

Teaching Tips: A Compendium of Conference Presentations on Teaching, 2020-21



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Disseminating Inclusive Teaching Practices: Findings from the Passion-Driven Statistics Project.

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Abstract

Passion-Driven Statistics is a project-based, introductory curriculum implemented as a course in statistics, research methods, data science, a capstone experience, and a summer research boot camp with students from a wide variety of academic settings. Funded by the National Science Foundation, the curriculum engages students in authentic projects with large, real-world data sets. Passion-Driven Statistics students were more likely to report increased confidence in working with data and increased interest in pursuing advanced statistics course work compared to students from the traditional statistics course (Dierker et al., 2018a). This presentation draws on pre/post data from 67 instructors attending a Passion-Driven Statistics faculty development workshop. Analyses evaluate instructor characteristics, attitudes, and experiences that predict its implementation. Findings show that nearly half of the instructors who reported being likely to implement passion-driven statistics and a quarter of the overall sample employed the project-based curriculum by the end of the first full academic year following the workshop. Those showing this fast uptake were more likely to be female than those who had not yet implemented (87.5% vs. 55.3%), were more likely to hold a Ph.D. (94.1% vs. 59.2%), and were more likely to be employed by a private rather than public institution (76.5% vs. 46.0%). Those showing fast uptake were also more likely to have been previously using statistical software (i.e., SAS, JMP, R, Stata, Python, or SPSS) in their target course (70.6% vs. 40.0%) and to have greater prior experience with project-based skills and fewer post workshop concerns about their likely success. Results from these analyses will guide recommendations for 1) engaging instructors ready to implement innovation in learning and teaching and 2) supporting those instructors requiring additional time, training and skills. Instructors are the most important resource for promoting innovations and all materials are open educational resources ([Link to website with resources](#)).

Detailed Description

Passion-Driven Statistics is about learning to use statistics to understand real world problems and conduct meaningful research (Dierker et al., 2015). Using this model to teach statistics makes the classroom a place where students are the stars of their own show and the leaders in their own learning (Dierker et al., 2017). Students bring their ideas, passion, and experiences to the classroom to answer research questions of their own choosing (Dierker et al., 2012).

Instructors guide them in providing the skills they need to use and apply statistics. This means each semester different project topics are developed, eliminating the mundane experience of the same topics and class lectures over and over again. Once the project-based features are integrated into a course, prep work for the instructor becomes minimal. Feedback on assignments becomes a stimulating task as students are investigating real world problems with real data, culminating in a poster presentation. Student projects many times are submitted to local, state, regional, or national conferences as poster presentations, and all have the potential to be written up for a student research journal.

Rather than focusing on rules associated with traditional lists of statistical tools, we organized the course to focus on the decisions and skills involved in statistical inquiry. Basic themes such as measurement, descriptive statistics, and graphical representation are covered, as well as more specific inferential methods needed to test hypotheses and/or explore the empirical structure of data. All, however, are introduced as the students' scientific questions dictate. In this way, students are provided with opportunities to learn to select the tools that are most appropriate to address their research question(s) and to engage in statistical decision making.

Based on data collected at the liberal arts college where the curriculum was originally developed, we have demonstrated that the project-based course enrolls higher rates of under-represented minority (URM) students compared to a traditional introductory statistics course (Dierker et al., 2015). Compared to students enrolled in a traditional introductory statistics course, those completing the project-based course have also been shown to be significantly more likely to report an increase in confidence between a pre and post course survey with regard to choosing the correct statistical test, managing data, and writing syntax or code to run statistical analyses. Overall, when compared to both traditional introductory statistics and introductory programming courses, the project-based course has been shown to attract students from a much wider range of academic backgrounds as measured by their Math SAT scores (Dierker et al., 2015; Dierker et al., 2017). The curriculum has been successfully delivered across more than 70 diverse educational settings including liberal arts colleges, large state universities, regional college/universities, community colleges, graduate programs, and high schools (Dierker et al., 2018b).

Public Website

Access published articles, presentations, partner map, and funding details at the [Passion-Driven Statistics Publications website](#).

E-book

An e-book provides a [course container](#) for students with short chapter introduction and conclusions, example assignments, and links to video lectures.

Instructor Resources

Email kristin.flaming@gmail.com or ldierker@wesleyan.edu to request access to our Free instructor resources that include example assignments, exams, handouts, real data and much

more. Listen to four Passion-Driven Statistics instructors discuss their experiences with the course including online delivery by watching the following YouTube video: [Instructors talk about Passion-Driven Statistics](#).

Workshops

We hold regular workshops intended for instructors at all levels, regardless of discipline-specific training. Workshops include brief demonstrations focused on the nuts and bolts of supporting project-based experiences. Presenters take an interactive approach by guiding attendees through condensed versions of key assignments in the model to help provide the students perspective. Workshops include a discussion of resources and the instructor's role to allow for a more behind-the-scenes view. Email for information on our upcoming workshops.

STP E-book Chapter

Passion-Driven Statistics ([chapter 5, pg. 55](#)) in For the Love of Teaching Undergraduate Statistics e-book published by Society for Teaching of Psychology. This chapter provides an overview of the model, resources needed, published research, and alignment with GAISE recommendations and APA Statistical Literacy Goals.

Translation Code Document

This document contains code for statistical procedures for [R, SAS, SPSS, Stata & Python](#). This is a resource to learn the major software languages and for those that are familiar with one to more easily learn another that we support.

Playlist

Below are videos you can watch to learn more about using a variety of statistical programs for Passion-Driven Statistics.

1. [SAS videos](#)
2. [R videos](#)
3. [Stata videos](#)
4. [Python videos](#)
5. [SPSS videos/print screen tutorials](#)

References

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A complete list of publications, blogs, general audience articles, book chapters and press from partner schools please visit [Passion Driven Statistics Publications Webpage](#).