Master Thesis

Towards Digital Humanities Tool Criticism

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Introduction

Technologies are quickly transforming scholarship. The humanities have been more resistant to the digital challenge than natural sciences, but the spread of what is called digital humanities proves that there too technologies play an increasingly important role. Going beyond simple calculations, digital tools can qualitatively change the character of research, or at least this is what digital humanists claim. While the use of computational strategies in humanistic inquiry have been discussed extensively, cultural, political and societal aspects of digital humanities tools have not been addressed. In a broad sense, tools are cultural phenomena that can be approached from a humanistic perspective. This paper addresses the possibility and necessity of the tool criticism in digital humanities.

Digital humanities is a field that has been known as humanities computing, humanistic informatics, or eHumanities.[1] The term 'digital humanities' was popularised by the Blackwell's *Companion to Digital Humanities* (2005).[2] In the years that followed it ceased to be 'a term of convenience used by a group of researchers who had already been working together for years', in words of Matthew G. Kirschenbaum, and was transformed into something like a movement, manifested in titles of local and international organisations, conferences, and journals.[3] To some extent, 'digital humanities' succeeds at uniting people from different fields. Yet the lack of a clear definition of the discipline is deeply problematic and discussions of the precise nature of the field recur regularly in digital humanities publications. There is a necessity to articulate the value of digital humanities to the outside community, both academic and non-academic. Speculations on the place of digital humanities in relation to other fields echo the discourse on the place of humanities at large. Since the nineteenth century, humanists have been looking for proper theoretical and

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1   M. Terras, J. Nyhan, and E. Vanhoutte, 'Introduction', in M. Terras, J. Nyhan, and E. Vanhoutte (eds), *Defining Digital Humanities: A Reader* (Farnham: Ashgate Publishing Ltd, 2013), p.2.

2   S. Schreibman, R. Siemens, and J. Unsworth (eds), *Companion to Digital Humanities*, Blackwell Companions to Literature and Culture (Oxford: Blackwell Publishing Professional, 2004), <http://www.digitalhumanities.org/companion/> (Accessed 25 June 2014).

3   M.G. Kirschenbaum, 'What Is Digital Humanities and What's It Doing in English Departments?', *ADE Bulletin*150 (2010), p.58. In 2005 the Alliance of Digital Humanities Organizations (ADHO) was formed on the basis of Association for Literary and Linguistic Computing (ALLC) and the Association for Computers and the Humanities (ACH). Other international organizations joined ADHO in the following years. ADHO organises the main conference of the field that changed its title from ALLC/ACH Conference to Digital Humanities Conference in 2006. Journal of Digital Humanities and Digital Humanities Quarterly are among the most influential journals in the field.

methodological foundations for the humanities—most prolifically as 'human sciences' opposed to 'natural sciences.' Today the debate still continues, much fuelled by the digital humanities.[4]

Numerous definitions of digital humanities exist. A witty remark made by Fred Gibbs in 'Digital Humanities Definitions by Type' illustrates their abundance: 'If there are two things that academia doesn't need, they are another book about Darwin and another blog post about defining the digital humanities.'[5] Several attempts have been made to provide an overview of existing opinions. Every year since 2009 participants of *A Day in the Life of the Digital Humanities*, a community publication project directed by Geoffrey Rockwell, are asked to describe their work and reflect on what digital humanities means to them.[6] The answers are published unedited on the wiki page of the project. The polyphony of replies portrays the digital humanities as ambiguous, revolutionary, traditional, or even non-existent. More substantial essays on the problem are collected within a section of the *Debates in the Digital Humanities* (2012).[7] Recently published *Defining Digital Humanities: a Reader* (2013) provides a historical perspective on the debates and brings together the core texts on the subject—both from the blogosphere and academic publishing —and it is by far the most complete anthology of the definitions.[8]

The most inclusive definition sees digital humanities as an open community. In the words of Stephen Ramsay, it welcomes anyone: 'code junkies, digital artists, standards wonks, transhumanists, game theorists, free culture advocates, archivists, librarians, and edupunks.'[9] If computer scientists are added, the list would be more complete. The collaborative and interdisciplinary character of this community is one of its most salient features.

Keeping in mind this societal aspect, we would like to approach the digital humanities as a set of activities. A suitable definition can be found on the website of the University of California, Los Angeles (UCLA):

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4   The work of C.P. Snow is an example of such discourse. C.P. Snow, *The Two Cultures* (London/New York: Cambridge University Press, 1993).

5   F. Gibbs, 'Digital Humanities Definitions by Type', *Fredgibbs*, 4 September 2011, <http://fredgibbs.net/posts/digital-humanities-definitions-by-type/> (Accessed 25 June 2014).

6   'How Do You Define Humanities Computing / Digital Humanities?', *A Day in the Life of the Digital Humanities*, 2011, <http://www.artsrn.ualberta.ca/taporwiki/index.php/How_do_you_define_Humanities_Computing_/_Digital_Humanities%3F> (Accessed 6 July 2014).

7   M.K. Gold (ed.), *Debates in the Digital Humanities* (Minneapolis: University Of Minnesota Press, 2012), <http://dhdebates.gc.cuny.edu/debates> (Accessed 25 June 2014).

8   M. Terras, J. Nyhan, and E. Vanhoutte, *Defining Digital Humanities: A Reader* (Farnham: Ashgate Publishing Ltd, 2013).

9   S. Ramsay, 'Who's In and Who's Out', *Stephen Ramsay*, 8 January 2011, <http://stephenramsay.us/text/2011/01/08/whos-in-and-whos-out/> (Accessed 2 July 2014).

Digital Humanities interprets the cultural and social impact of new media and
information technologies—the fundamental components of the new information age—
as well as creates and applies these technologies to answer cultural, social, historical,
and philological questions, both those traditionally conceived and those only enabled by
new technologies.[10]

Digital humanists have double work to do: addressing 'cultural, social, historical, and philological questions,' and interpreting the new media and technologies used to address these questions. Most commonly, however, efforts of the digital humanists are limited to applying technology to humanistic work. This, at least, is the most common definition of the digital humanities, according to Gibbs's analysis of the definitions made by the participants of *A Day in the Life of the Digital Humanities*.[11] This thesis claims that the critical reflection on technology developed in the field has yet received too little attention.

In this paper we will use the terms 'tools' and 'technologies' interchangeably, meaning pieces of software that are used to provide access to, produce, analyse, and edit digital media.[12] Word processors will be left out of the discussion. Although social media platforms and email applications can be interesting objects of study for digital humanists, these forms of software will not be discussed since they do not support humanistic research. Digital archives and collections, text analysis and visualisation tools, digital editions as well as platforms for creating digital editions are of great relevance for our research. Usually, digital archives and digital editions are not perceived as 'tools', because they provide access to the content rather than let user manipulate it. However, they are relevant for our study, because they are designed to support research. It is worth making a distinction between tools that reached a production level and experimental tools. Most tools in digital humanities are developed as experimental prototypes within research projects, and production level means that the tool is suitable for use by the general audience (it is well-documented, scalable, standardized, etc.). Such tool is perceived as 'service' rather than 'research'. As it was put by Joris van Zundert from the Huygens Institute, 'the more general your audience of your tool is, the less likely it is to be scholarly research.'[13] In this paper, we will mostly discuss production level, 'service' tools, although the 'research' tools will also be mentioned.

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10 'About UCLA Digital Humanities: What Is DH?', *UCLA Digital Humanities*,
   <http://www.cdh.ucla.edu/about/what-is.html> (Accessed 2 July 2014).

11 F. Gibbs, 'Digital Humanities Definitions by Type'; 'How Do You Define Humanities Computing / Digital
   Humanities?'.

12 N. Wardrip-Fruin and N. Montfort (eds), *The NewMediaReader* (Cambridge: MIT Press, 2003).

13 J. van Zundert, Interview, 2014.

Due to the interdisciplinary character of digital humanities, specialists from different fields perceive digital humanities tools as objects of study. Human-computer interaction studies focus on the usability of tools, and several initiatives have studied humanists as users.[14] Computer scientists discuss the technical innovations. The value and impact of digital collections, as well as the costs of development and sustainability have been addressed by archivists and librarians.[15] What interests us is the humanistic perspective on the technologies and the process of their creation.

The discussion of application of computational strategies in humanistic research is beyond the focus of this paper, because new methodologies—like Franco Moretti's 'distant reading' or the 'algorithmic criticism' of Stephen Ramsay—do not depend on concrete instances of software.[16] Discussion about the theoretical nature of tool building is more relevant for our purposes.[17] It cannot be disputed that digital humanists develop digital tools, enhance data and metadata critically— examples of critical self-reflection include Jerome McGann's *Radiant Textuality* (2001), a collection of essays on his work on the *Rossetti Archive*.[18] However, digital humanists rarely extend the discussion into the register of society, economics, politics, or culture. As suggested by Alan Liu, in order to articulate their worth, digital humanists will need to find ways to show that, 'thinking critically about metadata, for instance, scales into thinking critically about the power, finance, and other governance protocols of the world.'[19]

This thesis aims to propose a methodology for the critical study of research tools. It is based on the assumption that tools always make an argument, either on the type of scholarly purposes they support or on their broader socio-political implications. It is the aim of tool criticism to critically respond to these arguments. Second, this thesis also assumes that this argument or purpose can be reconstructed either by examining the interface or by inspecting underlying source code.

In the first chapter we will discuss the conceptualisation of digital humanities tools as theoretical objects. Debates about the scholarly and theoretical nature of tool building lead to

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14 C. Warwick, 'Studying Users in Digital Humanities', in M.M. Terras, J. Nyhan, and C. Warwick (eds), *Digital Humanities in Practice* (London: Facet Publishing in association with UCL Centre for Digital Humanities, 2012).

15 L.M. Hughes, *Evaluating and Measuring the Value, Use and Impact of Digital Collections* (London: Facet Publishing, 2012).

16 F. Moretti, *Graphs, Maps, Trees: Abstract Models for Literary Theory* (London: Verso, 2005); S. Ramsay, *Reading Machines: Toward an Algorithmic Criticism* (Urbana: University of Illinois Press, 2011).

17 See Chapter I.

18 J. McGann, *Radiant Textuality: Literature after the World Wide Web* (New York: Palgrave, 2001).

19 A. Liu, 'Where Is Cultural Criticism in the Digital Humanities?', *Alan Liu*, <http://liu.english.ucsb.edu/where-is-cultural-criticism-in-the-digital-humanities/> (Accessed 28 June 2014); A revised version of this article A. Liu, 'Where Is Cultural Criticism in the Digital Humanities?', in M.K. Gold (ed.), *Debates in the Digital Humanities* (Minneapolis: University Of Minnesota Press, 2012), <http://dhdebates.gc.cuny.edu/debates/text/20> (Accessed 25 June 2014).

realisation that digital humanities tools embed scholarly arguments which can be assessed, for example, through a peer review. More importantly, the conceptualisation of the digital humanities tools as theoretical objects means that they enter the field of humanistic discourse: they can be argued about, analysed and criticised. While the peer-review can address the scholarly arguments of the tools, it does not take into account their broader cultural and socio-political implications. In the second chapter we will argue the relevance of software studies, code studies and platform studies to the digital humanities. These fields perceive software as cultural phenomena and critically address their implications. In the third chapter we will claim that digital humanities tools are specific types of software, because of the scholarly context of their creation, and suggest a methodology to assess the cultural and socio-political arguments made by the digital humanities tools. To illustrate our method we will discuss the user interfaces of the tools and argue that the design of the interface is a reflection on the problem of black-boxing of technologies, which is essentially an epistemological problem in digital humanities. We will conclude by suggesting future directions for tool criticism.

