Assessing Student Learning Gains from a Data-Driven Storytelling Worksheet Implementation

Qualitative Analysis of the Survey Data for Spring 2024

1. What do you know about Storytelling with Data?

The evolution of student awareness of storytelling with data across the three rounds shows increasing depth, nuance, and critical reflection. Here's a breakdown of the key trends:

Round 1: Initial Understanding – Basic Definitions & Enthusiasm

Themes:

Basic Understanding of Storytelling with Data

- Most participants describe storytelling as simply using data to tell a story (P1, P4, P9, P12).
- Some recognize it as a way to engage audiences (P7, P11).

Engagement and Enjoyment

- Several participants express excitement and view storytelling as "fun" (P2, P7).
- Some note that it makes data more interactive and understandable (P6, P11).

Visualization as a Key Tool

- Many responses emphasize that storytelling is tied to data visualization (P5, P6, P8).

Round 2: Expanding Awareness – Techniques & Challenges

Themes:

Introduction of Specific Techniques

- Participants mention scrollytelling, geographic animations, and non-traditional storytelling forms (P3, P6, P8).
- The idea that storytelling goes beyond just charts emerges (P3, P8).

Recognizing Challenges & Effort Required

- Some acknowledge that storytelling requires meticulous planning (P2, P8).
- Others highlight difficulties in keeping the audience engaged (P2, P10).

Refining the Definition

- More responses shift from "telling a story with data" to emphasizing conveying a message (P5, P9).
- Some note the importance of structure and clarity (P12).

Round 3: Critical Reflection – Narrative Bias & Interaction

Themes:

Deepening Understanding of Audience Engagement

- Several participants now mention interaction as a key factor (P10, P11).

- P7 shifts from general engagement to understanding how storytelling aids in user-driven conclusions.

Critical Thinking About Storytelling's Role

- Some recognize potential biases in storytelling (P8, P13).
- P13 explicitly notes that the narrative structure itself can be flawed, showing a deeper level of critique.

Reinforcing Key Concepts with More Nuance

- Responses in this round consolidate earlier ideas with clearer articulation.
- P6, P9, and P12 largely repeat or refine previous definitions, indicating stable conceptual understanding.

Summary of Thematic Evolution

Round 1: Basic enthusiasm and fundamental definitions.
Round 2: Recognition of storytelling techniques and challenges.
Round 3: Critical thinking emerges, along with an emphasis on interaction and narrative bias.

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2. What are some of the components of storytelling with data?

Analyzing how participants' understanding of the components of storytelling with data evolved across the three rounds reveals a shift from basic elements to more complex and nuanced considerations.

Round 1: Fundamental Components – Visualization, Narrative, and Engagement

At this stage, participants mainly focus on the **essential building blocks** of storytelling with data:

Themes:

Visualization as the Core Element

- Many mention data visualization as a key component (P1, P3, P5, P6, P12).
- The emphasis is on clear and effective visual representation of data (P5, P7).

Narrative as a Key Structure

- Several participants identify "narrative" or "clear storytelling" as an essential component (P2, P9, P13).
- Some highlight how a story needs structure and continuity (P7).

Audience Engagement & Interaction

- The importance of making the data engaging is noted (P1, P11, P12).
- P6 mentions themes and trends, hinting at an emerging awareness of structuring information effectively.

Round 2: Expansion of Technical Elements & Storytelling Methods

Themes:

By the second round, participants refine their understanding by incorporating specific techniques and deeper structural insights.

Refining the Role of Visualization

- There's a shift from just "visualization" to more nuanced aspects like color schemes, labels, axis clarity, and good transitions (P5, P6, P10).
- P6 introduces scrollytelling and thematic visualizations.
- Some note the need for visualizations that enhance storytelling rather than just display data (P7, P9).

Deeper Understanding of Narrative & Engagement

- More participants emphasize storytelling techniques (P1, P8).
- Annotations and emphasis are introduced as ways to guide audience understanding (P6, P12).
- The need for audience interaction and engagement is repeated (P8, P11).

Recognizing the Role of Emotions & Thematic Elements

- P8 introduces the idea that storytelling should evoke a theme or emotion, showing an awareness of persuasion in data storytelling.
- Some recognize the importance of creating a hook to engage the audience (P2, P8).

