

Designing a Cross-Border Health Atlas through Immersion in Health Services Research

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Abstract:

This work describes an ongoing cartographic design process in the field between medical geography and health services research. The desired result is the prototypical implementation of cartographic artefacts united under the umbrella of a “Cross-border Health Data Compass” (CHDC). The resulting web-based visual analytics software aims to support multidisciplinary cross-border healthcare research in the northern Dutch-German border region. Visualizations of consolidated and harmonized data from publicly available information sources will interact with a model of the spatial accessibility of health care facilities of the region.

Medical geography describes the spatial accessibility of health care facilities as one of several dimensions of access to health care services. Of all the dimensions of access, the aspects of “accessibility” and “availability” (i.e. the presence of facilities) are spatial and distance-based and therefore empirically ascertainable (Kisteman et al. 2019). In addition, health care itself is part of a “social space” occurring in space and time. This implies that the regional socio-economic situation influences health care. For health services research these spatial dimensions are of great importance as well and therefore relevant background information. For this reason, an accessibility model from OpenStreetMap network data will calculate potential catchment areas of hospitals and care facilities. The resulting accessibility model data will be an integral part of the cartographic visualisation of demographic and socio-economic data.

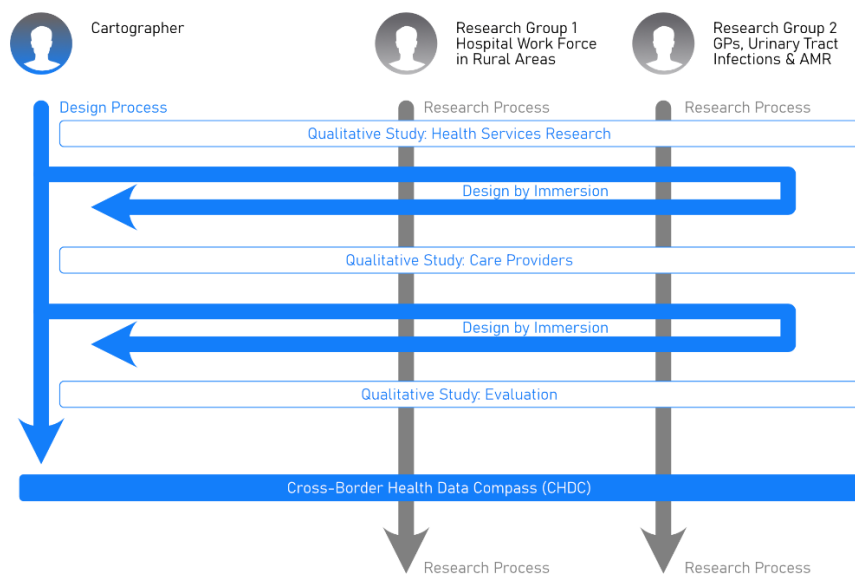


Figure 1: “Design by Immersion” as integral part of the design process of visualizations for health services research. (own work)

Common requirements engineering techniques, qualitative study methods, and the “design by immersion” approach described by Hall (2020) provide the methods for the design process of this work (Figure 1). The latter understands the design effort of a visualisation researcher as an “immersion experience” in a specific (scientific) domain: The elicitation

of cartographic requirements result from the visualisation problems of that specific domain and the reflection about the iterative and cooperative search for solutions.

The design process started with a qualitative study among Dutch and German health researchers from the CBI initiative (n=9, semi structured interviews). In the interviews, more than half of the participants stated that spatial aspects play a role or at least a subordinate role for their research. However, even though many collect data on socio-economic status as part of their own studies, only one researcher ever recorded spatial information about the study subjects. Generally, the study detected an interest in spatial aspects of their research questions, but at the same time a reservation about the feasibility of spatial analyses, the possible significance of the findings and uncertainty about the availability of secondary data across the border.

A number of challenges result from the findings of the first study: The transnational perspective of the CBI researchers call for homogenous data models from national sources and needs to create solutions to normalize data and classifications, which are hard to compare. The variety of disciplines in the consortium calls for a wide range of spatial scale down to spatial models using small-scale cartographic grids. The use of these grids in terms of statistical disclosure control, the soundness of disaggregation and small area estimations, and methodological transparency pose the research questions for the CHDC and the accompanying cartographic visualizations.

The presentation will give insight into the intermediate results of this design process, will report on methodological and algorithmic considerations and present the state of the visual analytics artefacts.

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