

Visual Suggestiveness and Change Blindness in Dynamic Cartographic Visualisations

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Extended Abstract

The movement that appears on the map leads to a perceptive problem known as change blindness. This consists in the failure to perceive changes in the presentation of spatial phenomena, e.g. the appearance, disappearance, location change, or changes in attribute. From the point of view of cartography, this leads to the loss of spatial information and may mislead the map user. The reason may be the divisibility of the user's attention, who must simultaneously look at the map and the legend. Another reason could be the focus on a certain fragment of the map, whereby changes in other parts of the map are not observed.

The subject of research concerned dynamic maps presenting physico-geographical and socio-economic phenomena. Phenomena was presented using point, line and area methods of cartographic presentation. In addition, the visualised phenomena were divided according to two types of dynamics: all were visible and changed simultaneously, or the phenomenon occurred, disappeared, or reappeared.

The most important objectives of the experiment concerned an analysis of the visual suggestiveness of methods of cartographic presentation with regards to the perception of changes on the animated map. In order to suggest responses, use was made of the superimposition of two visual variables – size and colour, and two dynamic variables: order and duration. In the research, we designed a model of concentrated and dispersed phenomena placement.

A total number of 125 students from the Adam Mickiewicz University in Poznań took part in the experiment. The results of the experiment were intended to answer the research question posed: can visual and dynamic

variables be used to suggest spatial information in dynamic cartographic studies?

The results of the experiment showed that visual variables have a decidedly greater impact on suggesting spatial information than dynamic variables and on reducing change blindness. It was very interesting to observe that the usage of visual suggestiveness in the dispersed model is considerably more effective than in the concentrated model. In addition, suggestiveness is weakest in reducing change blindness in the case of areal methods.

References

- Simons D, Rensik R (2005) Change blindness: Past, present, and future. *Trends in Cognitive Sciences* 9(1):16-20. doi:10.1.1.130.8597.
- Robinson A (2009) Visual highlighting methods for geovisualization. 24th International Cartographic Conference, November, p.15-21.
- Fish C, Goldsberry K, Battersby S (2011) Change blindness in animated choropleth maps: an empirical study. *Cartography and Geographic Information Science* 38(4):350-362. doi:10.1559/15230406384350.