Educational Impact of Storytelling and Data Visualisation in the Interpretation of Humanities Data

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ABSTRACT (ENGLISH)
The paper explores the role of storytelling in Digital Humanities education, focusing on how students engage with data to create meaningful narratives. Using MELODY, a web-based tool for user-generated data storytelling, students integrated textual and visual elements to interpret and communicate music heritage. This study emphasises the pedagogical importance of fostering user-driven storytelling, arguing that Humanists benefit from approaches that restore complexity and dignity rather than oversimplifying knowledge. Insights from student-created data stories illustrate how narrative-driven tools can bridge the gap between technical skills and interpretative thinking, without the need to hide complexity.
Keywords: Digital Humanities; storytelling; data visualisation; pedagogy

ABSTRACT (ITALIANO)
Impatto educativo dello storytelling e della visualizzazione dei dati nell'interpretazione dei dati umanistici.
L'articolo esplora il ruolo dello storytelling nell'educazione alle Digital Humanities, concentrandosi su come gli studenti interagiscono con i dati per creare narrazioni significative. Utilizzando MELODY, uno strumento web-based per lo storytelling di dati generato dagli utenti, gli studenti hanno integrato elementi testuali e visivi per interpretare e comunicare il patrimonio musicale. Questo studio sottolinea l'importanza pedagogica di promuovere uno storytelling guidato dagli utenti, sostenendo che gli studiosi delle Humanities traggono beneficio da approcci che restituiscono complessità e dignità, piuttosto che semplificare eccessivamente il sapere. Le storie di dati create dagli studenti illustrano come gli strumenti narrativi possano colmare il divario tra competenze tecniche e pensiero interpretativo, senza la necessità di nascondere la complessità.
Parole chiave: Digital Humanities; storytelling; visualizzazione di dati; pedagogia

1. INTRODUCTION

Storytelling has been a cornerstone of human culture, shaping how we share, understand, and preserve knowledge. In Digital Humanities (DH), the narrative form offers a powerful method for interpreting and disseminating data, particularly for students in their first steps into complex datasets. Data visualisation plays a pivotal role in this process, serving not merely as a tool for presentation or summarisation but as a medium for exploration and critical interpretation. Visualisation in the Humanities must transcend its roots in empirical disciplines to embrace ambiguity and the interpretive nature of humanistic inquiry. This involves acknowledging the situated, partial, and constructed character of knowledge (Drucker, 2011). Interpretation and subjectivity are central to humanities research, setting it apart from the precision-driven methodologies often associated with the sciences. Rather than striving for objectivity, the goal is to make interpretive perspectives explicit, fostering transparency and critical engagement (van den Berg et al., 2018). Tools like MELODY (Renda et al., 2023) enable students to create narratives that combine text and visuals, emphasising human interpretation. By contextualising and transforming data into meaningful narratives, MELODY supports the creation of user-driven storytelling that restores complexity and critical inquiry. In this article we analyse student projects created and published online using MELODY[1] to explore the educational value of integrating storytelling into Digital Humanities introductory courses. Our analysis focuses on the interplay of text and visualisations that structure the narrative flow and contextualise data insights. Findings highlight how narrative-driven tools encourage the curation of presentational aspects of data stories, fostering critical engagement and creativity while supporting the development of interpretative skills.

2. LITERATURE REVIEW

Semantic web technologies offer powerful tools for querying and structuring data. However, their technical complexity often creates a barrier for humanities students, whose academic backgrounds may not align

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[1] https://melody-data.github.io/stories/ (last visited 08/01/2025)

with the precision-driven nature of these tools. Traditional pedagogical approaches to teach semantic web technologies frequently prioritise technical skill acquisition, leaving limited space for creativity or interpretive exploration.

Storytelling has emerged as an effective way to contextualise the use of semantic web technologies in the humanities. It provides a narrative framework that enables students to bridge the gap between technical expertise and critical thinking, fostering a deeper engagement with the data they work with (McDowell & Turk, 2024). Project-based approaches to storytelling allow students to connect personally with their work (D'Ignazio & Bhargava, 2018; Bowler et al., 2017), using semantic web queries as the foundation for building interpretive and meaningful narratives (Evenstein Sigalov & Nachmias, 2023).

In this context, data visualisation becomes a key component of storytelling, helping students to transform complex, query-derived datasets into accessible and engaging outputs (Gershon & Page, 2001). Tools like MELODY (Renda et al., 2023) facilitate this process by combining semantic web querying with narrative-driven visualisation, allowing students to explore and present their data in creative and interpretive ways. This integration of storytelling into semantic web education not only demystifies the technologies but also enhances data literacy by emphasising the ethical and interpretive dimensions of data communication (McDowell, 2021; McDowell & Turk, 2024).

