Migration Observatory project explores how the public makes sense of visualisations

The challenge of understanding user' experience

In a world where more and more data is becoming open, the general public is increasingly exposed to visualisations of information. However, despite their popularity, it is unclear how such visualisations are received: are they effective? And what does 'effective' mean to a non-expert audience? What skills and abilities are needed to make sense of them? This knowledge gap has significant implications, not only for visualisation practice among professionals, but also the outreach and engagement activities through which 'intermediary' organisations communicate evidence-based research to the public.

The Migration Observatory is a part of the University's on the Centre on Migration, Policy, and Society (COMPAS). A key intermediary in informing public debate about UK migration, the Observatory wanted to understand how it could improve its visualisation practices for the benefit of non-experts. Although it had already published some visualisations (maps and charts) on its website, it wanted to find out how the public would react to a more interactive and customisable approach to visualisation.

To do this, the Migration Observatory joined the Seeing Data project, using international migration as a topical case study for exploring how visualisations of complex data are produced, received, and understood. Researchers extracted portions of the dataset from the 2011 UK Census relating to the foreign-born population in England and Wales, and then recruited field-leading designers Clever Franke to create visualisations for the statistics in question. The Seeing Data team then presented this visualisation (along with several others) to members of the public through in-depth focus groups and encouraged participants to share what they liked or disliked, and learned or didn't learn, from each visualisation.

What was achieved

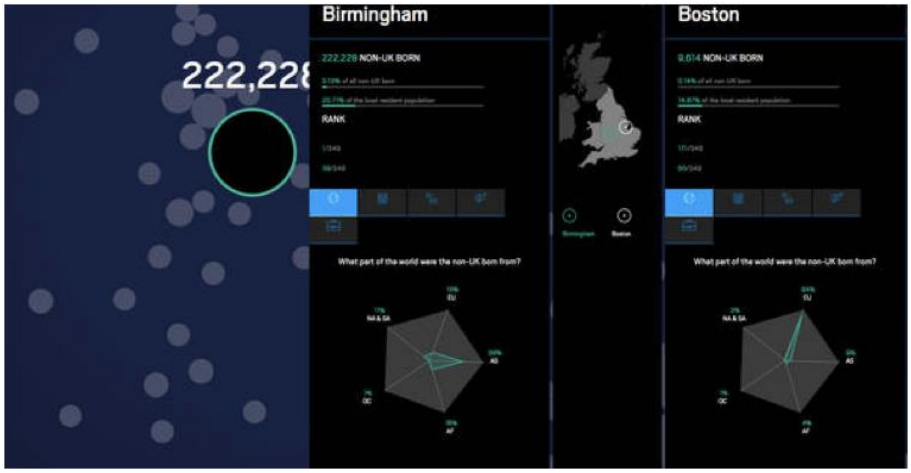

Figure 1 Screenshot from 'Migration in the Census' showing how users can compare data about foreign-born populations in different places: here, Birmingham and Boston.

The Migration Observatory's participation in the Seeing Data project resulted in Migration in the Census, a comprehensive visualisation of the demographic characteristics of foreign-born people in England and Wales. Clever Franke used open-source software D3.js to create the work, along with JQuery, Javascript, and HTML5 and CSS3 for styling. The Observatory collaborated with Clever Franke to ensure that, as far as possible, the visualisation content would be comprehensive, authoritative, and evidence-based.

