

Content Analysis of COVID-19 Cartographic Journalism

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Abstract:

Story maps are an increasingly popular way to communicate spatial information to the public, but little empirical work has been conducted to understand these powerful storytelling mediums (Roth, 2021). This work defines story maps as one or more maps structured as or within a narrative following a story arc that are accompanied with text, graphics, multimedia, and/or interactivity (Noé Cortes, 2018; Song et al., In Press). Story maps have been further characterized by two recent cartographic studies. Namely, Fish (2021) interviewed climate change mapmakers to identify eight elements of vivid cartography that are theorized to make maps more memorable and persuasive. Although this *vividness framework* was not explicitly framed to characterize story maps, vividness evokes similar effects as narratives, being intuitive, persuasive, and memorable (Green & Brock, 2000; Nisbett & Ross, 1980). Additionally, Roth (2021) developed a *map-based storytelling framework* that defines the structures, *genres*, storytelling techniques, *tropes*, and design techniques that evoke tropes, *trope techniques* utilized in story maps. In this presentation, I present the findings of an empirical study aimed to evaluate these two story map design frameworks and identify common design characteristics of story maps.

This work answered, 1) What genres, tropes, trope techniques, and elements of vivid cartography are utilized by story maps? and 2) Which pieces of the *vividness* and *map-based storytelling* frameworks can be operationalized? In doing so, this work met three major objectives. First, it operationalized *vividness* and *map-based storytelling* frameworks to turn proposed concepts into measurable factors. Second, it evaluated these frameworks by adding two new trope techniques to the framework, determining successfully operationalized concepts, and identifying concepts that need revisions or should be removed. Third, it characterized the design of digital (news) story maps by assessing how frequent different traits are implemented into story maps.

To accomplish these objectives, I conducted a quantitative content analysis (QCA) according to best practices identified in cartographic literature (Muehlenhaus, 2011). QCA is the systematic evaluation of different visuals according to a set of operational rules, or *codes*, that define aspects of the story map which are of interest to the researcher (Muehlenhaus, 2011). I developed a coding scheme based on the seven genres, seven tropes, twenty-nine trope techniques, and eight vividness elements conceptualized in previous work (Fish, 2021; Roth, 2021). All codes were binary, indicating if a particular code was present in a map or not. Next, I trained three coders with extensive cartography education in this coding scheme to ensure the results are replicable and robust. After training, these three coders and I analyzed a purposive sample of 117 story maps. COVID-19 journalism served as a case study for the scope of the sample. I coded all 117 maps in the sample. A random third of the sample (n=39) was cross coded by three other coders. The remaining two thirds (n=78) were cross coded by one coder with each of the three coders coding a different 26 story maps from the two-thirds subset. The *prevalence* of the concepts was calculated to answer research question one by first determining the number of stories that incorporated the presence of a code element and had majority agreement amongst coders. A chance-corrected interrater reliability coefficient that measures agreement strength, *Gwet's ACI*, was calculated to answer research question two (Neuendorf, 2017).

A snapshot of the prevalence and agreement for the two-coder subset is shown as a matrix in Figure 1. My findings indicate that most story maps only use a fraction of the theorized concepts from the *map-based storytelling* framework. One genre, longform infographics, accounted for nearly all story maps in the sample, suggesting that most story maps enforce the linearity of a story through browser scrolling. Furthermore, only three tropes were present in over 2/3 of the sample, and only five trope techniques were present in roughly half of the sample or more. The vividness elements were more common throughout the sample with four elements present in roughly 3/4 the sample, and three elements present in roughly half of the sample.

Agreement between coders for the genres was very high, likely due to the ubiquity of longform infographics in the sample. Conversely, agreement was low for all but two tropes. For the agreement strengths of the trope techniques, 11 were almost

perfect, 5 were substantial, 3 were moderate, and 10 were relatively low. Only two of the eight vivid elements had substantial or moderate agreement strengths.

Even after extensive coder training and multiple rounds of code revisions through pilot runs, many codes were still too indistinct or subjective. My work suggests that analyzing story maps according to the *vividness* and *map-based storytelling* frameworks is difficult even with highly skilled cartographers. Future work should concretize concepts with low agreement. Another avenue for future story map research is to evaluate how implementing common techniques that I found in my work affect reader's preference for, comprehension of, and retention of a story map.

