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Using Data Visualization to Teach Research Methods

Item Type	Presentation
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DOI	https://doi.org/10.7275/gpxp-3713
Download date	2024-11-02 02:14:41
Link to Item	https://hdl.handle.net/20.500.14394/771

Using Data Visualization to Teach Research Methods

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NELIG Annual Conference
June 6, 2023

Learning Outcomes

Upon completion of this presentation participants will be able to:

1. Define what data visualization means and identify different types of visualization options.
2. Describe how using data visualization can increase student engagement in the research process.
3. Identify how data visualization, as part of the research method, can be applied in both stand alone and semester long research projects.
4. Evaluate student learning outcomes through student reflection, discussion and presentation of their data visualizations.

What is Data Visualization?

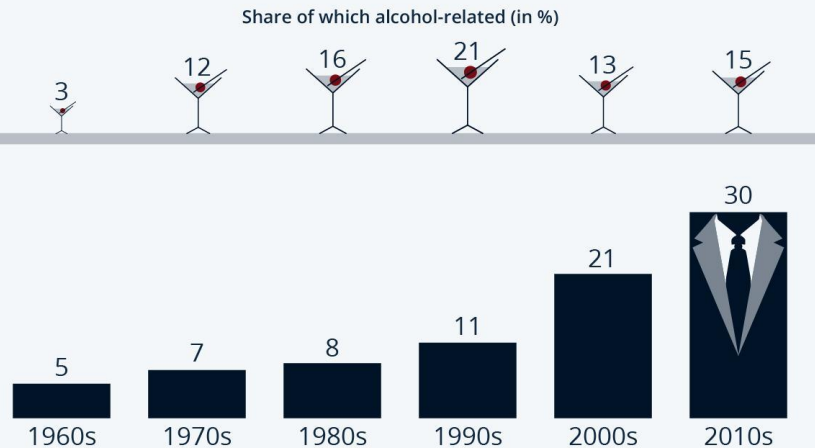
Information collected and expressed in the form of an image, chart, graph, plot, cloud, tree or other graphical means

Presenting data in a visual way can make your research more engaging as it is an extremely helpful resource in investigating, analyzing, and communicating research data.

When used effectively, data visualization can help a reader grasp a trend or correlation intuitively and near-instantaneously, no matter how complex the underlying data may be.

James Bond: A View to a Product Placement

Average number of product placements in James Bond films, by decade



Source: Medical Journal of Australia



statista

This visualization is easy to interpret.

It can be a catalyst to studying how changing habits in the films through the decades act as a reflection for changing attitudes towards alcohol consumption generally.

[License to Swill](https://www.statista.com/chart/16434/james-bond-product-placements/)

Armstrong, M. (September 29, 2022). James Bond: A View to a Product Placement [Digital image]. Retrieved October 03, 2022, from <https://www.statista.com/chart/16434/james-bond-product-placements/>

<https://www.statista.com/chart/16434/james-bond-product-placements/>

Why use data visualization for teaching research methods?

1. Increases engagement in the research process
2. Drawing inferences from data is a best practice and key part of establishing a critical learning environment
3. Understanding how data can be manipulated to affect the visual story being told increases the capability of assessing visualizations for truth and accuracy
4. Active learning applies concepts to real-world situations by using technology in a purposeful way
5. The ability to create data visualizations leverages several skills desired by employers including working with quantitative data, the ability to process information, and the use of graphics software

