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# Reconstruction – Representation – Collaboration: Interdisciplinary approaches to changes in contexts of digital (music) editions

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## Introduction

The field of Digital Humanities is characterized by complex questions and interdisciplinary discussions. That applies not only to the cultural science-based side of the humanities but also to the digital representation of cultural artefacts and, among other things, their processing, analysis, preservation and long-term availability. In order to handle these issues, interdisciplinary collaboration is required to pool and to coordinate expert knowledge and skills.

The Digital Humanities project ZenMEM (Centre of Music – Edition – Media) represents such an interdisciplinary project. Since September 2014, researchers from Paderborn University, the Hochschule für Musik Detmold and Ostwestfalen-Lippe University of Applied Sciences combine their expertise from musicology, various fields of computer sciences (contextual informatics, software engineering, usability engineering and music informatics) and media studies (media education and media economics) to investigate processes of change and new possibilities of the transition from analogue to digital music and media editions.

In this context, digitization can be discussed as distributed through material infrastructures and displayed on computer devices (cf. Huber 1998). But it can also be considered in non-physical dimensions. In this perspective cultures are containing specific structures that build a para-material quality (cf. Schrage 2006).

“Writing is a material act; textual production in any medium has always been a part and product of particular technologies of inscription and duplication.” (Kirschenbaum et al. 2009).

A third perspective can be discovered between these poles on the transition from material and immaterial (cf. Holl 2010, Manovich 2011, McGann 1991). The fourth dimension in this context refers to the fact that

“Digital Humanities work embraces iterative, in which experiments are run over time and become object to constant revision. Critical design discourse is moving away from a strict problem-solving approach that seeks to find a final answer: Each new design opens up new problems and – productively – creates new questions.” (Burdick et al. 2012)

Between these perspectives, we explore interdisciplinary approaches of digital (music) editions. First, the dimension of digital representation and the contents on the surface (cf. Manovich 2001). Here, the traditional Human Computer Interface (HCI) to digital editions is questioned and expanded to incorporate Computer Interfaces, ultimately demanding to “granting access to machines”.

The second perspective focusses on the relevance of the user for all types of media (cf. Fiske 2001). In this view, we present a qualitative research study (cf. Denzin 2000; Przyborski & Wohlrab-Sahr 2009; Keuneke 1999) dealing with the changing work

processes of musicologists and music editors in the context of digital music editions. These changes have, among other things, lasting impacts on their scientific research, orientation, academic ethos and knowledge building.

The third paper deals with the structural changes in scientific work in context of Digital Humanities. A growing number of interdisciplinary academic projects causes an increasing need for researchers with the key qualification “interdisciplinarity” as well as methods to verify the projects’ efficiency and quality (cf. von Kardorff 2000).

The analysis of the complex interactions among these dimensions leads to essential issues of the digitization of (music) editions: The access to perspectives of digital representation, the impacts on scientific work and access to user views and at last a dimension of access to changing interdisciplinary project work within the Digital Humanities.

In case of acceptance, this multiple paper session would be presented by Bianca Meise (media education and qualitative research, Paderborn University), Peter Stadler (musicology, Paderborn University) and Franziska Schloots (media economy and management, Paderborn University).

## Digital Editions and the Interface. Granting Access to Machines

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The history of Digital Editions and its main driving force, the Text Encoding Initiative (TEI), is a success story. It not only enabled the digital presentation and preservation of scholarly editions but subsequently facilitated further research on this digital material and the development of tools and methods, pushing forward the DH sector as a whole.

The TEI puts a lot of effort into its (prose) Guidelines and the formal specification of the schema(s) – it ultimately developed a meta language (ODD = One Document Does it all) for the definition and documentation of TEI schemas and customizations, leading to a well-documented, highly flexible interchange format. “This is standardization by not saying ‘Do what I do’ but instead by saying ‘Do what you need to do but tell me about it in a language I understand’.” (Cummings 2013)

The Music Encoding Initiative (MEI) adopts these principles, empowering it to encode a wide variety of musical styles and genres through its modular

approach. Yet, a long-standing issue with the resulting XML documents is the lack of interoperability. True interoperability would allow the ‘blind’ reuse of files within one’s own processing chain (cf. Bauman 2011). But due to the TEI’s and MEI’s flexibility of encoding even the (assumed) simplest operations can hardly be processed blindly, e.g. the extraction of a plain text version (aka the “throwing away of angle brackets”) or the extraction of a single voice from a score.

