MUSIC DIDACTICS – AN EVOLVING SCIENTIFIC DISCIPLINE

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Abstract

This paper proposes a framework to position music didactics as a scientific research field. The approach integrates three key elements: (1) applying Fensham's (2004) criteria for science education research evolution and Hoyningen-Huene's (2013) systematicity theory; (2) utilizing Merker et al. (2015) evolutionary theory of music to elucidate the nature and function of human song, music, and didactics; and (3) emphasizing the crucial role of normative and aesthetic dimensions in music education. By synthesizing these perspectives, I propose a conceptual foundation for understanding music didactics as a scientific domain, acknowledging its domain specificities and discussing normative and aesthetic aspects. This conceptualization aims to legitimize and advance research in music didactics, fostering its development as a scientific discipline.

Keywords: *Music didactics, systematicity, practice theories, cultural transmission, scientificity*

Introduction

Music teaching and learning have been integral to human culture for as long as we can remember. In the early stages of evolution, this likely occurred through the intergenerational transmission of skills, knowledge, and lore related to songs, dance, instrument making, and their use (Merker, Morley & Zuidema, 2015). Essentially, human cultures would not exist without these social practices across generations. To ensure and guide the transmission of knowledge and skills, modern nations have developed systems with institutions that facilitate formal education. Studying how these processes function – the formal teaching and learning of cultural content – has become central to didactics as a scientific discipline (Schneuwly, 2021).

To a considerable extent, music teaching and learning also occur in institutions as a formal practice constituted by norms, rules, and conventions. This practice can be viewed as the focus of music didactics (or music education in a broader sense) as a scientific discipline. The transmission of song is a fundamental aspect of most societies' educational policies, making it the core of music didactics.

Consequently, researchers in music education assert that their field is a scientific discipline analogous to developments in other educational domains as subject-specific didactics. However, in the recent history of didactics evolving into a scientific domain, music has been a marginal subject. Other educational disciplines – particularly science education, mathematics, and language didactics – have already established themselves as subject-specific didactic disciplines (e.g., Krogh, Quadrup & Ting Graf, 2021). Thus, it is timely to explore the topic of this article: *What characterizes music didactics as a scientific discipline?*

The aim is to provide guidelines and considerations for continuing the debate about how music didactics can be further developed as a scientific research domain.

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My proposition begins with references to the seminal work by Peter Fensham (2004), who conceptualized the development of science education into a scientific field of research. Among three areas he identifies are 'intra-research' criteria that I will discuss and further specify using the systematicity theory proposed by science philosopher Paul Hoyningen-Huene (2013). In the main part of this article, I will use systematicity theory to conceptualize didactics as a research domain and the evolutionary theory by Merker et al. (2015) to clarify the domain-specific characteristics of music didactics. I argue that this theoretical framework is essential for advancing its position as a scientific research domain.

Organizing Education Research in Society

In recent decades, researchers have shown growing interest in teaching and learning gaining scientific status as subject-specific didactics. Science education exemplifies how this development can occur through reconstruction provided by Peter Fensham (2004), who proposes focusing on three areas.

The first area concerns institutional conditions for research such as conferences, training programs, associations, journals, centres, and academic recognition. This area implies that resources must be available to establish institutional structures; thus, it heavily depends on political willingness to support the process of scientific development. The second criterion pertains to conditions within a research domain. Fensham (2004) suggests several factors: 1) the status of scientific knowledge; 2) asking questions; 3) conceptual and theoretical development; 4) research methodologies; 5) progression; 6) model publications, and 7) seminal publications. He discusses these themes as they have developed internationally in science education. Among other things, he addresses concepts that are used differently across geographical areas with the consequence that they cannot always be translated. The concept of didactics is one such notion.

This second area – criteria *within* a research domain – concerns topics genuinely discussed in the philosophy of science. As characteristics of scientificity are central to this article's main topic, I will present a theory on the nature of science that includes humanities and social sciences. As a third area, Fensham (2004) mentions research outcomes concerning implications for practice. It is important to note that he used these three areas to reconstruct the development of science education as a field of research. His notion of 'science' in the Anglo-Saxon tradition is restricted to *Naturwissenschaften* or natural sciences. I find Fensham's three areas valuable for analysing national and international levels in education. For instance, one could identify strengths and weaknesses across various educational domains and evaluate them concerning institutional conditions, scientific status, and transfers between research and practice. This has yet to be done for music education; understanding this omission becomes clearer when examining domain specificity later in this article.

