

Impact of Design Decisions in Information Visualization: two takes on the UNESCO World Heritage Sites dataset

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ABSTRACT

The poster represents the impact of design decisions on the insights that can be achieved from data in information visualization. Even with the same original design brief, with independence in design, and freedom to ask different questions to the dataset, data transformation and design choices, lead to entirely different final visualizations, which in turn lead to different conclusions about the dataset, as in the examples shown. Two interactive visualizations were developed with Tableau to create an interactive dashboard on the same dataset: the UNESCO World Heritage Sites (WHS).

CCS CONCEPTS

• **Human-centered computing** → **Human computer interaction (HCI)** • Human-centered computing → Visualization

INTRODUCTION

Information visualizations are visual representations of datasets which are used to augment human capabilities for a more effective decision-making [1]. The design space is huge and full of trade-offs so designers may arrive to very effective, yet different, designs. However, even effective visualizations can mislead or bias viewers, intentionally or unintentionally, by displaying either too much or too little information [2], but also by using a different design focus.

THE VISUALIZATIONS

The original WHS dataset [3] included the year sites have been declared, when they were endangered, their location, and category. Dashboard 2 used additional information about the conflict situation and exposure to climate change for each country.



Fig. 1 Dashboard 1 (left) and dashboard 2 (right) visualising UNESCO World Heritage sites (developed with Tableau)

Dashboard 1 focused on the *link between the endangered sites and their location*. It has three views: a map showing the location of currently endangered sites, a stacked bar chart showing the percentage of sites per region, and a bubble plot of the number of sites per country. Filtering by site category, region, or country allows the detailed exploration of the question.

Dashboard 2 supports the query with a focus on exploring *relationships between the endangered sites location and the circumstances of the country*. Its views include: a map and a pie

chart of sites per country, a table of endangered sites per conflict situation, and stacked bar charts. A detailed description of the visual mappings and interactivity for each dashboard is available at their respective project descriptions [4-5].

DISCUSSION

Overall, both dashboards used a similar approach to plot the Heritage Sites on a map, to provide an overview of the endangered sites and their spread across the globe, allowing the user to zoom in on regions of interest. However, with additional visualizations Dashboard 1 focuses on analysing which countries and regions have the most endangered sites, whereas Dashboard 2 puts the sites in context with additional data on climate and conflict situations to analyse whether there potentially exists a correlation. Therefore, though the same question was addressed, different interpretations and a potential bias from the designer led to contrasting results. Dashboard 1 focuses on the *where*, while Dashboard 2 concentrates on the *why* in relation to the endangered sites. Dashboard 1 allows conclusions such as that the most endangered natural sites are located in Africa while Arab States only have endangered cultural sites. Meanwhile, Dashboard 2 shows that the category Civil War seems to be a cause for sites to be endangered (i.e. Afghanistan), whereas the climate does not seem to be an influential factor. Neither of the conclusions from one dashboard could be reached with the other, but together provide a good exploration of endangered Heritage Sites from different perspectives.

CONCLUSIONS

We have shown that designers' interpretation and focus may influence the information gain. Two very different approaches to the task led us to conclude that while one designer on its own will only answer parts of a question, the collaboration of different designers, can significantly improve the knowledge gain that can be derived from such a dashboard.

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