Data Visualization

THE NATURE OF KNOWLEDGE

DESCRIPTION

Exploratory data visualizations can be used to identify curves, lines, trends, and outliers, to reveal new information about the data. Explanatory data visualizations can be used to present information visually from data that could not be seen otherwise. If used properly, explanatory data visualizations can reduce and/or manage cognitive load by offloading information into the visual/pictorial channel. The data visualization principle includes Ware's *Attributes of Preattentive Processing*, the *Gestalt Principles of Visual Perception*, a list of common visual properties used to encode data, a graph selection matrix, and best practices/examples of common visualizations.

LEARNER IMPACTS

- Attitudes
- Behavior
- Self-regulation

CAPABILITIES

- Management: Discussion analytics
- Management: Learning analytics
- Instruction: Multimedia active reading

SAMPLE DESIGN IMPLEMENTATIONS

- Robust Technology: Dashboard performance visualization/notification
- Simple Technology: Dynamic data visualizations with student input
- Content Support: Instruction/practice of designing instructional data

Pearson

Data Visualization

SELF-ASSESSMENT INSTRUMENT

Principle Criteria	Integration (4-5 points)	Exploration (2-3 points)	Consideration (1 point)	Not Applicable (0 Points)	Total Points
Definition	Strong basis in qualitative or quantitative data Strong representation of associated data Strong readability that communicates data to users	Some basis in qualitative or quantitative data Some representation of associated data Some readability that communicates data to users	Poor basis in qualitative or quantitative data Poor representation of associated data Poor readability that communicates data to users	Does NOT qualify according to definition	= _____
Development	Strong use of iterative revisions to improve visualization Strong use of research questions to drive data collection	Some use of iterative revisions to improve visualization Some use of research questions to drive data collection Some consideration of the costs and benefits of using different formats and styles	Poor use of iterative revisions to improve visualization Poor use of research questions to drive data collection Poor consideration of the costs and benefits of using different formats and styles	Does NOT apply the development process effectively	= _____
Design	Strong use of simplification to reduce distraction and improve clarity Strong use of emphasis to direct attention to the most important information Strong application of the taxonomy of visual effectiveness	Some use of simplification to reduce distraction and improve clarity Some use of emphasis to direct attention to the most important information Some application of the taxonomy of visual effectiveness	Poor use of simplification to reduce distraction and improve clarity Poor use of emphasis to direct attention to the most important information Poor application of the taxonomy of visual effectiveness	Does NOT use design effectively	= _____
Type Selection	Strong consideration of the costs and benefits of using different formats and styles Strong consideration of many potential visualization types, as well as multiple types together, to convey message	Some consideration of the costs and benefits of using different formats and styles Some consideration of many potential visualization types, as well as multiple types together, to convey message	Poor consideration of the costs and benefits of using different formats and styles Poor consideration of many potential visualization types, as well as multiple types together, to convey message	Does NOT make appropriate considerations	= _____

Copyright © 2016 Pearson Education Inc. Made available under a Creative Commons Attribution-ShareAlike 4.0 International license: https://creativecommons.org/licenses/by-sa/4.0/legalcode