Digital humanities is text heavy, visualization light, and simulation poor

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Abstract

This article examines the question of whether Digital Humanities has given too much focus to text over non-text media and provides four major reasons to encourage more non-text-focused research under the umbrella of Digital Humanities. How could Digital Humanities engage in more humanities-oriented rhetorical and critical visualization, and not only in the development of scientific visualization and information visualization?

1 Digital Humanities is Text? Four Arguments

There has long been a debate on what exactly is Digital Humanities (Cohen *et al.*, 2011; Terras *et al.*, 2013). My article will put forward the suggestion that in earlier books there is a subtext that Digital Humanities are primarily or uniquely or best viewed as computing services and tools applied to the digitalization and processing of text or literature (Baldwin, 2013) but this would be to the detriment of both text-based and non-text-based scholarly research.

My concern that visualization projects are not often mentioned as being part of the Digital Humanities might seem a little paranoid; clearly there are presentations on visualizations at Digital Humanities conference. However, I am not alone. Svensson (2013) has pointed out the great amount of projects done that can be described as digital humanities even if they are not textual studies.

Meeks (2013) entitled his provocative article 'Is Digital Humanities Too Text-Heavy?' and he observed that at Digital Humanities conferences 'a quick look at the abstracts shows how much the analysis of English Literature dominates a conference attended by archaeologists, area studies professors and librarians, network scientists, historians, etc.' Perhaps there are so many text-focussed attendees because they do not feel their digital leanings are appreciated at mainstream academic conferences in their field. Perhaps geographers and archaeologists do not attend en masse because their digital leanings are appreciated in their discipline but publications in Digital Humanities-specific proceedings and journals are not.

However, there may be another reason. As Meeks himself recounts, early Digital Humanities books were keen to show a trail of mythical origins in the Humanities Computing field, and the Humanities Computing field is itself heavily indebted to text-based research. Hence text-based research historically dominates Digital Humanities events. As an example, Hockey (2004) wrote the following in her chapter 'The History of Humanities Computing', in one of the first books dedicated to Digital Humanities (Schreibman *et al.*, 2004): 'Applications involving textual sources have taken center stage within the development of humanities computing as defined by its major publications and thus it is inevitable that this essay concentrates on this area'.

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Such a move has been recently contested (Robertson 2014a, b), but there does appear to be a text emphasis in many Digital Humanities research infrastructures. For example, ontologies for directories of Digital Humanities tools and methods in European projects (such as Digital Research Infrastructure for the Arts and Humanities (DARIAH) and Network for Digital Methods in the Arts and Humanities (NeDiMAH)) and in American or international projects (such as Digital Research Tools (DiRT) Bamboo, currently known as DiRT) are heavily influenced by the ontology of Digital Humanities as developed at the University of Oxford, following Unsworth (2007). The University of Oxford definition of Digital Humanities, at least on their webpage (unpublished), is text based and desk based. Their website (http://digital.humanities.ox.ac.uk/Support/whatarethedh.aspx) page says that, amongst other new advantages, digital humanities offers 'new desktop working environments' and 'new ways of representing data'.

Yet virtual reality has been involved with the humanities for at least two decades, and closer to three decades. I was involved in Computer-Aided Design and Drafting (CADD) and multimedia, and the experience of digital reconstructions of artefacts and heritage sites over 20 years ago, and computer games for over 30 years, others have been involved on this field for much longer. I consider these projects in the realm of humanities.

As an academic area, virtual reality's intersection with the humanities also measures in the decades. Year 2016 celebrates the 22nd conference of Virtual Systems and Multimedia (http://www.vsmm2016.org/), 'Virtual Systems and Multimedia (VSMM) has become a bridge between technology, art, culture, history, science and engineering'. VSMM has had a virtual heritage element for almost all of its 22 years. The Silicon Graphics International Corp (SGI) Virtual Reality Modelling language model of Tenochtitlan is from 1996, and Dudley Castle in England featured a 'Virtual reality tour' from around 1994. On a more personal note, I experienced the joys (and usability issues) of a virtual reality (head mounted display with cyberglove) environment at the start of 1991 and I was certainly not the first participant.

This leads me to argue that there are at least four reasons to be concerned with any idea that Digital Humanities are being perceived as primarily text based (and in particular not related to visualization). I will argue: there is 'not always' a clear separation between written language and images; that to be a humanist or a humanistic scholar (not the same thing) we do not always have to have high levels of literacy; that non-text-based media can be part of Digital Humanities for it is actually part of Humanities and that visualization-incorporating media can provide suitable scholarly arguments.