This research is based on qualitative methods, and derives from a broad bibliography and from several personal interviews with practitioners. As this study urges practitioners to interpret and to criticise technologies developed in digital humanities, it addresses humanities scholars rather than anybody else in the field. This work will also be of interest to scholars of new media studies and software studies.

Chapter One

In this chapter, we will discuss the conceptualisation of tool building as a scholarly and theoretical activity. We will then argue that once the tools are conceptualised as having theoretical value, they enter the humanistic discourse as objects to analyse, argue about, and reflect upon. A formal practice of peer-review for tools and projects is one way to critically discuss ('read') digital objects and assess their arguments.

Building tools as a scholarly activity

The conceptualisation of tool development as a scholarly activity, as well as the development of the criticism of academia has roots in the problem of academic recognition and tenure promotion, experienced by many digital humanists.

Digital humanists often complain that they do not get enough recognition for their work, and part of the discussion is built around the traditional academic tenure track. The problem here is to adequately match the results of the digital work to the aspects measured traditionally by institutions assessing academic performance. There are three domains of activity that faculty members engage in: research, teaching, and service. Most value was traditionally attributed to research that led to a publication.[20] So where does the creation of digital archives or development of software go? The situation in which publications play the greatest role in tenure and promotion decisions and in which ancillary digital activities, albeit appreciated, have little impact on the promotion, is not specific for digital humanities. Similar problems are experienced by scholars in other fields, as it was showed in a recent study of scholarly communication in seven disciplines (archaeology, astrophysics, biology, economics, history, music and political science).[21]

There are several initiatives to develop guidelines for recognising digital work as a form of scholarship. Among such are *Guidelines for Promotion and Tenure Committees in Judging Digital Work*, *Guidelines for Evaluating Work in Digital Humanities and Digital Media* by Modern Language Association, or *Tenure Guidelines of the American Association for History and*

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20 M. Kelly, 'Making Digital Scholarship Count', *Edwired*, 13 June 2008, <http://edwired.org/2008/06/13/making-digital-scholarship-count/> (Accessed 9 June 2014); R.M. Diamond, 'Defining Scholarship for the Twenty- first Century', *New Directions for Teaching and Learning*, 2002, 90 (2002), p.73; E.L. Boyer, 'From Scholarship Reconsidered to Scholarship Assessed', *Quest (00336297)*, 48, 2 (1996), p.131.

21 D. Harley et al., *Assessing the Future Landscape of Scholarly Communication: An Exploration of Faculty Values and Needs in Seven Disciplines*, University of California at Berkeley, Center for Studies in Higher Education (Center for Studies in Higher Education, UC Berkeley, 2010), p.8–10, <http://econpapers.repec.org/paper/cdlcshedu/qt15x7385g.htm> (Accessed 20 July 2014).

Computing.[22] Still, in many cases tenure committees remain traditionalistic in understanding scholarship as published research. A striking example is the tenure case of Sean Takats, the director of Research Projects for the Roy Rosenzweig Centrer for History and New Media and the co-director of Zotero, a tool for keeping track of bibliographic data.[23] The view of some members of the committee of the values of digital humanities work was truly narrow, and the credits were given largely on the basis of Takats's monograph in French history. In the committee's official letter, it was stated that 'projects like Zotero et al., while highly valuable, should be considered as major service activity instead.'[24]

Interestingly, there are digital humanists, who also equate scholarship and research. In 2008, in a series of blog posts entitled 'Making Digital Scholarship Count' Mills Kelly makes a distinction between digital 'scholarship' and other kinds of digital 'work'.[25] According to Kelly, scholarship has the following characteristics: it is the result of original research, it has an argument of some sort and the argument is situated in a preexisting conversation among scholars; it is public; it is peer-reviewed; and it has an audience response. Data sets, archives, and software in his view are not scholarship—unless supplemented with a publication. Cathy Davidson, co-founder of the HASTAC alliance (Humanities, Arts, Science, and Technology Alliance and Collaboratory), shares such conservative view, claiming that 'the database is not the scholarship. The book or the article that results from it is the scholarship.'[26]

Over and over, there are calls for broadening the definition of scholarship. Reflecting on Takats's tenure case, Mark Sample suggests a definition of scholarship that is independent from the research/service/teaching distinction: 'A creative or intellectual act becomes scholarship when it is

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22 C.D. Coletta, 'Guidelines for Promotion and Tenure Committees in Judging Digital Work', *Evaluating Digital Scholarship NINES/NEH Summer Institutes: 2011-2012*, <http://institutes.nines.org/docs/2011-documents/guidelines-for-promotion-and-tenure-committees-in-judging-digital-work/> (Accessed 22 June 2014); MLA, 'Guidelines for Evaluating Work in Digital Humanities and Digital Media', *Modern Language Association*, <http://www.mla.org/resources/documents/rep_it/guidelines_evaluation_digital> (Accessed 23 July 2014); 'Tenure Guidelines', *American Association for History and Computing*, <http://theaahc.org/about/tenure-guidelines/> (Accessed 22 June 2014).

23 S. Takats, 'A Digital Humanities Tenure Case, Part 2: Letters and Committees', *The Quintessence of Ham*, 7 February 2013, <http://quintessenceofham.org/2013/02/07/a-digital-humanities-tenure-case-part-2-letters-and-committees/> (Accessed 3 August 2014); *Zotero*, <https://www.zotero.org/> (Accessed 12 June 2014).

24 S. Takats, 'A Digital Humanities Tenure Case, Part 2'.

25 M. Kelly, 'Making Digital Scholarship Count (2)', *Edwired*, 16 June 2008, <http://edwired.org/2008/06/16/making-digital-scholarship-count-2/> (Accessed 9 June 2014).

26 Quoted in M. Kelly, 'Making Digital Scholarship Count (3)', *Edwired*, 27 June 2008, <http://edwired.org/2008/06/27/making-digital-scholarship-count-3/> (Accessed 9 June 2014).

public and circulates in a community of peers that evaluates and builds upon it.'[27] Essentially, the question 'what constitutes scholarship' has been discussed in the U.S. since 1980s in works of such theorists as Ernest Lynton, Ernest Boyer and Eugene Rice. Ernest Lynton, for example, defended professional service as an important form of scholarship and argued its influence on innovation and discovery in scholarly theory and methodology.[28] Similarly, Ernest Boyer and Eugene Rice called for a broader understanding of scholarship and appreciation of the full scope of academic work. Boyer classified scholarship into four basic components, which are inherently interlocked: scholarship of discovery (meaning traditional research), scholarship of integration, scholarship of application, and scholarship of teaching.[29] Therefore, the digital humanities' criticism of the academic definitions of scholarship should be seen in a wider context.

What digital humanities substantially bring to the discussion of scholarship is an understanding of tool building not in terms of service, but as a theoretical activity comparable to research. For major theorists of digital humanities Stephen Ramsay and Geoffrey Rockwell, the question is not whether tool building is scholarship—it certainly is—but, rather, how theoretical insights are implemented into coding.[30] In the next section, we will discuss attempts to conceptualise the theoretical nature of tool building.

Building tools as a theoretical activity

Academy is the context in which scholarly values and standards for knowledge production and dissemination are formed. In every discipline, there are standards for the modes of discourse (statements and arguments), as well as for the forms in which they are formulated (monographs, articles, digital media). Digital humanities are often accused of being undertheorized, and the famous motto 'more hack, less yack!' is often perceived as a neglect of humanistic forms of argument.

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27 M. Sample, 'When Does Service Become Scholarship?', *Sample Reality*, 8 February 2013, <http://www.samplereality.com/2013/02/08/when-does-service-become-scholarship/> (Accessed 3 August 2014).

28 E.A. Lynton, *Making the Case for Professional Service* (Washington: American Association for Higher Education, 1995).

29 E.L. Boyer, 'From Scholarship Reconsidered to Scholarship Assessed', p.131; See also E.L. Boyer, *Scholarship Reconsidered: Priorities of the Professoriate* (Princeton: Carnegie Foundation for the Advancement of Teaching, 1990); E.R. Rice, 'The New American Scholar: Scholarship and the Purposes of the University', *Metropolitan Universities*, 1, 4 (1991).

30 S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities', in *Debates in the Digital Humanities* (Minneapolis: University Of Minnesota Press, 2012), <http://dhdebates.gc.cuny.edu/debates/text/11> (Accessed 10 June 2014).

There is indeed a complex relationship in digital humanities between saying and doing, but it is not what 'more hack, less yack' seems to reflect.[31] The motto appeared within the context of THATCamp—an 'unconference' opposed to the traditional conferences with papers and panels, and much passive listening.[32] THATCamp is essentially an attempt to maximize knowledge transfer through informal, highly participatory, hands-on work. Bethany Nowviskie showed that 'more hack, less yack!' was to a greater extent a motto for THATCamp as alternative to the dominant structure of academic conferences, than a disapproval of the discourse-based humanities scholarship.[33] In other words, 'more hands-on experience, less formalities'. However, digital humanities do challenge traditional discourse-based scholarship. While they do not dispute the division between saying and doing, they argue that doing—building, designing, and coding—is a process of critical inquiry itself, not just the embodiment of the results. Therefore, it is theoretical.

Jerome McGann, the editor of the digital Rossetti *Archive,* distinguishes between theory as 'gnosis' and as 'poeisis'.[34] 'Gnosis' stands for a conceptual undertaking, an imagination of something that one essentially knows. This is the most common type of theorizing in humanities. For example, editors of most critical editions design them on the basis of what they know, or think they know, about the text. 'Poesis', on the contrary, is a construction, a dynamic process that embraces the possibility of imagining the unknown. This means that there is no finite view, but a continuous self-reflection and transformation. Creation of the *Rossetti Archive* has been such imagination of the unknown. Working on a digital format editors found themselves discovering the specificity of the book format, its materiality, its graphic conventions.[35] Technical problems also required constant rethinking and reshaping of the nature of the archive. For example, dealing with the copyright issue, the authors decided to collect the photos that were made in 1860-1920 by Rossetti's contemporaries, among which were pioneers in photography. This turned to be beneficial, making the archive relevant for studying both the history of photography and the history of painting.

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31 N. Cecire, 'Introduction: Theory and the Virtues of Digital Humanities', *Journal of Digital Humanities*, 1, 1 (2011), <http://journalofdigitalhumanities.org/1-1/introduction-theory-and-the-virtues-of-digital-humanities-by-natalia-cecire/> (Accessed 11 June 2014).

32 THATCamp stands for 'The Humanities and Technology Camp'. It is an unconference with informal sessions, ideas for which are proposed by the participants. There are no formal or pre-determined presentations. 'THATCamp | The Humanities and Technology Camp', <http://thatcamp.org/> (Accessed 24 July 2014).

