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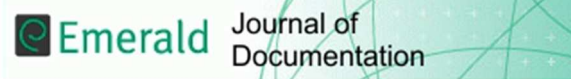
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A typology of music information for studies on information seeking

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Abstract

Purpose - A need to renew music-related information notions arises from both information-seeking models and literature of musical semiotics. The present article creates a music information typology, which aims at facilitating the examination of music information types at varying levels of abstraction in the context of information seeking.

Design/methodology/approach - Literature of musical semiotics and information seeking are juxtaposed to develop a novel approach to music-related information. The grounding concepts are Bruner's enactive, iconic and symbolic modes of representation. The modes of representation offer a universal scheme of knowledge that is applied to the domain of music by defining their content through Tarasti's *Theory of musical semiotics*.

Findings - This conceptual paper results in a music information typology ranging from the enactive music information representations to the abstract ones as follows. Music making as the first mode of enactive representations; music listening as the second mode of enactive representations; iconic representations of music; technological models of music as the first mode of symbolic representations; and ideological models of music as the second mode of symbolic representations.

Originality/value - The present article develops a music information typology that encompasses broadly different music information facets by categorizing music information sources according to their level of abstraction. When applied into empirical research, the typology opens a new window into the perceived roles of music information types in the context of information seeking.

Keywords Information representations, Information search process, Information seeking, Music, Music information, Musical semiotics

Introduction

The domain of music offers an opportunity for self-contemplation and renewal of information notions used in information science research. What does it mean to know about music? How is information science approaching music information? It is likely that the traditional scope of the notions of information does not cover all aspects relevant to representing music information for information-seeking studies. The validity of our information notions should be from time to time tested with theories of knowing and information emerging from particular domains such as music. The aim of this paper is to extend the

notion of information used in information-seeking studies to include facets relevant for representing music information, too.

The juxtaposition of Tarasti's (1994) *Theory of musical semiotics* and Kuhlthau's (2004) *Information search process (ISP) model* creates the starting point for this study. In their works on musicology and musical semiotics, Bengtsson (1977) and Tarasti (1994) examine the different systems of description relevant to musical communication. According to Bengtsson (1977), the concept of tone may refer to a notated tone, a measurable frequency or an aural experience. Tarasti (1994, p. 4) adds to the latter the gestural language, which is needed to transform a notated tone into both a measurable frequency and an aural experience. Tarasti (1994) affirms Bengtsson's (1977, p. 18) claim that these different systems of description should be held as separate and that it cannot be assumed that the possibility of direct transformation between these systems exists. The problem of transformation is reflected in Kuhlthau's (2004, p. 112) ISP model. It suggests that information types at varying levels of abstraction have differentiated interpretations, and that these interpretations can undergo change as the information-seeking process progresses.

Studies of music scholars' information seeking have shown that their work is based on a dialogue of different information types, such as music per se, notations and literature (Brown, 2002). However, the information notions used in these studies confine to textual information and they do not attempt to examine the interpretations of other information types. Neither from the research branches of music information retrieval or everyday life music information seeking can one find information notions designed for examining the interpretations of various music information types in the context of information seeking. Tarasti's (1994; also Bengtsson, 1977) claim about the problem of transformation between music information types and Kuhlthau's (2004) statement about the possibly developing differentiated interpretations of information types at varying levels of abstraction assert from a need to renew information notions used in examining music-related information seeking.

To elaborate the above issues, the present article develops a music information typology where the information sources are categorized according to their level of abstraction. By approaching music information through the level of source abstraction, the perceived roles given to a source category can be examined. The typology opens a new window into the perceived roles of different music information types, such as first-hand playing and music listening, within music-related information seeking. This approach not only broadens information science's understanding of the roles of different music information types, but also helps to understand how people can seek music information at varying levels of abstraction. When applied to empirical research, this typology produces new kinds of user behaviour

data, for which there is a demand in the fields related to music information-seeking behaviour (see e.g. Brown, 2001; 2002; Lee and Downie, 2004; Hunter, 2006; Liew and Siong, 2006; Casey *et al.*, 2008; Laplante, 2008).