1.1 Written language and images

Historically, the distinction between text and symbol has been blurred, from cave paintings through early European and Asian languages and as part of world history in general. Recent research suggests that caves were painted where the spaces were most reverberant, they are not only visual art forms but also reverberation chambers, possibly the more resonant spaces were seen as more spiritual. Regardless of the original reason, this is evidence of the early symbiotic relationship between space sound and image (Viegas, 2008; Brown, 2012).

Writing discovered in China that has been dated 5,000 years old also reveals the early mixed origins of image and text. Tang (2013) noted the 'primitive writing . . . [lies] . . . somewhere between symbols and words'. This language is created when five or six of the symbols are combined; they are no longer symbols but words.

Literature is also inextricably linked to rhythm and movement. Politics and the brainwashing effect of nationalistic marches are related to an understanding of movement (Turner and Pöppel, 1988); musical appreciation is heavily affected by both our mammalian heritage (Panksepp and Bernatzky, 2002) and by the body in space (Sacks, 2007; Thomas, 2013). Even today, language appears to be geographically influenced; one paper reveals that prepositions in parts of Spain appear to depend on the geographical terrain and the local speakers are unaware of this (Mark *et al.*, 1989).

If history is only that which has been written, then many cultures are excluded. Oral heritage has proven cultural heritage does not have to be written down to be considered part of the humanities. Worryingly, the scholarly field of history has a

popularity challenge: a survey of the American public revealed they were engaged by the notion of the 'past', but repelled by the word 'history' (Rosenzweig and Thelen, 2000).

1.2 Visualization literacy

In their book *Digital Humanities in Practice* (Warwick *et al.*, 2012) and on the related blog (Warwick, unpublished), Warwick, Terras, and Nyhan have decried the lack of public dissemination of Digital Humanities projects, and a lack of public accessibility was also pointed out by Kirschenbaum (2010). To improve public access to digitalized material we also need to tackle the problem of literacy, digital literacy, and digital fluency (Resnick, 2002). Multimedia, visualizations, sensory interfaces can communicate across a wider swathe of the world's population.

Although literacy is increasing, technology is further wedging a fundamental divide between those who can read and write and those who cannot (UNESCO, 2014). There also seems to be a need for visualization literacy, the public appear to be far more easily convinced by visualizations than by reading text. The implication is that their level of visualization literacy is not as discerning (Pandey *et al.*, 2014).

1.3 Visualization is part of the humanities

Visualization is an extremely significant aspect of Digital Humanities, and writers such as Burdick *et al.* (2012, pp. 2–3) agree. Literature itself is linked to both the image (Theibault, 2012) and materiality (Rudy, 2011); the materiality of Icelandic sagas and runic inscriptions are considered by various scholars to be essential properties (Jesch, 2013). Archives are not just text, and the Digital Humanities are collaborative and interwoven.

Even the book itself is a material, embodied experience. The University of Dundee's *Poetry Beyond Text Project* group's research is further evidence of the importance of image to the literary (University of Dundee, 2014): 'The CRs [co-researchers] rated works in which they felt the text and image mutually enhanced one another more highly than works which they felt were ''fragmented'' or disjunctive'.

Humanities is not merely multimodal but also embodied experiences. The objects in and on which the humanities are described, critiqued, and preserved are more than just holders for text; they are essential artefacts, which give researchers essential clues in the interpretation of text and author. Material objects are not merely brute objects; they are symbolic as well, inscribed into the lived and symbolic world (McDonald and Veth, 2013).

1.4 Visualization as scholarly argument

Where is visualization as a research tool in its own right? Can visualization not actually create new research questions? Jessop (2008) has argued that digital visualization is more than just an illustration; it is a scholarly methodology. Visualization is promoted at Stanford University's Digital Humanities workshops as both a tool and an argument (Robichaud and Blevins, 2011). Visualization workshops are increasingly popular fixtures at Digital Humanities workshops (Milner, 2014) and conferences (Weingart 2013, 2014), and some recent conference papers even promote the use of 'persuasive visualizations' (Hann, 2008). Archival organizations now offer tools to help humanities scholars visualize new research questions, 'By replacing information with image, we can often see a different story hidden in the data' (Tocewicz, 2014).

Research by Van den Braak *et al.* (2006) indicated some studies show improvement from argument visualization tools. However, the challenge of adopting visualizations to the strategies of humanities is not always clear-cut, especially given visualizations in the humanities tend to prefer to cover as many interpretations as possible (Sinclair *et al.*, 2013).

