

StatPREP:

Using Data-Centric Resources and Pedagogies in Introductory Stats Courses

Broader Impacts

For three summers, **StatPREP workshops** were offered on location at regional “hubs.” These workshops engaged 59 faculty participants in 2017, 84 participants in 2018, and 120 participants in 2019.

In 2020, the pandemic forced the cancellation of all StatPREP workshops. In 2021, StatPREP held 8 online summer workshops with a total of 405 attendees. Several in-person workshops and minicourses are planned for summer 2022.

StatPREP supplements the workshops with **webinars**, online **discussion platforms**, and freely-available **web-based Little Apps**. Through engagement with hundreds of instructors, **the StatPREP project has impacted thousands of students**, including many non-STEM students. The StatPREP data-centric approach ultimately impacts the workplace through graduates pursuing many different career paths.

What is StatPREP?

Project Summary

The StatPREP project originated as a mechanism for addressing the gap between traditional higher-education introductory statistics courses and the data-driven workplace that college graduates enter. **StatPREP has cultivated and encouraged the use of data-centered methods and pedagogies in undergraduate introductory statistics courses by**

- (1) offering a **multi-faceted professional development program** for mathematics instructors, at two-year and four-year institutions, who teach introductory statistics;
- (2) cultivating peer-to-peer and mentor relationships through **communities of practice**;
- (3) establishing **national online support networks** comprised of instructors who teach introductory statistics and statistics education experts.