The grounding concepts of the novel information typology are Bruner's (1966) enactive, iconic and symbolic modes of representation. Bruner's modes of representation offer a universal scheme of knowledge that is applied into the domain of music by defining their content through Tarasti's (1994) *Theory of musical semiotics*. Even though the focus of the present study is placed on the domain of music, the principles behind the construction of the typology can be applied to any domain of knowledge.

Since the present study deals with sign systems other than written or spoken language, it is important to define how such systems are identified in the development of the framework. The grounding concept of the article is music-related information seeking, and it encompasses as object of seeking all music-related information, be it in audible, written or notated form. When referring to the audible non-conceptual information types of performing and listening to music, for example, the concept of music *per se* is used.

This article is structured as follows. First, the problem statement is defined through Bruner's (1966) concepts of enactive, iconic and symbolic mode of representation. What follows is a literature review of information notions used in the research branches of research describing and modelling information seeking of music scholars and students, everyday life music information seeking and music information retrieval. Thirdly, the problem of musical knowing is discussed and approached through Tarasti's (1994) work on music semiotics. What follows is merging of Bruner's and Tarasti's works resulting in a novel information typology for studies on information seeking. The final chapter discusses the integration of the typology into empirical research.

Problem statement

As stated above, Kuhlthau's (2004) ISP model claims that information source's level of abstraction affects its interpretation in information seeking, and that this interpretation can undergo changes as the information seeking progresses from a stage to another. When examining information sources at varying degrees of abstractness, Kuhlthau (2004) borrows Bruner's (1966) concept of mode of representation. According to Bruner, any domain of knowledge, and every single problem within that domain, can be presented to the learner through using three modes of representation. *Enactive mode* of representation refers to sequences of activities for creating desired results. *Iconic mode* of representation refers to presenting a concept through a graphic without exhaustively defining it. Most abstract of modes is the

symbolic mode where through a system that defines rules of expression, a set of arguments is created for describing a concept. (Bruner, 1966, pp. 44-45.)

From the works of Bruner and Kuhlthau, the following question concerning music-related information seeking can thus be derived. How to define the different modes of representation while examining music-related information seeking?

Literature review

Previous studies have provided diverse approaches to music information. Often, studies describing and modelling information seeking and needs of music scholars review information behaviour among humanists in general (Brown, 2002, p. 74). Despite important works in this area (Brown, 2002; Hunter, 2006; Liew and Siong, 2006; Inskip, Butterworth and MacFarlane, 2008), emphasis on textual information seems to create a one-dimensional notion of information that does not make visible the perceived roles of the other information types. The branch of research primarily focusing on the source preferences and user satisfaction among music scholars and students (Brown, 2001; Lai and Chan, 2009; Dougan, 2012) often examines the perceived helpfulness of a set of pre-categorized sources of information. While these studies are very usable in collection development, they are less relevant for the interpretation of information types at varying levels of abstraction.

The context of everyday life music information seeking differs from the settings of vocational and school-related information seeking. Everyday life music information seeking and needs constitute not so much a goal-oriented activity, but are often initiated by hedonistic, social and cognitive needs, such as identity constructing, mood managing, maintaining interpersonal relations and alleviating monotony (Cunningham, Reeves and Britland, 2003; Laplante, 2008; Laplante and Downie, 2011; see also Bourdieu, 1984 and DeNora, 2002). In contrast to vocational and school-related information seeking, everyday information seeking is "definitionally unsystematic in order to incorporate counter-productive-type behavior" (Spink and Cole 2001, p. 301). As the above views differ considerably, it seems difficult to transfer information notions between them for the purposes of creating a framework for examining the perceived roles of varied music information types within an information-seeking process.