The Humanities' emphasis on subjectivity and situated knowledge aligns naturally with these narrative approaches (Boyd Davis et al., 2021; Drucker, 2011). By embedding storytelling into the use of semantic web tools, students are encouraged to make their interpretive perspectives explicit, countering the objectivity often associated with technological methodologies (Vance et al., 2022; Allington et al., 2016; van den Berg et al., 2018). This pedagogical model underscores the potential of semantic web technologies to support not just technical skill acquisition but also the interpretive richness characteristic of humanities research. However, to the best of our knowledge, empirical studies analysing and providing evidence for aforementioned theses are missing in the literature.

3. METHODOLOGY

This study is conducted within a master's program in Language and Communication, specifically during an introductory course on Semantic Web technologies for the Humanities. Students were tasked with creating data stories centered on music heritage[2]. These projects required students to apply SPARQL querying techniques while integrating their findings into cohesive narratives. The goal of course is to combine technical data exploration with interpretative storytelling to address research questions effectively. The MELODY platform[3] was selected as the primary tool to support this process. MELODY is a user-friendly platform designed for data storytelling, offering a what-you-see-is-what-you-get (WYSIWYG) interface that allows the integration of SPARQL queries and data visualisations. It enables users to create narratives enriched with charts, maps, tables, and text search functionalities (Renda et al., 2023). So created stories can be published for free on the web, and the backbone of stories, including queries, types of charts, and texts can be retrieved as JSON files in a dedicated repository[4].

Data collection involved two main sources. First, the students' data stories were harvested from the repository and analysed to evaluate the use of storytelling elements, including the frequency and distribution of textual and visual components, as well as the creative integration of MELODY's features. Secondly, qualitative feedback from students of the aforementioned course were collected after the exam (Renda & Daquino, 2024), and provided us with insights into their experiences, highlighting challenges encountered, skills developed, and reflections on the pedagogical value of storytelling.

4. FINDINGS

Fig. 1 presents the sequential distribution of element types across 51 data stories, with each row representing a unique story and the x-axis denoting the position of elements in the narrative. Four element categories are visualised: text (green), counters (red), data visualisation (blue), and text search (orange). The heatmap reveals that text elements are predominantly placed at the beginning of most stories, suggesting their foundational role in setting the narrative context. These text elements are often followed by data visualisations or counts, which provide supporting data to develop the narrative further. Notably, only 3 out of the 51 stories do not include any text elements, underscoring the critical importance

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[2] https://melody-data.github.io/stories/ (last visited 08/01/2025)

[3] https://projects.dharc.unibo.it/melody/ (last visited 08/01/2025)

[4] https://github.com/melody-data/stories (last visited 08/01/2025)

of text as a narrative tool. Among the 48 stories that do include text, 38 contain additional text elements beyond the initial one, indicating its recurring role in elaborating, transitioning, or concluding the narrative (notice that Fig. 1 includes the latter stories only for the sake of the analysis).
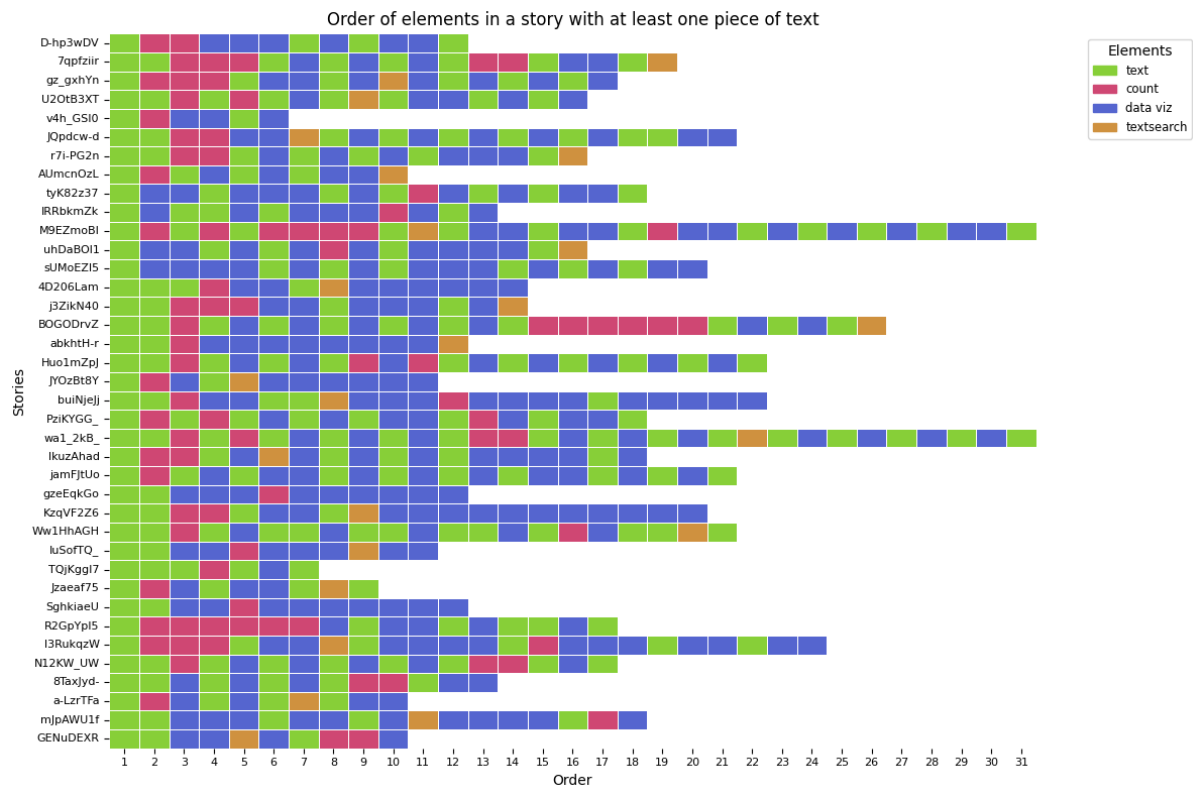

