

How do prosumers use graphical variables on webmaps to communicate?

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Abstract

When collecting geodata prosumers (producer + consumer) often rely on web maps. This pre-study looks at the characteristics of graphical variables created by prosumers in web maps to communicate. The central question is how do prosumers use graphical variables on webmaps. This is the basis for research into how they connect graphic representations to the underlying geographical phenomena.

Keywords: mapping, prosumer, communication, online-mapping, cartography, graphical variables

1 Introduction

The digital revolution changed traditional communication processes of cartography. The scientific research of cartography needs keep pace with the fast-paced innovation of computing technology to enhance the uses and possibilities of cartographic communication. Map creation and use are fundamentally changed and are now far easier, but not always better nor more effective. Webmaps and mobile maps created by stakeholders have multiplied with easy data access and increasing use of geographic information technology in web-products. Crampton and Fink point to the explosion of new 'spatial media' (Crampton, 2009, Fink, 2011, Jekel et al, 2013), for example.

Taking on this problem is complicated and requires attention to fundamental concepts. There are many possibilities to record and to visualize geodata using approaches, concepts and techniques from traditional cartography. Even if implicit, cartographic communication concepts provide the basis for digital geovisualisation for millions of mapmakers around the world. Many of the online tools widely used today (for example Carto, Mapbox etc.) have been designed to support easy prosumer (Toffler, 1980) map creation.

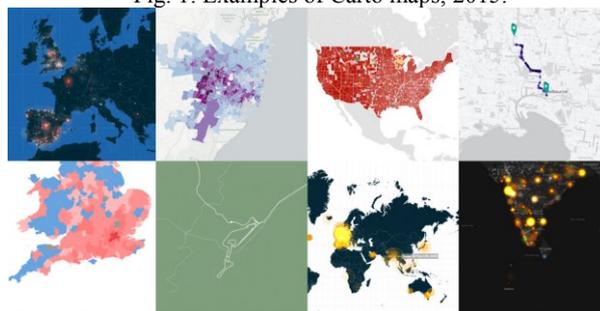
We know from cartographic research that graphic variables (Bertin, 1974) are important in traditional cartographic production environments. From a study of prosumers use of graphic variable, we present selected findings from research that empirically considers how they are used. Specifically we ask the following questions: How important are graphical variables in geovisualisation? Can we identify difference between the graphic variables used in classic cartographic

production and the graphic variables used in graphic geovisualisation? (Spiess, 1970).

2 Methodology

In this research, to understand which graphical variables prosumers use to communicate we start with a pre-study that considers examples of prosumer webmaps and a second study that examines how prosumers creation of maps in a controlled setting. The first step of the study is to analyse characteristics of 2D interactive webmaps available through Carto using content analysis based on Bertin's (1974) graphical variables and MacEachren's (1994) extensions. We chose these maps from Carto has it offers a variety of visualization tools for prosumers and seems to target this user group. In the actual content analysis we consider 157 interactive maps (see Fig. 1 for some examples) and 13 topics. The results are discussed below.

Fig. 1: Examples of Carto maps, 2015.



Source: CartoDB, <http://goo.gl/I3xtCX>, Sept., 2015.

3 Results

Results from the pre-study show that most maps (86%) are single-layer and 14% are multi-layered types. The graphical variables “resolution” as well as “orientation” are not used in all 157 maps. The map scales used in the 157 maps were: 1:500 - 1:50000 (28%), 1:50000 - 1:1 Mio (38 %), Milionscale (34 %) (classification proposed by Bollmann, 2001). Map scales appear to have no significant influence on the choice of graphical variables.

Table 1: Graphical variables used in Carto maps in %
MacEachren’s (1994) suggests:

G = good, M = marginally effective, P = poor.

	Numerical	Ordinal	Nominal	Total
Total	31	5	64	100
Colour hue	27	33	30	29
Transparency	22	21	19	20
Colour value	17	17	12	14
Size	15	4	13	13
...

Prosumers most commonly use Bertin’s graphical variable “colour hue” (29%) (Table 1). All 157 maps use colour to distinguish graphical elements. Points (58% of all maps) are the most commonly used geometrical element “Transparency” (20%) and “size” (13%) are also commonly used. However, “transparency” is dependent on other graphical variables, like colour hue, size or colour value. Labelling is used to help clarify cartographic communication in only 5% of the analysed maps. Pointsymbols which include textures, like icons or pictograms were only used in 3% of the maps.

4 Conclusion

Cartographic online tools offer a range of possibilities for prosumers to visualize geodata quickly and easily. However, often the aims for a map are not clear and there is a lack of description which then can be misinterpreted. To support prosumers more understandable tools based on this research can help to better and more effectively visualise geodata. A better understanding of cartographic communication will help produce better maps and visualisations.

In the results from the pre-study, prosumers tend to use colour distinctions with point symbols to communicate. The second part of this research works directly with prosumers to assess this and other choices.

This content analysis and study of user choices has been done to identify the most frequently used graphical variables and refine theoretical questions and methodological approaches for additional study. An empirical study draws on these results to analyse questions how prosumers operate with graphical variables in relationship to levels of measurements and communication goals.

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