

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.

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

LEARNER IMPACTS

- Attitudes
- Behavior
- Self-regulation



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	Some basis in qualitative or quantitative data	Poor basis in qualitative or quantitative data	Does NOT qualify according to definition	= ____
	Strong representation of associated data	Some representation of associated data	Poor representation of associated data		
	Strong readability that communicates data to users	Some readability that communicates data to users	Poor readability that communicates data to users		
Development	Strong use of iterative revisions to improve visualization	Some use of iterative revisions to improve visualization	Poor use of iterative revisions to improve visualization	Does NOT apply the development process effectively	= ____
	Strong use of research questions to drive data collection	Some use of research questions to drive data collection	Poor use of research questions to drive data collection		
		Some consideration of the costs and benefits of using different formats and styles	Poor consideration of the costs and benefits of using different formats and styles		
Design	Strong use of simplification to reduce distraction and improve clarity	Some use of simplification to reduce distraction and improve clarity	Poor use of simplification to reduce distraction and improve clarity	Does NOT use design effectively	= ____
	Strong use of emphasis to direct attention to the most important information	Some use of emphasis to direct attention to the most important information	Poor use of emphasis to direct attention to the most important information		
	Strong application of the taxonomy of visual effectiveness	Some application of the taxonomy of visual effectiveness	Poor application of the taxonomy of visual effectiveness		
Type Selection	Strong consideration of the costs and benefits of using different formats and styles	Some consideration of the costs and benefits of using different formats and styles	Poor consideration of the costs and benefits of using different formats and styles	Does NOT make appropriate considerations	= ____
	Strong consideration of many potential visualization types, as well as multiple types together, to convey message	Some consideration of many potential visualization types, as well as multiple types together, to convey message	Poor consideration of many potential visualization types, as well as multiple types together, to convey message		