**Affordable Learning Georgia Textbook Transformation Grants**

**Final Report for Mini-Grants**

# General Information

Date: December 6, 2018

Grant Round: 11

Grant Number: M22

Institution Name(s): Georgia Southwestern State University

Team Members (Name, Title, Department, Institutions if different, and email address for each):

 Gary Fisk, Professor of Psychology, Department of Psychology and Sociology, gary.fisk@gsw.edu

Project Lead: Gary Fisk

Course Name(s) and Course Numbers: PSYC 3301 – Psychological Statistics

Final Semester of Project: Fall, 2018

***If applicable to your project:***

Average Number of Students per Course Section: 25

Number of Course Sections Affected by Implementation of Revised Resources: 3 per year

Total Number of Students Affected by Implementation of Revised Resources: 75 per year

# 1. Project Narrative

A modern statistics class must include specialized software training to facilitate the calculation of complex analyses, such as t-tests, correlation, and analysis of variance. The standard statistics software for the social sciences has been Statistical Package for the Social Sciences (SPSS) by IBM. The major drawbacks of this software are the expense (approximately $5000/year for one classroom) and the restrictive licensing (the software stops working if an annual license expires). This grant proposal was to replace SPSS with a free work-alike software called PSPP from the GNU free software group (see <https://www.gnu.org/software/pspp/>). PSPP provides the same essential features and user interface as SPSS. The purpose of the grant was to develop a software tutorial aimed at helping beginning-level statisticians use PSPP software. This tutorial resource would support the transition away from the proprietary SPSS software.

The PSPP software tutorial web pages were developed during the summer of 2018. Care was taken during the writing process to promote accessibility and ease of use. For example, the tutorial uses extensive graphic screen shots to give students a visual guide to using the software. The web formatting also includes code to make these pages look good on smartphones. In addition, the html code has alt tags and similar features to make this teaching resource comply with accessibility standards from the Americans with Disabilities Act. Finally, each page clearly states the Creative Commons licensing that allows other teachers to freely use this content in their own courses. This tutorial resource was created from scratch, so there was no original work to update or revise.

Several additional adjustments were made to the Statistics course. The IT department installed the PSPP software in the computer classroom over the summer. The assignments and PowerPoint presentations were reworked to use PSPP rather than SPSS. In particular, several assignments were based upon open data from the Open Science Foundation web site. This use of open data is consistent with the spirit of OER educational resources and the increasing expectations for transparency in contemporary scientific research.

Two sections of Psychological Statistics were taught this fall with PSPP. In general, the transition to the new PSPP software went well. We were able to accomplish all of the analyses that were once done with SPSS. Student performance on the PSPP assignments was comparable to previous semesters based on SPSS software. The anticipated outcome that PSPP would be more than sufficient for an introductory-level statistics course was confirmed.

There were a few minor drawbacks encountered during this project. The most significant problem was that the PSPP software was unable to print graphs. This created problems when students had to turn in their assignments as a hard copy. The workaround was that students had to export the output contents to a pdf file or take screen shots of the graphs from the computer display. A second problem is that PSPP seems a bit more fragile than SPSS. The software would occasionally crash if the students tried to use it in an unusual way. A new version of PSPP (1.2) has been released in November that will, hopefully, address these buggy software problems.

The overall student reaction to this software was neutral to slightly positive. My impression is that PSPP was not regarded as being significantly better or worse than SPSS. The software is so similar to the SPSS that there isn’t much change in student attitudes. Many students opted to install this software on their own laptops, which was a positive development. This licensing freedom enabled students to do these analyses outside of the classroom and the computer lab. This freedom was particularly helpful for nontraditional students who live off campus and cannot easily access software that is located in a computer lab.

For lessons learned, the project was helpful to promote my understanding of how OER resources can be developed. The software features such as printing should have been more thoroughly tested before it was used with the students. It was just assumed that printing would work because this feature is so fundamental to most software. This is a minor problem though. Overall, I was pleased by how well free software worked in replacing a very expensive and restrictive proprietary software application.

# 2. Materials Description

* PSPP for Beginners: This is a tutorial web site for helping new statisticians get started with PSPP. The topics cover setting up data files, descriptive statistics, relationship statistics (correlations and regression), and inferential statistics (t-tests, analysis of variance, and chi-square). There are 46 web pages in the tutorial. These pages are ordered in a progression that starts from the most basic steps (e.g., obtaining and installing the software, creating data files) and then works towards increasingly complex analyses.
* Miscellaneous instructional tools: These are some interactive web pages for helping students to master basic calculations. Javascript is used in these pages to create small data sets from random numbers to create unique problems that must be solved by hand. The pages will then give students feedback on the correct answers. This was not part of the original grant. It’s a related project that has been included as an OER.
* Revised statistics assignments: New PSPP assignments were created. These are based upon open data from the Open Science Foundation. The data for two of these assignments were collected from a research project done at GSW. The assignments, including the written description and the data, are available for other teachers.

# 3. Materials Links

* PSPP for Beginners: <https://www.garyfisk.com/pspp/index.html>
* PSPP for Beginners in a zip archive: <https://garyfisk.com/pspp/pspp.zip>
* LibGuide description: <https://libguides.gsw.edu/c.php?g=897584>
* Two analysis assignments based upon open data: <https://osf.io/uh8xf/>

# 4. Future Plans

* The PSPP software in the statistics classroom will be upgraded to version 1.2 before the spring semester begins.
* We will continue using PSPP instead of SPSS for future Psychological Statistics classes. This will save approximately $5000 to $6000 per year in Student Technology Fee money.
* The two assignments based upon open data are described in an article that was submitted to the Journal of Open Psychology Data. Part of the justification for this paper is that educators might find these data useful for teaching purposes.
* These materials will be updated occasionally to fix broken links and describe changes to the PSPP software. There is no intention, however, to add any substantial new pages to the tutorial.
* There is no plan at this time to present this project at a teaching conference.