The research of music information retrieval (MIR) focuses on, and evaluates, different methods through which individual pieces of music can be accessed in a MIR system. Within this branch of research, the notion of information is, by necessity, more system- than learner oriented. (e.g. Downie, 2003; Downie, 2004; Lee and Downie, 2004; Casey *et al.*, 2008, see also Laplante, 2008, p. 49.) A good example of the latter is Downie's (2003, pp. 293-301) specification of seven facets of music information, which consists of

pitch, temporal, harmonic, timbral, editorial, textual and bibliographic facets. Coherent to MIR research, these facets approach music-related information mostly from the viewpoint of interacting and utilizing MIR systems, and provide a useful summary of the challenges for MIR system design. However, the typology is not well suited to the examination of behaviour of a person engaged in a music-related complex learning task in which first-hand music playing or varied literature may be of importance. Also semiotic approaches have been used in MIR system design (Inskip, MacFarlane and Rafferty, 2007).

Because the content of the different modes of representation within the domain of music are hard to derive from the previous research, the present study draws on the ideas developed by Tarasti (1994). What follows is a development of the content for Bruner's (1966) original concepts of different modes of representation through Tarasti's (1994) work. This development results in an information typology ranging from enactive music information representations to abstract ones. This typology can be used as a basis while categorizing different information sources within instruments of data collection. When applied to longitudinal studies, the typology opens a novel window into the roles of different music information types.

Musical knowing and semiotics

The problem with musical knowing, i.e., what it means to know about music, presents itself in a complex and problematic manner. According to Bengtsson (1977) the *concept of tone* (our italics) may refer to a notated tone, a measurable frequency or an aural experience. Tarasti (1994, p. 4) adds to the latter also the gestural language, which is needed to transform a notated tone into both a measurable frequency and an aural experience. Musical knowing therefore transpires also within sign systems, which are inherently non-conceptual (Ibid.). Bengtsson (1977, p. 18) stresses the importance of keeping the different systems of description as separate categories. We cannot assume that the possibility of direct transformation between these sign systems exists (ibid.). Yet, according to Tarasti (1994, p. 4) and Bengtsson (1977, p. 23), it is insufficient to state that musical knowledge is merely transmitted through the musical non-conceptual sign systems. As no sign system works in a vacuum, but in interaction with other systems, also verbal sign systems have had an important role in transmitting musical tradition (Tarasti, 1994, p. 4). Due to the detached nature of the different sign systems, it is important to take into consideration the process of translation, with its imperfect nature, taking place between the systems (Bengtsson, 1977, p. 18). According to Tarasti (1994, p. 4), the most radical translation occurs when a person is trying to explicate his or her aural experiences into conceptual information. Acknowledging the problem of transformation between the representation types is essential in gaining further understanding about their perceived roles

within information seeking. However, the mere multitude of differentiated information representations relevant to music pose a challenge to approaching them in information-seeking research.

Another problem related to approaching music information is the ability of music per se to form symbioses with other forms of humane self-expression. A melodic line that weaves with a vocal text creates structure, which is more than the mere melodic line. The latter kinds of symbioses can also be seen to be produced with for example music and dance and music and theater. (Bengtsson, 1977, p. 5.)

Tarasti (1994) strives to create an improved method of musical semiotics that takes into account the procedural and developing nature of music. One of the procedural traits of his method is that it accounts also for the musical happenings 'in absentia', that is unrealized but possible musical solutions. Tarasti (1994) thus creates a method for studying the semiosis created by musical discourseⁱⁱ. His comprehensive theory provides a fertile ground for the purposes of present study, since it also examines musical discourse's relation to the conceptual models that influence its formation. It seems necessary to clarify that although our study is influenced by Tarasti's (1994) work, in the present article no individual pieces of music will be analyzed. Tarasti's (1994) work is used as a point of departure in creating a synthesized information typology. Respectively, even though Bruner's (1966) theory of instruction is used as a starting point for the framework, the goal of the present study is not to create a theory of musical instruction. What follows is the juxtaposition of Bruner modes of representation with concepts used by Tarasti to classify sign systems relevant to music and to define the manifest level (i.e. conceptual) models used in forming a musical discourse.

