DOI: 10.14714/CP88.1391

PEER-REVIEWED ARTICLE

Accessible Web Maps for Visually Impaired Users: Recommendations and Example Solutions

Sabine Hennig
Paris Lodron University of Salzburg
sabine.hennig@sbg.ac.at

Fritz Zobl
Paris Lodron University of Salzburg
fritz.zobl@sbg.ac.at

Wolfgang W. Wasserburger
AccessibleMap Association/TU Wien
wolfgang@wasserburger.at

Due to advances in information and communication technology, web maps are an increasingly important means of communication. While paper maps provide solutions that are accessible to the visually impaired, the use of web maps is still difficult for these users. This is true even though technology opens up new possibilities for developing accessible web maps. But, what must be considered when creating web maps suitable for the visually impaired? This paper presents recommendations, including example solutions based on the results obtained in two projects: AccessibleMap and senTour. In both projects mixed methods were used: literature and internet review, questionnaires, and analysis of similar systems. All work was done in close cooperation with organizations that represent the interests of the target group.

The findings underline that web maps accessible to visually impaired users must support different interaction modes and assistive technology. A carefully designed user interface, an easy-to-read map picture, and the provision of a verbal description of the map content are important. Further, additional aspects should be considered to enable these users to fully benefit from web maps. This refers to the need to widen the concept of accessibility, encompassing among others usability, the importance of building up these users' digital and spatial competencies, and to leverage the advantages that result from the application of the participatory design approach.

KEYWORDS: accessible maps; accessibility; usability; web maps; visually impaired users; disabled users; special needs users; digital and spatial literacy; participation

INTRODUCTION AND RESEARCH QUESTIONS

Foote and Crum (1995) suggest that maps are perhaps as fundamental to society as language and the written word. They help people to orient themselves in physical space, to navigate from place to place, to plan routes, to acquire spatial knowledge, and to build up cognitive or mental maps (Helal et al. 2001; Montello and Freundschuh 2005). For persons who are blind, or who are severely visually impaired, maps are even more important. Without a visual sense, they can easily lose their orientation, particularly when traveling in unknown environments (Clark-Carter et al. 1986; Helal et al. 2001). Maps enable them to construct a cognitive map of as yet unknown areas, which they can later recall from memory while on-site, supporting them in independently finding their way (Brock et al. 2013; Golledge et al. 1996).

Web maps, like many other technologies, have the potential to enhance the quality of life and independence of disabled people (Harris 2010; WHO 2007). Nevertheless, technology does not automatically bring them benefits merely by existing (Macdonald and Clayton 2013): solutions must be implemented with an understanding of a user group's requirements. However, while web maps have the potential to benefit those who are visually impaired, current examples rarely meet the requirements of this user group. Depending on the type and degree of a user's visual impairment, web maps can be quite challenging; in the case of people who are severely visually impaired or blind, their use is often hardly possible at all (Call-Jimenz and Lujan-Mora 2016; Höckner et al. 2012; Zeng and Weber 2011). Barriers that generally hinder these users from using