Figure 1. Sequential distribution of text, visualisation, count, and search elements across data stories.

Building on these observations, we analysed the length of text elements to understand their variability and narrative role. Fig. 2 shows that text lengths are right-skewed, with shorter texts dominating the distribution. The most frequent range of text lengths is between 174 and 311 characters, representing over 70 instances. Medium-length texts (311–1131 characters) are present but less frequent, with a gradual decline in occurrence as text length increases. Very long texts, exceeding 1400 characters, are rare, with only a few instances surpassing 2000 characters. This distribution highlights a narrative strategy that favours brevity, possibly to ensure clarity and maintain audience engagement. The prevalence of shorter texts may reflect their use in providing quick explanations or transitions, while medium and long texts are reserved for more elaborate contextualisation or storytelling needs.

Given the importance of text as a closing element in data stories, we further analysed the 12 stories where text appears in the final position. Fig. reveals a slight negative correlation between story length (number of elements) and the length of the concluding text. As stories become longer, the length of the final text element tends to decrease. While most data points cluster around text lengths of 600 to 700 characters for shorter stories, longer stories exhibit a broader range of shorter final text lengths, with several falling below 400 characters. This trend may reflect a narrative strategy where longer stories, already rich in data and visualisations, require more concise conclusions to avoid redundancy and maintain focus.

These findings align with student feedback (Renda & Daquino, 2024), which emphasised the importance of text in providing context and guiding the narrative flow. For example, students reported using text to complement data retrieved from queries and to explain their findings, ensuring that complex information was accessible and meaningful. This feedback underscores the observed patterns, highlighting how text and visualisations work together to create cohesive and engaging data stories.
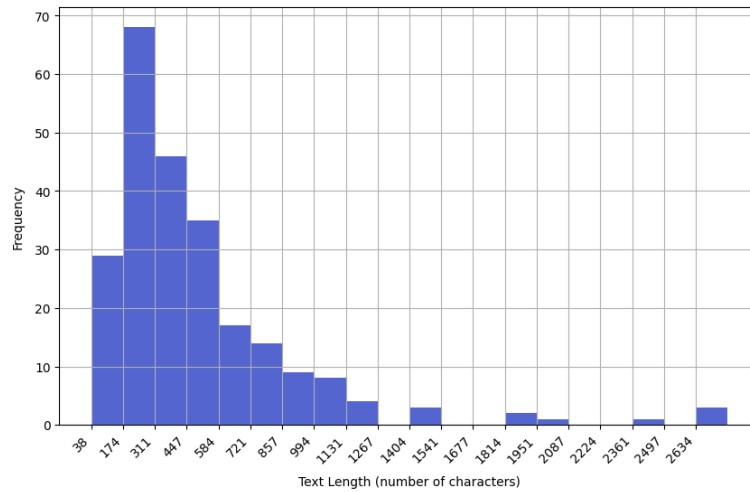
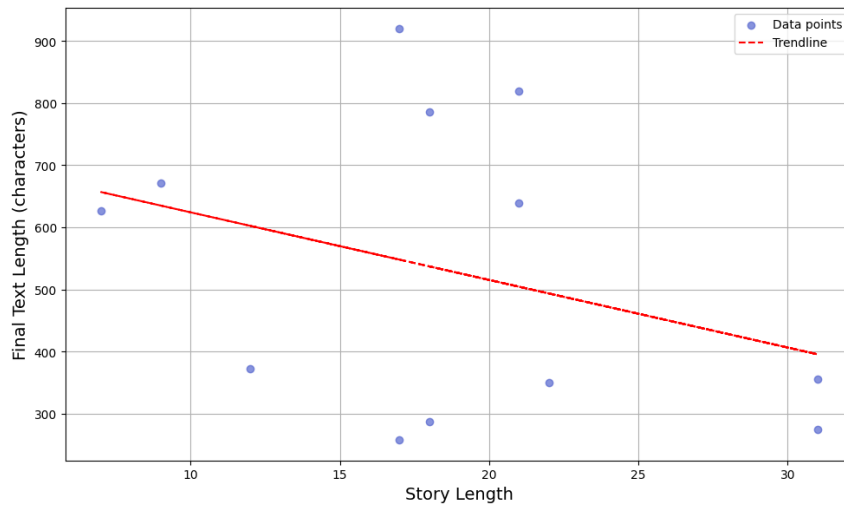**Figure 2. Distribution of text lengths in data stories.**

