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“If I know what I need” – on the importance of subjective metrics in map user studies

Izabela Gołębiowska [a,*], Francis Harvey [b], Jolanta Korycka-Skorupa [a]

[a] *Faculty of Geography and Regional Studies, University of Warsaw - i.golebiowska@uw.edu.pl, j.skorupa@uw.edu.pl,*
[b] *Leibniz Institute for Regional Geography, f_harvey@leibniz-ifl.de*

* Corresponding author

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Abstract:

Visualizing spatial data is meant to enable a user to gain insight into the data and spatial patterns and to understand the mapped phenomena. The scope of design choices is wide, and choosing an appropriate and most helpful scope is driven through guidelines often formulated based on empirical evidence. Map user studies and empirical assessment of geovisualizations are long-established in cartography. The commonly applied metrics in such studies are usability performance metrics: satisfaction, effectiveness, and efficiency (Çöltekin et al. 2009). The most often applied are effectiveness, indicating whether or not a task is successfully completed, and efficiency, understood as the time tasks are completed. Yet satisfaction, i.e., the user's attitude or preference toward the tested solution, seems to be a less common choice in map user studies. It is, however, of great importance to understand users’ opinions and subjective attitudes toward tested geovisualization solutions, since these are the main driving forces when selecting a product in real life.

Interestingly, subjective (satisfaction) and objective metrics (efficiency, effectiveness) may often not be in line with each other. One might prefer a design solution that is not the most effective or efficient. Such preferences might be shaped by familiarity, high realism (Lokka et al. 2018), attractiveness (Christen et al. 2021), and other factors.

Naive cartography (Hegarty et al. 2009) is especially relevant when conveying geovisualization forms to users who are not familiar with them and have not yet become accustomed to them. The presentation aims to discuss the importance of gaining insight into users’ subjective opinions while evaluating maps and geovisualizations. It includes a presentation of a variety of approaches to the subjective assessment of map usability. Each subjective metric provides a different perspective and may emphasize different aspects of map users’ satisfaction.

A closer look will be taken at an empirical study conducted among historians and digital humanities students and experts. The study aimed to evaluate various forms of spatiotemporal data presentation, including maps. We applied measurements of participants’ opinions and preferences using various approaches together with objective usability metrics and eye tracking. The results showed an evolution of participants' preferences toward the tested visualizations across subsequent stages of the study. This indicates the importance of careful investigation of users’ subjective opinions when evaluating design solutions.

Considering the currently growing role of prompt cartography and the human-in-the-loop process in developing AI-supported tools for map generation, awareness of discrepancies between objective and subjective usability performance metrics in geovisualizations should be maintained in order to avoid decreasing the diversity of design choices and the level of graphicacy. Balancing between providing well-known designs and challenging users with less comfortable but potentially more beneficial design choices might be difficult to achieve, yet is worth aiming for.

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