Learning Objectives

• Explore raw data visually and assess statistical models' fit using graphical diagnostics
• Critique and redesign statistical graphics based on the principles below
• Produce legible, self-contained, informative graphics using statistical software
• Plan effective statistical graphics using the principles of human visual perception
• Model statistical graphics according to the Grammar of Graphics principles
• Design multi-chart static works (conference posters, infographics) using the principles of graphic design
• Generate interactive data visualizations following the principles of interaction design
• Synthesize the data visualization research literature to justify recommendations for graphical practice

Audience

• Graduate students in Statistics, in CMU’s Master’s of Statistical Practice program (primarily R users)
• Other students taking course as elective: engineers, marketers, statistics undergrads (mix of software backgrounds)

Teaching Approach

• Active learning: think-pair-share critiques, perceptual experiments, follow-along demos

Rubrics and Assessment

• Instead of awarding points, I use specifications-based grading, a system designed to give students control over their final course grades and transparency about their progress.
• Each assignment targets one or two Learning Objectives. Every assignment is graded on a rubric, with detailed sub-categories evaluated on levels from Not Yet Competent to Competent to Sophisticated. Each rubric is software-agnostic, allowing students to use whatever tool is best for the task.
• To earn a high course grade, students must demonstrate competence or mastery on most Learning Objectives. Students unsatisfied with their initial submissions may revise and resubmit any assignment.

HWs: targeted practice

HW1: Legible Graphics
• Legible
• Comprehensible
• Informative
• Reproducible

HW2: Visual Perception
• Consistency
• Cognition
• Quantitative Comparisons
• Grouping and Search

HW3: Grammar of Graphics
• Description
• Creation

Projects: portfolio fodder

P1: Graphic Design
• Message
• Graphs
• Color & Font
• Layout

P2: Interaction Design
• Message
• Consistency
• Constraints
• Visibility
• Feedback

P3: Research
• Literature Review
• Guidelines
• Application