33 B. Nowviskie, 'On the Origin of "Hack" and "Yack"', *Bethany Nowviskie*, 8 January 2014, <http://nowviskie.org/2014/on-the-origin-of-hack-and-yack/> (Accessed 24 June 2014).

34 J. McGann, 'Editing as a Theoretical Pursuit', in *Radiant Textuality: Literature after the World Wide Web* (New York: Palgrave, 2001), p.83.

35 See also J. McGann, 'Dialogue and Interpretation at the Interface of Man and Machine', in *Radiant Textuality: Literature after the World Wide Web* (New York: Palgrave, 2001).

Similar epistemological aspect of building tools is discussed by Willard McCarty. In *Humanities Computing* (2005), he argues that 'analytical computing in the humanities is modelling.'[36] The process of modelling includes having initial knowledge, building of a model, using the model to investigate the subject, and further refinement of the knowledge by iterating the process. Modelling is therefore 'the continual process of coming to know by manipulating things.'[37]

Many digital humanists have argued that the development of tools is based on some theoretical assumptions which can result in decisions about the content, vocabulary, search algorithms, interface design, and data structure. Geoffrey Rockwell, for example, argues that 'a concordancing tool ... might be said to instantiate certain theories about the unity of a text.'[38] The creator of the *Railroads and the Making of Modern America* project, William G. Thomas calls digital archives 'intentional and interpretive'.[39] Jean Bauer in an article with a speaking title 'Who you Calling Untheoretical?' claims eloquently: 'The database is the theory.'[40] The high level of required technical skills and the intellectual nature of the activity cannot be disputed. But is calling the process of building theoretical the same as calling its result a theory? Does building essentially takes place of writing, as it was assumed by Ramsay and Rockwell?[41] In other words, can the tool convey an argument?

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36 J. Unsworth and W. McCarty, 'Modeling: A Study in Words and Meanings', in S. Schreibman and R. Siemens (eds), *Companion to Digital Humanities (Blackwell Companions to Literature and Culture)*, Hardcover., Blackwell Companions to Literature and Culture (Oxford: Blackwell Publishing Professional, 2004), <http://www.digitalhumanities.org/companion/>.

37 W. McCarty, *Humanities Computing* (Hampshire: Palgrave Macmillan, 2005), 28.

38 S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities'.

39 W.G. Thomas, 'What We Think We Will Build and What We Build in Digital Humanities', *Journal of Digital Humanities*, 9 March 2012, <http://journalofdigitalhumanities.org/1-1/what-we-think-we-will-build-and-what-we-build-in-digital-humanities-by-will-thomas/> (Accessed 11 June 2014).

40 J. Bauer, 'Who You Calling Untheoretical?', *Journal of Digital Humanities*, 9 March 2012, <http://journalofdigitalhumanities.org/1-1/who-you-calling-untheoretical-by-jean-bauer/> (Accessed 12 June 2014) This phrase mirrors what Lev Manovich famously said at the Digital Humanities 2007 conference: 'A prototype is a theory. Stop apologising for your prototypes.' Due to its rhethorical power, this phrase has become the sine qua non of any discussion on the subject. We decided to omit it, because without a context, it does not have a clear meaning. For more information see S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities'; S. Ruecker, '22.411 More on Thing Knowledge', *Humanist Discussion Group*, 29 December 2008, <http://lists.digitalhumanities.org/pipermail/humanist/2008-December/006944.html> (Accessed 31 July 2014).

41 S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities'.

Tools as Knowledge

In 2008, Willard McCarty started a thread in the mailing list of *Humanist,* asking: 'Can any such artefact ever stand for itself wholly without written commentary and explanation?' Or, more dramatically put, 'is it knowledge without words?'[42] In response, Stan Ruecker argued that 'there are two questions: is there knowledge without words? and is the knowledge without words the same as the knowledge with words?'[43] These questions are of particular importance, because the way a particular scientific community conceptualises knowledge affects the scholarly community, both in terms of discourse topics, but also in the reward system.

The recent argument in philosophy of science, articulated by Davis Baird in *The Thing Knowledge* (2004), is that physical objects can produce scientific knowledge. His material epistemology for instrumentation rests on the functional account of knowledge, a 'thin conception of function' in terms of Baird.[44] Scientific instruments instantiate five functional roles for the scientific community, which together constitute the function of truth, 'material truth'.[45] These functions are detachment (material models are multi-contextually applicable), efficacy and longevity, connection (they establish a relation between us and the world) and objectivity (the world has priority over their working, not our minds or our wishful thinking). Developing Popper's concept of objective knowledge, Baird insists that scientific instruments can be seen only as a kind of objective knowledge—knowledge maintained by the scientific community but not individually by a given scientist.[46]

The application of this material epistemology to the digital humanities tools is questionable, because the character of knowledge in humanities is different from the knowledge in science, where the concept of objective knowledge makes more sense.[47] What is important in Baird's *Thing Knowledge* for humanities is that it draws attention to the exaggerated focus in academy on studying texts against things, whereas things can 'speak' for themselves, because they represent knowledge. Similar idea was expressed by Tom Scheinfeldt in a tweet: 'DH arguments are encoded

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42 W. McCarty, '22.403 Writing and Pioneering', *Humanist Discussion Group*, 24 December 2008, <http://lists.digitalhumanities.org/pipermail/humanist/2008-December/006935.html> (Accessed 10 June 2014).

43 S. Ruecker, '[Humanist] 22.404 Thing Knowledge', *Humanist Discussion Group*, 26 December 2008, <http://lists.digitalhumanities.org/pipermail/humanist/2008-December/006936.html> (Accessed 23 July 2014).

44 D. Baird, *Thing Knowledge: A Philosophy of Scientific Instruments* (Berkeley: University of California Press, 2004), p.123–125.

45 *Ibid.*, p.119–123.

46 *Ibid.*, p.129.

47 Although those who perceive digital humanities as a scientific form of humanities would probably argue against this statement. Still, the discussion of the nature of knowledge is beyond the scope of this work.

in code. I disagree with the notion that those arguments must be translated / re-encoded in text.'[48] The question is, and it was formulated by Geoffrey Rockwell: 'What if we could read not just the debates about the DH but the actual things?'[49] Thinking of prototypes as theories can mean having the ability to de-code them, analyse them, argue about them, and test them—treat them as objects of humanistic study. In words of McCarty, theory can be understood as something 'for discussing, strengthening or weakening with evidence, testing in various ways.'[50]

The problem of communicating knowledge through artefacts, whether digital or not, and of reconstructing such scholarship is that we are not used to this form of dissemination, and we consequently have difficulties decoding their meaning. From school and university we know how the arguments are conveyed in text, because we have traditionally regarded writing as essential to scholarship.[51] Non-verbal communication is more challenging. We need the captions under an art object in museums with an explanation of its value and novelty. Art history has developed a way to decode art, so there could be a way to decode technologies. Preparing a course on the history of technology, particularly in the Renaissance period at Princeton University, Michael Mahoney realised that the 'primary sources' in his course would be exhibits in museums rather than books: 'Understanding ... ideas meant learning to "read" in a new way'.[52] So, what kind of arguments should we look for in digital tools?

Peer-review as a form of tool criticism

One of the first attempts to develop a framework to critically discuss ('read') digital objects was made by Stan Ruecker and Alan Galey. In *How a Prototype Argues?* (2010) they claimed that because the process of designing can be critical and creative, its result is a form of argument. They find similar conceptualization of the production of artefacts as a hermeneutic process in other disciplines, like design and book history.[53] For Rucker and Galey, to critically address the

48 T. Scheinfeldt, 'DH Arguments Are Encoded in Code. I Disagree with the Notion That Those Arguments Must Be Translated / Re-Encoded in Text.', microblog, *@foundhistory*, 5 November 2011, <https://twitter.com/foundhistory/status/134808062283354112> (Accessed 30 July 2014); For more on that Twitter thead see N. Cecire, 'Such Blogging Fail', *Works Cited*, 11 November 2011, <http://nataliacecire.blogspot.nl/2011/11/such-blogging-fail.html> (Accessed 14 June 2014).

49 G. Rockwell, 'Making Theoretical Things in the Digital Humanities' (HUMlab, Umeå University, 2012), <http://stream.humlab.umu.se/?streamName=theoretical_things> (Accessed 21 May 2014).

50 S. Ruecker, '[Humanist] 22.404 Thing Knowledge'.

51 S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities'.

52 M.S. Mahoney, 'Reading a Machine: Program in History of Science, Princeton University', 1999, <https://www.princeton.edu/~hos/h398/readmach/modeltfr.html> (Accessed 28 July 2014).

53 A. Galey and S. Ruecker, 'How a Prototype Argues', *Literary and Linguistic Computing*, 25, 4 (2010), p.412.

hermeneutic potential of tools means to peer-review them. The authors fail to explain why they choose this form of criticism, but their further reasoning is based on this decision, what makes process slightly confusing. They discuss the formal criteria for reviewing arguments of digital artefacts, the problem of authorship, the conditions for starting a peer-review, the right phase of the tool development to make a peer-review, etc. The condition for reviewing a prototype is a conclusion that the tool is intended to make an argument. The authors do not provide a guide to finding such intention, which is a serious omission. Intention is a problematic concept in humanities in general, and especially in literary or film studies, where the question 'What did the author mean?' is a long-time stumbling block.[54] In the academy, the reason for a peer-review is fact that the work is sent to a peer-reviewed journal. It is possible that Ruecker and Galey solved the question of intention by limiting themselves to the tools designed in 'the research mode', where the original intention is clearer than in 'the service mode' tools.[55] Each prototype they discuss 'already looks like scholarship', in words of Ramsay and Rockwell.[56] Indeed, the three case studies for the peer-review are experimental tools:Stefanie Posavec's *Literary Organism*, W. Bradford Paley's *TextArc*, and Adrian Cheok's *Poultry Internet.*[57] The two first tools are essentially experiments in visualisations of texts, whereas Cheok's complex software-hardware object as an experiment in virtual reality communication between humans and animals, and including it into their analysis Ruecker and Galey tried to show the flexibility of their approach.

The questions that Ruecker and Galey suggest for peer-reviewers can provide a base for a constructive peer-review, as well as for other types of criticism. They raise some important issues, like the problem of authorship in case of collaborations, or the necessity to putt the tools in a wider context of similar endeavours, which is indeed lacking in digital humanities discourse. The checklist questions are:

- Is the arguments reified by the prototype contestable, defensible, and substantive?
- Does the prototype have a recognizable position in the context of similar work, either in terms of concept or affordances?

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54 Especially after famously declared 'death of the author'. See R. Barthes, 'The Death of the Author', in S. Heath (ed.), *Image, Music, Text: Essays* (London: Fontana Press, 1977).

