CARTO DESIGN TO GEODATAVIZ: AN EVOLUTION

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The Cartographic Design team at Ordnance Survey was created in 2006 and performs a key role in the organisation, as the authority for cartographic design and development. Our workload is varied and includes creating one-off maps, designing new products and services as well as engaging with internal and external audiences to promote the value of good cartography. In 2016 we created the visualisation shown in Figure 1 and it was the trigger for us to review our team and implement some changes in how we operate and approach our work.

Introduction

It was the first time that we had published a geographic visualisation that doesn’t contain any topographic data. We simply plotted the GPS data using colour techniques that help represent the density. This method is much more abstract (possibly considered as more art than science) than our traditional topographic maps, but we felt it gave us a more engaging and stunning visualisation.

Around the same time there was lots of talk about data visualisation as a discipline and possibly as an industry in its own right. Over recent years there has been a huge increase in the amount of people creating data visualisations and there is a very apparent convergence of many disciplines. These include design, cartography, user experience, data science, game development, software development, data journalism and many more. We sit firmly in this space and have experienced this trend first hand.

Changing requirements

It has also become clear to us that our customers’ requirements are changing, often in-line with technology developments and current trends. What our customers require nowadays is often more than a map containing buildings, roads and woodland. We are seeing an increase in the demand for thematic and statistical mapping, as well as other forms of chart, graph, or table and sometimes the best answer is simply textual or numerical.

Increasingly we need to be able to present data (usually geographic) to our users in many different ways, methods that are sometimes new to Ordnance Survey. As Cartographic Designers we feel we are perfectly placed to do this and a few changes to our team will allow us to deliver more effectively.

The underlying design principles

More than ever before, our job involves telling stories and identifying patterns and trends in data; our work has become more journalistic in its nature. However, the objective of our work hasn’t changed, our aim is still to communicate geographic data in the most effective way.

Figure 1. An early visualisation, showing some of Britain’s most popular routes

The underlying design principles are still the same. We are simply evolving our craftsmanship as the role of a modern day cartographer continues to change. When talking about our move to GeoDataViz we often cite the fact that we have the same skillsets, are using largely the same software but have a different mindset and different approach.

Figure 2. The origin of the team’s title

In 2017 we had the pleasure of meeting with the data visualisation teams from the Office of National Statistics and the Financial Times. These teams are doing some fantastic work at the forefront of data journalism and it was interesting to note how many similarities there are between all three of our teams. The changes that we are making are certainly not unique and it is an exciting time for anybody working in data visualisation; in its many

* The author presented an earlier version of this paper in 2017, at the SoC/BCS Annual Conference ‘Maps for Changing Reality’, in Durham, UK.
forms and guises. This is a field that is starting to mature and for us it’s great to be working in it from the rather unique position of traditional map-makers.

What are we working on?
As well as the changes we have discussed above, we have also changed the way we work as a team. We now work in sprints which help us stay focused and deliver at pace. Regular showcases help us communicate with the rest of the business and discover new opportunities. We are also starting to see a difference in our work output and one of our key challenges is to create consistency throughout our portfolio of visualisations.

Our recent work has included:
Visualising spatio-temporal data – We have been exploring different methods for animating geographic data over time.

Supporting start-ups – We offer visualisation support to all members of the Geovation Hub. As an example, we helped Flock with the map design for their new app which includes visualising the inherent risk of topographic features.

Annotation design – We have been looking at the design of annotations on maps as well as other charts and graphs.

Designing Augmented Reality (AR) experiences – Technological advances are creating many new ways to interact with data. We have recently helped design a consumer AR experience that enables people to discover what’s around them and improve their sense of place.

Offline mapping with vector tiles – We have worked with customers to develop methods to get OS map data onto a mobile device. We have also evaluated various online tools for styling vector tile data.

Visualising the ‘Internet of Things’ and smart cities – Focussing largely on CityVerve (a Manchester-based IoT project) we have designed ways to effectively visualise data for various smart city use cases. This has included temporal chart and dashboard design.

Developing a GeoDataViz Toolkit – Our team has always played a key role in supporting customers in visualising OS data more effectively and we have now released the GeoDataViz Toolkit. The toolkit is a set of assets and resources that can help you communicate your data effectively through the design of compelling visuals.

What is in the toolkit?
Basemaps – Often referred to as a contextual or backroad map, a basemap contains reference information used to both orient the map and add context to any data that is overlaid. We are providing information about the OS range of basemap styles, the colour values for each and some best practice guidance.