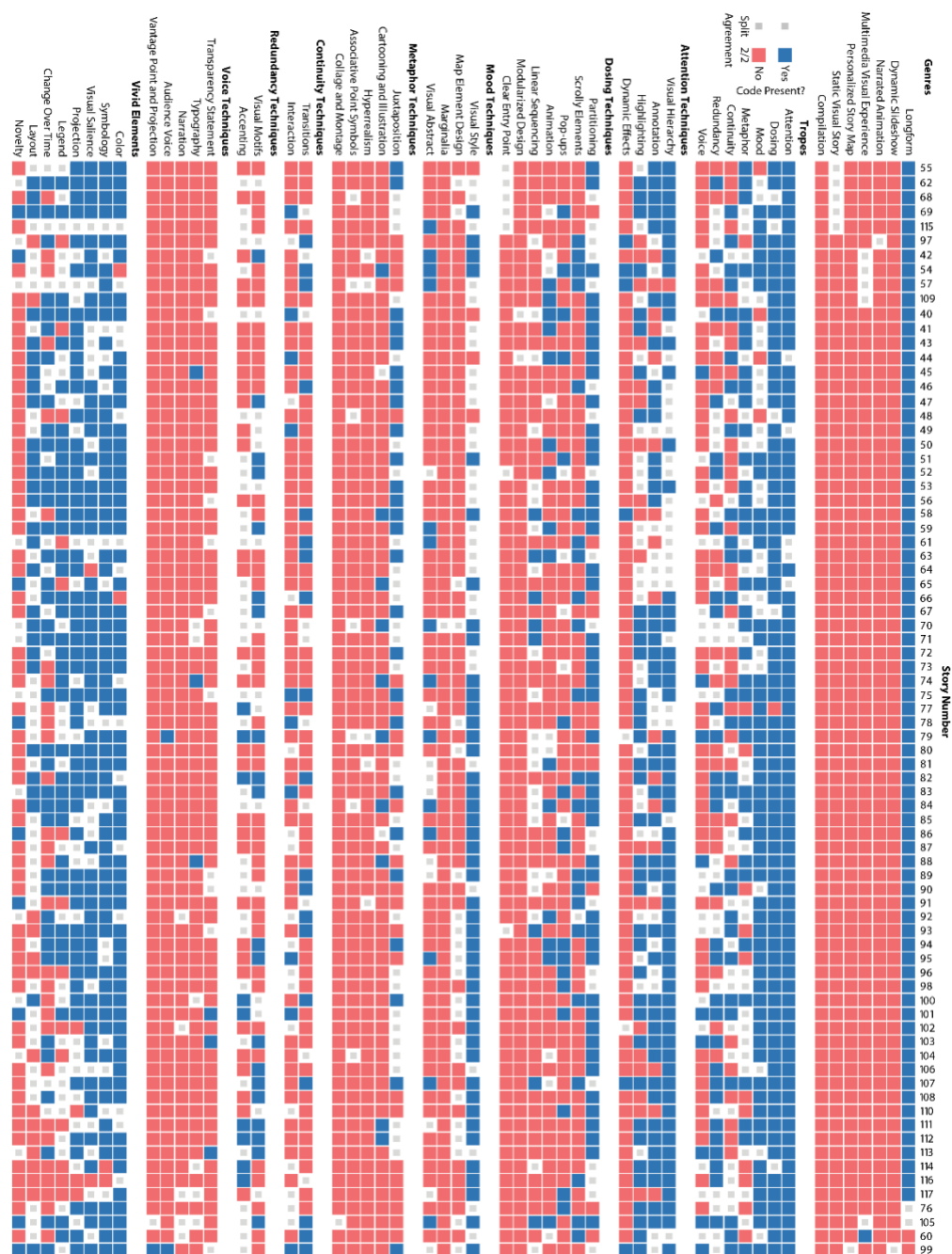


Figure 1: Prevalence and Agreement Matrix with Row groupings as Genres, Tropes, Trope Techniques, and Vivid Elements and columns as stories.

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