55 A. Galey and S. Ruecker, 'How a Prototype Argues', p.407.

56 S. Ramsay and G. Rockwell, 'Developing Things: Notes toward an Epistemology of Building in the Digital Humanities'.

57 Posavec's work has been renamed to 'Writing Without Works' S. Posavec, 'Writing Without Words', *Stefanie Posavec*, 2007, <http://www.stefanieposavec.co.uk/-everything-in-between/> (Accessed 2 August 2014); W.B. Paley, 'TextArc: Showing Word Frequency and Distribution in Text. Poster.', in *IEEE Symposium on Information Visualization*, Vol. 2002 (2002); K.S. Teh, S.P. Lee, and A.D. Cheok, 'Poultry.Internet: A Remote Human-Pet Interaction System', in *CHI '06 Extended Abstracts on Human Factors in Computing Systems*, CHI EA '06 (New York, New York: ACM, 2006), <http://doi.acm.org/10.1145/1125451.1125505> (Accessed 2 August 2014).

- Is the prototype part of a series of prototypes with an identifiable trajectory?
- Does the prototype address possible objections?[58]

The problem is that the authors do not follow their own guidelines. Questions about the context of similar work, or about the original contribution to knowledge, are either not covered or covered lightly (about TextArc they just say that it represents 'a striking departure from earlier concordancing approaches'[59]). Further confusion arises from their claim that experimental digital prototype conveys 'an argument about designing interfaces'.[60] This is relevant for the two visualisation tools, where the arguments are 'an infographic can be beautiful as well as meaningful', or 'prospect on the entire text is worthwhile.'[61] The choice of a particular visual form (tree in the *Literary Organism*, circle in *TextArc*) are logically seen as consequential argument, contestable in the context of symbolic meaning of visual structures. However, the arguments found in *Poultry Internet* are essentially different: 'technology should be used to intervene in cases of previous inhumane action' or 'technology should support animal-human relationships.'[62] The first two prototypes are studied from the perspective of aesthetics, the third one is perceived as conveying an ethical argument. Cheok's project argues about the aesthetics too, for example through the design of the 'pet dress'. Why do Ruecker and Galey limit themselves with a perspective? Moreover, their attempt for peer-reviewing such a complex software-hardware object is problematic, because their expertise in the field is questionable. Do they essentially have enough understanding of the technology for a peer-review?

Ruecker and Galey did not perform a peer-review the tools in a strict sense. What is important in Ruecker and Galey's work is that they argued that the tool can speak for itself, thus undermining the role of written project reports as the dominant source of knowledge. Suggesting that an artefact can be subjected to peer-review means justifying it as form of scholarly knowledge, and placing it in a wider scholarly context. Far from being a formal peer-review, Ruecker and Galey's endeavour is rather an exercise of thought, and a call for building tools more critically as well as learning to 'read' them critically.[63] For an academic peer-review, a higher degree of formalisation is needed, with a fixed sequence of guidelines and a certain level of expertise of the reviewer.

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58   A. Galey and S. Ruecker, 'How a Prototype Argues', p.414.

59   *Ibid.*, p.416.

60   *Ibid.*, p.405.

61   *Ibid.*, p.415.

62   *Ibid.*, p.420.

63   Alan Galey's own work 'Visualizing Variation' is a strong example of such critical building. It is a code library of visualization prototypes for textual scholars to use in digital editions and other born-digital objects. A. Galey, *Visualizing Variation*, <http://visualizingvariation.ca/> (Accessed 4 August 2014).

In some fields, the tradition of peer-reviewing digital objects was established for over a decade, for example of peer-reviewing learning designs or learning objects.[64] In the digital humanities such practices are only developing. Reviews of tools appear in some journals, for example in the Journal of Digital Humanities.[65] 'Programming Historian' is an outstanding platform with reviews and tutorials for humanists on digital tools and techniques.[66] A tradition of reviewing digital editions developed into a formalisation set of criteria.[67] The launch of the first journal dedicated to scholarly digital editions and resources manifests a new stage of incorporating digital objects into an academic discourse. A review journal, RIDE, was launched under the roof of the Institute of Documentology and Scholarly Editing (IDE) in Germany in June 2014.[68] The rationale behind this initiative is making digital editions and resources more visible and providing a platform for experts to evaluate and discuss current practices, what is supposed to help improve them and advance future developments. The novelty is to evaluate not only traditional aspects of editions, but also the methodology and technical implications. The detailed guidelines for reviewing scholarly digital editions were developed within IDE in 2012-2014.[69] They articulate the most crucial issues that arise in the context of digital editions. The criteria for evaluation of a digital edition include such issues as 'subject and content of the edition', 'aims and methods'—technical decisions about of text modelling should be discussed along with scholarly objectives, mission and method,—and 'publication and presentation', the largest section for evaluation. There the questions mostly concern usability and technical characteristics of the publication (sustainability, metadata, licences, etc.). In the conclusion, reviewers are asked to decide whether the project can be classified as a 'Scholarly Digital Edition': as an SDE it should fulfil some of the minimal requirements, like the justification of the editorial method, the compliance with scholarly requirements towards content and quality,

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64 See, for example, P.G. Taylor and A.S. Richardson, *Validating Scholarship in University Teaching: Contstructing a National Scheme for External Peer Review of ICT-Based Teaching and Learning Resources*, Report (Commonwealth of Australia, 2001), <http://eprints.qut.edu.au/10712/> (Accessed 3 August 2014).

65 See, for example S. Graham and I. Milligan, 'Review of MALLET, Produced by Andrew Kachites McCallum', *Journal of Digital Humanities*, 2, 1 (Winter) (2012), <http://journalofdigitalhumanities.org/2-1/review-mallet-by-ian-milligan-and-shawn-graham/> (Accessed 24 June 2014).

66 'The Programming Historian', <http://programminghistorian.org/about> (Accessed 4 August 2014).

67 An example of a review of digital edition is, for example,A. Ciula, 'The New Edition of the Letters of Vincent van Gogh on the Web', 4, 2 (2010), <http://www.digitalhumanities.org/dhq/vol/4/2/000088/000088.html> (Accessed 3 August 2014).

68 'About | RIDE', <http://ride.i-d-e.de/about/> (Accessed 2 August 2014).

69 P. Sahle, 'Criteria for Reviewing Scholarly Digital Editions, Version 1.1 / Kriterien Für Die Besprechung Digitaler Editionen, Version 1.1', M. Broughton et al. (trans.), *Institut Für Dokumentologie Und Editorik*, June 2014, <http://www.i-d-e.de/aktivitaeten/reviews/criteria-for-reviewing-scholarly-digital-editions-version-1-1> (Accessed 8 July 2014).

and the embracement of the 'digital paradigm' on the level of editorial concept. It is also worth noting that this journal does not provide peer-reviews of the editions in a strict sense. The creators of the editions are not sending their work for peer-review, rather the editorial board of RIDE is interested in reviews of some projects and seeks volunteer assistance.

Along with some tenure and promotion guidelines, these criteria formed a basis for the reviews of the DHCommons journal, which is expected in the autumn 2014: 'For DH scholars, the *DHCommons* review will compare in prominence to a peer-reviewed article.'[70] To have their project peer-reviewed, its authors are required to submit a project statement that will be taken into consideration along with the actual project. The fact that such written accompaniment is required makes an important statement. Ruecker and Galey denied the ability of designers and programmers to analyse their tool, because 'they are not always best critics of their own work.'[71] Boyers, on the contrary, astutely claimed that when it comes to evidence of scholarly performance, 'the first and most essential source of evidence is the scholar, the one who has actually done the work.'[72] The project statement is the long-awaited self-reflection, not substituted by project reports or specialised papers. The necessity to articulate some issues in words does not undermine the theoretical value of an artefact. In this statement, authors should provide a brief history of the project and a review of related projects, formulate its aims and objectives, articulate its value and methodology, describe the process of development, discuss issues, etc. The review will then consist of two sections, one will be published alongside the authors' statement and the second will be prepared privately for the authors to help them develop the project and will consist of comments and suggestions. The three categories of evaluation include 'contribution', 'presentation' and 'preservation'. Interestingly, presentation issues received a separate section, as a move from form/content divide toward understanding the critical interventions made by the digital. The questions therefore confront the methodological and scholarly aims of projects rather than usability issues:
Does the interface effectively communicate and facilitate the goals, purpose, and argument of the project?

- How do the design and content elements of the project interact and integrate with one another?

- Discuss usability of the interface(s) from the perspective of a reader/researcher.[73]

As Ruecker and Galey, and the editors of RIDE, the authors of these review guidelines address the ways digital tools advance contemporary discussions within scholarly fields. Similarly, McCarthy

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70 'DHCommons Journal', <http://dhcommons.org/journal> (Accessed 5 July 2014).

71 A. Galey and S. Ruecker, 'How a Prototype Argues', p.414.

72 E.L. Boyer, 'From Scholarship Reconsidered to Scholarship Assessed', p.138.

73 'DHCommons Journal'.

claimed that an artefact can qualify as research output, if its particular contribution to some field or fields of knowledge is self-evident.[74] The evaluation of the contribution to the field can solve the problem of the opposition between 'research' and 'service' tools.

The development of the peer-review for digital tools and projects signify an important achievement of the academy: the formal recognition of the theoretical value of digital objects. Apart from further institutionalization of digital work in terms of tenure and promotion, this will help make building of the digital tools more self-reflective, make digital objects more visible in the field of academic discourse.

In this chapter, we have argued that the question whether tool building is a scholarly activity is not merely a problem of tenure and promotion, but it is grounded in the fundamental question of knowledge production in the humanities. Digital humanities claim that doing is a process of critical inquiry itself. Its result is then perceived as a theoretical object that can convey an argument. This essentially means that digital tools enter the humanistic discourse. Just as traditional articles or monographs-'knowledge with words'—digital humanities tools can be critically addressed, analysed and argued about, for example, through a peer-review.

However, critical engagement with the tools is not limited to peer-reviews, tutorials, or any other kind of review. When Galey and Ruecker refer to Langdon Winner's article 'Do artifacts have politics?' (1980) they use it to illustrate their thought that the process of design is an interpretative act, critical and creative.[75] Winner claims that technologies in themselves have political properties, either intentional or unintentional. The problem is that they do not necessarily reveal an act of critical thinking. In the example of Robert Moses's design for Long Island's expressways—with overpasses too low for buses—the design reflected Moses's social-class bias and racial prejudice: automobile owners, mostly white, would be free to use the road, whereas poor people and blacks were in this way kept off the roads.[76] In the example of city structures unsuited for the handicapped, such design arose more 'from neglect than from active intention.'[77] Designs are political. This is the issue that does not truly fit into the framework of a peer-review—such arguments are hidden from the view. In the next chapter, we will discuss a way to approach the socio-political implications of the technologies.

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74 W. McCarty, '22.406 More on Thing Knowledge', *Humanist Discussion Group*, 27 December 2008, <http://lists.digitalhumanities.org/pipermail/humanist/2008-December/006939.html> (Accessed 31 July 2014).

75 A. Galey and S. Ruecker, 'How a Prototype Argues', p.406–407; L. Winner, 'Do Artifacts Have Politics?', *Daedalus*, 109, 1 (1980).

76 L. Winner, 'Do Artifacts Have Politics?', p.123.

77 *Ibid.*, p.125.

Chapter II

In the previous chapter, we have discussed Ruecker and Galey's attempt to apply critical analysis to the tools as distinct theoretical objects, and have showed that the format of peer-review does not address socio-political implications of the tools. In this chapter, we will argue that software studies offer critical approach to digital tools that combines an analysis of their technical protocols with cultural criticism.

