International Cartographic Association
Association Cartographique Internationale

Future opportunities for mobile thematic map design in data journalism

Lily Houtman [a,*]

[a] *GeoGraphics Lab, Department of Geography, The Pennsylvania State University, lhoutman@psu.edu*

* Corresponding author

Keywords: mobile cartography, thematic cartography, data journalism

Abstract

Mobile devices are increasingly one of the most common ways the public interacts with maps, driving the need for research specific to mobile cartographic design (see Roth et al. 2023 for a recent research agenda). Of the 20 open research challenges developed by Roth and colleagues, my research focuses on the question: "What is mobile-first thematic map design?" Previous research in mobile cartography has primarily focused on navigation maps. However, determining best practices for the design of mobile thematic maps is also important, since these maps are central to science communication, data journalism, and other forms of information visualization.

Here, I present results from a study on mobile thematic cartography in the context of data journalism, which is one of the most common ways the public encounters these maps (Houtman 2023). Adapting methods from previous work on cartographic journalism (Fish 2020), I conducted structured interviews with 18 news cartographers to understand the current state of mobile thematic news cartography. I also asked them to develop an interface mockup to envision the future of mobile thematic news cartography. The questions in these interviews were structured around six themes: responsive and mobile-first design, screen size, orientation, and resolution, generalization and complexity, post-WIMP environments, technical accessibility, and individual accessibility. Here, I describe four key areas from the results of this study that warrant additional research: simultaneous design, user testing, types of interactivity, and time constraints.

Simultaneous design: Most web maps are designed one of two ways: mobile-first or desktop-first. Often, when maps are intended to be viewed on both mobile and desktop devices, guidelines suggest designing mobile-first is better, as mobile is typically the more constrained use case (Roth 2019). However, the vast majority of cartographers are trained primarily in desktop-first methods and have practiced this way for many years, meaning designing mobile-first may take significantly more time and feel less intuitive. There are many cases where mobile-first is best, such as apps used primarily on mobile devices. In the case of data journalism, though, readers consume content on all types of devices, including mobile phones, midsize tablets, and desktop computers. Participants in my study were split on the best approach to map design; some clearly felt it was easier to design desktop-first, while others strongly believed it was easier to design mobile-first. However, the majority of participants designed maps on multiple artboards simultaneously. Recent tools like AI2HTML have made designing and editing on multiple artboards at once easier (Figure 1). Simultaneous design is similar to responsive design, but is unique to data journalism (Hoffswell, Li, and Liu 2020). Responsive design mainly focuses on text and images which have a limited number of ways they can change between desktop and mobile. However, in data journalism, data visualizations and maps can be modified in almost an infinite number of ways.

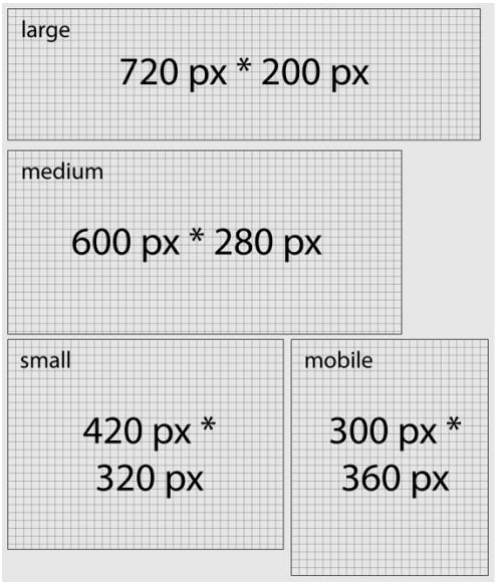

Figure 1: Four flexible artboard layouts provided by the tool AI2HTML. These options allow data journalists to display the same content differently across multiple device sizes.