Science of gestures and ideological and technological models of musical communication

Tarasti (1994, p. 4) affirms that the concept of tone may also transpire through a tactile mode of knowing, that is, through gestural language of muscular movements and touches that a performer translates, for example, a score into an aural experience. According to a French school, piano playing could be referred to as "a science of gestures" (Ibid.). When attempting to posit the science of gestures into the Bruner's modes representation, the following remarks can be made. As Bengtsson (1977, p. 17) states, the performing musician also receives the aural experience generated through his or her instrument. This creates a system of simultaneous feedback, which continuously affects the musician's performance (Ibid). Research on how music making effects the human brain states that this interaction is diverse, ranging from, for example, hearing, interaction with memory (and thus with e.g. expectations related to cultural intonations), gestures to visual interaction (Levitin, 2007). The present article differentiates this mode of enactive information of music making from the mere receiving or listening of music, as this mode provides

means of control over the sonic reality. The former mode of enactive information will later on be referred to as the 'first enactive' mode, whereas mere receiving or listening will be referred to as the 'second enactive' mode. This naming is used purely for distinguishing between the modes. As also music receiving and listening incorporates a myriad of possible interactions, it would not seem appropriate to define these concepts respectively as for example 'multi-enactive' and mere 'enactive'ⁱⁱⁱ. Whereas the term 'music making' may in its common use refer to either playing or composing music, here it is used in a broader meaning to illustrate the information resided in all sequences of actions that aim to produce sounds for musical purposes.

Tarasti's (1994) theory of musical semiotics bears also two other concepts, which this study finds meaningful for the creation of a typology of musical information. These concepts are technological and ideological models of musical communication, which have the function of guiding and influencing the formation of the musical discourse (Tarasti, 1994, p. 15). With technological models of musical communication, Tarasti (1994, pp. 16-17) refers to the manifest (i.e. conceptual) information mediating structural aspects of music, such as studies of harmony, counterpoint and composition. According to Tarasti (1994, p. 17), some of this technological knowledge is in some cultures transferred orally, such as music's interpretation in western music tradition. Therefore, the concept of technological models examines the structures of both tonal organization, for example harmony, thematicity and counterpoint, and the sonic formulae, for example orchestration and interpretation. As this technological knowledge strives to translate the structures and qualities present music per se into symbolic representations, this work considers it as the 'first symbolic' mode in its information typology.

Ideological models of musical communication Tarasti (1994, pp. 16-17) defines as "formed by models of thought which determine all symbolism related to music". In all musical societies one can also find rules and norms, which evaluate music accordingly (Tarasti 1994, p. 16). As presentations of these ideological models, Tarasti (ibid.) presents for example tracts, critiques and manifestos of schools of composing. From Tarasti's concept of ideological models, the present article derives its most abstract mode of information representation. These representations of information function outside mere structural qualities of music per se and links and negotiate music concerning conceptual symbolisms with other systems of conceptual symbolic representations. In other words, they negotiate the relationship of e.g. conceptual systems of 'western classical music' and 'history' or 'music' and 'aesthetics' or 'western classical music' and 'education'. The relationship of these conceptual systems may be discussed and negotiated without reference to actual structures and qualities of music per se. This mode of representation will be later on

referred to as the 'second symbolic' mode and it may be seen as a derivative of Tarasti's (1994) original concept of ideological models of musical communication.

