

Towards a hypermedia model for digital scholarly edition of musical texts based on MEI (Music Encoding Initiative) standard; Integration of hidden traditions within social editing paradigm



ABSTRACT

Digital scholarly editions are substantially modifying the way musical editions has been thought and conceptualized over long periods of time. It's hypermedia capabilities, and its multi-layered structure makes it possible to put in context different sources and testimonies in a virtual space where all objects are semantically related, as well as to take into account explicit distinctions about original sources, related historical information, or editorial interventions. Music digital scholarly editions embodied an interactive nature allowing users to choose from different outputs or reading paths on the bias of different purposes; namely musicological study, learning/teaching activities or performing.

In this context, this Ph.D. dissertation aims to develop a theoretical model for the integration of performing variants (technical and/or expressive) that are transmitted orally or through informal channels (marks, notes or text annotations), and usually from teacher to student, within a particular stylistic or interpretive school. The new standards for encoding musical documents like MEI, allow incorporating this information as superposed layers, explicitly differentiated, to the original sources and testimonies. The proposed model is developed within the so-called social editing paradigm, which postulates the integration of some of the 2.0 Web characteristics as the collaborative production of knowledge within the academic editing processes. These new editing practices allow the integration of work's related knowledge, that circulates outside the formal editing and publication circuits, within the scholarly edition.

CCS CONCEPTS

Applied computing → Arts and humanities

KEYWORDS

Digital scholarly editions; critical editing of music; performing editions; music encoding initiative; social editing; hidden traditions

ACM Reference format:

1. CONTEXT AND MOTIVATION THAT DRIVES THE DISSERTATION RESEARCH

The development of a hypermedia model for digital scholarly editing of musical texts based on the MEI (Music Encoding Initiative) in the web environment standard, allows to integrate a double teleological perspective; satisfying the present demand in the academic community of greater levels of transparency in the editorial intervention on one hand, and the integration with online publication systems for the digital consumption of musical texts.

Its eminently practical and open nature gives it a high degree of innovation in a context such as the current context in which most of the projects developed fall within the scope of historical or musicological research.

In addition, the dynamic and interactive nature of the system incorporates an important social dimension that allows users to draw up his own model for the reception of the text, in a contextualized way to his own aesthetic conceptualization of Work [17] or their final purposes.

In this sense, the proposed model aims to incorporate a marked openness and democratization, focusing on promoting collaborative editing within theoretical postulates such as social editing [14] The current knowledge society demands this commitment of openness and

knowledge dissemination, as well as its insertion and application in the educational field. In this sense, the access to musical texts through these systems represents a powerful tool to enhance user's understanding of the musical work [19]

2.STATE-OF-THE-ART

The textual representation of the musical phenomenon conforms as a process in permanent renewal that aims to establish, with the greatest fidelities degree, the musical work, as well as the prescriptive information necessary for its performance's reproduction. In the last decades, new digital technologies have allowed overcoming many of the limitations that the rigidity and the static character of the printed paradigm has imposed to this task, implying a qualitative jump without precedents in the representation of musical contents [2]

New digital musical scores, known as e-Scores[9], natively developed in digital environments, adopt the dynamic and holistic nature of the medium itself [13] reproducing the potentialities that characterize it: contents can be represented in a multimodal way and be copied, reproduced or modified infinitely. Thus, the space-time dimensions for the creation, transmission, and reception of the contents disappear[10]. If, at early stages, the digitalization of printed scores meant a drastic change in access and distribution of musical texts, e-Scores imply another series of novel practices related to digital consumption; namely reading, analysis or interpretation of the musical text through an electronic device [19]

The potential of the new format and the heuristic power of new tools developed under disciplines such as digital humanities, have led to an increasing demand for musical texts in digital format [11] The application of these new tools to the academic activity transforms some disciplines that have been resorted, almost exclusively to methodologies jealously consolidated during centuries; among the most paradigmatic is the academic edition and textual criticism

