

A General Education Data Literacy and Visualization Course Using Service Learning

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Keywords: general education, data literacy, data visualization, service learning

We report on a new course, Data Literacy and Visualization, that fulfills the university general education requirement for quantitative literacy and engages students through service learning. Students learn valuable data skills in an authentic context similar to those they would encounter in the workplace. Specifically, students work with local non-profit organizations who typically have data but lack the in-house expertise to derive value from it.

Motivation

At many institutions of higher education across the country, introductory undergraduate mathematics courses tend to have high failure rates and present a barrier to success for many students (Holm and Saxe 2016). In recent years many institutions have created alternative pathways to prepare students with quantitative literacy, and more recently, data literacy, skills (Dana Center 2020, Heinzman 2022). Data is ubiquitous in all types of organizations today, and individuals who have knowledge and skill in working with data, coupled with discipline-specific expertise, are increasingly valuable assets. Service learning is a method of experiential education that combines classroom instruction with meaningful, community-identified service. This form of engaged teaching and learning emphasizes critical thinking by using reflection to connect course context with real-world experiences (Bringle and Hatcher 1996).

Course Information

The course begins with an introduction to data and visualizations. Then students learn basic statistics including how to compute summary statistics by hand, create histograms, and identify normally-distributed data, then explore the concepts of correlation and regression. They then do these calculations and generate graphs in Excel. The next four weeks are devoted to learning about visualizations in general, including characteristics of good visualizations as well as how they can be misleading, and how to use Tableau, the software used for the projects. The final third of the semester is devoted to work with the community partners.

Results

Students leave the course with much more confidence in their mathematical ability than they had at the beginning of the semester. They report enjoying the class and finding it more interesting than other math courses they've taken. In their comments about the course, many students specifically state their appreciation for being able to apply the math they've learned in a real-world context.

Acknowledgments

This material is based upon work supported by the National Science Foundation under Grant No. 2021512.

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