Recommendations for the design of collaborative mapping software tools for maptables

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Nowadays, maptables are increasingly used in urban development related spatial decision-making processes, in which stakeholder participation has become a central element [1,2]. The maptable is an interactive horizontal mapping table displaying digital cartographic content. It allows users to interact with a map via touches and gestures [3]. While most studies of interactive maptable software focus on the involvement of stakeholders and domain experts, the use and usability of maptable software for collaborative mapping have been hardly investigated.

OBJECTIVES

The main objective of the research is to develop recommendations on design principles of GIS collaborative mapping software tools for maptables, based on testing and evaluating the usability of the Phoenix software.

The second objective focuses on the research methodology: to provide recommendations for the concurrent use of several mobile eye-tracking devices to investigate the usability of maptable software in collaborative mapping in group decision-making processes.

METHODOLOGY

The requirement analysis through a Focus Group interview with experts and a mixed-method approach of questionnaire, eye-tracking (Figure 1), thinking aloud, video observation, and interview techniques were used to implement the research.

Figure 1. Participant working on Phoenix with Tobii 2 Pro eye-tracking glasses

USER TESTS

A task-based experiment provided a complete and wide range of observation data for investigation of the usability of the Phoenix software. The experiment involved three workshops with three groups of four participants, including a moderator (Figure 2). Four eye-tracking glasses were used concurrently to investigate the group-decision making processes in collaborative mapping during the experiments. The glasses were connected to the tablet with Tobii Glasses Controller Software via Ethernet cables and a switch.

Figure 2. Participants collaborating with the maptable during the experiment

RESULTS

The records from the eye-tracking glasses of the participants helped to investigate the decision-making processes of the groups. The findings showed that the discussions among the participants happened while they were looking at the maptable and there were no explicit leaders in the groups. The analysis of the experiments outcomes revealed the strong and weak parts of the Phoenix software. Additionally, possible improvements for the Phoenix software were suggested. Based on the analysis of the retrieved results and requirement analysis the general recommendations for maptable software were developed.

RECOMMENDATIONS

1. The software interface and the tools need to be as simple as possible, with intuitive icons and buttons.
2. The map should be the central element of the interface, with intuitively simple gesture navigation. It is important to design the navigation gestures in such a way that they will not conflict with other editing gestures. Because users not only interact with maps but also make changes on them.
3. Depending on the users, the maptable software needs to have simple functions for non-expert stakeholders and advanced tools for experts. The solution for that could be placing the most essential functions on the foreground of the interface and activating more advanced functions only in case of need.
4. Adding an option of simultaneous drawing for two users could be a good solution for supporting the collaborative (group) mapping purpose of the maptable software.

CONCLUSION

This research aimed to investigate the usability of the Phoenix software to develop recommendations. The outcomes of the research could provide guidelines for further improvements of the maptable software and make them more user-friendly.

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