Action, Criticism & Theory for Music Education

Electronic Article

Music Learning In Schools
Perspectives of a new foundation for
music teaching and learning

Wilfried Gruhn

Music Learning In Schools:
Perspectives of a new foundation for music teaching and learning[1]

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Does music education need a new philosophy that is scientifically grounded on common agreements with educational and musical standards? If such standards are commonly accepted, why do we reflect philosophically about music teaching and learning? At first glance, these questions sound very abstract and theoretical because people love music, and because music has become a major industry with flourishing instrument factories, music productions, electronic devices, concerts, journals, festivals, and so on. Why, then, stop and think about new tracks of teaching and learning? Talented students learn to play an instrument or sing in a choir, they perform on stage while parents are proud and school principals observe if and how the students and the school benefit from those public musical activities. Why not just continue as in the past? The answer is quite simple: Because there is a big gap between extra-curricular activities and the way music is taught in the classroom, and between musical experience in real life and musical experience in a school setting.

What must be conceded is the social change that impacts on institutions such as schools. We see deficits in society and call for compensation through better education; and we complain about social behavior, attention deficits, hyperactivities, learning disabilities, and lack of motivation with respect to the increasing need for the next generation to deal with economic, social, cultural problems. But international measurements like PISA (Programme for International Student Assessment) or other comparative studies reveal dramatic deficits of reading and math skills in many countries. When school as a whole suffers from countless recent social developments, then music cannot stay untouched and we cannot just sing and play as before. School always reflects fluctuations in society caused by the ethnic diversity created by immigration, and by mass culture effects, popularization of world musics, cultural "mediatization," and global distribution of standardized rock and pop idioms. When social conditions result in instances of social decline – as reflected by unemployment rate, economic decline, growing violence, etc. – then students are also affected.

As a result, Hartmut von Hentig (Hentig, 1993) called for re-thinking the school as a political institution for education in general. Re-thinking is more than just initiating minor changes in the curriculum or just improving the current system; rather, it provokes a radical turn toward a new, completely different philosophy of schooling and education. The social turn which causes so many problems in society generates the need for a change of the entire education system and at the same time supports the need for a re-orientation of music education.

1. WHAT IS MEANT BY *MUSIC* IN AN EDUCATIONAL CONTEXT?

At a first glance, the question *What is music?* seems trivial. Attempts to define the true essence of music trace back to antiquity. *Quid sit musica?* is a philosophical and speculative question which has an answer that is culturally, socially, and historically determined. For present purposes, we do not intend to seek a general definition; rather, we take into consideration its phenomenological scope aimed at describing those aspects that are relevant to education in schools. Commonly, in music education at all levels, music is seen as a canon of great art works which are elaborated and notated, performed in concerts as an actual event, recorded on CDs, distributed by the media, and managed by concert agents. The criteria of artistic values change over time, but they are always socio-culturally determined. In this sense, music could be seen as a product of historical tradition (text), actual performance (sound), artistic expression (interpretation), and public presentation (distribution). However, this materialistic description is not sufficient because the roots of cultural identification go much deeper than to a socio-culturally mediated collection of compositions (objects). In essence, then, music, though a noun, is immaterial and traditionally has been described as an aesthetic experience in the musician and the listener that adds an incommensurable qualitative moment and gives music important subjective qualities (Adorno, 1970; Eggebrecht, 1995; Mollenhauer, 1990).

This, at least, was the core of the development of artistic theory until the 1970s when the 'work' – a definitely elaborated *opus* – became obsolete and was replaced by *processes* that favored open forms, "moment forms" (Stockhausen), improvisations as collective compositions, aleatoric combinations, and integrated forms of chance with their various indeterminations. The 'objects' disappeared and were transformed into unpredictable

processes, but there was still "music." Therefore, equating music with works or objects is insufficient and misleading.

