How useful are interactive small multiples for the visualization of overlapping areal information? An expert evaluation in spatial planning

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Abstract:

Multidimensional spatial data is used in a range of application domains, such as spatial planning or risk management. The datasets are often layered within single maps, where overlapping information may lead to complex and potentially misleading displays. Alternatively, this study investigates the use of an interactive small multiples layout, in which several maps with a common spatial area, each representing a different topic, are arranged next to each other and can be viewed simultaneously. For testing the small multiples display the application domain of spatial planning served as use case. In spatial planning processes, many different topics relevant to a defined area must be identified and analysed concurrently. Domain experts participated in a qualitative usability study, carrying out tasks that are typical for their field. The usability study aimed at analysing the experts' rating of the small multiples layout in terms of usability. The results were evaluated using qualitative content analysis. Using the small multiples layout for typical spatial planning tasks, the experts can quickly gain an overview of different topics and make an efficient cross-comparison between topics, particularly when weighing up interests. The tasks were completed efficiently and feedback on the layout was predominantly positive. Limitations arose when the area under consideration extended beyond the boundaries of the small multiples map windows. We conclude that small multiples layouts are useful and efficient for the simultaneous visual analysis of multiple spatially coincident topics. The finding may generalise to other application domains that use potentially overlapping multidimensional spatial data.