

# Pre-visualization

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## ABSTRACT

This position paper argues that deep collaboration must be a part of any humanities visualization project and it investigates the nature and the place of such collaboration. I re-introduce the term “pre-visualization” to refer to the interdisciplinary, transmedial critical work that underlies the design and implementation of, as well as the critical reflection on, visualization. I argue for seeing pre-visualization more than just in its temporal sense of a “first step” of building visual systems, but as a necessary process of digital humanities modelling that contributes to critical linkages between visualization and the humanities research tradition. Finally, I discuss the tension inherent in visual systems between their specificity and generalizability and the need to remain critical as they grow.

**Keywords:** digital humanities, visualization, modeling, critical practice, design thinking, transmedia, poetry.

## 1 INTRODUCTION

To the adjective “visual” we add a double suffix, “-ize” creating a verb of becoming and “-tion” creating a noun of action. Visualization, therefore, combines a number of modes—adjectival, verbal and nominal—related to creating something image-like, to forming a mental image of a concept, giving visual form to an idea or even lending interpretative possibility in visual terms. The term visualization referring to visual representations more generally has permeated post-digital society and culture. Some quick, distant analytics using HathiTrust’s Bookworm point to the sharp rise in popularity of the term after the 1980s and the term’s widespread usage in books published in 2010 on a range of subjects: mathematics, neurosurgery, energy, computing and medicine [1]. We can see the ubiquity of visualization, but by what process can we say that it actually comes into being? How do we adapt it to a field such as the humanities?

## 2 WHERE ARE THE HUMANITIES IN VISUALIZATION?

Visualization can be found throughout the digital humanities these days, but it is timely to ask the question “where are the humanities in visualization?” Is it because the materials from the humanities, or the data derived from them, are visualized? Do different forms of interactivity make assumptions about human cognitive capacity,

including questions of accessibility? Is it because we want visualizations to be useable by people? I suspect that the answer to all three questions above is affirmative. Other ways of locating the humanities in visualization might be more aspirational thinking than current reality. Do we peg our visual semantics to features inherent in our humanistic sources? Do our theoretical positions find themselves instantiated in our design decisions? Do our visualizations speak to complex issues in professional reading? Do (digital) humanists participate in the capture, carpentry or computation of the data underlying our visual systems? How do we link our visual practices to avenues of critical thought that will speak to our more traditional colleagues?

### 2.1 Pre-vis, for Vis

Tamara Munzner situates the practice of visualization squarely at the human/non-human interface. She writes in her primer of visualization design: “Vis design is full of trade-offs, and ... [v]is designers must take into account three very different kinds of resource limitations: those of computers, of humans, and of displays.” [2] Whereas humanists may be familiar with critiques of the computer, the display, or even the data, thinking of the human being as a resource limitation might require some clarification. According to Munzner, we (humans) do not always have the optimal approach to solving a problem, we are limited in our speed of performing actions and not all human users have the same content knowledge or decision making faculties. None of these points is a strong critique of human reason per se, but each is a motive, according to the author, to keep the human in mind while designing a data-rich, screen-based visualization. It seems to me that in Munzner’s description of the validation process, however, that although humans are portrayed as possessing a domain, research questions and data, and is most definitely included in the testing process, the user is somewhat absent from the iterative design process. Other arguments have been made for design study methodologies in visualization that lay out practical guidelines for visualization research emphasizing research literature reviews, expectations of real-world collaborative scenarios and reflective assessment at the end of the research process. [3] Few of these scenarios address directly the humanities.

In this position paper, I would like to make a more explicit case for visualization not simply being in the service of the humanist’s reflection, but rather for visualization as co-creation *with* the (digital) humanist, emerging theoretically from domain-specific problems and characterized by a critical design thinking at every stage of the process. Hinrichs and Forlini have argued for visualization as less of a means to an end than an integral part of the research process. [1] I agree fully with their principle of “thinking *through* visualization in digital humanities,” especially in their case study of literary data. To this end, I propose introducing the notion of “pre-visualization” to provide us a conceptual arena in which to explore the necessity, and challenges, of a collaborative modeling and design process between digital humanities stakeholders, including experts in visualization. Such dialogue, as we have argued elsewhere along with digital humanists and

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software engineers, requires a deep collaboration and an understanding both the affordances and constraints, both the rigor and compromises of each discipline’s conceptual vocabulary. [5] Pre-visualization, if we are to elaborate the concept fully, needs to draw upon the recent work on design-centered thinking in the digital humanities. [6]

Pre-visualization is, of course, not a neologism, but a term with a particular semantic trajectory that we need to acknowledge here. The term usually stands for a kind of staging of objects, or parts of a whole, before the final version of a representation is created, in particular when dealing with expensive or elaborate media that cannot easily be remade. It is used in the creation of real-world objects from custom dental implants to pre-manufacturing industrial design, often justified by the desire to assure that the creator’s intention is carried out by the producer’s implementation. In photography, pre-visualization is a realm of thought, of carefully studying of the object *before the exposure*. [7] In this respect, in a product-based media context, pre-visualization represents the thinking and studying carried out before the irreversible act of making.