Colours – The use of colour is very often fundamental to the success of a data visualisation. Colour can help with many elements of your design from improving visual contrast to simply catching the eye. Careful use of colour enhances clarity, aids storytelling and draws a viewer into your dataset. Poor use of colour can obscure data, or even mislead.

In the toolkit, we’re making available a recommended set of colour palettes, information on how to apply colour to your visualisations and links to other useful colour resources.

Symbols – Symbols help us to include large amounts of detail on maps. Maps often contain symbols instead of words to label real-life features and make the maps clearer. With so many features on a map, there would not be enough space to write everything down in words.

Symbols can be small pictures, letters, lines or coloured areas to show features like campsites, pubs or bus stations. If you look closely at a map, you will see that it is covered in symbols. There will often be a legend (or key) next to the map to tell you what the symbols mean.
In our toolkit you will find a set of OS map symbols (in SVG format), information on how to use symbols effectively and links to other useful map symbol resources.

**Visual deconstructions** – A visual deconstruction is a method of recording the styling rules for a data visualisation. It is made up of a title, a description, a URL (where relevant), keyword tags, an image, plus the drawing order and styling information for each layer of data from which it is compiled.

It is a form of documentation that allows you to quickly reference and recreate styling rules, as well as being able to share it clearly with others. It is also a great way to learn how something is made and is a useful tool for someone designing their own visualisation. We’re sharing our visual deconstructions and supplying templates so that you can create and share your own. We introduced this new concept in May 2017 and would love to see it being used to share the design details of maps and data visualisations more widely. Our Cartographic Design Principles and Cartographic Stylesheets also form part of our toolkit and we will be adding more content over time.

**Figure 6. A selection of symbols with customised colours**
How it is used at OS

We have been using the GeoDataViz Toolkit within our team for a while now. It has helped us work more efficiently and enabled us to bring greater consistency to our portfolio of work. Having assets readily available saves a lot of time in our work and means we can concentrate on other aspects of the design process. This allows us to focus on telling the right stories and ensuring that we meet the user requirements.

We have been sharing the toolkit within OS for the past few months and have seen some great results from our colleagues. We have supported the assets and resources with a series of workshops focused on the technical application. Again, the element of consistency is important, but it also allows for others to focus their efforts on their own area of expertise. We have used this as an opportunity to gather feedback and improve on the resources before launching.

Sharing knowledge

The team has been sharing knowledge and useful resources for a while now and the toolkit is a culmination of lots of work that has gone before it. It is based on and inspired by our own work, Ordnance Survey’s vast heritage of world class maps and the plethora of resources that are available from the fantastic community of which we are lucky to be part of. There are many cartographers and data visualisers who share articles, tutorials and helpful resources and we are indebted to many of them as we all benefit from their work and ideas.

What we are launching in the toolkit are not hard and fast rules, rather they are guidelines, recommendations and best practices. Using them may help you save time and concentrate your own efforts on refining other areas of your visualisations. For example, choosing the right visualisation type is often not a trivial process and it can take some time to explore the many options available.

The importance of cartography

We are living in a time where maps are ubiquitous in our everyday lives. More maps are being made by more people than at any time in history. The ability to access and collect data and the ability to make maps has been largely democratised so cartography as a discipline is arguably more important than ever. It’s important that cartographic design professionals continue to share their knowledge and expertise and we are very supportive of the cartographic bodies within the UK.

It’s promising to note that the changes we are witnessing and making here in the GeoDataViz team are being reflected more broadly in the cartographic communities. The job of a modern-day cartographer is varied and requires many skills.

Get in touch with the team

The resources in the toolkit are augmented by our blog posts, our workshops and #CartoClinic – use this hashtag to ask us questions on Twitter (@cartocraftsman and @charley_glynn). The toolkit can be accessed at this URL: goo.gl/TsAvuG View the team’s Flickr gallery by using this URL: goo.gl/tEQTjr

If you work involves cartography or data visualisation we would love to know if this article has resonated with you and your recent experiences. Please do contact us via email: cartodesign@os.uk.

Author

Paul Naylor is a cartographic design consultant at Ordnance Survey, Great Britain’s National Mapping Agency. Working as part of the GeoDataViz team Paul performs a key role in the organisation, as the authority for cartographic design and development, and engages with internal and external audiences to promote and communicate the value of cartography and geo data visualisation.