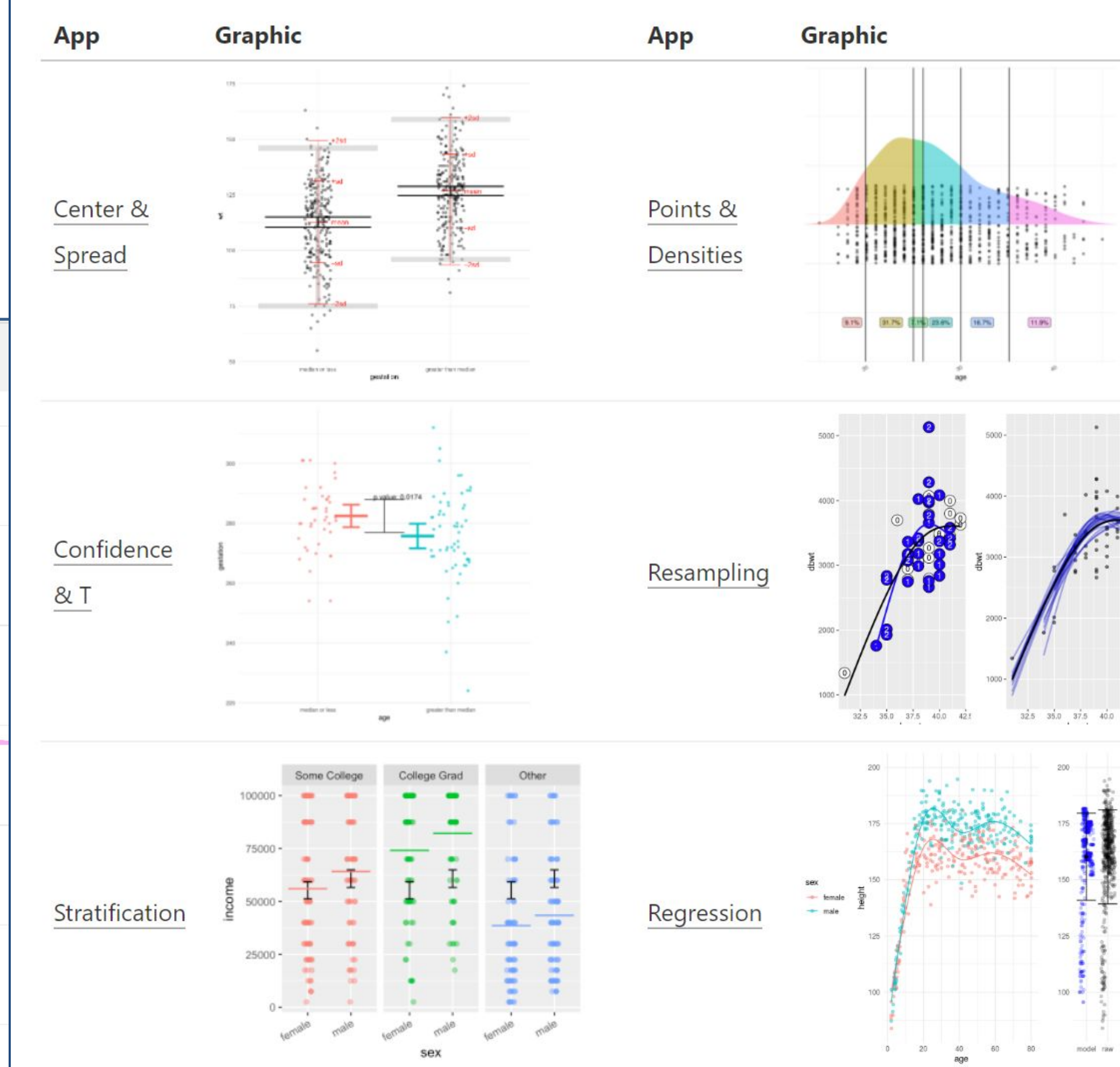
Guiding Questions

- (1) How effective is the StatPREP professional development model in prompting changes in participant instructors' beliefs about statistics education, resulting in changes in content and instructional practices?
- (2) How accessible is this model for faculty members at two-year institutions?
- (3) Does this approach prompt the formation of sustainable communities of practice and national network?
- (4) What are the benefits and barriers to faculty participation in a national online network?

StatPREP's goal is to stimulate community transformation by increasing faculty capacity to enact curricular change. The pedagogical tools emphasized are use of complex data, open-ended investigations, and statistical analysis software and computing technology. Parallel to the intervention and implementation work, the project seeks to address the questions above.

Gallery of Little Apps

Each Little App is oriented around a graphical display of data with statistical annotations. Users can select the size of sample to draw at random from a “population” of the entire dataset. *Every App shows each point in the sample.*



Outcomes

The StatPREP project has featured significant engagement with both two-year and four-year Introductory Statistics instructors. Robust communication channels have been established through

- in-person and online summer workshops,
- in-semester webinars,
- an online discussion platform,
- a monthly e-newsletter.

A highlight of the project has been developing **Little Apps and Activities**, a set of interactive web-based tools designed to

- illustrate how Intro Stats topics are traditionally taught,
- **demonstrate a data-driven approach** to presenting Intro Stats concepts,
- address potential student trouble spots,
- provide informal and formal assessments.

The MAACONnect online platform and a forthcoming MAA Notes book will ensure that **resources created through StatPREP will remain accessible** after the project ends.

Participant Feedback

Useful takeaways from the workshop:

- ❖ *Learning the power of R*
- ❖ *StatPrep community is happy to help you*
- ❖ *Learning what other colleges include in their data science degrees*
- ❖ *Learned what "real" data actually means and where to locate such data.*
- ❖ *Examples of lessons people have developed and used around the Little Apps.*

Acknowledgement

Support for this MAA program is provided by the National Science Foundation (DUE-1626337), in partnership with the American Statistical Association (ASA) and the American Mathematical Association of Two-Year Colleges (AMATYC)

Participant Feedback

As a result of this workshop, I plan to:

- ❖ *Collaborate with colleagues to build a local repository of data sets and R labs.*
- ❖ *Use methods of teaching that foster curiosity and exploration.*
- ❖ *I will use far more actual data.*
- ❖ *Incorporate simulations with Little Apps to help students visualize what is happening*

