Modelling the Scholarly Domain beyond Infrastructure

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This paper presents the findings of research conducted in the EU-funded project Digitised Manuscripts to Europeana (DM2E), which investigated how the modelling of scholarly practices and research processes might inform the development of research environments for digital scholarship in the humanities. In particular, the *Scholarly Domain Model* (SDM) will be presented as a framework for modelling the domain of digital scholarship, which provides the constituents for the systematic enquiry of continuously evolving Virtual Research Environments (VRE) and the emergence of digital practices and methodology within them. The importance of models and a practice of modelling cannot be overestimated for the creation of research environments that advance beyond a level of infrastructure, and achieve sustainability through the focus on the evolving scholarly practices at the heart of the transition that altered the humanities profoundly in the last decades.

International institutions of research funding have contributed tremendous efforts into that transitory process and have encouraged a variety of projects for the advancement of the Digital Humanities , focusing on attempts to further the development of infrastructures for digital scholarship in the humanities. In Europe, for example, the European Strategy Forum on Research Infrastructures (ESFRI) has funded several infrastructure projects such as the Digital Research Infrastructures for the Arts and Humanities (DARIAH) and the Common Language Resources and Technology Infrastructure (CLARIN), which have since been complemented by the Data Service Infrastructure for the Social Sciences and Humanities (DASISH). Each of these infrastructure projects have, in turn, influenced a number of other endeavours on a national, regional, institutional or disciplinary level.

Nevertheless, achieving a constellation of constituents and influential factors that facilitate the prospective sustainability of a Virtual Research Environment as a socio-technical system, is still an unresolved problem. Whereas this certainly is due to many reasons, we believe that among them a deficit of systematic investigation into the actual research practices of humanists and their sustainable representation in the digital realm is of crucial importance. We consider the inclusion of the scholars essential as the actors of a community of practice, who constitute precisely with this scholarly practice the basis for the development of research environments and infrastructures.

In this context, the research gap we identified and attempt to address is the lack of a model, which emphasises the importance of creating a bridge connecting the analogue and digital scholarly practices and, most importantly, underlines the recursive relationship between these scholarly practices and the models and applications reflecting on them. This kind of research falls within what is typically called 'digital humanities' and which we understand as a community of practices, regardless of their particular materiality. We therefore believe that in order to be able to discuss the 'digital humanities' in a way that goes beyond simply discussing infrastructure, and so that the aforementioned challenge can be overcome, we need to start from a modelling process that allows for the systematic and theoretically grounded integration of practices of humanist research approaches in both the analogue and digital world. In this paper, we discuss this undertaking and propose a multi-layered model, the SDM, that exemplifies the constituents of our modelling

endeavour. For this reason, the SDM is conceived as an explicit but not definite set of constituents of the domain of digital scholarship in the humanities. In his presentations Manfred Thaller has repeatedly stressed, that the controversy of the 'digital humanities' should rather focus on the scholarly practices in the digital humanities and in particular their prerequisites, the various epistemological implications that the application of digital technology entail, than to be predominated by arguments about labelling (cf. Thaller 2013, 2015a, 2015b; McCarty / Short 2002).

In this regard, Linked Data standards such as the Resource Description Framework (RDF), Resource Description Framework Schema (RDFS), and Web Ontology Language (OWL) constitute a well suited means for the development of the SDM, because they allow the process of modelling to be iterative and continuous since the graph of semantic statements created is extensible. Furthermore, it facilitated the development of the modules of a digital humanities research environment, which has been built around the semantic annotation application Pundit . As we will see, this is also an instance of a still uncommon and emerging way to think of Linked Data as an art with epistemological implications for the practice of modelling the domain of digital scholarship in the humanities (cf. Oldman et al. 2016).

Like other models since, the SDM takes up the notion of Scholarly Primitives (cf. Unsworth 2000) and develops them further. On the basis of the analysis and observation of the practices of digital scholarship, we are endeavouring to acquire a better understanding of the requirements for instructing the development of sustainable infrastructures that enable scholars to harness the potential of digital technology and hence to develop appropriate digital methodologies and practices. This requires to proceed beyond the establishment of static models to the iterative and continuous activity of modelling. Starting from the Scholarly Primitives by Unsworth (2000), the SDM was further constructed and refined by analysing the research literature and related models (cf. Atkins et al. 2003; Project Bamboo 2010; Benardou et al. 2010; Palmer et al. 2009). Furthermore, the conceptual input has been subsequently revised and supplemented by empirical evidence collected through a series of interviews with scholars and researchers from the humanities, and experiments using the Linked Data annotation environment Pundit. Finally, the development of the SDM has continuously been monitored and counselled by an advisory board of Digital Humanists .