The application of digital technology in this field has decisively influenced the development of new theoretical assumptions and epistemological perspectives [16], forming a new paradigm that gives singular relevance to the abstraction of processes as a vehicle to integrate a new media (digital medium) on the preexisting (printed medium), allowing a deeper understanding of the documents produced in previous times. Modeling, understood as the integrated set of relevant characteristics, according to a certain context or theoretical postulate, that allow building knowledge about a given text, is one of the most defining and essential pillars of scholarly editing and publishing in the digital environment [12]

3.HYPOTHESIS/THESIS AND/OR PROBLEM STATEMENT

This dissertation thesis, developed under *Formación en la Sociedad del Conocimiento* PhD Programme [3, 4] project defends the hypothesis stating that the current technological development level makes it possible the development of hypermedia editions that integrate the scholarly edition of musical texts in the web environment, integrating the so-called hidden traditions, with the necessary functionalities and resources for the digital consumption of the text from a performing point of view.

As can be seen from the above, this dissertation thesis aims to support the proposal of a theoretical model for the critical edition of musical texts (music scholarly editing). This model will be formed around a hypermedia archive that interrelates digital representations of sources, in order to overcome the implicit limitations of the critical edition in the printed paradigm. Although the research will be carried out basically through the design of a theoretical model, we would like also to develop also small web page to exemplify some of the underlined questions and functionalities of the model.

The encoding process will be based on MEI (Music Encoding Initiative) standard. It's modular and extensible character makes it possible to build up customized DTD schemas to meet the special requirements of each project. In this case, the schema customization will be centered around the need of encoding performing variants (expressive, gestural or technical ones) developed within the transmission history of the work, and related to different sources.

As a two-stage process [5]music creation (and musical works) are considered as the conjunction and interrelation of the text, created by the author, and the stylistic and interpretative conventions that prevail in each historical and cultural context, which are put in place by the performer in the recreation of the work. In this sense, variations on some of the performing aspects could be considered as constituent elements of the music work variants.

The model promotes the inclusion of all the so-called gestural variants, as a way to enhance the digital consumption in the field of music performing. Such variants arise under different technical-performing schools and represent hidden traditions circulating isolated, and barely inaccessible, to the rest of the musical community because they are usually not published and are only transmitted inside stylistic schools from which they are postulated.

The following scheme based on the transmission of Alexandre Tansman's *Cavatina* tries to briefly illustrate these ideas:

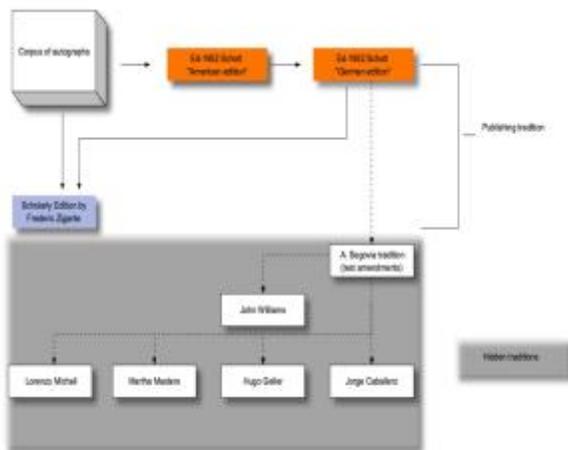


Figure 1. Publishing and hidden traditions in Alexandre Tansman's Cavatina transmission. Source: prepared by the author

As we can see in the figure above all the amendments and alterations made to the original Tansman's text by Andrés Segovia and the followers of his interpretative tradition (especially John Williams), based on their personal interpretation of the text and performing adaptations (fingerings, voicings, etc.) are in fact interpretative variants of the work which are only transmitted to their students and fellow performers, so they are left outside the editorial and publishing environment; that's what we have called hidden traditions. The model is intended to include these hidden traditions in digital scholarly editions by the collaborative action of different musicians related with different schools and interpretative paradigms which have been in contact with these traditions.

In this sense, the model seeks to make possible the joint inclusion of possible reading variants present in the sources on which the edition is based, as well as these interpretative variants that are ultimately the result of the evolution of the work in a stage after its genesis and musical community's reception.

