

In Defense of Sandcastles: Research Thinking through Visualization in DH

Uta Hinrichs, SACHI Group, School of Computer Science, University of St Andrews, UK
Stefania Forlini, Department of English, University of Calgary, Canada

INTRODUCTION

Although recent research acknowledges the potential of visualization methods in DH, the predominant terminology used to describe visualizations (prototypes, tools) narrowly focuses on their use as a means to an end and, more importantly, as an instrument in the service of humanities research. While acknowledging the broad range of possible approaches to visualization, we introduce the metaphor of the sandcastle to highlight visualization as a research process in its own right. We argue that building *visualization sandcastles* provides a holistic approach to interdisciplinary knowledge generation that embraces visualization as (1) a dynamic interdisciplinary process where speculation and re-interpretation advance knowledge in all disciplines involved, (2) a mediator of ideas and theories within and across disciplines and (3) an aesthetic provocation to elicit critical insights, interpretation, speculation and discussions within and beyond scholarly audiences. We illustrate our argument based on our own research of an exceptional literary collection.

VISUALIZATION TOOLS VS. SANDCASTLES

Pivotal Scene

*A steering committee meeting for a large-scale DH project. The goal of this interdisciplinary project is a combined computational and literary analysis of a literary collection, which will include the development of visualizations to enable the open-ended exploration of this collection by literary scholars. As the discussion starts to focus on the intended project outcomes, questions around the visualizations and their practical and research contributions arise. What role do visualizations play as part of DH projects? What makes them a valid contribution? One committee member brings it to the point: “Are we building **tools** or **just sandcastles**?”*

This question contrasts *sandcastles*—tailored, unique, often stunning yet also transient and unstable interactive visualizations—with more pragmatic, functional and transferable visualization *tools*. This framing is a provocation: these approaches are not necessarily diametrically opposed or mutually exclusive, but, rather, exist along a rich continuum. Even within one research project, the process can shift from a more transient “sandcastle” to a more targeted instrumental approach. And yet, the preference toward the latter is evident in recent DH discussions (Gibbs et al., 2012) and in a push by funding bodies toward research with concrete, high-impact outcomes. Notably, however, visualization “tools or prototypes” (terms typically used interchangeably) are not usually seen as research contributions in their own right (Schreibman et al., 2010) but, at best, as facilitators of research or as a way to communicate underlying research contributions. An overly pragmatic approach to visualization, and DH tool-building more generally, however, not only risks overlooking the value of the design process but also relegating computer science and design to service-based roles. What happens when we consider, as Bruno Latour has argued, that “far from fulfilling any purpose”, a new technology actually “explor[es] heterogeneous universes that nothing, up to that point, could have foreseen and behind which trail new functions” (Latour, 2002: 250)? What happens when we attend to the design process—and its many detours—as a research process in and of itself?

As a relatively young research field, information visualization (InfoVis) has seen calls to carefully and critically (re-)evaluate sometimes dated assumptions (see Kosara, 2016). Similarly, despite the increasing application of visualization in diverse DH contexts (Jänicke et al., 2015), it remains a relatively new approach and a call for generalizable visualization tools—drawing on science-based use cases—may reproduce unexamined assumptions and overlook important nuances of humanistic data and inquiry that is typically of a qualitative and interpretative nature (Drucker, 2011). As Latour argues, the ways in which we represent our arguments changes the way in which we argue (Latour, 1986). Introducing visualization into literary studies, introduces new modes of knowledge production. As such, we need to engage in open-minded and open-ended explorations of visualization as a research (rather than engineering) process, paying close attention to the ways this process changes our perspectives on data and research questions. At a time when leading practitioner-theorists suggest design as central to DH (Burdick et al., 2012), we must develop a more nuanced, critical language to discuss and further engage with the wide range of design approaches, especially from fields such as InfoVis and human computer interaction (HCI) that already combine design practice and research.

