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How does pre-existing knowledge affect map reading?

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Abstract:

Pre-existing knowledge plays a crucial role in map reading, influencing how easily and effectively individuals understand maps. Those with more prior knowledge can perceive and comprehend spatial information more effectively (Schwartz et al., 2007). This study investigates the impact of students' and their teacher's pre-existing knowledge on map reading using maps from school atlas. To explore this influence, an eye-tracking device was utilized. The respondents were presented with a series of tasks related to map stimuli, such as: "Identify a plain on the map."

The study explored how pre-existing knowledge, or the lack there of, in relation to map components (such as the legend, graphical representation of map features, attributes, and the location of objects) affected both the accuracy and the time taken to complete the tasks. The analysis of the data was based on several factors, the first of which was the accuracy of answers. The second factor involved the analysis of the collected eye-tracking data, which was quantitatively analysed using statistics and qualitatively examined based on the fixation patterns of the respondents. In tasks involving map reading based on object identification, it was found that the tasks resolved the quickest were those in which the respondents utilized their direct knowledge of the objects' locations. However, this approach proved to be the least efficient, as it places high demands on an individual's memory capacity and offers minimal practical applicability for solving other map-related tasks in an educational and map reading context.

This empirical study reveals, through user testing, the effectiveness of various types of pre-existing knowledge in map reading. Additionally, it uncovers how respondents cope with any lack of knowledge regarding specific map components. The findings provide new insights into how users cognitively process spatial information. This research will facilitate an understanding of the mental strategies and cognitive mechanisms used by individuals when interacting with and analysing maps.

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References

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