Software is the Message

Marshall McLuhan's famous declaration that 'the medium is the message' has been influential in drawing attention to the materiality and intrinsic features of technologies as opposed to their contents. He also draws attention to the impact technologies have on society. His media theory is developed in *Understanding Media: The Extensions of Man* (1964).[78] McLuhan uses the terms 'media' and 'technologies' synonymously, as 'any extension of ourselves': physical, social, psychological, or intellectual.[79] The wheel is an extension of feet, the phone extends our voice, or language is an extension of inner consciousness. The 'content' of any medium is always another medium, for instance print is the content of the telegraph, while written word is the content of print. As for the 'message' of the medium, it is 'the change of scale or pace or pattern that it introduces into human affairs.'[80] In Part II McLuhan analyses different media and their impact on society. He discusses, for instance, the spoken and the written word, and numbers, as well as roads, clothing, clocks and television.

Essentially, McLuhan discussed media that were commonly used by people historically and in his times, and thus computers were out of his sight. Nowadays, when digital technologies are used in nearly every sphere of our lives, from complex systems inside cars to the word processors, their cultural and social effects are reflected upon by many authors from many fields of expertise: Lawrence Lessig, Katherine Hayles, Manual Castells, and Eli Parison, to name a few.[81] However, even within such IT-oriented fields like cyberculture studies, game studies, or new media studies, software as a distinct subject has received little attention. In words of Noah Wardrip-Fruin, 'writings

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78 Originally published in 1964 by Mentor, New York. M. McLuhan, *Understanding Media: The Extensions of Man* (Cambridge: MIT Press, 1994).

79 *Ibid.*, p.7.

80 *Ibid.*, p.8.

81 L. Lessig, *Code: And Other Laws of Cyberspace* (New York: Basic Books, 2000); K. Hayles, *Writing Machines* (Cambridge, Mass.: MIT Press, 2002); M. Castells, *The Internet Galaxy: Reflections on the Internet, Business, and Society* (Oxford: Oxford University Press, 2002); E. Pariser, *The Filter Bubble: What the Internet Is Hiding from You* (New York: Penguin Press, 2011).

on digital media almost all ignore something crucial: the actual processes that make digital media work, the computational machines that make digital media possible.'[82]

The notion that software is a cultural phenomenon, and that it is important to study it, has been articulated most explicitly by Lev Manovich in *Language of New Media* (2001) and in the latest *Software takes Command* (2013).[83] He draws attention to the fact that 'software as a theoretical category' has been invisible to most academics, artists, and cultural professionals interested in IT.[84] Manovich understands 'software' broadly, including social network services and social media technologies in it.[85] For all applications that are the visible to users, he introduces the term 'cultural software'—essentially, it gives access to culture.[86] It also influences the culture by shaping and adjusting everything it is applied to, like communication, analysis, writing, representation, or contemporary techniques of control. That software is 'our interface to the world' also means that the actual content (digital data) is not accessible to our senses, and the properties of all digital media (images, videos, electronic text) are essentially governed by the properties of a particular software.[87] Or, put more provocatively: 'There is no such thing as "digital media". There is only software.'[88]

Manovich's ideas have been instrumental in the development of new fields like software studies, critical code studies and platform studies. In order to understand modern culture and society it is necessary to investigate code, software architectures and interfaces.[89] In analysing software and hardware in relation to the culture and society, these fields are, in words of Matthew G. Kirschenbaum, 'where computer science and cultural studies collide.'[90]

Software studies have a broad definition of software. In *Behind the Blip* (2003) Matthew Fuller, one of the first theorists of software studies, calls for 'theorisations of software that are able to operate on the level of a particular version of a program, a particular file structure, protocol, sampling algorithm, colour-scheme, API, Request For Comment, and so on.'[91] Like in many interdisciplinary fields, there is no shared methodology in software studies, various approaches

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82 N. Wardrip-Fruin, *Expressive Processing: Digital Fictions, Computer Games, and Software Studies*, Software Studies (Cambridge, Mass: MIT Press, 2009), 3.

83 L. Manovich, *The Language of New Media* (Cambridge: MIT Press, 2001).

84 L. Manovich, *Software Takes Command: Extending the Language of New Media* (London: Bloomsbury Publishing, 2013), 8.

85 *Ibid.*, p.6.

86 *Ibid.*, p.7.

87 *Ibid.*, p.2.

88 *Ibid.*, p.152.

89 Matthew Fuller puts this more provocatively: 'All intellectual work is now "software study"'. *Ibid.*, p.11.

90 M. Kirschenbaum, 'Where Computer Science and Cultural Studies Collide.', *Chronicle of Higher Education*, 55, 20 (2009).

from humanities, cultural criticism, and social sciences can be applied. The flagship publication of the field, *Software Studies: A Lexicon* (2008), consists of thirty-nine entries from authors with different fields of expertise: art and design, literary theory, computation and computer scientists.[92] For Fuller, as an editor, the form of a lexicon created the possibility to include thinkers from all fields currently concerned with culture and media and provide pathways into the subject of software rather than strive to depict a whole.[93] All authors are, however, involved in the production of software as well as in thinking about it

Thinking about software 'in wider terms' takes various forms.[94] Manovich, for example, paints a large-scale picture of software's impact on society and culture, examining how computers became cultural machines and how software has been central to reshaping practices of media creation and editing.[95] Manovich's primary interests are media contents: tweets, messages, photos in social media, professional designs, and video games.[96] , to which he applies 'cultural analytics'. Since media are shaped by the software, he finds it essential to study it. For him, understanding software means discussing its genealogy, anatomy (interfaces and operations), and its practical and theoretical effects.[97] For instance, a detailed analysis of Photoshop and Adobe's After Effects is incorporated into the discussion of the development of modern aesthetics of visual design.[98]

Matthew Fuller's 'software criticism' is concerned with ways to and release 'the unexpected' of software and undermine the existing 'software oligopolies'—dominant software companies that impose their totalitarian constraints.[99] Using Deleuze and Guattari's idea of a conceptual personae, he calls for understanding software as a form of digital subjectivity that both interprets and shapes the processes. For Fuller theorising about software is closely related to making software. He distinguishes three forms of software that break free from any preformatted uniformity: critical software, social software and speculative software. Critical software draws attentions to the phenomenon of norm in software. For instance, it reveals the underlying construction to the user through fundamental modifications of existing software, like the famous Jodi's SOD, which is an

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91 M. Fuller, 'Behind the Blip: Software as Culture (Some Routes into "Software Criticism," More Ways Out)', in *Behind the Blip: Essays on the Culture of Software* (Brooklyn, NY, USA: Autonomedia, 2003), 17.

92 M. Fuller (ed.), *Software Studies: A Lexicon* (Cambridge: MIT Press, 2008).

93 *Ibid.*, p.8–9.

94 *Ibid.*, p.10.

95 L. Manovich, *Software Takes Command: Extending the Language of New Media*.

96 'Software Takes Command: An Interview with Lev Manovich', *Rhizome.org*, <http://rhizome.org/editorial/2013/jul/10/lev-manovich-interview/> (Accessed 6 August 2014).

97 L. Manovich, *Software Takes Command: Extending the Language of New Media*, p.124.

98 *Ibid.*, p.243–323.

99 M. Fuller, 'Behind the Blip: Software as Culture (Some Routes into "Software Criticism," More Ways Out)', p.11.

artistic modification of the action game Wolfenstein 3D.[100] Social software, like the one produced within the Free Software movement, problematises the power relations involved in the development of the software and interrogates the implicit politics of software. The third type of software, speculative software, explores the possibilities of programming and provides a space for the user to re-evaluate the possibilities of software and add critical analysis to traditional software by challenging the institutions that produce them. And while it is the most important type of software —in the sense of impact others provide only something small, 'a little nothing'—it is the least developed.[101] Fuller's own work towards speculative design is, for example, The Web Stalker, a browser for the World Wide Web that gives the user control over the Web document.[102]

Another influential software studies theorist, Noah Wardrip-Fruin, is interested in general algorithms of software. In *Expressive Processing* (2009) he understands design as an expression of processes, and claims that understanding principles of digital media helps understand how similar larger, more powerful, and generally, closed-source algorithmic processes function.[103] Thus, knowledge about AI techniques in the context of computer games can give insights on similar techniques in more complicated and socially important software, for example, in surveillance systems.[104]

Critical code studies are closely related to software studies, but attuned to the level of the code rather than the program. As Mark Marino suggests 'to begin to analyse and explicate code as a text, as a sign system with its own rhetoric, as verbal communication that possesses significance in excess of its functional utility.'[105] In other words, this approach suggests reading code as a work of literature. Its flagman publication is the book entitled '10 PRINT CHR$(205.5+RND(1)); : GOTO 10' (2013).[106] This book takes a single line of code, the one inscribed in the title, and uses it as a lens through which to see culture, technology, society, and economics. The authors claim that even single characters in that line of code, like the semicolon, can yield surprising finds.[107] For instance,

100 *Jodi SOD* (2013), <http://www.youtube.com/watch?v=24KQiy0U_Uk&feature=youtube_gdata_player> (Accessed 7 August 2014).

101 M. Fuller, 'Behind the Blip: Software as Culture (Some Routes into "Software Criticism," More Ways Out)', p.28.

102 M. Fuller, 'A Means of Mutation: Notes on I/O/D 4: The Web Stalker', in *Behind the Blip: Essays on the Culture of Software* (Brooklyn, NY, USA: Autonomedia, 2003), p.59.

103 N. Wardrip-Fruin, *Expressive Processing*.

104 *Ibid.*, p.5.

105 M.C. Marino, 'Critical Code Studies', *Electronic Book Review* (2006), <http://www.electronicbookreview.com/thread/electropoetics/codology> (Accessed 22 June 2014).

106 N. Montfort (ed.), *10 PRINT CHR$(205.5+RND(1));:GOTO 10*, Software Studies (Cambridge, Mass: MIT Press, 2013).

107 M. Sample, 'Ready: 10 PRINT CHR$(205.5 RND(1)); : GOTO 10', *Sample Reality*, 4 December 2012, <http://www.samplereality.com/2012/12/04/ready-10-print-chr205-5rnd1-goto-10/> (Accessed 4 August 2014).

discussing the 'RND' command, authors use the examples from art, music and literature—work's of George Brecht, John Cage, and William Burroughs—to describe the creative power of randomness.[108]

Among the three fields, platform studies are least developed. Essentially, 'platforms studies' is the title of the MIT Press series, edited by media studies professors Nick Montfort and Ian Bogost. According to Montfort and Bogost, 'platform studies investigates the relationships between the hardware and software design of computing systems and the creative works produced on those systems.'[109] With only four books published within the series it is difficult to judge the input of this field. Most publications discuss game consoles, such as the Atari Video Computer System or Nintendo Wii, and are closely related to the field of game studies.[110]

We have shown that there is no single methodology in software, platform and code studies. There are two main assumptions that characterize this approach. First, there is a belief that software, as well as hardware, is not neutral but essentially political, and it unnoticeably shapes and influences our experience and culture. The second assumption is that the algorithms, code, systems and protocols of technologies are not less, or even more meaningful than their content (texts, tweets, images, etc.) and their study is beneficial for understanding the socio-cultural effects of technologies.