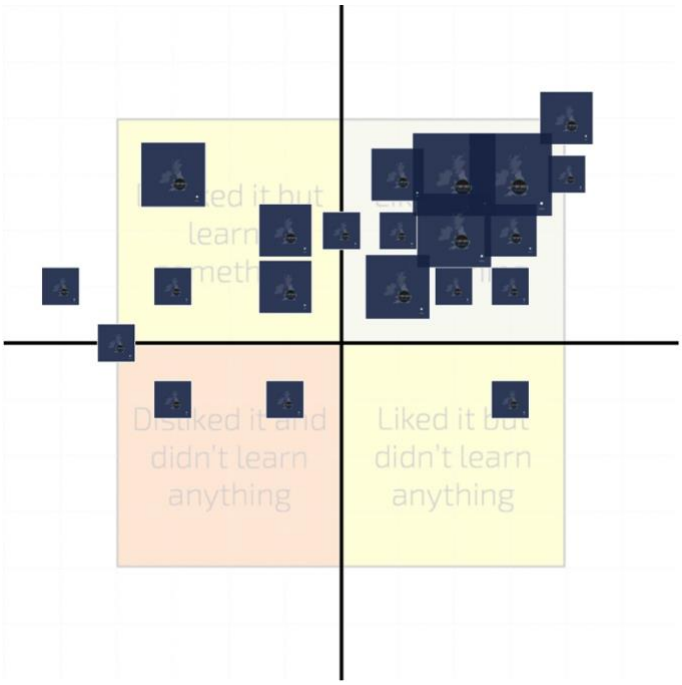

Figure 2 Combined reactions to 'Migration in the Census' from the focus groups. The axes run horizontally from 'disliked' (left) to 'liked' (right) and vertically from 'didn't learn' (top) to 'learned' (bottom).

The focus groups yielded a qualitative sense of how ordinary, non-experts perceived the visualisations. The team recruited 46 participants from seven locations across Great Britain that varied in rural, urban, and experiences of migration. They ranged in age from 11 to 70 and came from diverse backgrounds, many of which were not data- or technology-oriented, such as farming, and charity work. They were asked to rate visualisations in terms of how much they liked and learned from them. The results for 'Migration in the Census' (shown above) suggest that most participants liked the visualisation and felt that they learned something from it.

The Seeing Data project also produced a website of written and video resources that aim to improve the public's ability to make sense of visualisations. A key feature is 'Rate these visualisations!', an activity which allows visitors to rate the same visualisations as the focus groups.

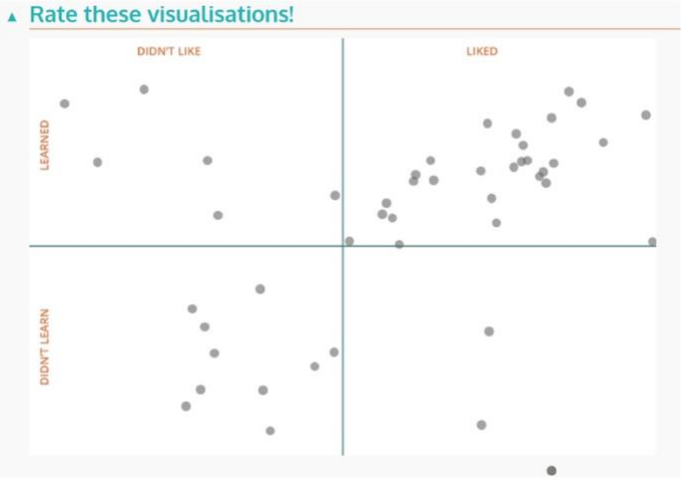

Figure 3 Reactions to 'Migration in the Census' of participants in the 'Rate these visualisations!' activity on the Seeing Data website.

Notable successes of the project

In addition to the positive feedback gathered in the focus groups, 'Migration in the Census' has received considerable professional acclaim. Clever Franke won a 2015 European Design Awards Gold Medal.

Following on from their initial collaboration, The Migration Observatory and Clever Franke have applied for a €25,000 grant from the Creative Industries Fund in The Netherlands to carry on developing visualisations on this topic.

Gaining insight from the bigger picture

Drawing on the experience of designing and developing 'Migration in the Census', the Migration Observatory has this advice to others who wish to use visualisation to engaging a wider audience:

1. Start by considering the aims, rationale, and potential political context of a visualisation before you embark on the design process.
2. Consider what the intended audience of the visualisation should gain.
3. Take the available design options into consideration when deciding what features to visualise.
4. Acknowledge how the topic chosen, as well as its visual presentation, can influence viewers' judgements about whether or not to believe a visualisation.
5. Be aware that academics and professional visualisers may come from different backgrounds and speak different 'languages.' Therefore, build time into the project for developing clear communications.

Further information

- IT Services' Research Support team is developing a service to academics who wish to create interactive data visualisations.
- The IT Learning Centre in IT Services offers a number of courses on data visualisations and the tools available to analyse big data.

Winner, OxTALENT 2015 award for data visualisation. The text and images in this case study have been adapted from Mikal Mast's entry for the OxTALENT competition.