Generally speaking, digital editions are potentially multifunctional and enable multiple views on the text (cf. Sahle 2013; Pierazzo 2016), yet this potential can hardly be activated from the outside but has to be revealed by a standardized endpoint or interface. Most commonly, the only (public) interface of a digital edition is the HTML version accessible online with a (Javascript enabled) browser. Different views are created from one TEI source file and prepared for a human reader, e.g. a “Semantic Edition” or a “Philological Version” (see the respective tabs at e.g. <http://burckhardtsource.org/letter/508>). While this interface and its functionality is adequate and pleasing for a human agent, it’s more or less useless for a machine agent which would have to grab the web pages and parse idiosyncratic flavours of (X)HTML(5). Only a few digital editions offer the direct download of TEI encoded files and even less offer a dedicated (and well documented) interface for machines.

Within the ZenMEM and ViFE research infrastructures we are trying to remedy this shortcoming of digital editions by developing dedicated APIs for our projects. We believe that this has at least two advantages:

1. intrinsic: better documentation of our own work
2. extrinsic: facilitated reuse of our work by others

These project APIs are developed and documented using the Swagger framework (<http://swagger.io>) and the resulting configuration files can be found at <https://github.com/Edirom/ViFE-API>. Along with those project specific APIs we strive to develop a meta API with a core set of functions which are to be supported by all projects. There is an ongoing discussion on what these core functions are – especially since we are dealing with various materials, from music to text encoding, from placeographies to bibliographies, from sketches to prints. On the other hand, we are confident to come up with a set of generic functions that could then easily be adopted by other projects. With these interfaces to digital editions we

will finally leave the traditional resource based approach to digital editions behind and move on to a new functional, truly dynamic approach.

## A changing paradigm? Implications of digitization on musicologists work on editions

*Bianca Meise*

Digital Humanities are focusing on digital data. Therefore, issues on modelling, representation, analysis and annotations are crucial dimensions of research like processing and archival storage. But digital data and the procedures quoted before are used by editors and have impacts on their scientific work, too (cf. Edwards 2012). This contribution is focused on an access to the editors as special user and producer group in the process of digitization through a qualitative empirical study. In this study, it is neither the editor nor the data alone, rather, it is the act of editing, analyzing, representing and annotating that gives insights into the relation between media, material and subjects that allow deep insights into the transformational impacts of digitization. First, I discuss the changes of the scientific working process from analogue to digital. Secondly, the challenges and potentials of this change of paradigm will be discussed. At last, as a result of these findings, the future inquiries of digitization of music editions, changes of work processes and not least the education and varying access to knowledge work will be pointed out.

Digital music editions have a lot of potential for editors, scientists and recipients (cf. Veit). Thus, the digital availability accelerates and arranges the editorial scientific process. Furthermore, the different representations of the digital offer a great transparency and confirmability. In this perspective, the digitization of music editions enriches the work of musicologists (ibid.). A lot of issues are discussed in context of digital humanities refer to the digital representation or the transformation of cultural artefacts, their further analysis and processing. These subjects are considered on data. The work, examination and handling of the digital and the influences of the knowledge evolving within is discussed less. In this contribution, the formal layer (cf. Kirschenbaum 2008) or cultural layer (cf. Manovich 2001) and moreover the performative interactions between the material and the subjects will be considered (cf. Drucker 2013). Issues like the challenges to adopt digital techniques, to prepare digital sources, to represent and analyze them are important, too. The examination of the various

practices of adoption, handling and orientation offer deep insights into the possibilities of digitization and its relevance for scientific work. This study allows a rare attendant insight in the transformation of a media paradigm in music philologists' work.