Normally software, code and platform studies are excluded from discussions of the digital humanities.[111] Much is dependent upon the definition of digital humanities, and since we understand digital humanities broadly and claim that the critical study of the technologies is a feature of digital humanities, software studies et al. can be associated with the field of digital humanities, and can add to the discussion of digital humanities tools. While the theoretical value of digital tools and their theoretical arguments have been addressed, for example in the practice of peer-review, the social, cultural and political implications of tools are usually left unnoticed. In the next chapter we will suggest a critical approach to digital humanities tools that embraces their socio-political aspects rather only focuses on the objectives that they serve.

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108 N. Montfort (ed.), *10 PRINT CHR$(205.5+RND(1));*, p.124.

109 'Platform Studies', <http://platformstudies.com/index.html> (Accessed 22 June 2014).

110 N. Montfort, *Racing the Beam: The Atari Video Computer System*, Platform Studies (Cambridge, Mass: MIT Press, 2009); S.E. Jones, *Codename Revolution: The Nintendo Wii Platform*, Platform Studies (Cambridge, Mass: MIT Press, 2012).

111 A. Liu, 'The State of the Digital Humanities. A Report and a Critique', *Arts and Humanities in Higher Education*, 11, 1–2 (2012), p.10.

Chapter III

This chapter will argue the specificity of digital humanities tools and suggest a critical approach to them. We will show that tools always make an argument, either on the type of scholarly purposes they support or on their broader socio-political implications. Conceptualising the interface and the open code, we will argue that these implications can also be on the nature of scholarly research. Anticipating certain types of scholarly use, digital humanities tool essentially shape the user experience without the user being aware of that. t is the aim of tool criticism to decode these arguments through an examination of the components of tools (interface, source code, algorithms, etc.).

Towards digital humanities tool criticism

Software, platform and code studies have significantly broadened the horizon of humanistic enquiry by conceptualising software as a theoretical category and by approaching single instances of technology critically.[112] For digital humanists, reflecting on technologies is often a by-product of their main research. Jerome McGann's work on the *Rossetti Archive* is illustrative in this respect: initially an inquiry into the nature of textuality, it soon became a meditation on the logic and structure of digital archives, coding languages, and digital image processing.[113] Recently, David Berry encouraged the computational turn in the digital humanities, characterized by 'looking at the digital technologies in the light of their medium specificity, and thinking about the ways medial changes produce epistemic changes.'[114] For Berry, this mostly means envisioning the potentialities of software, reflecting on the new possible modes of collective knowledge that the software can enable or constitute, new ways of reading and writing.[115]

So far, however, existing digital humanities tools have not been a subject of a distinct critical inquiry, although they certainly qualify as 'cultural software' in terms of Manovich.[116] Is there something that distinguishes these technologies? On the first sight, the developments in digital humanities are largely dependent on existing technologies. No special coding languages have been

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112 L. Manovich, *Software Takes Command: Extending the Language of New Media*, p.9.

113 J. McGann, 'Rethinking Textuality', in *Radiant Textuality: Literature after the World Wide Web* (New York: Palgrave, 2001), p.141.

114 D.M. Berry, 'The Computational Turn: Thinking About the Digital Humanities', *Culture Machine*, 12, 0 (2011), <http://www.culturemachine.net/index.php/cm/article/view/440> (Accessed 22 June 2014).

115 *Ibid.*, p.8.

116 There are, of course, exceptions, like M. Cohen, 'Design and Politics in Electronic American Literary Archives', in A.E. Earhart and A. Jewell (eds), *The American Literature Scholar in the Digital Age*, Editorial Theory and Literary Criticism (Ann Arbor: University of Michigan Press and University of Michigan Library, 2011), p.229–50.

created for the humanities, and practitioners manage with, for instance, R, Perl and XML.[117] Search engines are often developed from Google's algorithms.

While this is true, there are several aspects that distinguish digital humanities tools from other software. First, there is potential for producing new types of digital objects, due to the fruitful collaboration between humanists, computer scientists and designers in the digital humanities. There are initiatives that think about what would humanistic software look like. As visual theorist and cultural critic Johanna Drucker notices, it is commonly used platforms and protocols are created by disciplines 'whose epistemological foundations and fundamental values are at odds with, or even hostile to, the humanities' and therefore called for 'humanistic computing at the level of design, modelling of information architecture, data types, interface, and protocols'.[118]

Visualisations is the one direction where the collaboration is especially fruitful. Drucker has called for a humanities approach to the graphical expression of interpretation.[119] She draws the attention to the fact that often the spatial and temporal modelling is done without taking the social, cultural and experiential aspects into account. In humanities, however, space and time are understood as constructs, not givens. In 'Humanities Approaches to Graphical Display' (2011) she claims that incorporating the ambiguity and subjectively of information in humanities is possible if 'data' instead of being given is understood as 'capta', taken, against data as 'given'. This will extend information visualization to the level of graphical expressions of interpretation.[120] Drucker's SpecLab, a digital humanities laboratory at the University of Virginia, has been the place for such experimentation with visualisation techniques.[121]

Another specificity of digital humanities tools as unique digital objects is their theoretical nature, which we have discussed earlier. Doorknobs can have politics in that they presume and construct different kinds of worlds, as it was noted by Ruecker and Galey, and so does software.[122] However, unlike the designers of doorknobs, expect in the field of critical design, the creators of digital humanities tools argue for the theoretical nature of their work and its rhetorical force.[123] This

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117 Of course, TEI has been developed for the purposes of humanities, but it exploits the features of XML and cannot be compared to a distinct coding language.

118 J. Drucker, 'Humanistic Theory and Digital Scholarship', in M.K. Gold (ed.), *Debates in the Digital Humanities* (Minneapolis: University Of Minnesota Press, 2012), <http://dhdebates.gc.cuny.edu/debates/text/34> (Accessed 25 June 2014).

119 *Ibid.*

120 J. Drucker, 'Humanities Approaches to Graphical Display', 5, 1 (2011), <http://www.digitalhumanities.org/dhq/vol/5/1/000091/000091.html> (Accessed 6 August 2014).

121 J. Drucker, *SpecLab Digital Aesthetics and Projects in Speculative Computing* (Chicago: University of Chicago Press, 2009).

122 A. Galey and S. Ruecker, 'How a Prototype Argues', p.407.

123 J. Bauer, 'Who You Calling Untheoretical?'.

means that all constituent parts of software: interfaces, databases, algorithms—are, ideally, carefully considered and can therefore be critically assessed, either in the form of peer-review (for the scholarly purposes), or cultural criticism of the tools (for broader socio-political implications). The latter can draw attention to the lack of self-reflection on cultural and political aspects of tool building. Critical, social, or speculative software, described by Fuller, aim to reveal the imposed structures, and this approach can be applied in the development of digital humanities tools.[124]

Moreover, the scholarly environment in which digital humanities projects are developed is important, because they have direct impact on the research practices. Knowledge shapes tools and tools shape knowledge. Functionality of tools reflects the theoretical practices in the field. For instance, after McGann's deformation, or Ramsay's concept of 'screwing around', became an applicable theory in text analysis, text analysis tools enhanced the text analysis functions with the support for 'playing around'.[125] Thus, visualisation tools have become integral to text analysis tools, and nearly every digital humanities make use of word-cloud generators and other visualisation forms. This is of course a twofold process, and tools shape the knowledge production too. For example, over the last decades, TEI has become the default text-encoding format for digital editions. However, it imposes a model of text as a linearly structured object, and shapes the possible operations with the text. This is by no means the only possible understanding of textuality. The universal application of TEI determines the common research methods and practices in the field of literary studies.

From the practical point of view, the academic environment matters, because success and usability of tools largely depend on the institutional support for the construction of digital humanities projects.[126] Funding institutions and large-scale infrastructures that support the production, like DARIAH and CLARIN, influence the directions of the development of tools as well as set the requirements for them, like scalability, APIs, metadata, etc.

Alan Liu connected the impossibility for digital humanities to take up 'their full responsibility' partly with the lack of 'focus on the specifically institutional... issues at stake.'[127] Our proposal for digital humanities tool criticism is the call for embracing the specificity of the scholarly development of the digital humanities tools and projects. The arguments encoded in tools are either on the type of scholarly purposes they support or on their broader socio-political

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124 See Chapter II, p.22

125 A. Liu, 'The State of the Digital Humanities', p.23.

126 C. Warwick et al., 'The Master Builders: LAIRAH Research on Good Practice in the Construction of Digital Humanities Projects', Proceedings paper, *Digital Humanites 2007: The 19th Joint International Conference of the Association for Computing in the Humanities and the Association for Literary and Linguistic Computing. University of Illinois, Urbana Champaign, June 4-8, 2007*, 2007, <http://discovery.ucl.ac.uk/4807/> (Accessed 28 July 2014).

127 A. Liu, 'The State of the Digital Humanities', p.11.

implications. They essentially construct ways of seeing, knowing, and doing—but without often scholars recognising this. Following the principles of software studies, we will focus on single instances of tools and reconstruct some of their political implications of the tools by analysing their user interfaces.

Interfaces

User interface is he space where interactions between humans and machines occur. McGann writes:

> There can be no data without structure, and all structure is interface, whether we view it as a screen appearance or not... Even more importantly, all interfaces—visible as well as invisible —are interpretational forms.[128]

Indeed, no structure or order of information is neutral.[129] In digital humanities, as well as in library studies, the subjective, interpretive aspect of structuring the information, has been excessively conceptualised.[130] This largely correlates with the discourse of argumentative power of artefacts, and the statements like 'database is the theory' are illustrative.[131] Interfaces are interpretative in two senses. First, there are the arguments that correlate with the scholarly purposes. For example, *The Invisible Australians (*2011) is a cultural-critical project of a digital historian Tim Sherrat and its interface is an essential part of the argument.[132] The project addresses the discriminatory policies of White Australia Policy administration in the beginning of the twentieth century. Non-white residents were obliged to have a certificate with a photograph, and the National Archives of Australia's has a big database of such certificates. Sherrat made these photographs the crux of the interface. They are literary windows onto people's lives, linking to copies of the original certificates and to the collection database of the National Archives. Sherrat claims that as the *Remember me* project of the US Holocaust Memorial Museum, his project is about 'finding the oppressed, the vulnerable ... and giving them their place in history.'[133] For tools that do not directly engage in cultural criticism, the functionalities of the interface constitute the scholarly argument. McGann

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128 J. McGann, 'Introduction', in J. McGann (ed.), *Online Humanities Scholarship: The Shape of Things to Come* (2010), <http://cnx.org/contents/3d5747d3-e943-4a39-acf9-beb086047378@1.3:1> (Accessed 23 July 2014).

129 See, for example, G.C. Bowker and S.L. Star, *Sorting Things out: Classification and Its Consequences* (Cambridge, Mass.: MIT Press, 1999).

130 For debates in library studies, see G.J. Leckie, L.M. Given, and J.E. Buschman, *Critical Theory for Library and Information Science: Exploring the Social from Across the Disciplines* (Santa Barbara: ABC-CLIO, 2010).