The derived first symbolic mode, which examines for example harmony and counterpoint, and the second symbolic mode, which reviews, for example, aesthetics and history of western classical music, are no separate entities. For example, the technological models of harmony and counterpoint are closely weaved with the history of western music, which is evident in concepts such as 'Palestrina style counterpoint'. Thus, the same sources can very well include both types of information. In some cases, it is only through the information-seeker's need of either one of the information types that this separation transpires and can be examined. Also Tarasti (1994, p. 17) stresses in his examination of the original concepts that "the technological and ideological models can cooperate in several ways" and develop independently of each other.

As the present study has now defined both the enactive and symbolic ends of its typology, the next task is to fill out the remaining mode of representation presented by Bruner (1966), that is, the iconic mode. The in essence differentiated nature of graphical notated and conceptual symbolic musical representations are discussed, for example, by Adorno (2006, p. 168) as follows.

"[...] in fact, one could even see musical notation as no more than a pseudomorphosis towards the realm of verbal terms. The fact that it has to borrow its signs from verbal writing shows how alien it is to its terms [...] The name 'A' can be removed from the note A without the slightest loss of musical definition; it would be a futile undertaking, however, to attempt a separation of the letter a and the vowel a."

A detailed definition of iconic musical signs in the semiotic sense is a complex task (see e.g. Tarasti, 1994, pp. 54-57) and way beyond the scope of the present article. This task also becomes more complicated due to the intermingling of signs, which often renders it difficult to distinguish a pure iconic sign, for example (Tarasti, 1994, p. 58; see also Petrilli and Ponzio, 2005, p. 30). An important aspect in our approach to the definition of iconic representations of music is Bruner's (1966, pp. 44-45) idea of iconic representations as "graphics and diagrams, which describe a concept without defining it fully". Different systems of music notation seems to fit well with Bruner's definition of iconic representations, as different technological structures can be derived^{iv} from the same notation (Tarasti 1994, p. 31). Also notation can be interpreted, or modalized in Tarasti's (1994, p. 39; also Adorno, 2006, p. 163) terms, in various ways, allowing for the performer great power over the musical message. The present study thus approaches iconic representations of music as graphic illustrations presenting music-related information, of which different

notations, such as modern staff notation, function as an example. The above semiotic simplification is also present in the ways our study approaches the concepts of enactive and symbolic modes musical information. As Tarasti (1994, pp. 53-58) states, music per se, which we classify as enactive information, can be seen to articulate indexes, icons and symbolisms both in relation to its surroundings and in relation to itself. Even though Tarasti's (1994) theory of musical semiotics influenced the typology presented below, it is not semiotic in nature, but builds on Bruner's (1966) ideas of modes of representation.

A typology of musical information

As a synthesis derived from the studies discussed above, a typology of musical information is presented. The typology's purpose is not to exhaustively classify phenomena as belonging to one information type alone. The position and needs of the information seeker play a crucial role in providing the angle through which the different modes of representation transpire. We argue that this approach can be used to gain understanding about the perceived roles of various information types present in music-related information seeking

Music making as the first mode of enactive representations

This mode of representation refers to concrete action to produce sounds for musical purposes. This action may appear in varied forms, such as playing the violin, singing or creating electronic music with a computer. This mode is close to the concept of 'science of gestures' (Tarasti 1994, p. 4). Whereas the term 'music making' may in its common use refer to either playing or composing music, here it is used in a broader meaning to illustrate the information resided in different sequences of actions that aim to produce sounds for musical purposes.

Receiving music as the second mode of enactive representations

This mode refers to receiving musical performances of others, whether being present in the moment of the creation or through a recording, but without the possibility of control over the sonic results. The lack of this control is seen to produce a distinction between the level of interaction present between this mode and the first enactive mode. This information mode, as also the first enactive, should be conceptualized broadly enough to encompass also situations where music is present as a part of a symbiosis, as discussed by Bengtsson (1977, p. 5).

Iconic representations of music

Iconic representations of music refer to the graphic illustrations presenting music-related information. Different notations, such as modern staff notation, function as an example of these kinds of representations.