On the other hand, this first materialistic (objectivistic) view opens a new path for characterizing music as a three dimensional phenomenon: music is realized as sound, object (work), or process depending on its (a) appearance in the course of history, (b) on the perspective of a listener, and (c) on the function that music retains in cultural memory. Whatever our choice – music as sound, object, or process – there are four agencies involved. First, there is a creator (composer) who invents sound structures. Second, if the creator elaborates such musical ideas and notates them in a musical score, an expert re-creator is needed who interprets the notation and transforms notation into sound. Sometimes the two agents are identical and coincide in the same musician, who simultaneously invents and interprets. Third, there must be an audience that either listens to music attentively or uses music just as an accompaniment to other, extra-musical practices. This audience, from necessity, will consist mostly of musical amateurs. What is important here is the fact that these individuals bring their own meaning to the sound. By this, they make sound into music and generate the actual musical forms, structures, tunes, and so on, that they have in mind. This is a very important aspect of all musical events because it makes clear that what we perceive and understand depends on mental activities; it is thus productive not only reproductive. Therefore, motor activities of a performer and mental activities of composers, interpreters, and listeners are the constituents of what is perceived as music. Finally, there are also many agents whose work with music in terms of promotion, technical production, advertisement, management, and so on, determines the music that is experienced by listeners. (Figure 1).
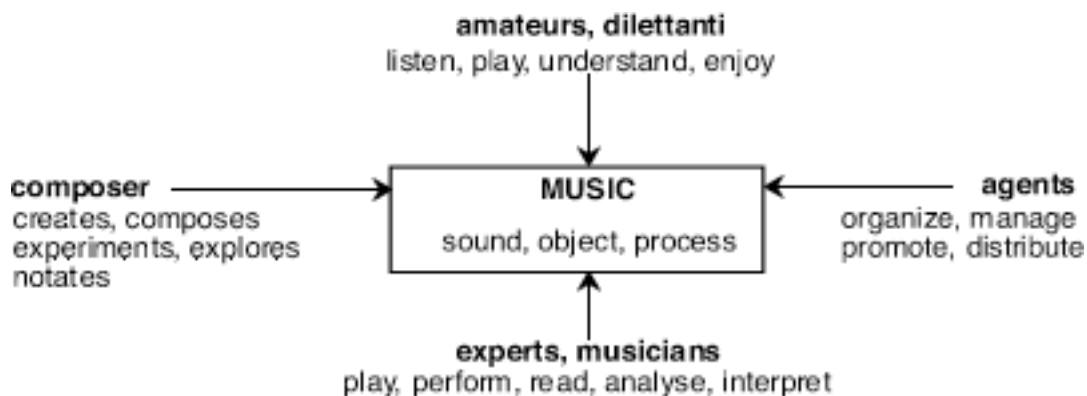

Figure 1: Actions and agents involved in music

The common aspect of all four agents is that they act; they do something with or to music. Action is thus the dimension that unifies all agents. Acoustically, music is just "moved air" (*bewegte Luft*, Busoni) and needs action to come into existence; but it also causes the action processes of perception, cognition, interpretation, promotion, consumption, and distribution. From this perspective, we give up a product- or object-centered understanding of music and define music as an *objectivation of actions*. This understanding of music as action (Elliott, 1995), has consequences for music education, of course: Music instruction in schools should aim at teaching students how to *act* musically. Curricula should emphasize all actions that are involved in musical processes. Then, aspects of style and preference (e.g., who likes rock or jazz or classical or folk music) become subordinate, while processes that initiate and support the incorporation of music practice become dominant.

EXCURSUS: THINKING AND ACTING, KNOWING AND DOING

Cognitive psychology (Aebli, 1980; Piaget, 1947) has clearly demonstrated how thinking develops from acting and, therefore, that in principle there is no difference between thinking and acting. What one can think originates in former practical experiences; thinking performs an abstract action that has an inherent structure and is intentional. The common structure of thinking and acting tends to establish relations between objects. Aebli (1980) has shown that, as far as cognitive and developmental psychology are concerned, the Aristotelian dichotomy of body and soul, ideas and objects, thinking and acting, theory and practice is obsolete. On the other hand, not any kinds of 'doing' qualify as action in terms of action theory.