131 J. Bauer, 'Who You Calling Untheoretical?'.

132 T. Sherratt and K. Bagnall, 'Invisible Australians: Living under the White Australia Policy', 2011, <http://invisibleaustralians.org/> (Accessed 20 July 2014).

aimed to develop the *Rossetti Archive* as an edition that is both critical and documentary, and this is the scholarly argument of the archive, its structure and presentation are aimed to support his intention.[134] Other editions, like the *Van Gogh Letters* project, are diplomatic editions, they are shaped for the purposes of study, and therefore make another statement.[135] How text analysis tools perform different functions is how they differ from each other and is essentially their argument. Second, beyond the scholarly purpose, there are broader socio-political, aesthetic and ethical implications incorporated in the tool, as well as assumptions about the nature of scholarship or about the intended user. These arguments are mostly invisible to the user, but they still mediate the user experience.

It is worth noting that the focus on users in digital humanities is relatively new. Its relevance is grounded in the problem of low level of adoption of technologies in humanities.[136] Various empirical studies have focused on the role of new ICTs in humanities scholars' research and scholarly communication patterns.[137] Some studies examined the information needs and information seeking practices of humanities scholars.[138] Humanities scholars as users were examined in the fields of human-computer interaction and information studies.[139] There have also been some research focused on the developers of tools with regard of the use of digital projects.[140] Claire Warwick demonstrates the importance of understanding the behaviours of humanities researchers and the users of digital cultural heritage resources to make them more usable and sustainable in future.[141] The modern focus on users is also reflected in the recent practice of inviting scholars at the

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133 T. Sherratt, 'It's All About the Stuff: Collections, Interfaces, Power, and People', *Journal of Digital Humanities*, 9 March 2012, <http://journalofdigitalhumanities.org/1-1/its-all-about-the-stuff-by-tim-sherratt/> (Accessed 14 June 2014); T. Sherratt and K. Bagnall, 'Invisible Australians: Living under the White Australia Policy'; 'Remember Me?', *United States Holocaust Memorial Museum*, <http://rememberme.ushmm.org/> (Accessed 27 July 2014).

134 J. McGann, 'Rossetti Archive', 1993, <http://www.rossettiarchive.org/> (Accessed 24 June 2014).

135 'Vincent van Gogh: The Letters', 2009, <http://vangoghletters.org/vg/> (Accessed 20 June 2014).

136 According to Hayles, only ten per cent of humanities scholars use digital technologies in research.. K. Hayles, *How We Think: Digital Media and Contemporary Technogenesis* (Chicago/London: The University of Chicago Press, 2012), p.44.

137 O.Y. Rieger, 'Framing Digital Humanities: The Role of New Media in Humanities Scholarship', *First Monday*, 15, 10 (2010), <http://firstmonday.org/ojs/index.php/fm/article/view/3198> (Accessed 10 August 2014).

138 E. Herman, 'End-Users in Academia: Meeting the Information Needs of University Researchers in an Electronic Age: Part 2 Innovative Information-Accessing Opportunities and the Researcher: User Acceptance of IT-Based Information Resources in Academia', *Aslib Proceedings: New Information Perspectives*, 53, 10 (2001); S. Talja and H. Maula, 'Reasons for the Use and Non-Use of Electronic Journals and Databases: A Domain Analytic Study in Four Scholarly Disciplines', *Journal of Documentation*, 59, 6 (2003).

139 C. Warwick, 'Studying Users in Digital Humanities', p.4.

140 C. Warwick et al., 'The Master Builders'.

141 C. Warwick, 'Studying Users in Digital Humanities'.

early stages of development. Assumptions and models about potential users are implement then into the technical design, interface in particular.[142] As Rieger comments,

> '[t]he key requirement in the design of information technologies is the alignment of developers' inscriptions of end users with actual end-user behaviours so that system features represent users' needs, competencies, and actions.'[143]

However, what if design imposes rather than just serves? Interface is where human action is structured, and there is no doubt that interfaces are powerful in shaping the user behaviour. Software studies have drawn attention to the manipulating power of the interface, which often predetermines work and denies the user's sense of autonomy. For example, in 'It Looks Like You Are Writing A Letter' (2003) Fuller analyses the popular word-processing software Microsoft Word and demonstrates how it shapes the production of text through an imposed metaphor of the office environment.[144]

Another example illustrating the constructive powers of interface is the Noam Knoller's experiment entitled *Interface Portrait* (2004-2006).[145] It draws attention to the fact that a user is often unaware of the choices available and blindly follows the logic of the program. In the prototype, the touch screen interface consists literary of an interactive face that is composed from a hundred individual video shots. While user interacts with the interface, an algorithm interprets the user behavior and plays the video shots accordingly. *Interface Portrait* responds to the unique interaction style of users, so that every interactor sees a slightly different portrait. This is the kind of speculative, self-reflective software that Fuller encourages. Arguing that '[f]orms of interaction involving an embodied subject construct the subject, defining a scope of action', Knoller developed an interface that draws the attention of the user to this process and promotes reflective engagement.[146]

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142 L. Manovich, *Software Takes Command: Extending the Language of New Media*, p.29.

143 O.Y. Rieger, 'Humanities Scholarship Int Eh Digital Age: The Role and Influence of Information and Communication Technologies', Cornell University, (2010), <http://ecommons.library.cornell.edu/handle/1813/17217> (Accessed 5 July 2014).

144 M. Fuller, 'It Looks Like You're Writing a Letter: Microsoft Word', in *Behind the Blip: Essays on the Culture of Software* (Brooklyn, NY, USA: Autonomedia, 2003).

145 N. Knoller, *InterFace Portrait #2:: Touch/gesture Interactive Simulated Character*, InterFace Portrait (2004), <http://www.knoller.com/ip/index.html> (Accessed 24 June 2014).

146 N. Knoller, 'Interfaces as Aesthetic-Theoretical Objects', presented at the 'The Object Speaks Back', ASCA mini-conference (Amsterdam, 2007), <http://www.knoller.com/papers/ASCA_10may2007/Interfaces_aestheoretical_objects.html> (Accessed 5 August 2014).

It is reasonable to assume that the user experience of digital humanities tools is often shaped by the interface. Ideally, using the tool the user should be able to deconstruct the scholarly arguments that the tool makes. Yet the 'black box' mentality is very influential in the tool development. In technical and social sciences, the concept of 'black-boxing' of technologies is defined as:

> 'the way scientifically and technical work is made invisible by its own success. When a machine runs efficiently, when a matter of fact is settled, one need focus only on its outputs and not on its internal complexity. This, paradoxically, the more science and technology succeed, the more opaque and obscure they become.'[147]

In other words, 'black box' is an object that is described in terms of its inputs and outputs, whereas processes inside are left unknown. For the digital humanities, the problem of black-boxing is a fundamental epistemological problem that can be formulated as a question: to what extent humanities scholars should understand the technologies they use?

This question is much debated. There is a position according to which humanities scholars do not have to understand the technologies in order to use them, and the argument usually points to the fact that people do not need to understand how their car works to drive it.[148] According to another view, understanding the basics, the general algorithms, the limits of the computer as well as its strengths, is necessary. Stephen Ramsay famously said: 'Do you have to know how to code? I'm a tenured professor of Digital Humanities and I say "yes."'[149] James Gottlieb wittily compared a digital humanist 'afraid of the digital' to a 'scholar of French literature who is afraid of French.'[150] Although 'digital' usually refers to the methodology rather than the subject of research, this metaphor is relevant. Understanding the code does not mean turning into a sophisticated computer scientist, just as understanding French literature does not mean the ability to write French literature.

Whether the humanist would use technologies for the sake of new insights, in the deformance mode, or to quantitatively support an argument, is essentially up to the scholar. For instance, Trevor Owens warns the users of topic modelling tool MALLET, which is very easy to use and difficult to understand (the theory behind it is the Latent Dirichlet Allocation): 'if you aren't using the results of a digital tool as evidence then anything goes.'[151] In any case, the evaluation of

147 B. Latour, *Pandora's Hope: Essays on the Reality of Science Studies* (Cambridge: Harvard University Press, 1999), 304.

148 This is the kind of remarks I heard at the DHBenelux conference in the Hague, 12-13 June 2014.

149 S. Ramsay, 'Who's In and Who's Out'.

150 J. Gottlieb, 'Coding and Digital Humanities', *James Gottlieb*, 8 March 2012, <http://www.jamesgottlieb.com/2012/03/coding-and-digital-humanities/> (Accessed 11 August 2014).

work that makes use of computational strategies can be judged from the traditional criteria of being contestable, defensible and substantive.[152]

More importantly, the assumptions about the possible use of technologies are implemented in the tool. In other words, developers either expect the user to open the black box, or not, and design the tool accordingly. There is a tradition of creating interfaces that facilitate the user experience and minimise the distractions—Google's search interface is illustrative. The design that follows these guidelines creates a complete black-box. For example, the interface of a text analysis tool TokenX is very simple, and no useful information, except the stop word list, is available. While the tool aims to be useful in 'visualization', 'analysis' and 'play', the distinction between the latter two appears to be less evident, because the user has no means to critically address the results of the analysis.

Alternatively, the design of the tool can make the mechanisms of the tool more explicit. As it is put by Max Kemman, a developer from the Rotterdam University, 'there is a trade-off between understandability and complexity.'[153] For instance, the interface of the Voyant environment attempts to find the balance between minimising the distractions and being explicit for the user.[154] There is a default configuration of tools with the basic information about the texts, like the number of words, the length of documents, vocabulary density. Additional tools that can be added to the view. At the same time, the interface of the tool aims to be explicit, making use of tips popping up when the cursor is navigated on icons. There is also a separate website dedicated to the use of the Voyant environment, with a complete documentation for individual tools, useful resources (examples and workshops), and some general information.[155] Moreover, there is an accompanying website dedicated to the fundamentals of text analysis.[156] However, except for the stop word list, the Voyant does not allow to access and manipulate the parameters of text analysis, for example, the tokenization. User's interaction with the tool is seriously limited. While documentation partly covers the problem of untransparency of the tool, it acts more like a separate publication about the

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151 A.K. McCallum, *MALLET: A Machine Learning for Language Toolkit* (2002); T. Owens, 'Discovery and Justification Are Different: Notes on Science-Ing the Humanities', *Trevor Owens*, 19 November 2012, <http://www.trevorowens.org/2012/11/discovery-and-justification-are-different-notes-on-sciencing-the-humanities/> (Accessed 19 July 2014).

152 W.C. Booth, *The Craft of Research*, Chicago Guides to Writing, Editing, and Publishing (Chicago: University of Chicago Press, 1995).

153 M. Kemman, E-Mail, dated 24 June 2014, .

154 S. Sinclair and G. Rockwell, *Voyant Tools* (2012), <http://voyeurtools.org/> (Accessed 28 July 2014).

155 However, currently, the documentation of the tool is lacking ('Page not found'). S. Sinclair and G. Rockwell, 'Voyant Tools Documentation', <http://docs.voyant-tools.org/> (Accessed 11 August 2014).