In order to achieve these general objectives, this model is based on two fundamental pillars: the Music Encoding Initiative (MEI) standard and the postulates that underpin the new forms of social editing in the digital paradigm.

MEI standard emerged in 2000 as a new line of research, namely a spin-off project, within the scope of the TEI (Text Encoding Initiative) consortium. From that moment onwards begins a movement that allows the confluence of the most relevant research groups in the moment in areas such as digital musicology, MIR (Music Information

Retrieval) or documentation, to develop a basic scheme for music content encoding based on XML meta-language.

The open and customizable character of the initiative, supported by a set of rules and good practices proposition (the Guidelines), allows the consortium to locate MEI standard as the de facto standard for musical texts semantic encoding. The success of the proposal is mainly based on the fact that the MEI standard allows covering and solving most of the present problems in the edition, description, and publication of musical texts; from the most generic to the most specific. In this way MEI standard is developed with the premise of satisfying all the requirements that the development of the new digital musicology and MIR (Music Information Retrieval) proposes with the continuous advances in this disciplines, and what is more important, allowing to establish adaptable solutions to each of the specific domains in which they are been developed.

ISO (International Standardization Organization) [6] proposes four basic domains to define all the essential characteristics implied in the textual representation of the musical information present in a particular work. These 4 domains constitute an accepted standard within the academic community for the reference of certain areas of application, or facets, within the musical content: the logic domain, the gestural domain, the visual domain, and the analytic domain[7].

On the other hand, this dissertation thesis tries to explore the possibilities of new technology tools and practices focused on facilitating the sharing of and interaction with data in various ways, offering new possibilities for community-driven scholarship as the key element of social scholarly editing[18].

Initiatives as the Open Annotation Collaboration, and practices as User-derived Content will be considered as a mean to achieve the main goal of incorporating and preserving those hidden traditions that are transmitted outside the publishing circuits.

4. RESEARCH OBJECTIVES AND GOALS

Broadly speaking this research project is configured as a multidisciplinary work that integrates different domains of knowledge: musical philology, scholarly edition in the digital sphere, the semantic markup of musical texts and electronic publication for online consumption, and is established in relation to the following objectives and goals:

- To identify and analyze the theoretical postulates that underlie digital scholarly modeling, in a generic way, and of musical texts at a particular level.
- To identify, analyze and classify the interpretive variants of musical texts, belonging to the gestural domain, as well as the resources and guidelines for its integration into the digital edition.

- To know and analyze the MEI standard's architecture, as well as the main guidelines for musical scholarly editing.
- To develop a hypermedia model for the critical edition of musical texts in the web environment based on the MEI standard.
- Identify and analyze the tools needed for the electronic publication of digital scholarly editions focused on performing online consumption.
- To know and analyze the theoretical postulates that promote the new forms of collaborative editing in the digital sphere within the stream known as social editing.

5. RESEARCH APPROACH AND METHODS

The proposed methodology for the development of this research project comprises two blocks of procedures that are directly to the main objectives and goals of the work; A systematic literature review to identify and synthesize the theories and foundations that underlie the scholarly editing of musical texts in the digital environment. And on the other hand, an applied research methodology related to the development of the model itself.

Currently a systematic literature review it is been developed according to this workflow scheme:



Figure 1. SLR workflow scheme. Source: prepared by the author

The main findings synthesized from the systematic literature review will serve as the basis for the model development that will comprehend, at least, the following stages: identifying the theoretical assumptions upon which it will be developed; creating a customized MEI schema for the scholarly editing of musical text focused on the possibilities that the standard itself allows for implement performing variants; exploring the means and tools for implementing the model as a system for dynamic online music texts consumption; and finally making it possible to assume the model as a for community driven knowledge hub through collaboration and annotation in the social editing paradigm. At present, the MEI standard is a project in constant development that is articulated and evolves around an open community of scientists from around the world working in a collaborative way. This consortium has mailing lists and forums where academics who work with the standard in different contexts share their experiences at the time of the

labeling of the texts or the construction of the different schemes specific to each project.