User testing: News cartographers are experts at their jobs and trained in best practices that consider the needs of the average user. However, regular user testing, particularly for novel map types or uncommon forms of interaction, can provide concrete data on assumptions about usability and utility. In most newsrooms, there is very little time for user testing or other types of reader feedback. Participants in my study shared that some newsrooms track simple interactions like whether an element was clicked on. Occasionally some readers comment or email with their feedback (though this

Figure 2: In the interface mockup portion of this study, one participant proposed a "magnifying glass" style of map, as opposed to a traditional zoom. However, this map has not yet been tested with news audiences.

most often occurs when data is inaccurate, not when a design is flawed). Since data journalists rarely have time for user testing, there is an open opportunity for academic cartographers to test emerging ideas and novel designs relevant to mobile thematic news cartography (for an example, see Figure 2). These studies will add to previous literature on web and interactive cartography and benefit practicing news cartographers in their jobs.

Types of interactivity: Interactive maps allow cartographers to display complex subjects and give users the ability to manipulate the map as they choose. However, interactive maps typically take longer to view and have a greater risk that all information will not be explored by the user. In news cartography and data journalism, where audiences are very general, interactivity may not be the best way to display information because many users will miss out on essential content. News cartographers report that in recent years they have produced fewer interactive maps and that they expect few users to interact regardless of the device type. There are two key exceptions: scrollytelling stories and egocentric maps. Scrollytelling refers to map-based stories that extend beyond one screen height and include multiple maps and other visualizations. Scrolling is inherent to all news consumption, whether text-based or visual-based, and is similar across all device types. Therefore, revealing information through scrolling is natural and more likely to be seen by audiences than more active forms of interaction. Second, users are also more likely to interact with egocentric maps. Egocentric maps are maps that reveal something about the user or a location of interest. Maps that display the weather in one's area or how that area voted are likely to encourage interaction because users are often interested in learning more about themselves. Other forms of interactivity are not impossible to implement in mobile thematic data journalism, but come with additional risks.

Time constraints: One of the key limiting factors for mobile thematic map design in data journalism is time constraints. Newsrooms run on fast-paced schedules which can lead to little time for experimentation or novelty. Instead, news cartographers often rely on the same templates to produce content fast for breaking news stories. Time constraints contribute to each of the other three key concepts discussed above. Since more time for map production is not likely to be a realistic solution for newsrooms, best practices for mobile thematic map design must be established to expedite the process, similar to other types of web and print cartography. Academic cartographers may conduct studies on the templates commonly seen in newsrooms in order to inform news cartographers which designs work well and which need improvement. Additionally, these results may expedite mobile thematic map design in other contexts.

This work lays out major considerations for future research on mobile thematic news cartography, drawing from interviews and interface mockups with practicing news cartographers. This research builds on related literature in web cartography by considering a mobile-specific context, given that the majority of maps are now consumed on mobile devices. By situating this work within data journalism, I consider only one of many contexts where mobile thematic maps may be viewed. I call for related research that similarly answers the question, "What is mobile-first thematic cartography?", in additional contexts and more generally.

References

Fish, C.S. (2020) Storytelling for Making Cartographic Design Decisions for Climate Change Communication in the United States, *Cartographica: The International Journal for Geographic Information and Geovisualization*, 55(2), pp. 69–84. Ahn, J. and Freeman, H., 1984.

Hoffswell, J., Li, W. and Liu, Z. (2020) Techniques for Flexible Responsive Visualization Design, in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems. CHI '20: CHI Conference on Human Factors in Computing Systems*, Honolulu HI USA: ACM, pp. 1–13.

Houtman, L. (2023) At the Intersection of Mobile Thematic Cartography and Data Journalism, *Abstracts of the ICA*, 6, pp. 1–2.

Roth, R.E. (2019) What is Mobile First Cartographic Design', in. *ICA Joint Workshop on User Experience Design for Mobile Cartography*.

Roth, R.E. et al. (2023) Designing maps & visualizations for mobile devices: A collaborative research agenda, *Abstracts of the ICA*, 6, pp. 1–2.

https://doi.org/10.5194/ica-abs-7-59-2024