The editions contain different types of "texts" like several notation formats, facsimiles, born digital annotations, text and audio files. Before digitization there are analogue procedures of searching, collecting, arranging and reviewing. Since the digitization of music editions, the shift is not only digital. Moreover, it's both digital and analogue, material and corresponding practices, that construct the editions. It is the operation, the handling of the musicologist with cultural, material and immaterial artefacts. To develop the importance of media and the corresponding methods in digital music editions, its necessary to explore these various interactions. Like the radical contextualization of the cultural studies pointed out that object and subject, media technology and context (cf. Winter 2010) continuously affecting each other and be interwoven.

Based on the qualitative research perspectives of the Grounded Theory Methodology (cf. Strauss & Corbin 1996; Denzin 2000, Przyborski & Wohlrab-Sahr 2009) in this study eight narrative guided interviews with problem-centered parts have conducted. Because of the academic void of the user perspective qualitative research offers great potentials to get essential insights and generate first hypothesis in this field (cf. Flick et al. 2000). The investigation on varying routines or the knowledge of the musicologists even if it's implicit (cf. Polanyi 1985) is not simple to transfer in direct questions. In fact, the qualitative research provides many methods to manage this problem (cf. Flick 2002). The guided interview is an inquiry method that follows a structure, but allows a lot of free space for further situated questions and narrative answers (cf. Keuneke 2000). The questions are focused on the routines of the working process of music philologists, their evolving (implicit) knowledge and their biographical reference points to music editions. The qualitative material has been analyzed by a modified coding version of the grounded theory (cf. Strauss & Corbin 1996) like Przyborski and Wohlrab-Sahr (2009) pointed out.

The empirical data and their interpretation documented, that the change in the working process in not only a shift from analogue to digital. Moreover, the hole scientific process is changed and the work on digital music editions have deep impacts on editorial,

juridical, organizational, social and not at least educational processes. Digitization changing the scientific work organization, the editorial work and the perspective on editions and the interwoven knowledge.

### **Interdisciplinary research and knowledge building – Development of recommendations for action for academic projects in the digital humanities**

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The heterogeneous research field of digital humanities is characterised by a high level of connectivity and interdisciplinarity. Not least because of this the digital humanities turned out to be a dynamic field with high velocity of scientific discourses (cf. Gold 2012). In this context, the development of research infrastructure for interconnected and collaborative scientific work (cf. Reichert 2014) as well as the management of interdisciplinary research projects represent particular challenges. Whereas especially the economically characterised management research (cf. Bea, Scheurer & Hesselmann 2011/ Steinmann & Schreyögg 2005) deals with project management processes in companies, network groups or other cooperation forms, project management in academic contexts is hardly found in research literature. One important distinctive feature, especially for academic projects without industrial partners, is that the goal dimension of academic projects fundamentally differs from economic projects. Its focus is not a typical measurable economic gross profit or other definable objectives. The openness for results as an important part of scientific research requires a modified form of project management. However, strategic and systematic project management is hardly implemented in the structure of universities, particularly in cultural science departments and projects. Oftentimes, a rather “muddling through” (Lindblom 1959) can be noticed. This is not a desirable condition because consequences might be increasing transaction costs as well as reduce chances for long-term and stable research collaborations. Furthermore, the special structures in academic contexts must be considered concerning the planning, implementation

and organisation of collaborative interdisciplinary projects.

In view of these conditions, the importance of professional project evaluation is evident, especially in interdisciplinary projects involving cultural scientists as it is the case in digital humanities projects. Digital humanities can be seen as an extension of the complexity dimension according to Rinza (1998): A high scientific novelty grade is associated with an increased risk for the project goals and a relatively large project group might increase the dependencies in the work processes because of the close interlocking of the individual departments.

The growing concentration of interdisciplinary academic projects causes an increasing need for scientifically verified evidence of their efficiency and quality (cf. von Kardorff 2000). For this purpose, summative evaluations are used to review the effectiveness and the achievement of defined targets as well as formative evaluations which can contribute to the optimization of an ongoing project and can provide the basis of strategic decisions and changes (cf. *ibid.*). Within this paper, the procedure will be clarified through a concrete case study from the field of digital humanities.

In the project ZenMEM (Centre of Music – Edition – Media), a formative evaluation in the ongoing project was conducted so its results could be used to develop recommendations for action for the further process.