These resources and tools are in themselves a very relevant part of the research methodology, in the specific part related to the MEI standard, since the development of the standard itself is conceived through the knowledge generated in the projects of Research in which it intervenes. In other words: the standard grows and is perfected as the problems are solved by the people who use it in their research projects, and who report collaboratively to the rest of the MEI community.

6.RESULTS TO DATE AND THEIR VALIDITY

In the course of the systematic review of literature for the doctoral thesis, and pending the results of definitive synthesis, we have found some key points that are configured as one of the theoretical pillars for the development of the model.

The critical edition of music in the digital field is based on three fundamental and interrelated pillars that make up hypermedia spaces of multidimensional character; The first of which are the semantic markup systems and standards, (of which we have spoken throughout previous sections) with an emphasis on the MEI standard. Alongside this, the hypertextual quality present in the digital ecosystem, and the massive conversion of texts, from the printed area to digital facsimiles, took place decisively in recent years.

The hypertextual quality allows the structuring, presentation, and access to the text in a fragmentary or multilayer way, as opposed to the linear and unidimensional structure of the printed work. This resource is essential in the field of critical editing through the new digital technologies since it allows the presence and access to all the materials that make up the edition in the same plane of semantic and documentary relevance. In the same way, it allows the layout of different configurations of the text through the different reading paths that run sequentially through the base text and the variants present in sources and testimonies.

On the other hand, the concept of hypertext underlies the logical structure that supports the critical edition, from the point of view that both the codification of the base text, as well as the sources and testimonies, are supported by links and references to their respective digital facsimiles images. Likewise, external references are included to materials of different consideration that allow a deeper contextualization and understanding of the work. These facsimiles or digital reproductions of the musical text form part of the group of documents that are generally being digitized in libraries, archives, and cultural institutions in general; either for its preservation or for its distribution and access to the service of any interested person.

This process of mass translation of the musical text from the printed field to the digital ecosystem, which has been developing since the last decades of the twentieth century until today, is an unprecedented milestone for the circulation and access to many corpora of works that have remained inaccessible to the present day. In any case, these are only part of the critical edition as a facsimile representation of sources and testimonies, since only the bibliographic information (metadata) that incorporates this semantically codified. In spite of this, its value and importance in the new paradigm of textual criticism is evident when being responsible for being able to contextualize the reading variants or the editorial amendments, or to be able to observe, within the same space, any type of conjuncture relative to the Material aspect of the document[20].

Regardless of the phagocytizing power of digital technologies to adapt and improve previous experiences of any type of knowledge representation in the printed area, the translation of the critical edition to the digital sphere supposes as a more relevant fact, the overcoming of the limitations of the printed book and the physical medium in which it has been inserted. Throughout the centuries, these limitations have led to the development of an *astonishing textual machinery* [8] developed and evolved in order to represent a network of textualities that allowed to reflect the historical evolution of a particular work through the documents that prove it.

The main problem arises when information needs arise that transcend the semantic content of the text; that is, when we need to go to sources, testimonies or auxiliary materials for the compression, analysis or justification of one or another innovation in the work. In these cases, a network of texts and related materials is needed through a given structure, which indicates the relationships between them. When the edition takes place in the form of a printed book, this consideration implies that the structure that makes up the edition is represented in the same plane and dimension as the object it serves; that is to say, we are before a fragment or section of a text (critical apparatus) that explain the relations between another series of texts.

These relations are based, by the imposition of the medium, on the reference to fragments, sections or concrete words that in no case allow the complete presence of the material and textual reality from which they emerge. This highly relevant issue is dramatically increased in cases where the number of auxiliary materials is greater. This fact usually happens, for example, in disciplines or arts such as music, which as we have been analyzing throughout the work is expressed in different domains and by manifestations of different nature.

