

## **Optimization of the legend design of a map as a component of a geovisualization tool in the context of effectiveness and information acquisition strategies**

Nowadays, maps are frequently combined with other data displays. The example is an approach to geographic visualization (geovisualization) which is based on coordinated and multiple views (CMV). It integrates multiple visualizations (maps, tables, diagrams, and graphs) with different strengths and interactive capabilities. CMV tools show data in separate but dynamically linked views, and display data simultaneously in these views by means of interaction techniques. CMV tools are considered one of the dominant approaches in geovisualization, although they are associated with high cognitive load due to its high complexity.

Over the last few decades, cartographers have attempted to establish design principles that allow maps to be adapted to the cognitive abilities of the user. Unfortunately, the topic of legend design has not received similar attention. In order to develop rules for legend design, it is important to understand how information is acquired from a legend as well as from a map. This means not only should the result of the map usage be analysed, but the entire process of map and legend handling needs to be examined.

The new context in which maps appear brings new challenges. Maps being a part of a CMV tool generate new challenges for the design of legend layouts, since visual logic, as well as the relationships between the themes and topics presented by the map and other views, have to be maintained. This growing complexity means that it is becoming more important to understand how legends are used in the process of solving problems with the help of maps integrated with other views in a CMV tool. **The objective of the project is to determine the role of a legend design which explains a map applied in an interactive geovisualization tool. The scope of the research includes analysis of small-scale thematic maps perception in the context of legend design.**

In order to achieve the stated goals, there will be conducted an empirical study with applied eye tracking and usability performance metrics (answers accuracy, response time and preferences). The participants will answer questions and solve given tasks using information that they have to read from the presented CMV tool with differently designed legends. Based on the eye movement recordings, there will be investigated how users work with the tool and whether they applied various strategies of information acquisition when working with the different legend layouts. Applying both usability performance metrics and eye tracking will enable an comprehensive insight to be gained on what users tend to look at, and why they do so.

I want to contribute to an increased understanding of how legends for maps in geovisualization tools should be designed in order to support users effectively.

**The planned research enables the achievement of results that are twofold in nature:**

- **cognitive: exploring the role of the legend in the usage process of maps of different kinds;**
- **practical: indicating a more effective legend design for maps in interactive geovisualization tools.**

Based on the collected data, I would like to develop empirically justified tips for legend design that may serve cartographers, map makers and other professionals in spatial data visualization.