From Fensham's work, we can conclude that in any nation, the process of scientifically developing an educational field primarily concerns governance issues related to educational policy processes. Without political support and resources, institutions cannot change or be created anew. Institutional resources are necessary for stakeholders to discuss, plan, and implement content effectively. If such resources are available, then we must consider what it means to understand and practice subject didactics as a science. An explicit and agreed-upon understanding is essential for governance when observing or shaping the process of scientific development. If

institutional conditions are established and maintained, then issues within Fensham's second area – criteria within a research domain – are at stake.

On the Nature of Science

What can guide the process of scientifically developing music didactics or subject-specific didactics more generally? It is not surprising that this development has primarily advanced in science education (*Naturwissenschaft*), illustrated by Fensham's seminal book (2004), rather than in the arts as part of *Geisteswissenschaft* (humanities). This fact relates to the issue that general theories of science in Philosophy have historically focused mainly on physics (Popper, 1959; Kuhn, 1962; Feyerabend, 1975). A further limitation of the concept of science (*Wissenschaft*[1]) occurs when research methods from social sciences are applied standardly in music education contexts. Since Kuhn (1962) and Feyerabend (1975), it has been recognized that focusing solely on applying scientific methods is one-sided and insufficient.

A further development stemming from Kuhn's and Feyerabend's positions is Paul Hoyningen-Huene's theory of systematicity (2013). He answers the question about the nature of science as follows: "*Scientific knowledge differs from other kinds of knowledge, in particular from everyday knowledge, primarily by being more systematic"* (p. 25).

What does it mean to apply systematicity theory to didactics as an evolving scientific discipline? Hoyningen-Huene and I (2022) have outlined a proposition that I will summarize here while employing it within the context of music didactics.

The theory of systematicity applies to all scientific disciplines taught at universities; therefore, it encompasses both natural sciences (*Naturwissenschaften*) and humanities (*Geisteswissenschaften*) – a subdivision introduced in the latter half of the 19th century. Notably, while 'science' in English refers only to natural sciences, the German term *Wissenschaft* comprehensively covers all scientific fields. It is also noteworthy that Hoyningen-Huene (2013) does not address distinctions between pseudoscience and science – a discussion prevalent in philosophy of science – since his concept serves primarily to differentiate everyday knowledge from scientific knowledge. Systematicity manifests itself gradually across nine dimensions:

- Descriptions,
- Explanations,
- Predictions,
- Defence of knowledge claims,
- Critical discourse,
- Epistemic connectedness,
- Ideal completeness,
- Knowledge generation,
- Representation of knowledge (Hoyningen-Huene, p. 35).

Didactics can clarify its scientific nature by specifying how it aligns with these dimensions. Not all dimensions apply equally well across domains; for instance, predictions hold greater importance in natural sciences than in social sciences or humanities. To apply systematicity theory effectively requires delimiting the subject area – that is identifying phenomena under investigation by this discipline.

[1] The German concept of *Wissenschaft* is broad, encompassing all fields of science. There is no precise translation or equivalent term in English.

Didactics and Related Scientific Research from Systematicity Theory Perspective

Schneuwly (e.g., 2021) provides comprehensive historical analyses regarding Didactics' evolution into a scientific discipline. Building on this foundation and incorporating the proposal by Hoyningen-Huene and myself (Stadler Elmer & Hoyningen-Huene, 2022), I outline **six key aspects serving as a framework for contextualizing and specifying music didactics:**