On the contrary, the digital medium allows to keep present in each moment both the semantic and material features of all the objects and realities involved in the edition, of doing it

in addition, in different planes and dimensions, and allowing the resources to incorporate the edition not limited to the textual plane, but also the possibility of including other types of sources of different nature, such as audio, video, etc. In this sense, the electronic medium allows to overcome the encapsulation that constrains the printed book at a physical level, allowing access within a single virtual space to all texts and materials that make up the edition, regardless of their nature; and what is more important, in all its dimensions; semantics, material, sound, etc.

While it is true that one of the fundamental objectives of classical practices in both literary and textual criticism has been to reconstruct and fix ancient texts; many of them with fractured documentary traditions, missing key testimonies or fragments of any of them. On the other hand, it is no less true that in the most modern works with more extensive traditions, and in which there are no discontinuities or absence of documents, the focus of the editorial practice moves from the field of reconstruction to that of analysis in evolution of the transmission of the work, and to the establishments of the possible implicit relations between the different testimonies. Although in most cases this type of analytical work aims at establishing the most representative text of the work (according to the criteria of the editor) there are other types of situations that require the possibility of choosing between different versions or configurations of the work, where the fixing of a "definitive" text is more a disadvantage than a virtue.

The field of notated music is a context where the reflection provided by McGann is frequently reproduced, and where the possibility of choosing between different options and configurations of the work, based on pedagogical criteria, adaptation to trends and stylistic schools, or simply in relation to criteria of aesthetic exigency, is a fundamental value. Moving away from the unitary and immutable vision of classical textual criticism, the digital medium does not necessarily impose the need to organize editing into a single final text, but predisposes the opportunity to create individualized editions around each of them. As postulated for McGann[7], the digital medium favors hyper edition, which, in its own words, resembles a fabulous circle whose center is established everywhere, and whose circumference is none.

One of the first considerations worthy of review that emerges from the previous analysis, and which refers to the field of functional analysis of digital publishing, is to consider this as a system or set of interrelated materials, eminently interactive in nature; or what is the same, that allows to be accessed or used in a dynamic and individualized way compared to other types of static digital materials. At this point, it is convenient to re-focus on the differences between what can be considered digital publications (static electronic documents such as PDF) and the digital editions themselves that allow for dynamic

variability and interaction, both at the semantic and formal and structural levels, within the content itself.

Behind these differences lies a question of vital importance; the digital editions incorporate the digital representation of the logical structure of the musical text and of the musical edition itself as a set of interrelated documents[15]. In this sense the native digital edition incorporates the digital semantics both in the own logical structure of the information as in the structure and the relations that are established within the own edition.

The most traditional publishing practices, generally related to the publication of works on paper, ultimately involve the analysis, consideration, and selection of the aspects considered most significant to represent the musical work in its closest state to the supposed artistic intention of your Creator. The evidence of these processes of analysis, discrimination, and selection is made explicit (in the paper edition) through appendices and sections attached to the work itself, so that the editor himself records the different variants and alternatives that make up the corpus of lessons and testimonies through which the edited work is based.

The critical edition in electronic format, on the other hand and apart from other considerations related to its own digital essence, allows the presentation of the differentiating fact of each variant or testimony in a contextualized way (ie within the whole text where it occurs), in all its dimensions (semantics or material), independently of the guideline text or, conversely, integrated in the selected reading path. This allows the translation of the selection of variants and readings, from the stage of the edition until the moment of the interpretation; and what is perhaps more relevant, from the field of the editor to the field of the interpreter, or investigator. In this way, it is possible to include all the nuances and conjunctures that express the different testimonies of the work in the graphemic domain or written musical experience [1]

7. DISSERTATION STATUS

We are currently working, apart from continuing in parallel with the development of the SLR, in the design of a customized scheme for the MEI standard that adapts and allows to implement the functionalities that the model described before intends.

The specific adaptation to the context (specialization) of the necessary scheme for a concrete project, is made possible by virtue of two basic questions; the incorporation of the MEI.core declaration and the customization of the same by the selection (incorporation or elimination) of modules, elements and / or attributes; or through the creation and insertion of new specifications through the ODD sheet called MEI customization. If the selection of modules is a matter solely related to the delimitation of the needs of the project, the creation of new elements involves other types of issues

of major importance, since they will be analyzed by the consortium's technical committee (Special Interest Group or SIG) for future incorporation as a stable module within the core.