The call for a broader perspective on technology design within DH is not new, but it is increasingly urgent as the pragmatic value of visualization tools risks overshadowing the profoundly fertile design process as an intellectual and cognitive practice or a “method of thinking-through-practice” (Burdick et al., 2012). Previous work has discussed “tools” in DH as “experiments” or “embodiments of ideas” (Sinclair et al., 2011), advocated for prototypes as arguments in their own right (Galey & Ruecker, 2010), and highlighted visualization as a starting point to humanities research rather than a means to an end (Hinrichs et al., 2015; Forlini et al., 2015b; Hinrichs et al., 2016). Furthermore, critical perspectives from within the DH (Drucker, 2011) and InfoVis communities (Dörk et al., 2013; Hullman & Diakopoulos, 2011) call for further examinations of the rhetoric of visualizations. Expanding on these discussions, we reclaim the *sandcastle* as a lens through which to critically examine current DH discussions of technology design and to promote an open-ended, speculative and process-oriented approach to visualization design based on a robust model of interdisciplinary collaboration that advances knowledge in all research fields involved. Our argument is grounded in critical theory, design research, HCI and InfoVis, as well as in our own experience of combining research in literary studies and visualization to explore an untapped collection—the Gibson Anthologies of Speculative Fiction (Forlini et al., 2015b; Hinrichs et al., 2015).

BUILDING SANDCASTLES AT THE INTERSECTION OF LITERARY STUDIES AND INFOVIS

Our project—the Stuff of Science Fiction¹—explores a vast untapped collection of 10,000+ science fiction stories single-handedly compiled into 888 hand-crafted anthologies by the avid science fiction fan, artist and collector Bob Gibson² (see Fig.1). This unusual collection raises a number of questions regarding the evolution of science fiction in the context of popular periodicals and the role of fan practices in sustaining and promoting this popular genre. Working with a subcollection of 1,500+ stories, we developed interactive visualizations that came together as the Speculative W@nderverse (see Fig. 2) to help us explore and analyze these stories through their metadata.

The W@nderverse can be considered a tool, or at least a prototype, and we have discussed it as such in our own humanities (Forlini et al., 2015a; Forlini et al., 2015b) and InfoVis publications (Hinrichs et al., 2016). In many ways it is a means to certain valuable ends: (1) it makes the Gibson anthologies explorable from different (visual) perspectives by multiple scholarly and public audiences, (2) it has generated insights about the collection, and (3) it showcases InfoVis design considerations specific to visualizing untapped literary collections (Hinrichs et al., 2016).

However, if we reflect on our process with our initial research questions on one end and the visualization as a reflection of our research outcomes on the other, it becomes clear that the W@nderverse is not just a tool, at least not in the narrowly instrumental sense. It only appears to be a means to certain ends *in retrospect* when we overlook our many detours in order to narrate (for the sake of dissemination) a direct line from our questions to our contributions. However, our grant proposal and the copious notes through which we documented our research process (see Neustaedter & Sengers, 2012) remind us of our initial intentions and reveal the transformative nature of