In ZenMEM, researchers from Paderborn University, the Hochschule für Musik Detmold and Ostwestfalen-Lippe University of Applied Sciences investigate processes of change and new possibilities of the transition from analogue to digital music and media editions since September 2014.

The project is initially promoted for three years by the German Federal Ministry of Education and Research (BMBF) and combines experiences and expertise as well as concepts and methods from musicology, various fields of computer sciences (contextual informatics, software engineering, usability engineering and music informatics) and media studies (media education and media economics). The focus of their research is on musical and other non-textual objects in context of digital editions. In this sense, the researchers are able to link to their preliminary scientific work as well as international developments like the Edirom project or the standards of Music Encoding Initiative (MEI) and Text Encoding Initiative (TEI). They participate in its further development and examine innovative interacting and editing functions for the creation of

digital music and media editions. In addition to research work, corresponding software tools are developed, technical advice and coordination is provided to external projects and training activities in form of workshops, courses and lectures are conducted and further developed. These steps are being accompanied by qualitative and quantitative user studies which take the entire creation process of digital editions into consideration. The results flow back into research and development work within the ZenMEM center. This short project description gives an impression of the complexity of the tasks in this joint project and the amount of heterogeneous research questions the cooperation partners are dealing with.

To conduct a formative evaluation for the ZenMEM project in order to develop recommendations for action for the further project progression, a qualitative half-standardized written survey was chosen as research method. For this purpose, a questionnaire with 18 questions was given to all project members. These questions were relating to previous experiences with working in interdisciplinary projects, special challenges within the project, specific work packages and personal goals. In the last section, the researchers were asked for valuation of ongoing processes and constructive suggestions for improvement. In addition, a shorter questionnaire was sent to the project leaders. Thus, the perspectives of different project status groups could be surveyed.

For the analysis of the results, amongst other things, a categorization based on the concept of SWOT analysis was performed. Developed at Harvard Business School in the 1960s for the strategic planning in companies, the SWOT analysis is a versatile tool (cf. Schawel & Billing 2009) describing the strengths, weaknesses, opportunities and threats of any company or project which constitute a basic structure for developing strategic recommendations for actions (cf. Kotler, Berger & Bickhoff 2016). To derive concrete statements from these four dimensions, the categorization had to be refined. Regarding the evaluation method of coding with Grounded Theory (cf. Przyborski & Wohlrab-Sahr 2009) a differentiated categorization within the root categories was performed.

In this context, it is important to note that Grounded Theory is a methodology as well as an evaluation method (cf. Strübing 2004). The paper at hand focuses on Grounded Theory as an evaluation method to collect phenomena, condense them into concepts, identify categories and uncover connections

between them. Following, recommendations for action could be worked out from the combinations of single phenomena in order to optimize processes within the project. Furthermore, indications could be provided to identify which actions should be focused and which should be avoided (cf. Pepels 2005). Individual competences of the project participants were also taken into consideration. Among other things, it became clear that interdisciplinarity in such a project can be considered as both opportunity and challenge, especially regarding the different preconditions, approaches and methods. People not only hold various paradigms and epistemological interests but also act within different organizations and social systems – nearly all university departments and courses are oriented mono-disciplinary (cf. Dressel et al. 2014). Stringent guidance is needed to enable successful interdisciplinary research. In the ZenMEM project, superiority of the subject disciplines was at least a little bit softened and reflected by mutual work observations as well as agreements on certain terminology so that a basal equality of the participating research partners could be established and constantly evolved.

While in this case, systematic knowledge building took place directly from within the project, it can be discussed how the mediation of interdisciplinary competences could be implemented a lot earlier. As already indicated, interdisciplinary collaborations in academic contexts are of increasing significance and the demand for qualified young researchers with the key qualification interdisciplinarity (cf. Mainzer 2013) grows. More and more universities offer degrees in digital humanities or related fields. However, corresponding curricula show very different weightings of cultural science-based or computer science-based contents (cf. Schubert 2015). A closer inspection of digital humanities projects and a comparison between project experience and curricula might be helpful to develop degree courses so that interdisciplinary competences and shared knowledge can be gained.

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