Furthermore, the SDM differs from the work done, for example, by DARIAH and the Network of Digital Methods in the Arts and Humanities (NeDiMAH) in so far as it approaches the scholarly domain from a more comprehensive perspective that tries to integrate Primitives and constituents influencing the processes of digital scholarship in the humanities and to reflect on their social construction on different layers of abstraction. Furthermore, we believe that a continuous and recursive

process of modelling is ultimately the goal, not the model itself. With reference to Willard McCarty (2003, 2004 and 2005), resonating a distinction, introduced by Geertz (1973) between a model 'of' something and a model 'for' something, the SDM in that sense is a descriptive model 'of' the scholarly domain and as imperfect it may be, it is built for a purpose and it may fail. The benefit of this failure, for that matter, is that it emphasises the importance of modelling in many respects. As for the modelling of scholarly practices of the digital humanities may further the self-reflection and pattern discovery resulting in new models 'of' these practices as well as in models 'for' the conduct of such new modes of digital scholarly activities in the Virtual Research Environments developed concomitantly. The SDM attempts to provide an explicit but not definite set of constituents to initiate a self-reflected development of Research Environments for Digital Scholarship in the Humanities on the basis of scholarly practices going beyond infrastructure.

In sum, the SDM is a framework for better understanding scholarly research practices and the ways digital working modes might evolve in the future. Despite the fact that the SDM has been devised in the context of applications based on Linked Data, the model is independent from particular representations and meant to be applicable as a reference model for the discussion, evaluation and development of digital research infrastructures and environments for the humanities. The SDM allows to create representations of the workflows of digital humanists and to function as a terminological bridge between the scholarly practices of the humanities and digital applications. The goal is to reflect on the social nature of scientific practice, regardless of its materiality, and, based on such reflections, to receive a stable core for its sustainable representation. Only if we better understand how scholars undertake their research and how their functional framework might be adequately translated to the digital environment, we might actually approach the emergence of new digital modes of working.

Fußnoten

1. The project ran from Feb. 2013 until Jan. 2015. URL: http://dm2e.eu/ [last accessed 15. October 2015]; for a more detailed account cf. further Hennicke et al. 2015.
2. Cf. Candela et al. 2013. Respective Research Infrastructure.
3. We understand this term to be grounded in the basis of the translation of the German word for *Geisteswissenschaften* and not in the political sense (also cf. Gold 2012; Terras et al. 2013).
4. Cf. for the following standards http://www.w3.org/standards/techs/rdf and http://www.w3.org/standards/techs/owl [all last accessed 15. October 2015].
5. In particular, the Methods Ontology (NEMO); cf. further Hughes et al. 2016 for a more detailed account.

Bibliographie

Anderson, Sheila / Blanke, Tobias / Dunn, Stuart (2010): "Methodological commons: arts and humanities e-science fundamentals", in: *Philosophical Transactions of the Royal Society A* Mathematical, Physical and Engineering Sciences 368, 1925: 3779-3796 http://rsta.royalsocietypublishing.org/content/368/1925/3779.short [last accessed 15. October 2015].

Atkins, Daniel E. / Droegemeier, Kelvin K. / Feldman, Stuart I. (2003): *Revolutionizing science and engineering through cyberinfrastructure*. Report of the National Science Foundation Blue-Ribbon Advisory Panel on Cyberinfrastructure. Ann Arbor: University of Michigan Library Press http://www.nsf.gov/cise/sci/reports/atkins.pdf [last accessed 15. October 2015].

Project Bamboo (2010): *Project bamboo scholarly practice report* https://googledrive.com/host/0B3zU098zQ8VMc2xfMUJZaWxXNWs/wp-content/uploads/Project-Bamboo-Scholarly-Practices-Report.pdf [last accessed 15. October 2015].

Benardou, Agiatis / Constantopoulos, Panos / Dallas, Costis / Gavrilis, Dimitris (2010): "A conceptual model for scholarly research activity", in: Reilly, Maeve (ed.): *iConference Papers 2010* https://www.ideals.illinois.edu/bitstream/handle/2142/14945/benardou.pdf?sequence=2 [last accessed 15. October 2015].

Candela, Leonardo / Castelli, Donatella / Pagano, Pasquale (2013): "Virtual research environments: An overview and a research agenda", in: *Data Science Journal* 12: GRDI75-GRDI81.

CLARIN: *CLARIN*. Common Language Resources and Technology Infrastructure http://www.clarin.eu/ [last accessed 15. October 2015].

DARIAH: *DARIAH-EU*. Digital Research Infrastructure for the Arts and Humanities http://www.dariah.eu/ [last accessed 15. October 2015].

DASISH: *DASISH*. Data Service Infrastructure for the Social Sciences and Humanities http://dasish.eu/about_dasish/ [last accessed 15. October 2015].

DM2E: "Digital Humanities Advisory Board" http://dm2e.eu/dhab/ [last accessed 15. October 2015].

ESFRI: *ESFRI*. European Strategy Forum on Research Infrastructures http://ec.europa.eu/research/infrastructures/index_en.cfm?pg=esfri [last accessed 15. October 2015].