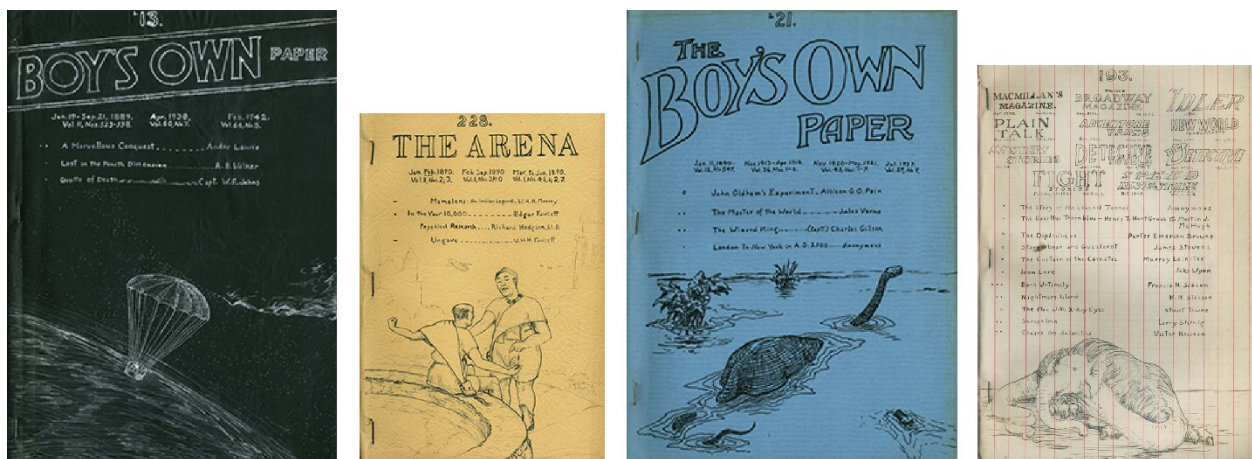


Figure 1: The Gibson Anthologies of Speculative Fiction

¹ <http://stuffofsciencefiction.ca/>

² <http://stuffofsciencefiction.ca/GibsonAnthologies/>

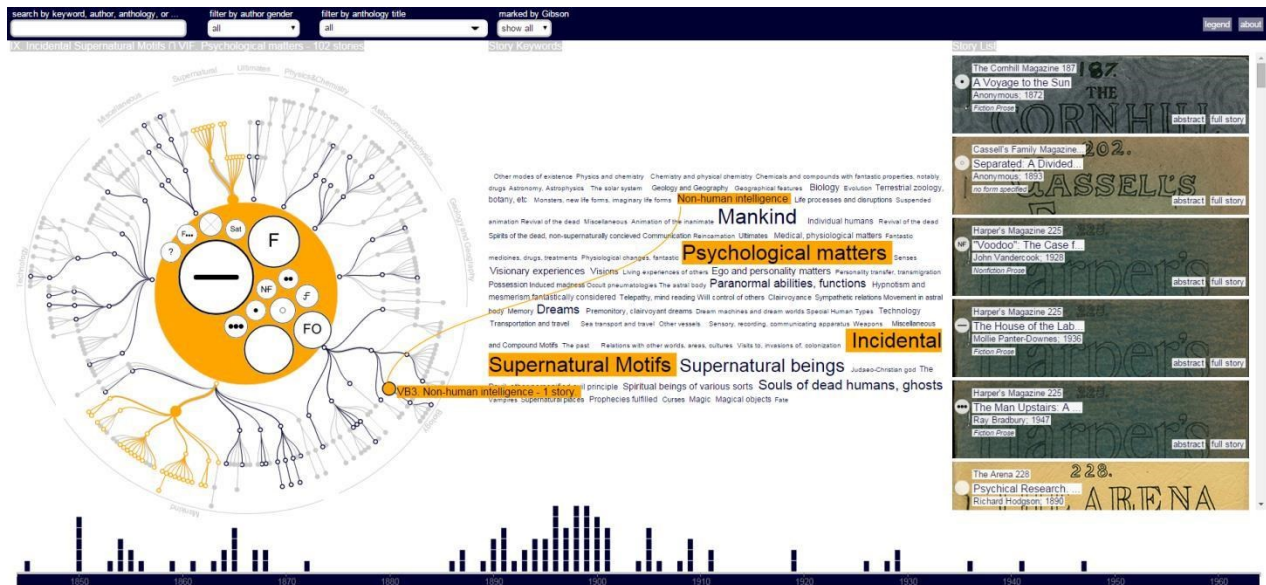


Figure 2: The Speculative W@nderverse visualization

our collaborative “prototyping” process, which profoundly altered our research questions and intentions as well as our perspectives on the collection and our respective disciplines—literary studies and InfoVis. The W@nderverse is therefore both the mediator and manifestation of our exploratory and interdisciplinary research process. Our many design detours (necessitated by ongoing archival discoveries and visualization experiments, see Fig. 3), show what is now largely invisible yet fundamental to the W@nderverse: our *research thinking through visualization*, an approach that has its parallel in HCI with “research through design” (Zimmerman, 2007).



Figure 3: Early visual speculations leading up to the W@nderverse

In order to investigate humanities questions from truly novel perspectives and to engage in profoundly interdisciplinary collaborations that combine humanities and visualization research (not engineering!) approaches, we advocate for research thinking through the creation of visualization sandcastles as:

- Aesthetic and in-flux **manifestations of visualization as a speculative, provocative process** that generates insights about: 1-the underlying collection; 2-(visualization) design considerations; 3-needs of the intended audience(s); 4-and new research questions which, in turn, drive the development of new (and different) sandcastles and grounded insights valuable to all involved disciplines,
- **Dynamic mediators** that by provoking and guiding discussions can bridge boundaries between disciplines (e.g., literary studies & InfoVis) and between academic and fan endeavors, and
- **Aesthetic provocations** that can promote critical discussions of best practices for studying and making

accessible cultural collections among scholarly and public audiences.