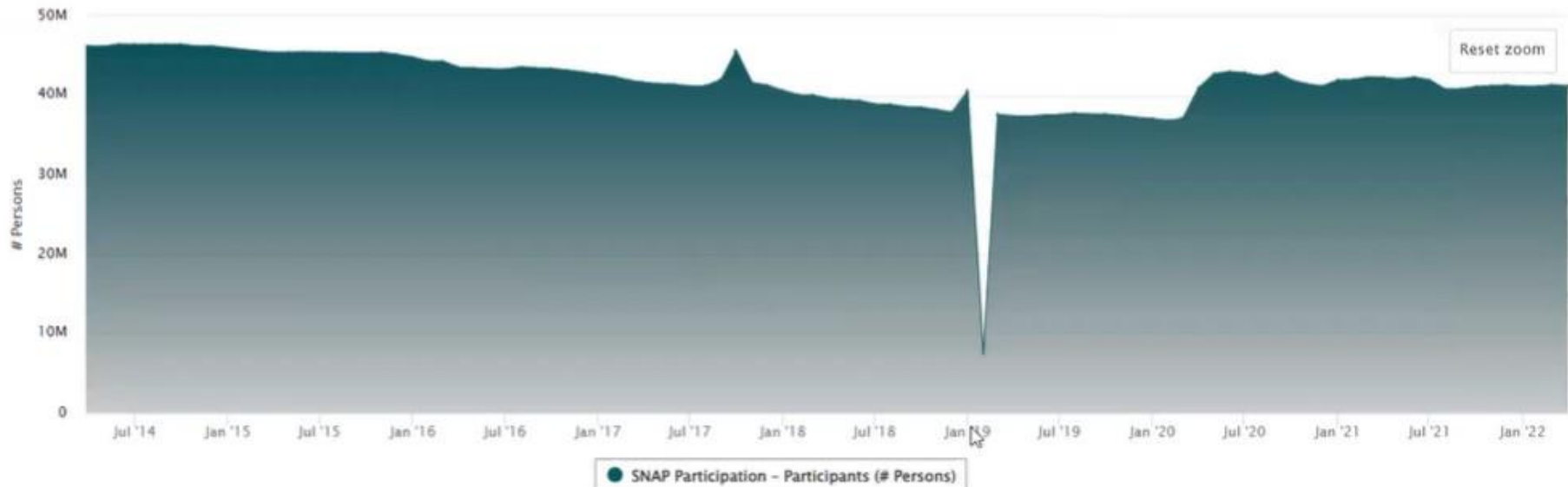
Data-centered courses can be successful in achieving important learning outcomes related to critical thinking:

- learning how to find and use resources for answering questions or solving problems
- learning to analyze and critically evaluate ideas, arguments, and points of view
- acquiring an interest in learning more by asking questions raised from the data visualization and seeking answers

SNAP Participation - Participants from the Supplemental Nutrition Assistance Program (SNAP) - Monthly Database

USA 10/1979 - 04/2022

Data Planet™: A SAGE Publishing Resource. Source: United States Department of Agriculture



How to apply in an assignment

- **Choose a topic for research**

- You can give a specific topic or let students choose their own

- **Gather data**

- You can provide a data set for a specific topic or have students find their own based on their particular topic of choice

- [Open Data Sets Guide](#)

- **Chose a data viz tool**

- Can suggest specific tools or leave open ended

- [Data Viz Tools](#)

- **Explore the data set and create a visualization** to answer an initial research question(s)

- Use this in place of or in conjunction with a literature review

- **Share the outcome**

- Have students share the created graphic
- Students can explain why they chose a specific query, where the raw data came from, and how they approached the design process
- Students should divulge what was learned
 - Patterns, trends, projections?
 - Further questions

This can be a stand alone assignment or the initial phase of a semester long research project

Example Assignments

[Example Assignment 1 Instructions](#)

[Student Example 1](#)

[Example Assignment 2 Instructions](#)

[Example Assignment 3 Instructions](#)

[Student Example 3](#)

Seeing how other students use the data set to show different analyses can be very beneficial.

- Student work can be shared via link to a discussion board in the Learning Management System (Blackboard, Canvas, Moodle, etc.) so that peers can access and leave feedback to each other
- Students can present their findings through a class presentation

Student reflections and outcomes:

- Reflection, discussion and presentation of their visualizations to classmates increased student engagement in not only their own research, but their classmates as well
- Students reported that the assignments helped them to research their final paper and clarify goals for their research
- Students reported a greater confidence in their ability to find resources to solve problems and an increased interest in developing and seeking out answers to their own questions
- Students became critical consumers of data in the sense that they learned the limitations of these techniques
- Collaborative learning > Students are often more comfortable exploring new skills in groups or pairs and the ability to articulate new skills is a component of mastery

2011 ACRL Visual Literacy Competency Standards for Higher Education

Visual literacy is a set of abilities that enables an individual to effectively find, interpret, evaluate, use, and create images and visual media. Visual literacy skills equip a learner to understand and analyze the contextual, cultural, ethical, aesthetic, intellectual, and technical components involved in the production and use of visual materials. A visually literate individual is both a critical consumer of visual media and a competent contributor to a body of shared knowledge and culture.

- Learners participate in a changing visual information landscape
- Learners perceive visuals as communicating information
- Learners practice visual discernment and criticality
- Learners pursue social justice through visual practice

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Thank you!

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