Geertz, Clifford (1973): *The interpretation of cultures*. Selected essays. New York: Basic Books.

Gold, Matthew K. (2012): *Debates in the Digital Humanities*. Minneapolis: University of Minnesota Press.

Hennicke, Steffen / Gradmann, Stefan / Dill, Kristin / Tschumpel, Gerold / Thoden, Klaus / Morbidoni, Christian / Pichler, Alois: *D3.4.* Research Report on DH Scholarly Primitives http://dm2e.eu/files/D3.4_2.0_Research_Report_on_DH_Scholarly_Primitives_150402.pdf [last accessed 15. October 2015].

Hughes, Lorna / Constantopoulos, Panos / Dallas, Costis (2016): "Digital Methods in the Humanities: Understanding and Describing their Use across the Disciplines", in: Schreibman, Susan / Siemens, Ray / Unsworth, John (eds.): *A new Companion to Digital Humanities*. New York: John Wiley & Sons 150-170.

McCarty, Willard (2002): "Humanities computing: Essential problems, experimental practice", in: *Literary and Linguistic Computing* 17, 1: 103-125 http://llc.oxfordjournals.org/content/17/1/103.full.pdf+html [last accessed 15. October 2015].

McCarty, Willard (2003): "Knowing true things by what their mockeries be: Modelling in the humanities", in: Woolridge, Russon / McCarty, Willard / Winder, William (eds.): *Computing in the Humanities Working Papers* http://journals.sfu.ca/chwp/index.php/chwp/article/view/A.24/52 [last accessed 15. October 2015].

McCarty, Willard (2004): "Modeling: A study in words and meanings", in: Schreibman, Susan / Siemens, Ray / Unsworth, John (eds.): *A Companion to Digital Humanities*. Malden: Blackwell 254-272.

McCarty, Willard (2005): *Humanities computing*. Houndmills: Palgrave Macmillan.

McCarty, Willard / Short, Harold (2002): "Mapping the field: Report of ALLC meeting held in Pisa, April 2002" http://www.allc.org/node/188 [last accessed 15. October 2015].

NeDiMAH: *NeDiMAH*. Network for Digital Methods in the Arts and Humanities http://www.nedimah.eu/ [last accessed 15. October 2015].

NeMo: *NeMo*. NeDiMAH Methods Ontology http://nemo.dcu.gr/ [last accessed 15. October 2015].

Net7: *Pundit* http://thepund.it/ [last accessed 15. October 2015].

Oldman, Dominic / Doerr, Martin / Gradmann, Stefan (2016): "Zen and the Art of Linked Data: New Strategies for a Semantic Web of Humanist Knowledge", in: Schreibman, Susan / Siemens, Ray / Unsworth, John (eds.): *A new Companion to Digital Humanities*. New York: John Wiley & Sons 251-273.

Palmer, Carole L. / Teffeau, Lauren C. / Pirmann, Carrie M. (2009): *Scholarly Information Practices in the Online Environment*. Themes from the Literature and Implications for Library Service Development. Dublin, OH: OCLC Research http://www.oclc.org/content/dam/research/publications/library/2009/2009-02.pdf [last accessed 15. October 2015].

Schreibman, Susan / Siemens, Ray / Unsworth, John (eds.) (2004): *A Companion to Digital Humanities*. Malden: Blackwell http://www.digitalhumanities.org/companion/ [last accessed 15. October 2015].

Schreibman, Susan / Siemens, Ray / Unsworth, John (eds.) (2016): *A new Companion to Digital Humanities*. New York: John Wiley & Sons.

Terras, Melissa / Nyhan, Julianne / Vanhoutte, Edward (eds.) (2013): *Defining Digital Humanities*. A Reader. Farnham: Ashgate.

Thaller, Manfred (2013): *Praising Imperfection.* Why editions do not have to be finished http://www.culingtec.uni-leipzig.de/ESU_C_T/node/292 [last accessed 15. Oktober 2015].

Thaller, Manfred (2015a): *Digital Humanities*. Eine Bestandsanalyse https://de.dariah.eu/documents/10180/472723/Thaller_Digital+Humanities+-+eine+Bestandsanalyse.pdf [last accessed 15. October 2015].

Thaller, Manfred (2015b): *Wenn die Quellen überfliessen*. Spitzweg und Big Data https://static.uni-graz.at/fileadmin/veranstaltungen/von-daten-zu-erkenntnissen/thaller_keynote.pdf [last accessed 15. October 2015].

Unsworth, John (2000): "Scholarly Primitives: What methods do humanities researchers have in common, and how might our tools reflect this?" In: *A symposium on Humanities Computing: formal methods, experimental practice sponsored by King's College, London, May 13, 2000* http://people.brandeis.edu/~unsworth/Kings.5-00/primitives.html [last accessed 15. October 2015].