The process of “pre-visualization” which I am suggesting we explore, of course, does only not refer to what is done before visualization. It does not jettison the design and prototyping steps in the early stages of research. It is also not a way of ensuring the integrity of concept in a manufacturing process. Finally, it does not distinguish firmly between creators and producers. Instead, it is a deliberate hack of the usual sense of word “pre-visualization” in that insists on a blurring of creative roles, underscoring reflexivity not before or after the design process, but throughout the research cycle.

Allow me to suggest other words bearing the prefix *-pre* (*-prae*, in Latin) that do not necessarily give the sense of something that happens before: “precept” (a principle that stands out in importance), “prelection” (reading out in public, that is, in front of a public), “pretext” (a reason that is front for another one) and “preface” (a part of a book that comes first, but in reality is written *post facto* to describe the process of writing the book). The prefix *pre-* in these cases points to the importance or prominence (i.e., the “frontedness”) of something. Worldbuilding, storyboarding and 3D modeling of interactive environments for digital games or mixed-reality filmmaking employ the term pre-visualization perhaps closer to this sense. [8, 9] “Worldbuilding is among the most fundamental rhetorical and communicative acts of speculative fiction” [10], writes Roine, by which I believe she means that discourse allows a world to come into being *that did not exist before*. Speculative fiction without a well-developed world would be entirely unsuccessful.

Pre-visualization looks beyond the first wave of digital humanities, characterized by specific applications of computing in the humanities, to embrace the second wave: “qualitative, interpretive, experiential, emotive, generative in character,” focusing on humanities strong points, “attention to complexity, medium specificity, historical context, analytical depth, critique and interpretation.” [11] Put very simply, instead of leading an abstract user through a process to a visual language that they don’t know they don’t know yet, the co-designers of humanities visualizations must work together not only to build visual analytics systems, or “knowledge generators” as they have been called in the humanities, but also to craft arguments about how and why they should do so in the first place. [12]

There is also a philosophical connection between a theory of pre-visualization and modeling in digital humanities for us to explore, but to do so would require more space than this short paper allows. Much thought has gone into the notion of modeling in digital humanities research as (1) a method of “[bringing] together disparate elements of heretofore distinct (but perhaps converging)

traditions” such as computing and the humanities and (2) an “iterative, perfective process [by which] an improved and increasingly explicit understanding of the modelled phenomenon arises.” [13] Pre-visualization is, in other words, not a one-time thing, not simply a precondition for making an interactive visualization. It is also not simply a design reflection and writing stage. [3] Instead, pre-visualization is a palpable interweave between theory and practice, an articulation of methodology about creating humanities data and employing interface that allows us to link our work intentionally to the “epistemic culture of the humanities” and to bring our findings to the fore. [14]

## 2.2 A Digital-Humanist-In-The-Loop

Human-in-the-loop approaches to computing in general use the power of human cognition to adjust the results obtained by a machine, and in visualization they take advantage “pattern detection properties of the human visual system in [one’s] design.” [2] In the case of visual analytics systems, they allow for quick glances into complex data for a variety of users and in a variety of use domains, with different levels and kinds of interaction. [15] It is possible, of course, to think of the user too late in the design process. Fred Gibbs and Trevor Owens argue, for the case of digital humanities tools creation, that designers do not focus enough on how they expect their tools to work for users, and that the “tool builders must consider themselves as entering into a social contract with tool users.” [16] In other words, they seek cooperation for mutual benefit, and do this by organizing panel discussions and incorporating user experience feedback. The visualization literature is chock full of thoughtful reflection on how to inscribe the user into such visual systems. [3, 17, 18] Visual knowledge generators, Drucker reminds us, however, “have a dynamic, open-ended relation to what they can provoke” [12] and we have only just begun to think about how design and research in the humanities fit together. [6, 18, 19] The need for reflective writing that stands out in front of what we design, and what it “provokes” us to know, is urgent.

A real-life example is in order at this point. Let us consider an interdisciplinary research project born of a collaboration between two researchers, one in visualization and one in digital literary studies. Along with Stefan Jänicke, I have been pursuing research on text reuse and alignment in medieval French poetry. [20, 21] From the beginning of the collaboration, a literary perspective on the instability of orally-inflected poetry informed both the data and design decisions of our visual research. Such literary data exhibit multiple, overlapping complexities that we wanted to build into the system.

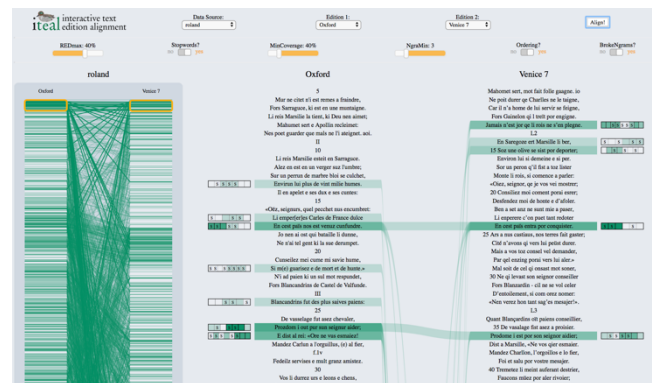


Figure 1: Our Visual System *iteal*, Comparing Versions of the *Chanson de Roland*.

