Teaching with Writing (TWW) Tip

**Teaching student writers to build
effective tables, charts, and figures**

Tables, charts, and figures are commonplace in academic and scientific writing, as well-organized visual displays make it easier for audiences to draw conclusions. Producing effective visual representation of data can be challenging, even with the help of sophisticated software. Selecting appropriate data, preparing data for display, plotting using appropriate tools, and reviewing for consistency and clarity are all essential steps in the process of building effective visuals. Here are some of the best ways to help your students communicate with data in tables, charts, and figures.

Teaching students to select appropriate data and edit in appropriate ways
Most disciplines have standard practices for gathering data, but the process of turning raw data into usable information is less explicit. Three simple strategies for assisting students in the selection of data include

- *Model the process of data selection*: Using your own research or publicly available data, show students the processes of moving from reviewing collected data to evaluating and making ethical decisions about what data should be conveyed for a particular project or context.
- *Address visualizations through course readings*: In scientific disciplines, standard methods and results sections of papers are clearly identified. In assigning course readings, instructors can usefully guide students to delineate between methods of investigation to the questions answered by visuals in the results section. In qualitative and humanistic fields, students might need more assistance in identifying the moves that typically precede and follow figures.
- *Present strong and weak examples*: When presenting effective examples of tables, charts, and figures, ask questions that will elicit from students the observable features and choices that make for good data selection and representation. In addition, show students examples of ineffectively selected or represented data, ask them to identify weaknesses, and to suggest revisions.

Teaching students to plot using appropriate tools
When designing assignments, consider and specify how tables, charts, and figures may "count" toward page length requirements. Here are some important reminders for students about what form to choose and what to include.

Tables are used for large sets of data when each item matters. They generally require a title at the top and an explanation of the contents along both axes. Whether presenting nominal, ordinal, or quantitative data, the text should be large enough for easy reading, and the grid should make it easy to find unique values.

Charts are used for aggregate data, including composition, distribution, correlations, and trends. Charts require titles, legends, and captions. They should be labeled with clear units of measure,

but should otherwise be restrained in the use of visual effects like color. Most charts should avoid grid lines, but should have a clearly established 0 on the y axis.

Figures are the broadest category, and can include a host of visual materials. Figures should always be labeled sequentially and require a caption. Because figures often include complex visual information, they can range significantly in size and level of detail.

Teaching students to review their tables, charts, and figures
Students often overlook proofreading, particularly of visuals. Providing checklists for important details (titles, legends, captions, and the like) can assist students in remembering the observable features of an effective visualization and avoid some of the headaches associated with common errors.

Requiring students to engage the process of building visuals from the beginning
Among the most common issues that students face when incorporating data into their drafts is ineffective time management. Because students often underestimate the time required for exploring data and extracting useful information, it is useful to set aside time in class to review drafts of visuals. In scientific fields, the writing process often begins with charts and figures. If an assignment incorporating tables, charts, or figures is due in two weeks, it may be useful to set aside time a week previous to discuss early data considerations to head off serious challenges.

> *In-class writing:* In a few sentences, describe the central message that you have identified from your data. On what basis can you draw your conclusions? Given the message you have identified, what modes of display might be appropriate to communicate your message visually?

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Learn more:
- Alberto Cairo, [The Functional Art: An Introduction to Information Graphics and Visualization](#)
- Stephen Few, [Now You See It: Simple Visualization Techniques for Quantitative Analysis](#)
- Dona M. Wong, [The Wall Street Journal Guide to Information Graphics](#)

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