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Issues faced when developing an atlas for both paper and online

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Abstract:

Two years ago we started an atlas project: *The atlas of the world of ITC - the impact of capacity development* It narrates the activities of ITC, the Faculty of Geo-Information Sciences and Earth Observation of the University of Twente, the Netherlands. It resulted in a hybrid atlas, an atlas published on multiple mediums: digitally as an online edition and analog as a printed edition. This is not necessarily new. Often an online interactive version is derived or based on a printed atlas or the other way around. The hybrid atlas production considers both a digital and analog edition from the beginning. Both editions are considered not complementary but combined. Earlier we (Kraak et al, 2023) noted that two major challenges originate from the atlas' hybrid nature: the visual coherence between both editions, and an efficient single-source-publishing workflow. The objective of this contribution is to elaborate on the challenges faced in this process.

Visual coherence between the digital and the analog atlas was a hard requirement, despite diverging needs and contexts of both environments (see Figure 1). We see the coherence as a requirement because the atlas reader may want to switch from one media to the other. This transition should be as smooth as possible by ensuring a common "look and feel". This is mainly realized using shared styles (e.g., colors, color palettes, typography, patterns, stroke styles).

For an efficient approach to create visualizations for both editions we have set up a workflow based on a component library. It differentiates between three types of components: generic, adaptive, and targeted (Listabarth ert al, 2022). Generic components occur across both editions. Examples are components directly related to the map, like proportional symbols, scales, or legends. Adaptive components use the same "atoms" or "molecules" but vary slightly based on the medium. Map annotations are an example. The third group contains targeted components, intended for one specific medium and highly tailored to it. For online examples are interactive elements to highlight or select elements, and for print layout a page footer or figure caption are examples.

The SVG-file format plays a prominent role in our single-source-publishing workflow. It enables visualizations with interaction possibilities in the browser as well as static print-ready visuals. Next to the SVG-based illustrations, implemented mainly with the JavaScript library *D3*, we also created 3D rendered visualisations using the JavaScript library *ThreeJs*. The maps and related visuals are composed to an atlas with different software: for the print version we used *Adobe InDesign* desktop-publishing software, the online atlas is implemented with the JavaScript framework *react*.

The challenges faced were data, technical and design related. The data issues are not uncommon for everyone making maps: As usual the data wrangling process took more time than anticipated. This was mainly due to dependencies on different sources, incompleteness and in consistencies. Additionally, the EU General Data Protection Regulation (GDPR) had an influence on the workflow since all student and staff data had to be anonymized. This also affected the scale certain topics could be mapped.

Technical issues were mainly related to the web mapping implementation. The components library offered us a considerable flexibility, but to create components for all our creative ideas proved impossible due to the project's time budget.

Design issues where mainly related to the (im)possibilities of both print and web environments. Here the adaptive component played a prominent role. However, certain map types work well online but must be adapted for print to avoid for instance visual clutter. In some cases, it might have been more effective to come up with new visualizations, instead of adapting visualizations which we originally designed for one environment for the other (e.g. make a map intended for the print atlas interactive).

