

Accessibility in Conceptual Modeling Research and Tools (Extended Abstract)

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Abstract: The reports on Disability by the World Health Organization show that the number of people with disabilities is increasing. Consequently, accessibility should play an essential role in information systems engineering research. While software and web engineering research acknowledge this need by providing, e.g., web accessibility guidelines and testing frameworks, we show in this paper, based on a systematic review of the literature and current modeling tools, that accessibility is, so far, a blind spot in conceptual modeling research. With the paper at hand, we aim to identify current research gaps and delineate a vision toward more inclusive, i.e., disability-aware conceptual modeling. One key finding relates to a gap in research and tool support concerning physical disabilities. Based on these results, we further present the first modeling tool that can be used keyboard-only, thereby including users with physical disabilities to engage in conceptual modeling.

This work is published in the 42nd International Conference on Conceptual Modeling (ER 2023) [SMB23, Lu23].

Keywords: Conceptual Modeling; Accessibility; Disability; Modeling tools; Systematic Literature Review; Tool Review

1 Motivation

While accessibility discussions have paved their way into the scientific discourse of many disciplines close to conceptual modeling like web engineering and software engineering, accessibility is still a rather unexplored area for the conceptual modeling discipline. This is an obstacle to the wider adoption of conceptual modeling as the number of people with some sort of disability is continuously increasing [WH23].

Conceptual modeling heavily relies on visual cues to encode and decode semantics represented by conceptual models. Only small variations in the visual representation can result in huge semantic differences. Consequently, the design of conceptual modeling notations should account for the many people facing some sort of visual impairment (color blindness, red-green problems, partial blindness, etc.). This requires rethinking the current methods, techniques, and tools, we use to design and evaluate conceptual modeling language notations.

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Another characteristic of conceptual modeling is that the discipline heavily builds and uses modeling tools to support modeling languages. These tools are mostly heavily pointing-device-based (i.e., using a computer mouse) and require complex interactions (clicking and dragging, panning, etc.). Such interactions are extremely challenging—if possible at all—for people with physical impairments. With the uptake of web technologies and the availability of platforms that enable the use of such technologies for the development of web-based modeling tools, we now see the possibility of leveraging the built-in flexibility of these technologies, particularly in the front-end (i.e., the user interaction) to implementing more accessible modeling tools.

2 Contributions

In the two papers, this extended abstract builds upon [SMB23, Lu23], we report on a systematic literature review on the state-of-the-art of research on accessibility in conceptual modeling, we present an interaction concept and a tool prototype for keyboard-only interactions with a conceptual model, and we propose a framework for disability-aware conceptual modeling with many research directions for the future.

3 Data Availability

The original ER 2023 full paper publication is accessible via https://doi.org/10.1007/978-3-031-47262-6_4, the vision paper is soon to be published online. Preprints of both papers are accessible via https://model-engineering.info/publications/papers/2023_ER_CM_Accessibility-CR-web.pdf and <https://model-engineering.info/publications/papers/ER2023-Forum-InclusiveConceptualModeling-web.pdf>.

The source code of the keyboard-only tool prototype we developed in this research is freely available via <https://github.com/glsp-extensions/keyboard-only>.

Literaturverzeichnis

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