Technological models of music as the first mode of symbolic representations

This mode of representation is derived from Tarasti's (1994, pp. 16-17) concept 'technological models of musical communication'. It refers to the structures of both tonal organization (e.g. harmony and counterpoint) and sonic formulae (e.g. orchestration and interpretation), and strives to translate these structures to symbolic representations. In contrast to the mode that follows, the structures examined transpire in the enactive information modes.

Ideological models of music as the second mode of symbolic representations

The typology's most abstract mode of representations is an extension of Tarasti's (1994, pp. 16-17) original concept of 'ideological models of musical communication'. This second mode of symbolic representations addresses music but not directly the qualities that transpire in the enactive modes of representation. It functions as information that negotiates music concerning conceptual symbolism with other fields and their conceptual representations. For example, it is possible to produce narratives on concepts such as 'western classical music' and 'history' or 'music' and 'aesthetics' without reference to actual phenomena present in music per se. Both the first and second symbolic modes appear in the forms of spoken and written language. Information sources that incorporate both the first and second modes of symbolic representations are, for example, textbooks of harmony and counterpoint. Examples of information sources that can be more geared towards the second symbolic mode include monographs on philosophy of music and some texts concerning the history of music, such as some biographies of composers. The two symbolic modes are not separate entities and it is often only through the information seeker's need that this division into these two levels of abstraction transpires (see also Tarasti 1994, p. 17).

Discussion

The present article developed a novel music information typology that encompasses broadly different music information facets by categorizing music information sources according to their level of abstraction. In the development of our typology we utilized Tarasti's (1994) *Theory of musical semiotics* to derive the content for Bruner's (1966) modes of representation within the context of music information. The result

is a continuum ranging from the enactive music information representations to the abstract ones as follows: music making as the first mode of enactive representations; music listening as the second mode of enactive representations; iconic representations of music; technological models of music as the first mode of symbolic representations; and ideological models of music as the second mode of symbolic representations.

The typology can be used to restructure research of music-related information seeking. Previous studies on information seeking among music scholars, for example, have not defined separate types of music information as information in their own right, subject to diverse interpretations and roles in information seeking. With the help of the typology, research questions may now be posed at the level of individual types of music information. For example, coherent to Kuhlthau's (2004; see also Nahl, 2007) ISP model, the emotional dimensions of individual music information types affecting the overall attitude towards an information-seeking task can be examined through empirical research. Longitudinal studies can be designed to examine various developments at the level of individual music information types as the information-seeking task progresses. For example, it can be examined how the perceived role and importance of music listening change at diverse stages of information seeking. Furthermore, using the typology as a starting point, the relations of the different types of music information within an information-seeking task can be examined. This broader approach to music information is more coherent with the notions of knowledge present in music semiotic works (Tarasti, 1994) and also Kuhlthau's (2004) ISP model.

What follows is a set of example questions that can be generated via approaching music information through the typology presented in this paper. Are there emotional dimensions linked to, for example, music making or ideological models of music, which affect the overall attitude towards an information-seeking task? How are music making, notation-based analyses and writing connected in an information-seeking task? Does the perceived role of music listening change, when such tasks commence? Does the perceived importance of individual music information types undergo change as the information-seeking task progresses? What task affecting decisions are made by listening others perform a piece? Finally, how is music-related literature seen to affect performing of pieces?

When using the above typology in empirical research, the following addition can be made. For example, university level music students might also have other than music-related information needs, such as information needs about academic writing. In order to get a more holistic view of, e.g., music students' information-seeking behaviour, a sixth information type titled 'other symbolic information' could be added to the five types of music information presented in the typology. The latter is supported by Brown's

(2002, p. 82) finding, that over 85% of the music scholars who participated in her research used sources from other than music-related disciplines.

When music information sources are approached at their varying levels of abstraction, the breadth of sources in examination becomes larger than used in previous research. Especially information sources concerning the enactive modes of representations of music come to fore in studies having a broader scope. Examples of sources of the first mode of enactive music information representations include private rehearsing and rehearsals in an educational institution. The perceived roles of such representations in information seeking should be examined in future studies.

