Visualization as an epistemic tool for multimodal sources in the history of education

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Visualizations are established as a research method in the Digital Humanities (DH). From a semiotic point of view, visualizations firstly are images and act as *icon* signs, which in terms of diagrammatics (cf. Glinka /Dörk 2018: 236) have an epistemic effect (cf. Peirce, CP 2.279 / Freyberg 2021: 77 ff.). Taking *iconology* (cf. Panofsky 1970) into account, they can also be analyzed as *symbols* embedded in their original cultural-historical context. In particular in historical sciences this function of visualization and its underlying data unfolds relevance. Therefore, it is a desideratum in the DH to develop a suitable visual language for the mediation of historical discourses in the context of multimodal sources, which goes beyond quantitative approaches in the sense of a mere representation of established facts.

For the ressources of BBF | Research Library for the History of Education of DIPF | Leibniz Institute for Research and Information in Education, exemplary, more research driven visualizations are about to be developed. The BBF holds multimodal sources (images, texts, audiovisual media and 3D objects) from the 15th century until today. These stocks of the history of education are highly diverse, ranging from estates and autograph collections to curricula to students drawings and pupils newspapers (see BBF) to busts of famous educators.

For a sub-collection of the Georg Eckert Institute (Leibniz Institute for Educational Media), a visualization has been created by the UCLAB (see GEI-Digital visualized 2017), which enables traditional accesses, such as timelines, maps and keywords (see Fig. 1), but also comparisons (see Fig. 2) in an interactive and dynamic manner.

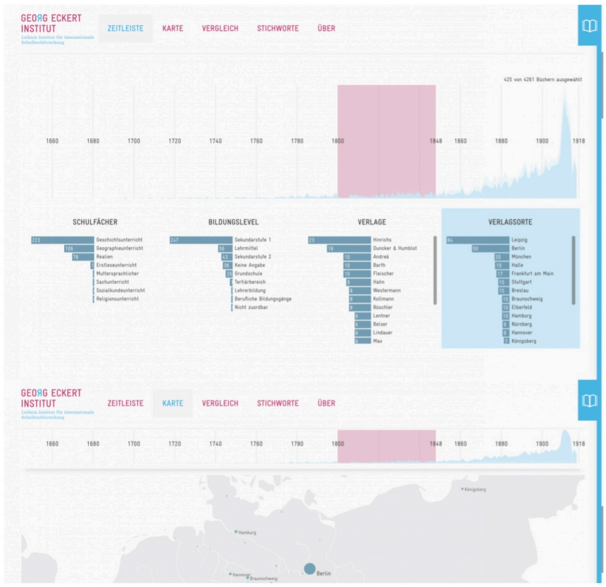

Figure 1: Screenshot visualization timeline and map GEI-Digital

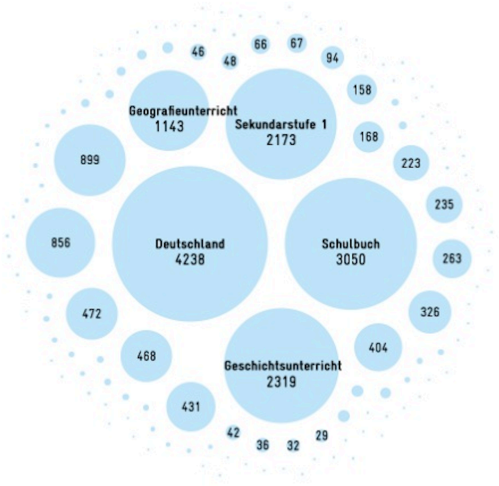

Figure 2: Screenshot keyword cluster in GEI-Digital

These visualizations provide for a structured overview of the digital holdings and their semantic references presented as abstract representations that enable quantitative access. The individual objects are less in the foreground, although interactive access to the single items in the catalog is possible in some views. This visualization of UCLAB (see UCLAB) provides a good initial introduction to textual educational sources (in this case, textbooks). However, for multimodal data, such as the BBF holds, a research-based presentation, other visual modes of representation and access to the data are needed.

In terms of visualizing cultural data, Windhager et al. (2019: 2316) distinguish four visual granularities: 1) single-object previews, e.g., high-resolution photographs, 3D scans, video clips, or audio encodings. 2) multi-object previews, which combine thumbnails with multi-object arrangements such as lists, grids, or mosaics, 3) collection overviews, which use comprehensive arrangements of proxies and provide a macro-level representation while encoding metadata into visual variables, and lastly 4) collection overviews, which use abstractions to represent all possible types of diagrammatic representations abstracted from the hidden objects.

A combination of these granularities, which can be read as a scaling from c *lose* over *distant* to m *ega distant reading* (see Horstmann 2020, 159), seems useful, especially for multimodal data. In the history of education, we are mostly dealing with small to medium sized data sets. The preparation of virtual corpora can partly conducted with methods such as text mining, but the analysis requires a complementary close reading (Cramme / Reh 2022: 79-80). In particular in order to depict the reception history as well as the cultural-historical embedding and impact, a focus on individual objects would be helpful as well as the identification of semantic relations between different sources.

For the development of an adequate form of presentation, the expertise of both scholars and information specialists is required. Therefore, a co-creation workshop (see Dörk et al. 2020) has been held in May 2023 with researchers of the BBF as well as library staff to jointly develop concepts for visual interfaces, in particular including the integration of non-textual sources and visual modes of data presentation. Based on the results of the first workshop in addition to the exploration aspect of the sources, ideas for mapping

the research process in form of narratives and for illustrating and presenting research findings will be developed.

In this talk, the results of this workshop will be presented and contextualized with overarching questions on the visualization of historical collections such as the integration of multimodal sources. Also the visual representation of *ambiguity* and *uncertainty* (see Drucker 2014: 125-35) embedded in the overall context of the scientific discourse of historical data will be discussed.

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