ARTG 5000 Topics in Design: Rhetorical Data Visualization

Time:
Campus class Location:
Professor: Enrico Bertini
Office Hours:

Course Description

While data visualization is often portrayed as a tool to convey "the truth" based on "data," the reality is that data communication is a form of rhetorical device, often employed to provide persuasive arguments. Examples abound: journalists equipping stories with powerful but inaccurate visuals, scientists trying to persuade their community using visuals to depict experimental evidence, humanitarian organizations and think tanks trying to convey the urgency of some issues over others.

This course is targeted to all students who want to learn how to evaluate and design communicative visualizations. In the course we explore the role of Data Visualization as a "rhetorical device" and we will explore questions such as, "How do practitioners and designers use visualization to create persuasive arguments? What elements of a visualization design play a role in conveying persuasive messages? How can designers design persuasive messages with integrity?"

Students will learn how to evaluate, design and implement persuasive visualization while being mindful of ethical constraints and the need for integrity. The course includes modules to teach students how to perform information gathering, data transformation and analysis, and data presentation with data visualization.

Course Format

This course explores the idea of Data Visualization used as a rhetorical device, that is, as a means to persuade readers of the validity of a given argument. The course includes readings, and discussions on the meaning and use of rhetoric in data visualization, analysis and critique of existing data visualization projects, design, development and evaluation of rhetorical data visualizations.

Learning Outcomes

Students in this course learn to:

1. Develop a critical understanding of new concepts and frameworks of relevance to data design and visualization disciplines.

2. Synthesize new learnings from data design related readings and critical group discussion.
3. Reflect on and critique new research and scholarship related to data visualization and data journalism.
4. Develop an understanding of design as an agent of cultural and social change.
5. Cultivate conceptual, and technical skills to produce data design projects, including gathering, processing, transforming, analyzing, and visualizing datasets.
6. Employ iteration, revision, and experimentation to develop concept, form, and craft, and develop an understanding of how to use graphical and textual elements as rhetorical devices.

COURSE FORMAT AND EXPECTATIONS

The course will be based on three main types of activities. First, we will focus on learning how visualization is and can be used to convey persuasive messages. This activity will be based on readings and discussions. Second, we will focus on use cases. We will analyze existing data visualization projects to identify (and possibly criticize) design elements that play a role in conveying a persuasive message. Third, we will develop rhetorical data visualizations. Students will be assigned a data set and topic of interest and will prepare data visualizations in support of a specific argument. In relation to that, we will also organize “data visualization debates;” one team arguing in favor and one team against a resolution.

Students should be able to read and understand research papers and evaluate them critically, write proper prose, and present their work in the classroom effectively. The course may eventually touch upon controversial topics. It is of the utmost importance that students will behave respectfully with each other and will be open to listening to a wide set of opinions (as long as they are expressed with respect).

The course will require students to gather, process, transform, analyze and visualize data. No pre-existing knowledge of specific data processing and visualization technologies is needed to carry out these tasks. The course will introduce Tableau and Tableau Prep, but students will be free to use tools of their preference.

Grading & Evaluation

The course will include a number of assignments based on the main activities performed in classroom, namely, discussion of assigned readings, critical review of data visualization projects and “data visualization debates.” There will be three type of assignments:

- Readings and critical reflections associated to the readings

- Critical reviews of existing data visualization projects
- Presentations and discussions developed for the “data visualization debates”

The course will walk the student through the following steps, organized by week:

Week	**Topic**	**Description**
1	Introduction	General introduction and overview of the course.
2	Understanding data	Understanding where data come from and learn to verify its meaning, provenance and trustworthiness.
3	Statistic and fallacies	Understanding basic statistics and the many ways they can mislead.
4	Exploratory data analysis	Generating and answering questions from data.
5	Data stories, framing and narratives	Building and presenting stories based on data.
6	Misleading visualizations	Understanding the many ways data visualization can mislead.
7	Persuasion and biases	Understanding how persuasion work and what biases readers (and designers/authors) have.
8	Integrity and data ethics	How to develop an attitude of integrity and how to keep data ethics in mind when communicating with data visualizations.
9	Disagreeing constructively	Learning to disagree constructively and respectfully.
10	Projects	Time devoted to develop, present and gather feedback on students’ projects.
11	Projects	Time devoted to develop, present and gather feedback on students’ projects.
12	Projects	Time devoted to develop, present and gather feedback on students’ projects.
13	Projects	Time devoted to develop, present and gather feedback on students’ projects.

Examples of the reading assignments may include: reading a research paper and answering questions regarding the main lessons learned, the practical applications to data visualization design, the open issues and implications.

Examples of the critical review assignment may include: analyzing an existing data visualization project, identifying the main rhetorical strategies used, analyzing the quality of the visualizations and the argument put forward, proposing ways to improve the visualization.

Examples of the "data visualization debates" may include assigning a data set on a current event topics debated in the US (e.g., climate change, COVID19 pandemic, gun violence) and performing gathering of background information, data processing and transformation, data analysis and data presentation, and delivering a talk in the context of a "data debate" organized in the classroom.

ARTG 5000 Learning Outcome to Grading Mapping

Assessment Activities *(generalized versions of what is in the syllabus)*	**LOs Assessed**	**% of grade**
1. Readings and discussions (multiple approx. 10)	1, 4, 5	20%
2. Critical reviews	1, 2, 4	30%
3. Data analysis and design (to be done individually) (multiple approx. 3)	1, 2, 3, 4, 5	30%
4. Data visualization debates (to be developed in a team)	1, 2, 3, 4, 5	20%

SUGGESTED READINGS

Here follows a sample of readings we will cover in the course.

Rhetorical Data Visualization

Cairo, Alberto. How charts lie: Getting smarter about visual information. WW Norton & Company, 2019.

Bergstrom, Carl T., and Jevin D. West. Calling bullshit: The art of skepticism in a data-driven world. Random House Trade Paperbacks, 2021.

Huff, Darrell. How to lie with statistics. Penguin UK, 2023.

Abelson, Robert P. 2012. *Statistics As Principled Argument*. Psychology Press.

Emerson, John, Margaret L. Satterthwaite, and Anshul Vikram Pandey. 2018. “The Challenging Power of Data Visualization for Human Rights Advocacy.” *Practice* 171: 97.

Hullman, Jessica, and Nicholas Diakopoulos. 2011. “Visualization Rhetoric: Framing Effects in Narrative Visualization.” *IEEE Transactions on Visualization and Computer Graphics* 17 (12): 2231–40.

Kong, Ha-Kyung, Zhicheng Liu, and Karrie Karahalios. 2018. “Frames and Slants in Titles of Visualizations on Controversial Topics.” In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, 1–12. CHI ’18. New York, NY, USA: Association for Computing Machinery.

Pandey, Anshul Vikram, Anjali Manivannan, Oded Nov, Margaret Satterthwaite, and Enrico Bertini. 2014. “The Persuasive Power of Data Visualization.” *IEEE Transactions on Visualization and Computer Graphics* 20 (12): 2211–20.

Pandey, Anshul Vikram, Katharina Rall, Margaret L. Satterthwaite, Oded Nov, and Enrico Bertini. 2015. “How Deceptive Are Deceptive Visualizations? An Empirical Analysis of Common Distortion Techniques.” In *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 1469–78. CHI ’15. New York, NY, USA: Association for Computing Machinery.

Segel, Edward, and Jeffrey Heer. 2010. “Narrative Visualization: Telling Stories with Data.” *IEEE Transactions on Visualization and Computer Graphics* 16 (6): 1139–48.