

The Impact of Maps on Climate Information Communication: An Empirical User Study on Social Media Trustworthiness

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Abstract:

Maps play a key role in bringing climate science closer to different audiences. They can attract readers and make climate change tangible (Fish, 2020). Since maps are effective means for communicating complex information, they also have the power to persuade readers (Deitrick & Edsall, 2009). Previous research has discussed about how cartographers can ensure and/or enhance the trustworthiness on maps (Gartner, 2023). However, these studies predominantly examine maps independently of other media influences. Little research has assessed the trustworthiness of social media posts involving maps. Relying on the confirmation bias of their readers, maps can be taken out of context and used alongside false information to convey messages from climate denialists (Fish & Kreitzberg, 2023).

Research shows that people rarely engage in effortful information evaluation tasks with their full mental capacities (Metzger & Flanagin, 2013). They likely develop quick strategies for assessing credibility. According to the Limited Capacity Model (Lang, 2000) of message processing, people rarely process all aspects of information they receive online. Instead, they select only some salient features to encode, store, and retrieve. When people assess credibility online, Prominence-Interpretation Theory (Fogg, 2003) suggests that two things happen. First, user notices something (i.e., prominence). Second, user makes a judgment about it (i.e., interpretation).

Social media platforms feature various components, including the publisher, description, visual presentation (videos or images), user engagements (likes, shares, reposts), and comments. When considering maps within this complex context, two critical questions arise: 1. How does including a map enhance the perceived trustworthiness of climate-related posts? 2. How does including a map affect the trustworthiness of both supportive and skeptical viewpoints on climate change?

In this study, a user experiment is conducted to answer these questions. It is developed based on an open-source online testing platform that simulates components of social media (Butler et al., 2023). The key variable is the visual presentation. Components like publisher and user engagements are controlled. Figure 1 shows two examples. Participants are presented with a post and are required to rate their trustworthiness on a four-point scale.



Figure 1. Two examples of pair post

Figure 2 shows the overall experimental process. At the beginning, participants were assured that all data collected would be anonymized and only used for research purposes. Before assessing the posts, participants disclosed their age, nationality, professional background related to maps, social media habits, and views on climate change. They then took part in an introductory session that included instructions and a warm-up exercise to familiarize them with the task.

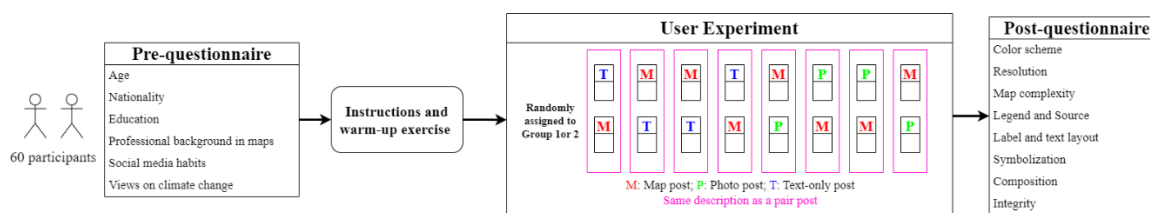


Figure 2. User experiment process.

Sixty participants were randomly divided into two groups, each of which was exposed to a series of eight posts in a randomized order. These posts varied in type: four included maps, two contained photographs, and two were text-only. Fifty percent of the posts were identified as supporting viewpoints of climate change, with the other fifty percent coming from skeptics. The study was designed to compare visual presentations across two groups: one comparing map posts with text-only posts and the other comparing map posts with photo posts, as shown in Figure 1. If a post was presented as a text-only or photo post in Group 1, it was presented as a map post in Group 2, and vice versa. Following the review of posts, participants completed a questionnaire assessing their reactions. They rated their agreement with statements about how different map elements and visual variables influenced their trust in a post.

The study revealed that maps significantly enhance the perceived trustworthiness of climate-related posts on social media, compared to text-only or photo posts. This effect was consistent regardless of whether the post was supportive or skeptical of climate change, indicating that maps are a robust tool for boosting credibility across various viewpoints. Thus, the potential for misuse of maps should not be ignored. When maps are used in social media, they can reinforce existing beliefs, making supporters more steadfast and skeptics more doubtful. Furthermore, specific map features such as the source were found to be crucial in influencing credibility assessments. These elements help reinforce the reliability of the information, underscoring the importance of clear and accurate map design in effective climate communication.

This empirical user study has explored the impact of maps within social media posts on user credibility assessments. It underscores the vital role maps play in climate communication. However, this phenomenon also raises concerns about the potential for maps to contribute to more pronounced misinformation if not used responsibly. As such, using maps must be approached with caution to avoid amplifying biases and misleading the public.

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