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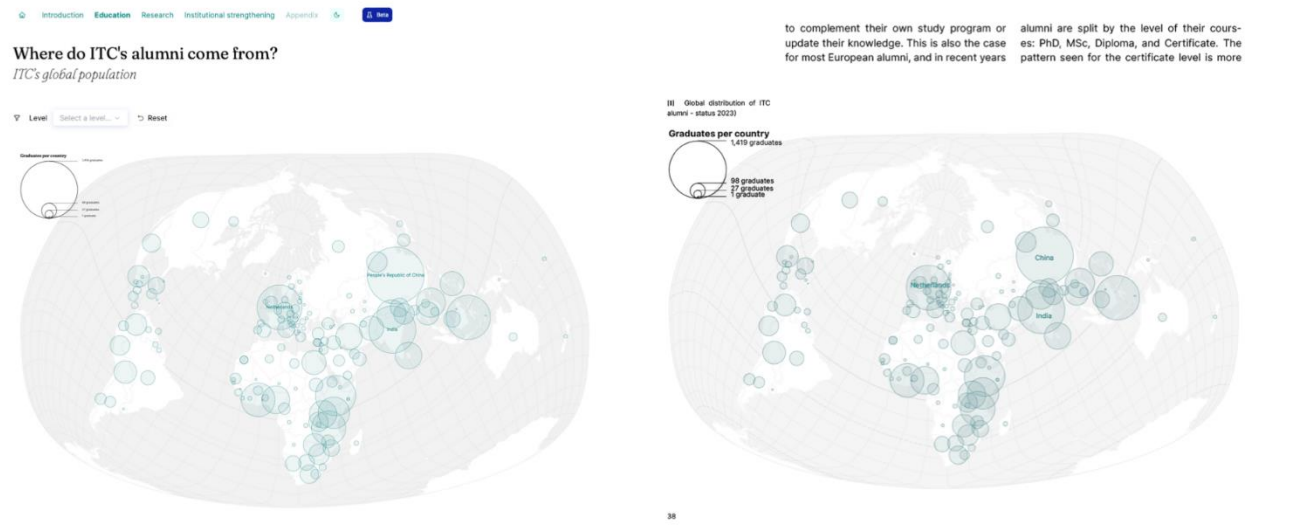

Figure 1. Similar look and feel between the online (left) and print (right) version of the atlas.

Figure 2 gives an example of the travel history of ITC staff over the last 25 years. The online map is a simple proportional symbol map and interacting with an individual symbol results in a graph with annual data and the name of that particular location. The print map would be limited if presented as a proportional point symbol, since it would only offer overall data. Here we decided to visualize the sparklines for each country. However, in dense areas like Europe this would result in visual clutter especially since we also must provide the country names in the printed map. After all graphs were created using our component library, the positioning was done manually. Extending the components to take care of respective displacement would have been a project in itself. More of these examples will be discussed during the presentation.

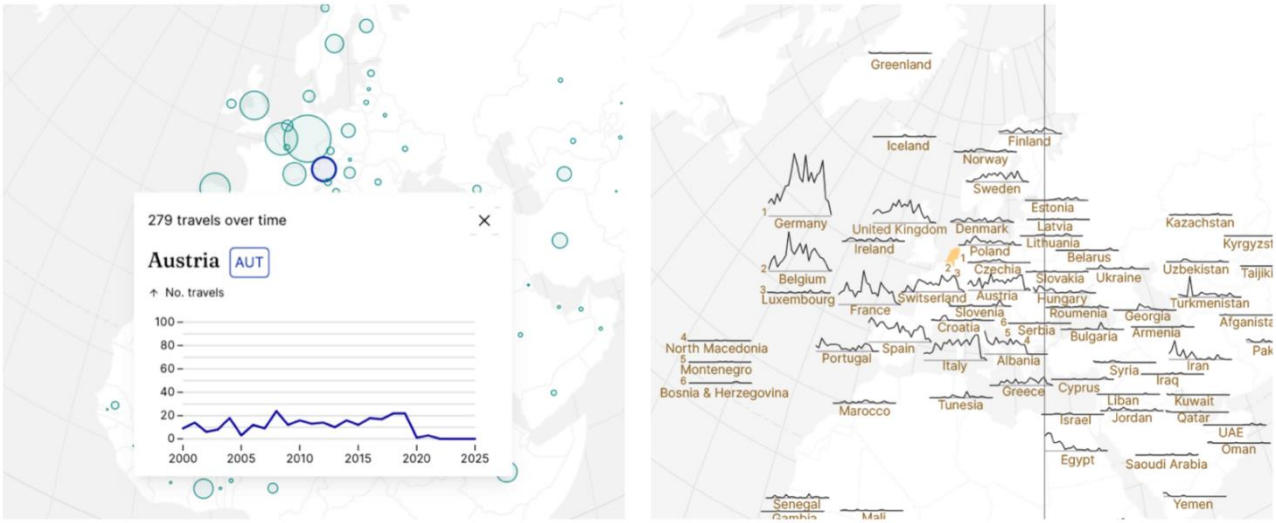

Figure 2. Global UTC Staff travel over the last 25 years. Left a detail of the online solution, right the print solution.

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