As discussed previously, it is hard to strictly classify phenomena solely belonging to a single music information type. This becomes an issue if a researcher strives to pre-classify information sources according to the typology. For example, being present at musical performance could be considered both as a source of both first enactive representations, that is, a study of the twofold interaction of the performer creating the music, and the second enactive representations, that is, a study of the mere audible qualities the performed musical piece. A musical performance could also be approached as a manifestation and an example of an interpretative device, and thereby an example of a technological model in action.

There are, however, some arguments that we find to support pre-classification of sources when the typology is applied into empirical research. As stated by Tarasti (1994, p. 4), it is very difficult to explicate musical experiences into conceptual wordings. It is thus reasonable to presume, that this difficulty is also faced when an information seeker strives to describe their rationale behind acquiring, for example, first or second modes of enactive musical representations. This task is not helped by the typology that is very abstract in nature. Therefore, even a rudimentary pre-classification of sources might help the interviewee to understand the concepts of differentiated music information modes. Even though the pre-classification of sources results in simplification, it could still provide a preliminary structure of research.

The functionality of the typology will be verified by applying it into empirical research. It is only through longitudinal empirical studies possible to examine, for example, Kuhlthau's (2004) statement about the developing nature of the interpretations of information sources at different levels of abstraction. Key factors in successful empirical applications include sufficient time between the observations of a longitudinal study and the use of detailed qualitative methods, such as interviews and questionnaires with open-ended question types. University level music students are one of the optimal target groups for empirical applications, as through their training they have a high readiness to explicate how they see diverse information types affecting the procedure of writing a dissertation proposal, for example.

Even though the focus of our study is in the domain of music, the principle of categorizing information sources according to their level of abstraction can be applied to any domain of knowledge. As stated by Bruner (1966), any domain of knowledge can be approached through the modes of representation. This approach could be particularly useful while examining information-seeking behaviour in domains where the enactive information representations play a significant role in learning.

ⁱ With the possible conceptual symbioses included (see e.g. Bengtsson, 1977, p. 5)

ⁱⁱ The concept of musical discourse is understood in Tarasti's (1994, p. 16) theory as a discourse in a broad sense, including music per se, i.e. its tonal realization, and also its perception in the collective musical consciousness and its notation.

ⁱⁱⁱ Even though this study draws from semiotics, the epithet 'first' should not be confused the semiotic Peircean 'firstness', which is present in both first and second enactive modes of this study (see e.g. Petrilli and Ponzio, 2006).

^{iv} One of the Brown's (2002, p. 86) examples stated by a music scholar also illustrates this multitude of possible interpretations. "What happens is, you have an [notated] example, then go to the word processor and you write it up, and the example sort of fades into the background [...] Then you read it and look at the example and say, 'Wait a minute, this isn't exactly what happened.' You go back to the example and look at it and realize you have to rewrite the passage [...] This constant going back and forth is a real feature of writing about music."