REFERENCES

- Burdick, A., Drucker, J., Lunenfeld, P., Presner, T., and Schnapp, J. (2012). *Digital Humanities*. MIT Press.
- Dörk, M., Feng, P., Collins, C., and Carpendale, S. (2013). "Critical InfoVis: exploring the politics of visualization." *CHI '13 Extended Abstracts on Human Factors in Computing Systems (CHI EA '13)*. ACM
- Drucker, J. (2011). "Humanities Approaches to Graphical Display." *Digital Humanities Quarterly (DHQ)*, 5(1).
- Dunne, A., Raby, F. (2001). *Design Noir: The Secret Life of Electronic Objects*. Basel: Birkhäuser.
- Galey A. and Ruecker, S. (2010). "How a Prototype Argues." *Literary and Linguistic Computing*, 25(4):405–424.
- Gibbs, F. and Owens, T. (2012). "Building Better Digital Humanities Tools: Toward Broader Audiences and User-Centered Designs." *Digital Humanities Quarterly*, 6(2).
- Forlini, S., Hinrichs, U., and Moynihan, B. (2015a). "Data Visualization and the Gibson Anthologies." *Presentation at MLA*, Vancouver, BC.
- Forlini, S., Hinrichs, U., and Moynihan, B. (2015b). "The Stuff of Science Fiction: An Experiment in Literary History." *Digital Humanities Quarterly (DHQ); DHSI Colloquium 2014 Special Issue*, 10(1).
- Hinrichs, U., Alex, B., Clifford, J., Watson, A., Quigley, A., Klein, E., Coates, C.M. (2015). "Trading Consequences: A Case Study of Combining Text Mining & Visualisation to Facilitate Document Exploration." *Digital Scholarship in the Humanities (DSH); DH2014 Special Issue*, 30(1): i50-i75.
- Hinrichs, U., Forlini, S. and Moynihan, B. (2016). "Speculative Practices: Utilizing InfoVis to Explore Untapped Literary Collections." *IEEE Transactions on Visualization and Computer Graphics (Proceedings Visualization / Information Visualization, Oct. 2015)*, 22(1):429-438.
- Hullman, J. and Diakopoulos, D. (2011). "Visualization Rhetoric: Framing Effects in Narrative Visualization." *IEEE Transactions on Visualization and Computer Graphics*, 17(12):2231-2240.
- Jänicke, S., Franzini, G., Cheema, M.F. and Scheuermann, G. (2015). "On Close and Distant Reading in Digital Humanities: A Survey and Future Challenges." *In Proc. of the Eurographics Conference on Visualization (EuroVis – State of the Art Report)*.
- Kosara, R. (2016). "An Empire Built on Sand: Reexamining What We Think We Know About Visualization." *In Proceedings of Beyond time and errors: novel evaluation methods for Information Visualization (BELIV)*.
- Latour, B. (2002). "Morality and Technology: The End of the Means." *Trans. Couze Venn. Theories, Culture & Society*, 19.5/6, 247-260.
- Latour, B. (1986). "Visualization and Cognition: Thinking with Eyes and Hands." *Knowledge and Society: Studies in the Sociology of Culture Past and Present*, 6, pp. 1 – 40.
- Neustaedter, C. and Sengers, P. (2012). "Autobiographical Design in HCI Research: Designing and Learning through Use-It-Yourself." *In Proc. of the ACM conference on Designing Interactive Systems (DIS)*, pp. 514–523.
- Ruecker, S., Radzikowska, M., Sinclair, S. (2011). *Visual Interface Design for Digital Cultural Heritage - A Guide to Rich-Prospect Browsing*. Ashgate.
- Schreibman, J. and Hanlon A. (2010). "Determining Value for Digital Humanities Tools: Report on a Survey of Tool Developers." *Digital Humanities Quarterly*, 4(2).
- Zimmerman, J., Forlizzi, J., and Evenson, S. (2007). "Research through design as a method for interaction design research in HCI." *In Proceedings of the SIGCHI Conference on Human Factors in Computing Systems (CHI '07)*, 493-502.