How can we nuance the notion of intertextuality by combining three scales of reading on the screen at once (micro, meso and macro)? How can stream graphs overlap in an intuitive fashion for a comparison of two textual versions? For three or more? Can we visually represent common passages in a language marked by significant orthographic instability? If alignment varies across texts along a spectrum of similarity and difference, what properties of color should be used to mark the relevant importance of the detected phenomena? How might scoring of computationally derived alignments depend on the particular opinion of a scholar? What kinds of screen behavior can allow us to assert alignment? How much interaction is enough? How much is superfluous? Obviously, not all theory can be instantiated in practice, but textual critical work in the digital age has become, as Pramod Nayar argues, implicitly transmedial, since it adapts material “*from and about literary texts*” within its new visual modes. [22] The blend of deep knowledge of the sources at hand and matching of characteristics of the literary text with elements of the visual design lend the visualization in Figure 1 a concise and powerful, heuristic quality. We might compare visual design to the age-old practice rhetoric: visual cues on the screen are similar to flourish in discourse: just enough to produce an effect, not too much to be confusing.

Despite requests from domain specialists to adapt our visual system for interoperability with other digital humanities tools and standards (e.g. TEI XML texts) as well as to develop it as a product for all to use, I do not think of our experiences in visualization as finished. Far from it. They can perhaps be made into a stable, generalizable product someday, but at the moment, I prefer the process of theorizing different visual systems, implementing and optimizing them for specific forms of expert-centered reading, as well as publishing both about them and the expanding knowledge of the corpora that the systems afford us. Our thinking about these medieval textual data are evolving as both our data and our systems expand.

### 2.3 DH for Vis

David Berry discusses visualization in the context of the “plethora of computational devices that facilitate the colonization of code into the lifeworld,” by which he means self-tracking devices or the corporatized recording of our post-digital lives and the generalized graphs and maps that they produce. [23] Such ubiquitous analytics allow us to check the weather trends, to monitor our REM-sleep patterns or even to track the engagement with our posts on social media. Data visualization, from his perspective, is viewed as highly problematic, indissociable from the modes of data collection. His characterization of visualization sits outside of the paradigm of user-centered design we have discussed above. While some have argued that we must remain vigilant that such analytics in the humanities do not distort our view of the sources we study and that their hidden algorithms do not takeover human critical thought [24], I would argue that there is a difference between visualized live streams of self-quantification data and carefully modeled, critically built humanities datasets that we visualize in full cognizance of the underlying assumptions of any translation to the screen. In this respect, the reflective, participatory co-design that I propose in this position paper, what I have called “pre-visualization,” is coterminous with the domain of data literacy, a required element of critical pedagogy and reflective practice of our era.

As the humanities continue to engage with new media, there is all the more reason to see visualization as a continuum of types, to build one-off “sandcastle” visualizations [3] or visual systems that intentionally expose their situatedness and algorithmic assumptions, as feminist perspectives on visualization encourage.

[25] Unlike the corporate visualization criticized above for its “anytime, anywhere” approach, critical visualization has both a time and a place. This means maintaining some resistance to stable, transferable visual systems that generalize and hide such assumptions, potentially reifying the collapse of the digital and real worlds, what media theorists have called the “new aesthetic.” [26, 27] Complex, provocative visual rhetorics—that require specialized literacies of expert readers to interpret—need to be cultivated that resist such a collapse. The pre-visualization agenda outlined here aims to do just that. An important distinction that allows us to contrast more general forms of visualization of the sort mentioned above with those co-crafted through reflective digital humanities is that of visualization for “professional reading.” [29] Finally, as scholars in the humanities become more accustomed to the digital, visual turn, we may rely less on the notion of visualizing for the “traditional” scholar. As those interested in what the humanities have to offer visualization, we may have to turn our attention to needed visual literacies to make sure our understanding of the visual remains critical.

### 3 CONCLUSION

The purpose of purposefully hijacking the notion of pre-visualization in this position paper has been to suggest a process (1) for cross-fertilization between the content knowledge of the humanities and the evolving semantics of visualization and (2) for grounding our visualization practice in recognizable methodological concerns so that we can communicate the findings of domain-specific humanities visualization to the kinds of publics that expert readers usually address. Ultimately, the study of digital humanities needs to incorporate more visual literacy, not only for their input into visual design of data, but perhaps also for the creation of new data as well. One might advocate for adding classics of visual design and design thinking to the digital humanities syllabus as well as for promoting interdisciplinary dialogue about data structures. [29] Instead of the real-world examples of pre-visualization for commercial product development context mentioned above, the notion of pre-visualization I have laid out in a humanities context does not contribute to the profitability or sustainability of a product, but rather it increases the persuasive capacity that visualization lends research in a discursive world, a world of argument. In this respect, critical, interdisciplinary design contributes to visual systems that like rhetoric, provide heuristics, facilitating the identification of details that might lead to construction of new knowledge.

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