Round 3: Critical Reflection – Bias, Pacing, and Advanced Interactivity

By the final round, participants demonstrate a deeper awareness of the complexities and challenges of data-driven storytelling.

Themes:

Advanced Interactivity & User Engagement

- More participants highlight interaction techniques like tooltips, brushing, dragging, and animated transitions (P6, P9, P10, P11).
- P10 refines the role of interaction in maintaining attention rather than just making it "engaging."
- P12 emphasizes selection of data, suggesting a growing awareness of how data choice impacts storytelling.

Critical Reflection on Narrative & Bias

- P13 acknowledges that the narrative itself can have flaws, hinting at an awareness of potential bias in storytelling.
- P8 introduces critique and the need to avoid bias, recognizing that storytelling is not always neutral.

More Structured & Holistic View of Storytelling

The final responses reflect a more comprehensive understanding, where participants integrate multiple elements:

- Pacing in storytelling (P8).
- Theme-driven design (P6, P8).
- Objective-driven storytelling (P5, P7).

Summary of Thematic Evolution
Round 1 - Basic elements: Visualization, Narrative, Engagement
Round 2 - Technical refinements: Annotations, Scrollytelling, Color, Hooks
Round 3 - Critical thinking: Interaction, Bias, Data Selection, Pacing

This evolution suggests that students moved from basic visualization-based storytelling toward a deeper awareness of techniques, emotional impact, and the potential for bias in storytelling with data.

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3. What do you notice when interacting with a data-driven story?

Round 1: Initial Engagement and Surface-Level Observations
Themes:
Engagement & Learning
- Many participants found data-driven stories engaging and easier to understand (P7, P10).
- Some noted that interacting with data-driven stories made learning more enjoyable (P1, P8, P11).

Interactivity & Visual Appeal
- Participants appreciated interactive elements, such as animations and smooth transitions (P3, P7, P10).
- Noted the importance of interactivity in making the experience more dynamic (P4, P5, P6, P7, P9).

Narrative Structure & Data Progression
- Some participants identified that data-driven stories often follow a linear progression, making them easier to follow (P3, P9, P13).
- One participant (P13) observed that the data in these stories tends to reinforce a specific narrative rather than being purely analytical.

Visual Simplicity & Readability
- Some participants appreciated clear descriptions, simple visualizations, and ease of reading (P2, P5).
- Factors like font size, scaling, and color legends were noticed as important for comprehension (P2, P10).

Round 2: Increased Attention to Details & Interaction Enhancements
Themes:
Refined Focus on Interaction & Data Presentation
- Participants started noticing more details in interactivity, such as the ability to drag through different years (P8).
- They began recognizing how interactions (e.g., bolding text, enlarged elements) helped guide attention (P5, P6).
- More emphasis on dynamic vs. static charts and how they change perception (P10).

Increased Awareness of Visual and Text-Based Design

- Participants now explicitly noticed bolding and enlargements in text (P6).
- Font, transition smoothness, scale, and annotations became important considerations (P2).
- Noticing how inconsistencies in labels and colors could cause confusion (P5).

Blending of Storytelling Techniques

- Some participants started suggesting combinations of scrollytelling and stepping techniques in the same story (P9).
- Recognizing that well-structured animations enhance storytelling and engagement (P7).

Deeper Engagement & Emotional Response

- Participants mentioned feeling more intrigued and wanting to explore more (P11, P12).
- Emotional and psychological aspects, such as inspiration and curiosity, became more prominent (P12).

Round 3: Critical Analysis & Recognition of Complexity

Themes:

Questioning Narrative Framing & Bias

- Some participants started critically analyzing how data-driven stories might be structured to push a specific narrative (P13).
- Concern over how visual complexity can sometimes become overwhelming (P8).

Deeper Reflection on Visual & Interaction Design

- Participants reinforced previous findings, such as the importance of consistent labels, legends, and color choices (P5).
- Acknowledged the need for balancing visual appeal with clarity (P8).
- Further emphasis on interactivity being essential for engagement (P10).

Stability of Noticing Patterns

- Several participants did not notice anything new (P3, P4, P6, P13), suggesting that they had reached a plateau in their observations.

Summary of Thematic Evolution

Round 1: Initial engagement with surface-level elements (interactivity, visual appeal, engagement).
Round 2: Deeper attention to interaction, design choices, and storytelling techniques.
Round 3: Critical reflection, recognition of bias, and reinforcement of prior observations.