References

- Adorno, T. (2006), *Towards a theory of musical reproduction: notes, a draft and two schemata*, Polity Press, Cambridge.
- Bengtsson, I. (1977), *Musikvetenskap: en översikt [Music science: an overview]*, Esselte Studium, Stockholm.
- Bourdieu, P. (1984), *Distinction: a social critique of the judgment of taste*, Routledge, Oxon.
- Brown, C. (2001), "The role of computer-mediated communication in the research process of the music scholars: an exploratory investigation", *Information Research*, Vol. 6 No. 2, available at: <http://InformationR.net/ir/6-2/paper99.html> (accessed 4 January 2015).
- Brown, C. (2002), "Straddling the humanities and social sciences: the research process of music scholars", *Library & Information Science Research*, Vol. 24 No. 1, pp. 73-94.
- Bruner, J. (1966), *Toward a theory of instruction*, Harvard University Press, Cambridge.
- Casey, M., Veltkamp, R., Goto, M., Leman, M., Rhodes, C. and Slaney M. (2008), "Content-based music information retrieval: current directions and future challenges", *Proceedings of the IEEE*, Vol. 96 No. 4, pp. 668- 696.
- Cunningham, S., Reeves, N. and Britland, M. (2003), "An ethnographic study of music information seeking: implications for the design of a music digital library" in *Proceedings of the 3rd ACM/IEEE-CS Joint Conference on Digital Libraries, JCDL '03, Houston, TX, 2003*, IEEE, pp. 5-16.
- DeNora, T. (2000), *Music in everyday life*, Cambridge University Press, Cambridge.
- Dougan, K. (2012), "Information seeking behaviors of music students", *Reference Services Review*, Vol. 40 No. 4, pp. 558-573.
- Downie, S. (2003), "Music information retrieval", *Annual Review of Information Science and Technology*, Vol. 37 No. 1 , pp. 295-340.
- Downie, S. (2004), "The scientific evaluation of music information retrieval systems: foundations and future", *Computer Music Journal*, Vol. 28 No. 2, pp. 12-23.
- Hunter, B. (2006), "A new breed of musicians: the information-seeking needs and behaviors of composers of electroacoustic music", *Music Reference Services Quarterly*, Vol. 10 No. 1, pp. 1-15.

- Inskip, C., Butterworth, R., and MacFarlane, A. (2008), "A study of the information needs of the users of a folk music library and the implications for the design of a digital library system", *Information Processing & Management*, Vol. 44 No. 1, pp. 647-662.
- Inskip, C., MacFarlane, A. and Rafferty, P. (2007), "Meaning, communication, music: towards a revised communicated model", *Journal of Documentation*, Vol. 64 No. 5, pp. 687-706.
- Kuhlthau, C. (2004), *Seeking meaning: a process approach to library and information services*, 2. edition, Libraries Unlimited Inc., Westport, NY
- Lai, K. and Chan, K. (2010), "Do you know your music users' needs? A library user survey that helps enhance a user-centered music collection", *The Journal of Academic Librarianship*, Vol. 36 No. 1, pp. 63-69.
- Laplante, A. (2008), *Everyday life music information-seeking behavior of young adults: an exploratory study*, dissertation, McGill University.
- LaPlante, A. and Downie, S. (2011), "The utilitarian and hedonic outcomes of music information-seeking in everyday life", *Library & Information Science Research*, Vol. 33 No. 1, pp. 202-210.
- Lee, H. and Downie, S. (2004), "Survey of music information needs, uses, and seeking behaviours: preliminary findings", *In Proceedings of the 5th International Conference on Music Information Retrieval in Barcelona, 2004*, The International Society of Music Information Retrieval, pp. 441-446.
- Levitin, D. (2007), *This is your brain on music: the science of a human obsession*, Plume book, New York, NY.
- Liew, C. and Siong, S. (2006), "Beyond the notes: a qualitative study of the information-seeking behavior of ethnomusicologists", *The Journal of Academic Librarianship*, Vol. 32 No. 1, pp. 60-68.
- Nahl, D. (2007), "The centrality of the affective in information behavior", in Nahl, D. and Bilal, D. (Eds.), *Information and emotion: the emergent affective paradigm in information behavior research and theory*, Information today Inc., Medford, NJ, pp. 3-38.
- Petrilli, S. and Ponzio, A. (2005), *Semiotics unbounded: interpretive routes through the open network of signs*, University of Toronto Press, Toronto.
- Spink, A. and Cole, C. (2001), "Introduction to the special issue: everyday life information seeking research", *Library & Information Science Research*, Vol. 23 No. 1, pp. 301-304.
- Tarasti, E. (1994). *A theory of musical semiotics*, Indiana University Press, Bloomington, IN.