1. ***Subject Area:*** Didactics focuses on guided learning processes occurring within specialized institutions – essentially on didactic processes at schools (Schneuwly, 2013). These processes consist of three interrelated components: teacher, subject matter, and learner – a configuration referred to as 'didactic system' (e.g., Reusser, 2018). The didactic process represents an inherently social intervention wherein cultural achievements are transmitted within institutions across generations.
2. ***Aim:*** The transmission of knowledge – including skills – is both a social practice and investment governed by norms loaded with qualitative expectations denoted by characteristics or superlatives such as efficient or effective transmission. Everyday reflections on didactic practices often evaluate lessons based on what 'ought to be' correct or appropriate while assessing authenticity regarding subject treatment.
3. ***Reflection:*** Didactic practices typically reflect everyday knowledge aimed at maintaining or improving processes; however, didactics as scientific disciplines necessitate more systematic reflection on these practices aimed at enhancing understanding within their dynamics (Stadler Elmer & Hoyningen-Huene, 2022).
4. ***Normativity:*** Employing practice idioms (e.g., Rouse, 2007a, 2007b; Schatzki, 1996; Reckwitz, 2003) makes sense since formal knowledge transmission is inherently guided by norms, rules, and conventions. The implicit normativity is an essential feature within social practices.
5. ***Meta-Practice:*** Scientific inquiry into didactic processes functions sas social practice – a meta-practice influenced by researchers' embeddedness within their respective cultures affecting normative orientations (see e.g., Schneuwly, 2021).
6. ***Technical Vocabulary:*** As an evolving field does introduce technical terms towards developing shared conceptual systems or vocabularies essential for effective communication among educators regarding learning objects or subject matters. Examples that can be inspiring across disciplines are *scolarisation*, introduced by Denizot (2013), and *transformation*, introduced by Chevallard (1991).

In summary, didactics is characterised by formal social practices that aim to effectively transmit knowledge and skills in specialised institutions. A systematic study of the teaching and learning processes – empirical or historical, for example – further deepens our understanding and can help to improve their effectiveness.

Specificities of Music Didactics

I highlight **seven principal considerations that make music didactics distinct from other didactics and central themes in developing the scientific position among other domains of didactics.**

1. ***Music didactics belong to the arts.*** An important feature of the arts (visual arts, music, dance, theatre, poetry, film, photography etc.) is that they do not strive for truisms but rather intend to present something sensual that has affective relevance to the author(s). Symbols, stories, and verbal and non-verbal modes of expression are used to communicate affective states, share them with others and induce transformations and hyper-generalization (Valsiner, 2019). Thus, the arts are not primarily rationales for gaining truisms and differ from sciences that strive for collectively and even universally valid truths. The arts are cultural techniques to transform and represent subjective feelings with conventional means of expression to make affective states social (Vygotsky, 1971). The subjective feeling that a product is appropriate, correct, or well-formed is equivalent to aesthetic feelings, which can be experienced and shared collectively. In order to produce art that transforms individual affective states and makes them accessible collectively, many prerequisites (skills, knowledge) are needed, which children have yet to acquire. Their spontaneous creativity (Cropley & Cropley, 2013) can be called proto-aesthetic acts in the sense of Dissanayake (e.g., 2011) which include simplification, repetition, variation, exaggeration, and surprise. These proto-aesthetic acts are termed 'artifying', transforming an ordinary event or subject into something special. Such artifying acts precede artistic acts. Two remarks with respect to music are important here: a) It is striking that all artifying acts also characterize music-making even at elementary levels; b) Dissanayake abstracted these artifying acts from analyses of interactions with infants. They support the regulation of attention and the building up of rituals. The upshot of both remarks is that artifying as proto-aesthetic acts is included in social practices; vice versa, artifying is imbedded in social practices.
2. ***Music systems are made by humans for humans for expressing, creating and recreating affective states in connection with following some kind of rules and norms.*** Definitions of the concept of music hardly find consensus (Hallam, 2006) as they tend to reflect cultural, political, economic, and social factors prevailing at a certain place and time. Notwithstanding, two statements have gained broad acceptance. Susanne Langer (1953, p. 27) proposed *„measured sound and silence"* while John Blacking (1995, p. 237) stated *„humanly organised sound"*, adding: *"Music ... can only be inferred from careful observations of human behaviour and action".* The evolutionary conception of how music may have originated – proposed by Merker et al. (2015) in terms of five constraints – characterises comprehensively the nature and conditions for music:
    - Intergenerational cultural transmission (in contrast with Darwinian evolution),
    - The generativity of music (comparable with language),
    - The human-specific capacity for vocal production learning (a prerequisite for speech and song),
    - The propensity to entrain with perfect synchrony,
    - The propensity to gather occasionally to sing and dance together in a group; this suggests a motivational basis inherent in our biology.
3. This evolutionary theory of music by Merker and co-authors (2015) provides an eminently plausible interpretive framework for understanding the nature and function of human song and music and for comparison with other didactic domains. The first component – cultural transmission – is true for all didactics, even for autodidactic claims that can only be realized within a socio-cultural environment offering inspiration. The differences between individuals in their capacity to produce music is not due to Darwinian evolution since human

genomes do not inform about the musical rules that humans created and transmitted over generations.

