

Mapbusters: Breaking the rules in cartography

Kenneth Field ^{a,*}

^a Esri Inc – kfield@esri.com

* Corresponding author

Keywords: map design, best practices, communication

Abstract:

Understanding, and managing the world around us requires maps. More than that, it requires useful, and well designed maps yet so many maps simply follow defaults and are sub-optimal. It's easy to make changes to those defaults, but that's often where people go wrong because they do so in isolation of understanding the design task at hand. This problem is nothing new and perhaps exacerbated by the rise of digital cartography over the last two decades, and in particular the emergence of consumer mapping tools over the last ten years or so.

The ability for people with fairly entry level computing equipment, and access to the internet to become map-makers is a natural extension of how computing has impacted many aspects of our lives from the ability to use word-processors to type up manuscripts, to filing our own tax returns, to keeping track of finances, or drawing our own diagrams. Software brings with it the ability for people not necessarily trained in writing, financial management, or illustration to be able to simply do enough to serve their own needs. And making maps is not different. But, of course, not all maps are made equally, and with such a democratization comes a wide range of quality. And the internet means many of those maps are shared.

For some, a modicum of appreciation of the art and science of cartography helps them achieve a map that works reasonably well. It's easy to go beyond best practice and advice too. But to do so successfully requires a good understanding of the map's purpose and its audience's needs, as well as at least some understanding of how to design a map that works. It requires logic, careful choices, and a human touch. It demands a coherent strategy to help achieve a great map design whether you adhere to best practice or choose to make justifiable decisions and ignore it. In essence, it requires what we know as 'cartography'. Or does it?

Maps can be made without recourse to cartographic theory. But that has always been the case since many of our widely acknowledged cartographic classics were either made, or envisioned by people with no training in cartography. Think Minard, Snow, Nightingale, Berann, Pearsell, and Beck for example. This pattern continues today but there's perhaps a gulf between the maps made by those with cartographic training, and some of the maps we might see as problematic given their stated objective.

Figure 1 illustrates a range of some of the more common mis-steps that tend to characterize at least some maps made by people who ignore best practices and advice. This list has been compiled through conversations with many cartographic experts and portrays a collective experience of what it is that the cartographic community see as areas where democratized map design might be improved. It's very easy to find these sort of mis-steps but the vast majority only occur through naivety, and not by design. Simply pointing them out, and somehow expecting people to revisit and revise is often futile. Giving people a reason to be curious about understanding the language, grammar, and syntax of cartography is more useful. Then they can make their own cartographic recipes up with knowledge of the ingredients at their disposal, and what pairs well together. The point then, is to guide people who perhaps reject what they see as cartographic dogma, who are unreceptive to having their work scrutinized, and who are uninterested in learning or improving their maps.

This talk, then, presents ongoing work that tests common, and assumed cartographic practice, and explores how, and to what extent we can defy well-understood advice with solutions that work. It encourages positive disruption in map design through an appreciation of what are loosely called cartographic rules (best practices) for the use of colour, and typography for instance, and how they can be broken with success. It explores ways of appreciating that some of our long-held beliefs are perhaps not as critical as they once were.

As part of this work to better understand the contexts in which people eschew cartographic best practice, and advice when it's offered, the talk also introduces 'map doctor'; a new AI developed to help students and non-cartographers to get a critique on their maps. It helps identify what elements are working on the map, and can offer some options for solutions that might improve it. By sharing map design critique through Generative AI, the hope is to break down the barrier between the map-maker and those who they may perceive as simply be out to criticize their work. Rather than debate the nature of effective, constructive critique as opposed to criticism, map doctor is intended to provide anonymized feedback

in a supportive style. It's been trained on a large repository of cartographic research and collective work on what works in cartographic communication, and is a good first pass for people to assess whether their chosen map design works in the way they intend.

Stating the obvious e.g. labeling the legend "Legend", the key "Key", "This is a map to show..." Mapping raw data inappropriately e.g. totals on a choropleth. Assuming the map is understandable e.g. including/not including text on the map to explain obvious things about the map. Using hue instead of a colour ramp for continuous data e.g. red, blue, green, yellow... Using a colour ramp for nominal or non-continuous data e.g. land use. Unnecessary use of grids and graticules e.g. on thematic maps. Overly detailed symbol design. Poorly differentiated symbol design e.g. all too similar. Empty classes e.g. no data values represented on the map in a thematic map legend. Poor visual hierarchy e.g. within and between line weights, font style and size, colour. Poor or minimal figure-ground relationship e.g. a flat looking map. Overly detailed projection information e.g. on a small format, small scale thematic map. Using "web Mercator" no matter what/where is being mapped. Using non-equal area projections for statistical data thematic maps. No mention of units e.g. for spot heights.	Overlapping leader lines. Poor or missing inset locator maps. Poorly organised layout e.g. alignment of elements lacking. Overly large type e.g. shouty title, large obtrusive labels. Unnecessary marginalia e.g. north arrow, or overly large/ornate elements. Lack of ownership e.g. data source, date, author. Poor label placement e.g. ambiguous or overlapping. Inappropriate scaling factors for symbols e.g. particularly a problem in 3D where radius is mistakenly used to scale spheres. Occlusion of content e.g. particularly in a 3D view, but also overprinting. Unreasonable expectations e.g. readers comparing prism heights across a curved 3D surface with perspective and foreshortening. Poor typeface choice e.g. use of overly ornate typefaces or mix of different typefaces, including the use of Comic Sans or Papyrus. Poor understanding of colour connotations e.g. red for danger. Inappropriate use of transparency e.g. using topographic basemaps as a layer underneath a thematic map that has had transparency applied to see the basemap underneath. Strange annotations e.g. adding sharpie 'corrections' to an otherwise authoritative map.
--	---

Figure 1. Common mistakes/mis-steps and dubious design choices

As part of this work to better understand the contexts in which people eschew cartographic best practice, and advice when it's offered, the talk also introduces 'map doctor'; a new AI developed to help students and non-cartographers to get a critique on their maps. It helps identify what elements are working on the map, and can offer some options for solutions that might improve it. By sharing map design critique through Generative AI, the hope is to break down the barrier between the map-maker and those who they may perceive as simply be out to criticize their work. Rather than debate the nature of effective, constructive critique as opposed to criticism, map doctor is intended to provide anonymized feedback in a supportive style. It's been trained on a large repository of cartographic research and collective work on what works in cartographic communication, and is a good first pass for people to assess whether their chosen map design works in the way they intend.

Should people break cartographic rules? Sure! And they will continue to do so. But breaking them with meaning, and justification is the key to making a map that remains useful. The work that underpins this talk will provide new ways to encourage and help nourish map-makers who wish to strive for better mapping whatever their background.