Figure 3. Negative correlation between story length and concluding text length.

5. DISCUSSION

The findings of this analysis, combined with feedback from students, reveal key insights into how textual and visual elements interact to create engaging and effective narratives, the challenges faced in the storytelling process, and the educational value of such projects.

The results highlight the central role of text in framing data stories, with most narratives beginning with a textual element to provide context or set the stage. Students consistently noted that text was used to complement data retrieved from queries, often incorporating additional information from external sources to provide a comprehensive overview of the topic. Text also played a pivotal role in explaining and contextualising data, ensuring that complex information was easily understood by the audience. By combining SPARQL queries with narrative-driven visualisation, MELODY facilitated the integration of semantic web technologies into interpretative storytelling, bridging the gap between technical expertise and humanistic inquiry.

In addition to text, data visualisations emerged as a key component in structuring and enhancing narratives. Students highlighted that visual representations not only helped to present insights but also provided a framework for the overall story. Visualisations were described as a starting point that guided the structure and linearity of the article, emphasising their importance in organising and delivering the narrative. Visualisations served not only as tools for presenting insights but also as interpretative devices

that guided students in structuring their narratives and making complex data accessible to diverse audiences.

A notable theme in the feedback was the emphasis on empathy and audience-centered storytelling. Students expressed the importance of tailoring content to meet the needs of the audience, focusing on relevance and clarity. For example, they considered how the materials could be made more useful for readers, which also inspired creativity in the process. This aligns with best practices in storytelling, where understanding the audience's perspective is critical for creating impactful narratives that resonate.

The project provided significant educational and creative value, as reflected in student feedback. Participants reported gaining new skills, deepening their understanding of data storytelling, and exploring intersections between data, technology, and specific themes such as music. For many, the process of building a data story was an iterative and rewarding learning experience that enhanced both technical and creative abilities. A tool like MELODY was particularly praised for its ability to uncover insights and facilitate engaging storytelling. The iterative storytelling process supported by MELODY enabled students to manage and narrate complex datasets effectively, demonstrating the value of narrative frameworks in simplifying and contextualising intricate information.

Students also recognised the value of storytelling elements in making data narratives more memorable. By incorporating a mix of text and visuals, they were able to craft stories that effectively conveyed key messages while maintaining reader engagement. This iterative process of crafting narratives, refining visuals, and integrating textual elements allowed students to develop an advanced understanding of how to communicate complex information.

While the feedback was largely positive, it also pointed to some challenges in the storytelling process. Students noted the effort required to iteratively refine their stories as they progressed through successive queries. Balancing textual and visual elements to achieve clarity and engagement was another recurring theme. Despite these challenges, the process was seen as a valuable learning opportunity that allowed students to experiment with the Semantic Web. This underscores the pedagogical potential of narrative-driven tools to foster data literacy and interpretative skills, making them invaluable for modern humanities education.

6. CONCLUSION

This study highlights the pedagogical value of narrative-driven tools like MELODY in fostering critical and interpretative skills within Digital Humanities introductory courses. By combining text and visual elements, students were able to craft engaging and effective narratives, enabling them to explore and communicate complex datasets creatively. The central role of text in structuring and contextualising data stories is deemed pivotal by students, and visualisations demonstrated having a complementary function in enhancing narrative coherence and audience engagement.

The iterative process of creating these stories not only fosters students' technical proficiency in semantic web technologies but also emphasises the importance of balancing textual and visual components to convey meaning effectively. While challenges related to refining narratives and managing incomplete data sources were noted, the process was universally regarded as an enriching educational experience that bridged technical learning with humanistic inquiry.

Overall, this research reaffirms the value of storytelling as a framework for managing complexity, fostering empathy, and restoring interpretive richness to data communication in Digital Humanities. Further studies might focus on refining user interfaces and interaction design in storytelling tools to lower barriers for non-technical users while promoting creative engagement with data.

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