Various scholars have argued that visualization can be reflective and critical (Dörk *et al.*, 2013; Jessop, 2008; Robichaud and Blevins, 2011), but there is an important problem that is critical to my field of research, virtual heritage, and, I believe it is of great interest to Digital Humanities in general. I am speaking here of the distinction between the model and the simulation.

2 Simulations are not Simply Models

I am trained as an architect, and so I probably define the word 'model' differently to an archaeologist, a

computer scientist, or a fashion designer. I am however finding myself more and more influenced by the archaeological distinction between model and simulation because it has also revealed to me an important issue in my own field of research, virtual heritage. It makes more sense to see the model as a physical or digital representation of a product or process, while a simulation is actually the reconfigurative use of a model to reveal new and potential aspects of a model. So a model can reveal or explain current states of a system, but a simulation can reveal new and hitherto unimagined potential states and possibilities of a system. A model of the weather is not the same as a simulation engine that finds out what the weather might be like tomorrow.

This distinction between model and simulation is important when we wish to understand process rather than merely an end product. I employ games, game engines, and virtual reality to create virtual heritage projects (virtual reality in the service of cultural heritage). The most famous charter dedicated to best practices in virtual heritage is The London Charter (Denard, 2009, p. 12) defines 'computer-based visualization' as 'The process of representing information visually with the aid of computer technologies'. It may seem that virtual heritage is simply the recreation of what used to be there. Yet, what used to be 'there' was more than a collection of objects. Those objects had specific meaning to the cultural perceptions of the site's traditional inhabitants.

Reproducing the artefacts is not enough for we must also convey the importance of that cultural heritage to the public. And here lies the dilemma of space and time, a culture may no longer exist, the artefacts may have moved and been dispersed, our understanding of either the site or its owners could be conflicted and our interpretations of both may have dramatically changed or never have been agreed upon. These considerations lead me to suggest an alternative definition: 'Virtual heritage is the attempt to convey not just the appearance but also the meaning and significance of cultural artefacts and the associated social agency that designed and used them, through the use of interactive and immersive digital media'.

This alternative definition of virtual heritage is directly involved in the issue of simulation versus model. In many archaeological texts (Bentley *et al.*, 2008; Costopoulos, 2008; Lake, 2014; Molyneaux, 1992; Rahtz and Reilly, 2003; Winsberg, 2015; Wurzer *et al.*, 2015) there is a notion of a simulation as being like a model, but a less restricted model, because the aim is to understand the processes rather than view an abstracted or simplified representation (a model, in other words). So a simulation is concerned with creating just enough modelling so that the ways in which components interact can be studied (and experienced) both spatially and temporally. Winsberg in particular gave a good explanation: 'Successful simulation studies do more than compute numbers. They make use of a variety of techniques to draw inferences from these numbers. Simulations make creative use of calculational techniques that can only be motivated extra-mathematically and extra-theoretically.'

As an example, I would like to proffer the research opportunities of game design. Games may be defined as systems of rules, but the rules that people follow, break, and create are not the algorithms in the software, and the way in which people interact with each is far more than a pre-scripted system of rules. Games are simulations in the sense that they allow both players and spectators to examine behaviours change and reveal themselves over time (behaviours here can be in the simulated environment or be expressed by the human actors). Thanks to game templates and frameworks, there are many technological options to explore human issues and values over time without having to immerse oneself in years of programming.

Archaeologists such as Wattrell (2010) can see the potential of games for engaging the public, 'a no brainer of mythical proportions', but stress they also require games and virtual environments to 'provide the vital intellectual context of that information, exploring how and why archaeologists and Egyptologists reached the conclusions they did about a given site, individual, historic event, cultural practice, etc.' Meyers (2012) reminds us that it is 'necessary for students to know how this highly contested knowledge is constructed'. Graham (2010) declares, 'Let the students do it. . .the learning in

doing'. Other archaeology academics have also told me of the unexpected but delightful learning benefits they and their students discovered when trying to simulate archaeological environments inside game engines. For example, the Fort Ross historical game project in Unity had input from historians, staff, and students (Lercari *et al.*, 2013).

