
The lack of empirically-derived guidelines about designing cartographic user experiments

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Abstract:

Since cognitive science is a highly interdisciplinary field of research, we, cartographers, have to be in close collaboration with psychologists, neuroscientists, usability engineers and HCI (human-computer interaction) experts while designing cartographic user experiments and studying the cognitive issues related to the cartographic products and map users. Several user studies on maps and geovisualizations borrow principles and methods from psychology and related domains and therefore, apply them in a cartographic context. However, there is still a lack of guidelines or rules to help conducting this type of research, especially when a technology that is relatively new to our discipline (e.g. EEG, mobile eye tracking) is integrated in cartographic usability research. For instance, unlike as controlled in a typical psychological experiment, there is no standardization about the experiment set-up including the number of participants and trials should be taken into consideration, the age and gender balance of the participants, the duration of the experiments based on the task variety and the complexity of the stimuli. Additionally, it is crucial to define which methods should be used for which tasks and which insights can be derived/explored through the methods combined within the case study. This gap in the methodological aspect affects our research in many ways such as jeopardizing the objectivity, repeatability/reliability and generalizability of the findings and making comparisons between similar studies impossible. These issues should be discussed and somehow standardized, if we would like to build a knowledge/know-how that will help the future advancement of our discipline. Roth et al. (2017) addressed them in the research agenda for empirical research to meet our methodological needs as maps and visualizations become interactive and available online and on mobile devices.

Another issue worth discussing is that the majority of the publications focus on communicating good results or successful implementation of methods and theories. However, sharing not only the best practices, but also mentioning the flaws in the experimental design and failures will indeed help saving the time and effort devoted to the traditionally embraced trial and error approach. In this context, as I strived to achieve in my PhD (see Keskin, 2020), it is very important to provide in-depth discussions, lessons learned through experiments using mixed empirical methods (e.g. eye tracking and EEG or eye tracking and sketch maps) or specific methodological and technical problems encountered throughout the user experiments regarding to the participants, materials, procedures and analyses.

References

- Keskin, M. (2020). Exploring the Cognitive Processes of Map Users Employing Eye Tracking and EEG (Doctoral dissertation, Ghent University).
- Roth, R. E., Çöltekin, A., Delazari, L., Filho, H. F., Griffin, A., Hall, A., ... & van Elzakker, C. P. (2017). User studies in cartography: opportunities for empirical research on interactive maps and visualizations. *International Journal of Cartography*, 3(sup1), 61-89.