4. Analogous to languages, music systems are generative; both make infinite use of finite media to create infinite forms such as sentences, phrases, melodies, etc. In music systems, the discretized elements are pitch and time; in languages these are phonemes. The rules or grammars inherent in producing music and language are not biologically rooted in humans but are acquired in the context of cultural transmission.
5. A specific human biological condition for music and language is found in the capacity for vocal production learning (Merker, 2008). Vocal development in early human life paves the way for singing and speech. It is noteworthy that for infants, producing recognizable melodies is easier than articulating words (Stadler Elmer, 2022). In song, syllables vary in pitch, duration, and stress pattern; they can be repeated in an unsemanticised manner. In contrast, articulating words requires combining syllables according to a language-specific stress pattern to produce words with semantic meaning (see e.g., Stadler Elmer, 2021). Although song production is possible earlier than speech during infancy, vocal production learning is culturally guided through social practices. To sum up, early vocal learning of recognizable melodies – and thus early rule-following – is specific to the music domain.
6. Rhythm in music and in language are rooted in bodily predispositions. Repetitive and periodic movements – including the production of vocal sounds – yield binary and ternary patterns in melodies and poetic language. The stress patterns in word articulation follow language-specific rules. Humans tend to synchronize their body movements with periodic signals such as regular beats – a phenomenon called entrainment (Clayton et al., 2004). Although metricized syllables are characteristic of poetic language, entrainment to periodic pulses is specific to music. The vocal production learning capacity – and even more so the propensity for entrainment – are related to the sensor-motor and sensual dimensions of music-making. These bodily dispositions and expressive means – vocalization and movements including handling instruments – are two fundamental modes of expression specific to music.
7. The motivational basis – gathering for song and dance – that Merker and co-authors (2015) mention as the fifth constraint together with cultural transmission can be interpreted as within social practice theories. Rouse (2007b) circumscribes social practice: *"A practice is not a regularity underlying its constituent performances, but a pattern of interaction among them that expresses their mutual normative accountability"* (p. 669). Wittgenstein (1953) has been influential on practice theories – especially his considerations about rules and rule-following. He proposed invoking *"This is what we do"* (p. 217) when justifications run out; this statement can also represent his understanding of 'social practice'.

To conceive of music teaching and learning both within evolutionary theory and practice theory highlights the bodily dispositions – vocal production learning and entrainment with steady beats – that enable enacting rules, norms, and conventions constituting a mutually adapted practice. Practice theorist, like Joseph Rouse (2007b) understands human bodies as *"both the locus of agency, affective response and cultural expression, and the target of power and normalization"* (p. 652). I argue that formal practices of teaching songs at school are paradigmatic as they constitute mutual normative accountability between teachers' and pupils' performances regarding rules

and norms always at issue within practice. Furthermore, dynamics between teacher, subject matter, and students can be viewed from a proto-aesthetic perspective.

The seven considerations on the specificity of music didactics imply some rationales for directions toward further scientific evolution as well as obstacles which I discuss in the next section.

Challenges of Music Didactics as a Scientific Domain

The major challenges arise from music didactics being a normative and aesthetic domain. Normative sciences – e.g., law, education, aesthetics, ethics – study what ought to be, thus, they study norms and rules for reaching ideals or goals, and propose and establish new ones. Their task is to understand the conditions and laws related to norms and ideals (see e.g., Peirce, 1997). The philosopher Georg Henrik von Wright (1963) distinguishes between three main types of norms – prescriptions, customs, and rules –, that I elsewhere (Stadler Elmer, 2021) applied to the practice of song transmission in order to reconstruct some of its normative layers.

Music didactics and the arts are not oriented towards truth and rational thinking – highly valued in all sciences (including humanities and social sciences) – but towards effective transmission of lore and cultural achievements, correct rule-following, and guiding the generalisation of affective states (Vygotsky, 1971).

Since didactics are tasks legitimized by education policy, they are evaluated in terms of degree or quality of implementation. Normative tasks can be evaluated and judged regarding quality. Often education research is called for the evaluation of political goals. The problem here is twofold: the control of norms and evaluation of teaching and learning quality is very complex because norms and values are human-made and thus negotiable. There is no objective measure but always judgements in relation to norms and values. This makes it difficult to gain true, objective, and generally valid facts from research. The typical solution is asking for expert judgments though the normative basis of these ratings remains implicit and tacit.

In this dilemma, an important step is to make conceptual distinctions. One of these issues concerns the status of music in schools.