Some have noted that games research has not been met with much approval and encouragement even in the digital humanities. Jones (2013) commented, 'My own interest in games met with resistance from some anonymous peer reviewers for the program for the DH2013 conference, for example . . . [yet] . . . computer-based video games embody procedures and structures that speak to the fundamental concerns of the digital humanities'. The distinctive and—dare I say it—revolutionary power of games to afford the player the ability to test and develop their own theories is perhaps best but paradoxically exemplified by the attempts of traditional scholars to mould the simulation-rich possibilities of games into a system of rules, a model if you like. Jeremy Antley provided an example in his article 'Going Beyond the Textual in History':

> To put it on even simpler terms—the main objection the authors have with current gamic modes is that they produce history for consumers, while the authors would much rather produce history for producers. This approach, currently, is endemic in the historical discipline because historians, by and large, are used to being both the producers and consumers of their own product . . . Textual modes focus on producing knowledge through reading, while gamic modes focus on producing knowledge through play.

Yet, historical understanding does not have to be passively received. In Norway and Italy a Virtual Reality project was designed to engage students in the area of Renaissance science and travel diaries (Carrozzino *et al.*, 2013). The project team wished to explore Information Technology (IT) in museum education, particularly to see how historic manuscripts from the 16th and 17th centuries could convey knowledge through interactivity, without damaging the originals. They created an augmented 3D book, where objects appear to pop out of the page, an 'Information Landscape' and Virtual Reality (VR) display so participants could view and share a digital simulation of the books. The relevant aspect to this discussion is that the project did not stop at digital displays; the participants perform experiments in the real world after visiting the digital environments.

My own area of research is more to do with the simulation of built history and interactive heritage (Champion, 2015a) but even here I have found that students learn even more from designing and playtesting their own and others' game engines than they learn simply as players. Games should not only be seen as products but also as processes. Games have the ability to synthesize narrative, conjecture, computer-generated objects, contextually constrained goals, real-time dynamic data, and user-based feedback (Mateas and Stern, 2003).

For example, I have explored the action and role-playing game 'Elder Scrolls V: Skyrim' to see if new ways of interacting with literature could be designed inside the game engine (Champion, 2015b). Skyrim mods can potentially allow scholars to create and insert their own stories, voice-overs, and movies into books. More interestingly though, the mod editor of this game allows designers to create their own adventures predicated on the player's interaction with books as interactive artefacts. I could, for instance, create a game level where the player has to determine which characters are authors from judging their behaviours in comparison to the writing style found in books discovered in the game. Or possibly the players could be transformed into different characters, but are not able to see themselves or their identities, and must discover what sort of character they are from information found in books or in the game level or from conversations with the non-playing characters in the game.

Through this interactive richness—rather than through a high-tech ability to reproduce elements of the real world—people can both learn and enjoy alterity (experience of the 'other'). In a virtual heritage environment, the more one can master local cultural behaviour, the more one can understand significant events from the local cultural perspective. Mastery of dialogue and artefact use, as viewed from

a local cultural perspective, may lead to enhanced cultural immersion. It may consequently lead to a heightened sense of engagement. On the other hand, the interactive nature of the simulated environment allows us to create questioning rhetorical affordances that are either encountered dramatically and abruptly, forcing the player to confront their subconscious or desensitized default behaviours, or the rhetorical affordances are absorbed slowly during game-time, evoking questions only after post-game reflection.

This critical approach can be used in game mods (Champion, 2012) but it can also be employed in machinima—game engine cameras used to create pre-rendered video—it does not have to be employed solely in real-time computer games. So, while game design and machinima production are not typically seen as part of Digital Humanities, they are interesting vehicles for fostering and examining community feedback, cultural issues, critical reflection, and medium-specific techniques (such as procedural rhetoric). Machinima in particular is an excellent vehicle to engage and then confront automatic player behaviours and assumptions (Champion, 2011).

3 Conclusion

Visualization projects leverage and incorporate text, they have been taught for centuries as humanities disciplines, and they can present and project interesting and provocative questions of immediate interest to humanities scholars; these projects also function in ways beyond the traditional act of reading. Visualization employs research in the traditional humanities, converts Information Communication Technology (ICT) people to humanities research (sometimes) and in the above examples helps preserve and communicate cultural heritage and cultural significance through alterity, cultural constraints, and counterfactual imaginings. Despite some strict definitions of the terms, history and heritage are not always literature! And the Digital Humanities audience is not always literature-focused or interested in traditional forms of literacy.

Down through the ages, text has not lived in a hermetically sealed hermeneutic well all by itself. A world with literature but without the arts is intellectually and experientially impoverished. Critical thinking and critical literacy extend beyond the reading and writing of text. Visualization can make scholarly arguments. Therefore, non-text-based research should figure more prominently in Digital Humanities readers and monographs.

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