team members determine learning objectives to be addressed by WeBWorK questions and examples. • September-October 2019: Team members create/revise WeBWorK questions and dynamic examples for Chapter 8 (Confidence Intervals) and Chapter 9 (One-Sample Hypothesis Tests). • November 2019: Field test Chapters 8 and 9 questions with students. • November-December 2019: Team members create/revise questions and dynamic examples for Chapter 10 (Two-Sample Hypothesis Tests) and Chapter 11 (The Chi-square Distribution). • January-February 2020: Team members create/revise questions and dynamic examples for Chapter 12 (Linear Regression and Correlation). • March-April 2020: Field test Chapters 10, 11, and 12 questions with students. • May 2020: Finalize and publish all problem sets. Drs. Michael Dancs and Catherine Matos will create/revise WeBWorK questions to provide better feedback to student errors, provide support for use of Geogebra as a Statistical software tool for the exercises, and will create dynamically-generated examples for students. Dr. Dancs has been using WeBWorK in several classes and writing problems since Fall 2015. He completed the MAA-PREP workshop “Authoring Effective Homework Problems with WeBWorK” during Summer 2017. Dr. Matos began using WeBWorK in Fall 2015 in her Differential Equations class, and added it to her statistics classes the following fall. Both have taught Introductory Statistics for many years and continue to do so each semester.
Budget	• Dr. Michael Dancs: Compensation for preparation time, $2000 • Dr. Catherine Matos: Compensation for preparation time, $2000
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