The music made at school by teachers and pupils is not yet artistry but serves the pupils to practice and acquire the rules and norms and to experience collectively shared feelings that are induced by the form and the performance. Teaching and learning how to produce grammatically well-formed songs by following the rules is the core and fundamental practice for individuals to acquire skills, knowledge, and aesthetic feelings and for the tradition to be continued and secured. Yet, far from preparing musical artistry and excellence, the music-making at school is taking place as proto-artistic preparation. Already at the elementary level, infants and toddlers are capable of producing well-formed songs by following music-linguistic rules. The generativity of music (and language), with the infinite potential for combining elements (syllables, pitches, time), results in songs or music that the producer implicitly evaluates in terms of well-formedness during performance. This creative process always involves subjective aesthetic or proto-artistic feelings, and by repeating the action, the affective states are getting generalized at individual and collective levels. That is to say, the well-formedness of the song – its grammaticality – is part of the aesthetic evaluation. At the proto-artistic level, rule-breaking likely signals a lack of command whereas at the artistic level, the intentional breaking of rules, norms, and conventions may serve the creation of deliberate effects.

It follows from these considerations on the proto-artistic status of music at school that the degree of rule-following or grammaticality can be evaluated – given repeated

listening – rather objectively. But musical expressions in relation to the dynamics of intensity, timbres, articulation, and other dimensions are not normatively regulated but are due to regional or even local authenticity and thus are subjective.

Another important aspect of aesthetic evaluations of music-making or listening is the subjective and collective feelings that are lived through while participating. The experience of affective states – a mixture of subjective and collectively shared feelings – also has to do with the semiotic aspects of music. Those affective states are generalized feelings – hyper-generalized sign fields with catalytic functions (Valsiner, 2019) – and they are beyond verbalization. Their 'meaning' has no analogy in another media, thus is not communicable outside the practice itself. To have stated this in this way means that the meta-practice of science is limited.

To sum up, music didactics prepares for participation in music practices that are constituted by rules and norms and that convey generalized affective states. The aesthetic evaluation of musical experiences happens at subjective levels but concerns generalized feelings in relation to the shared experiences that became meaningful. Because many of the musical rules or grammar of songs are made explicit, rule-following can be evaluated in an objective manner, but not the many implicit ones.

How can these specificities of music didactics and aesthetics be dealt with in a scientific manner? Norms and values, here given in didactics and arts, result from tradition, conventions, and negotiations. What 'ought' to be has to be distinguished from compulsion, coercion, and determinism. The philosopher Charles Peirce (1997) says that *"it is always possible to act contrary to the 'ought'. The 'ought' rather implies ideals, ends, purposes which attract and guide deliberate conduct"* (p. 25).

The difficulty lies in dealing with normativity and aesthetics inherent in music didactics. As I have been at pains to make credible, the specificities of music didactic processes require them to be systematically observed and described and the intentions of those involved to be determined. Furthermore, a scientific approach to music didactic processes is to analyze compliance with the rules and to assess whether it is correct or not, and if not, whether the deviation is intentional or due to a lack of skills, or possibly for aesthetic purposes. Hence, a hermeneutic approach, consisting of the combination of systematic observation and description with the exploration of the agents' intentions is important.

As a consequence of these considerations, I propose to refrain from traditional normative evaluations of the quality of teaching and learning and instead observe and analyze how the music practice works in terms of the dynamics between teachers, pupils, and their shared music regulate themselves. Systematic observation and description of music didactic practices prevent premature judgment about quality by making explicit the grammatical aspects of music-making and adherence to rules, that can be evaluated intersubjectively.

I summarize my **arguments for promoting the scientific position of music didactics** as follows:

1. More care should be taken to observe and analyze the norms and rules that constitute the practice on which judgments are often implicitly based. Making explicit the norms and rules through systematic observation and analysis, through systematic interventions, and through historical analysis are important alternatives to quality judgments via ratings.
2. To improve the understanding of music didactic processes, I propose applying hermeneutic approaches in the form of combining observation of actions with accounting of the agents' intentions by interviews. In this normative and aesthetic

domain, I argue, the application of a hermeneutic approach by combining systematic observation of actions with accounting for the agent's intentions is the royal way to gain better understanding of didactic processes.

Music didactic research cannot directly improve practice, establish causal laws, or predict specific outcomes, but it can offer valuable insights into a human practice.

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