Accordingly, the configuration of a customized schema for a particular project is carried out through a specific tool, which is accessible on the web and the MEI standard called ROMA. Through this program, it is possible to configure a custom scheme through a process like the one shown in the next figure.

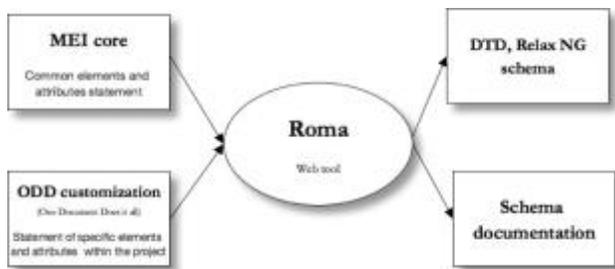


Figure 2. MEI schema customization. Source: prepared by the author

8. CURRENT AND EXPECTED CONTRIBUTIONS

Some contributions related to this Ph.D. dissertation the model development expected in the future are:

- Its real online implementation might secure the fixation of all the music interpretation knowledge of any musical work that is transmitted from generation of teachers to their students out of the publishing circuits, preserving a very rich and important cultural and textual heritage
- Digital scholarly editions are evolving as some kind of knowledge hubs that will expand, enrich and make public access possible of musical scores and its related information
- The multilayered information structure of digital scholarly editions allows its implementation on educational institutions in bias of fomenting collaborative work of students, as well as shaping a very powerful tool for score annotating and performing instruction

9. CONCLUSIONS

Most of the research works developed up to the present time in the field of music criticism, reproduce two characteristics that are replicated in a generalized way; all of them focus almost exclusively on the articulation of models for textual criticism from a perspective centered on the philological study of the musical text, independently of the target audience of the edition, or its use as a source for interpretation. In this sense, the produced knowledge is

almost completely circumscribed to the academic-scientific field that produces it. On the other hand, it is clearly perceptible a lack of standardization in the developed practices and models, so that the research ecosystem in the matter is configured as a kingdom of taifas where each proposal is presented as an isolated model, and without functional relationship with other proposals. This fact is representative of the degree of development of a young and incipient discipline, which although it is true that at a theoretical level already has a certain route, its practical implementation on the web goes back just a decade ago.

In addition, it inherits symptomatically the lack of standardization of the languages and codification protocols on which it is based. The disparity of models and proposals in this regard is practically endless throughout history, even though at present the TEI and MEI systems seem to conform to de facto standards accepted by most of the scientific community.

Most of the works currently implemented on the web related to the critique of musical texts, focus on the reconstructive edition of a base text, and the representation of the different sources or testimonies that make up the tradition, with the inclusion of certain functionalities of interactive character related to the visualization of the variants, systematically excluding explicit references to the interpretive and / or expressive aspects.

The theoretical model proposed allows integrating into a single virtual space the aspects related to the logical and visual domain, such as variants and editorial amendment, or transcription and representation in different notation systems, with aspects specific to the interpretive (gestural) field. In this sense, the system allows the choice of different reading paths, which pass through the texts that make up the edition by reference to a guideline text that is conformed as the best possible text in the interpretive field. Around this one articulates the critical apparatus, the corpus of comments and interpretations, the alignment of multimedia files, social intervention or interpretative innovations.

On the other hand, the inclusion of sources and testimonies marked semantically allows to develop a very relevant number of operations that concern the analytical domain; from the reconstruction of fragments and sections lost or illegible, or the creation of thesauri of stylistic resources, or the search for structures, harmonic, melodic or rhythmic in the text.

The edition is thus shaped as a space for the production and management of information contextualized around the edited work, which is developed in a social and collaborative way and

can be accessed in a dynamic and interactive way in a medium such as a web that allows its distribution in a fast and universal way. The edition thus becomes a living and constantly evolving entity that develops cumulatively and

avoids the risk of duplicate efforts and obsolescence of information.

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