156 S. Sinclair and G. Rockwell, 'Hermeneuti.ca—The Rhetoric of Text Analysis', <www.hermeneuti.ca> (Accessed 20 June 2014).

tool, rather than a part of the interface. Therefore, theoretical arguments made by the developers and embedded in the code are essentially hidden from the users. This is surprising, because Geoffrey Rockwell, who is one of the creators of the Voyant, regularly advocates the theoretical value of tools.[157]

The type of the interface that most successfully addresses the problem of the black box is the command line. Gertijan Filarski from the Huygens Institute claims: 'Interfaces hide decisions from scholars and actually add to the feeling of a black box'.[158] He is convinced that for any kind of text analysis, command-line interface is the best solution, because it forces the user to think more critically about the processes and break up the workflow into constituent parts. 'Micro services' developed at the Huygens Institute—separate tools for conversion, lemmatisation, tokenization, or collation—are all managed from the Terminal.[159]

Therefore, different types of interfaces make different assumptions about the users and thus encourages different behaviour styles. The TokenX does not expect a critical approach from the user, Voyant positions itself as a user-friendly environment and provides some information about the tool, but what user can do with the tool is seriously limited. Finally, command-line tools require the user to be highly proficient in coding and encourage exploratory use of the tools (for example, through changing the parameters). These assumptions about users are implicit and they inevitably influence the user experience.

Opening the code

Still, all interfaces inevitably hide something from the user, and the source code is essentially an entry point to the black-boxes of technologies. Therefore, whether the application opens its code and provides documentation is another fundamental issue. This is another way, in which a prototype argues, although not on a technical level. While most digital humanists subscribe to the open-source philosophy, and while the code can be seen essential for a peer-review, it is too soon to say that the value of openness has become institutionalized. The Huygens Institute is an example of an institution that actively advocates open software. Codes for the 'micro services' tools are published online, and there are plans for opening the code of most software. Even there the code written for a single implementation, like the search algorithm for the *Arthurian Fiction* archive, is not usually published.[160] Generally, search algorithms are not shared. When I asked Suzan Verberne, whether

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157 See, for example, his speech at HUMlab: G. Rockwell, 'Making Theoretical Things in the Digital Humanities'.

158 G. Filarski, Interview, 2014.

159 'About Microservices', *Interedition Wiki*, <http://www.interedition.eu/wiki/index.php/About_microservices> (Accessed 8 August 2014).

160 'Arthurian Fiction in Medieval Europe: Narratives and Manuscripts', 2012, <http://www.arthurianfiction.org/> (Accessed 24 June 2014).

she thinks that the search mechanism of the *RemBench*—which is a strategic component of the project—should/could be published openly, so that the users can engage with them critically, she seemed surprised: 'You do not have to know how Google works in order to use it, do you?' [161]Such reaction indicates the focus on the user needs instead of trying to 'imagine the unknown', to borrow McGann's phrasing.[162] Indeed, studies have shown that scholars do not have a methodological problem with using such a black-boxed tool as Google.[163] However, having the ability to critically engage with the search engine is another thing. Search algorithms are not neutral, but contain the 'dispositions, the habitus, the assumptions of its coder'.[164] Moreover, as Van Dijck warns, 'unawareness of the implications of convenient yet black-boxed tools inevitably leads to more control by owners of search technologies over the production of knowledge.'[165] Of course, search algorithms, and Google's in particular, can be too complex to assess, but deciding for the user that it is not even worth trying already sounds like a political statement. Having the code open is essential for the tool criticism,, and it is important to give the option for humanists to engage with technical protocols of the tools they use. What can result from such engagement is hard to predict. As it is claimed by Martin Mueller, '[i]f nothing changes except that more people can get at the same stuff with equal ease, some of them will do different and interesting things'.[166]

Tool as a cultural thing

The technologies are shaping the learning practices, but such changes often come unnoticed. The adoption of technologies can be invisible to most users, and it is true that with technologies, little differences add up. It is therefore crucial to begin to recognize not only the scholarly arguments encoded in the tools, but also their political, cultural, and societal arguments. In this chapter we discussed the fundamental assumptions about the nature of scholarship that are encoded in the user interfaces of tools. The suggested analysis is obviously not the only way to critically discuss the interface of digital humanities tools. For instance, Manovich claims that the '[i]nterface reflects

161 S. Verberne, Interview, 2014; See the project's proposal for CLARIN-NL 'Call 4 Projects', <http://www.clarin.nl/node/1404> (Accessed 18 August 2014).

162 J. McGann, 'Editing as a Theoretical Pursuit'.

163 M. Kemman, M. Kleppe, and S. Scagliola, 'Just Google It', in C. Mills, M. Pidd, and E. Ward (eds), *Proceedings of the Digital Humanities Congress 2012.*, Studies in the Digital Humanities (Sheffield: HRI Online Publications, 2014), <<http://www.hrionline.ac.uk/openbook/chapter/dhc2012-kemman>> (Accessed 8 August 2014).

164 K. Hillis, M. Petit, and K. Jarrett, *Google and the Culture of Search*, 1 edition. (New York ; London: Routledge, 2012), 5.

165 J. van Dijck, 'Search Engines and the Production of Academic Knowledge', *International Journal of Cultural Studies*, 13, 6 (2010), p.587.

166 M. Mueller, 'Digital Shakespeare, or towards a Literary Informatics', *Shakespeare*, 4, 3 (2008), p.288.

visual mentality and a semiotic worldview', what makes him dream about renaissance or baroque interfaces.[167] What if cultural differences were encoded in the interfaces of tools developed in different countries? With such an interdisciplinary and international context of creation of the tools it can sound unreasonable, but what if the dominance of U.S. and UK projects in digital humanities imposes Anglo-American perspective on culture? Is not it the time for the French to develop a French approach to the database? While these are mere phantasies, what definitely exists, are interfaces on one database for different communities. Mukurtu, an open source content management tool addresses the needs of indigenous communities. The origin of this software is the *Mukurtu: Wumpurrarini-kari* project, developed for Australian Aboriginal culture, histories and images.[168] The community expressed a need in a design that could follow their social and cultural systems. The interface for Aboriginal users offered more extensive access than the interface for general public. Moreover, the cultural practices were implemented. For instance, viewing images of deceased persons is culturally prohibited, and the user is warned and given the opportunity to proceed or close the window. The technology was successful, and the project developed into a software, Mukurtu CMS, that can be used in community-driven development projects.[169] While, in this case, cultural values are implemented in the interface consciously, is it so absurd to assume, for example, that the databases being built are also culturally dependent?

In this chapter, we addressed the specificity of the digital humanities tools and argued that the tools always make an argument, either on the type of scholarly purposes they support or on their broader socio-political implications. These implications can also be on the nature of scholarly research. We showed how interfaces address the problem of black-box technology which has epistemological nature in digital humanities. A necessity of the open source codes can be conveyed form the problem of black-box technologies. Anticipating certain types of scholarly use, digital humanities tools essentially shape the user experience without the user being aware of that. It is the aim of tool criticism to decode these arguments through an examination of the components of tools (interface, source code, algorithms, etc.).

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167 L. Manovich and G. Lovink, 'Digital Constructivism: What Is European Software? An Exchange between Lev Manovich and Geert Lovink', *Continuum*, 13, 2 (1999), p.166.

168 Now the website does not exist, but K. Hayles describes it in, for example, N.K. Hayles, 'How We Think: The Transforming Power of Digital Technologies', in D.M. Berry (ed.), *Understanding Digital Humanities* (Houndmills, Basingstoke, Hampshire; New York: Palgrave Macmillan, 2012), p.42–66, <http://www.palgraveconnect.com/doifinder/10.1057/9780230371934> (Accessed 9 June 2014).

169 'Mukurtu(MOOK-Oo-Too)', <http://www.mukurtuarchive.org/> (Accessed 10 August 2014).

Conclusion

In this paper we have argued that the recent conceptualisation of the tools developed in the digital humanities as theoretical objects that can 'speak' for themselves is a significant achievement. Digital tools thus enter the humanistic discourse as objects to argue about and analyse. The development of peer-review allows assessing the scholarly arguments of the tools, undermining the dominance of the written reports. However, tools are essentially not neutral and also have cultural and socio-political implications, what has been explicitly articulated in the field of software studies, critical code studies and platform studies. Software constructs ways of seeing, knowing, and doing, often unbeknown to the user. This is also true for the digital humanities tools. Developed in the scholarly context, digital humanities tools are claimed to be interpretive and theoretical. The arguments of the tools are not limited to their scholarly purposes. Digital humanities tools also have cultural and socio-political implications that can influence the research practices. It is the aim of tool criticism to critically respond to these arguments by examining the interface or by inspecting underlying source code. Better understanding of the technologies being produced as support for the research can reveal truth about the practices of research. As Tara McPherson writes,

> We need database literacies, algorithmic literacies, computational literacies, interface literacies. We need new hybrid practitioners: artist-theorists, programming humanists, activist-scholars; theoretical archivists, critical race coders. We need new forms of graduate and undergraduate education that hone both critical and digital literacies. We have to shake ourselves out of our small, field-based boxes so that we might take seriously the possibility that our own knowledge practices are normalized, modular, and black boxed in much the same way as the code we study in our work.[170]

Large-scale institutions are formalising the existing research practices and prioritise certain developments. For instance, an ontology of digital methods in humanities is being developed by the giants DARIAH-EU and NeDiMAH.[171] However, the future development should not be governed solely by large infrastructures and funding agencies. In words of Christine Borgman, '[t]his is an opportune moment to think about what we should be building.'[172] Generally, digital humanists are

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170 T. McPherson, 'U.S. Operating Systes at Mid-Century: The Interwinning of Race and UNIX', in L. Nakamura and P. Chow-White (eds), *Race after the Internet* (New York: Routledge, 2012), 35.

171 Fondation européenne de la science, *Network for Digital Methods in the Arts and Humanities (NeDiMAH) Research Networking Programme* (Strasbourg: European Science Foundation, 2012).

172 C.L. Borgman, *Scholarship in the Digital Age: Information, Infrastructure, and the Internet* (Cambridge: MIT Press, 2007), XVII.

eloquent in describing the transformational powers of technologies. The visionary character of digital humanities has been observed and analysed by Patrik Svensson.[173] Suggested tool criticism can help make the interaction between human researchers and computers more transparent and thus encourage the development of research tools that make their assumptions clearer to the user. As it was put by Adam Kirsch, criticising digital is the intellectual responsibility of humanities.[174] This applies to the digital humanities in particular, where digital tools are one of the most extensible assets.[175]

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173 P. Svensson, 'Envisioning the Digital Humanities', *Digital Humanities Quarterly*, 006, 1 (2012).

174 A. Kirsch, 'Technology Is Taking Over English Departments', *The New Republic*, 2 May 2014, <http://www.newrepublic.com/article/117428/limits-digital-humanities-adam-kirsch> (Accessed 2 July 2014).

175 L. Nguyen and K. Shilton, 'Appendix F: Tools for Humanists', in *A Survey of Digital Humanities Centers in the United States* (Council on Library and Information Resources, 2008), <http://www.clir.org/pubs/reports/pub143/appendf.html> (Accessed 21 August 2009).

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