To clarify the distinction between 'making' and action, I would like to differentiate between *poiesis* and *praxis* in the classical understanding of Plato and Aristotle. For them, *praxis* was understood as an independent human action in accordance with the moral habits of a community (Aristoteles, 1961; Platon, 1995). In distinction, the production of concrete objects through craftsmanship in daily life or in the arts was called *poiesis*. If we use the term *praxis,* we think in ethical categories that form a mindful habit, and that are independent of objects or works that can be separated from particular persons and actions. Only with general ethical principles that guide an action do we have *praxis*. On the level of *poiesis* we focus on the product of an activity that develops into a concrete, autonomous object (*opus perfectum et absolutum*).

Let us take an example. In a choir rehearsal, the individual singer needs to accept and embody general behavioral habits such as being on time, participating in warm ups, being mindful of intonation, knowing how to sing a certain style or type of music, and so forth. In this sense we speak of performance praxis (*Aufführungspraxis*), which refers to a general knowledge of musical standards for a particular style or period. After practicing a piece, the choir attains a level of achievement and can perform it in a concert or record it. Then, as a result of this *poiesis,* we have an 'object'. Performances are crystallized moments of *poiesis*, whereas habits, attitudes, and actions during a rehearsal reflect the *praxis* of that choir.

This is also an important feature in learning. If we understand music as action and musical works as objectivations of actions, then we should no longer focus on abstract works and 'aesthetic objects', but on acts (*poiesis*) that help to develop personal attitudes and habits (*praxis*) regarding music. Such musical actions, then, open an educational domain for personally experiencing, critically understanding, and pragmatically interpreting the world we live in. As Helmuth Plessner (Plessner, 1982) has put it: "Interpreting music means making music. Musical meanings are inseparably connected with musical performance" (p. 471).

If we regard music as action, then verbal approaches and the applications of the technical terminology developed by music theory lose predominance; they are even no longer necessary to music learning since music learning is best achieved by music making, and that can be done without technical terminology. Therefore, we should distinguish on one hand between *talking about* music and *naming musical phenomena,* from general verbal responses to music,[2] on the other. Verbal communication requires the correct and precise use of a well-established terminology, but such use does not give any reliable indication that we understand music or perform it mindfully; performance takes place in its own "terms" or following its immanent rules. When talking *about* language we call a noun "noun" and not "verb," but knowing this difference does not imply an understanding of the language that we can describe in those terms; in use, we need to call a spoon "spoon" and not "flour," otherwise we provoke confusion. Our knowledge of verbal meanings is gained through use in a socio-cultural context: as linguistic pragmatism has explicated, meaning arises from – takes the form of – use in a particular social context. Use is always a matter of acting with words in a successfully communicative manner.

So in music, too, acting musically in a communicative musical context manifests and further develops musical understanding. This type of "understanding" is profoundly different from correctly applying words (terms) or describing music's relation to non-musical situations. If music teaching and learning starts with using words, symbols, notations, stories, and the like, without musical intentions and meanings, then it falls short of teaching and learning *music*, which, instead, is comprised of intrinsic musical meaning. As a consequence of this way of understanding music, a very basic change in our pedagogical approaches to music learning is required. We must consider that musical interaction and musical understanding happens only within music, but without verbal or symbolic transformations.[3]

2. SCHOOL, INSTRUCTION, EDUCATION

If we want to legitimate music education in schools, we need to approach this transformation of pedagogy from an internal and an external point of view. *Internally*, we must ground music education in music and its special properties. In this connection, we can argue that music requires its own pathways to learning; for example, learning to play a musical instrument is approached differently than learning how to play soccer, and promoting musical understanding is different from improving verbal understanding. However, from the *external* perspective we must also look at the functions of music in social life because these determine people's behavior, attitudes, and preferences. Therefore, we will now consider the social dimensions of music.

Lack of common musical experience

We live in a global world where economic, social, cultural, and religious encounters are widespread. This does not always imply a mutually inspiring exchange or an assimilation of cultural differences, as much as the export of Western general culture that has been identified as *Eurocentrism*. The omnipresence of many musical styles and cultures in the world creates a multicultural or pluralistic assortment where everybody achieves different profiles of musical experience. Even in more or less homogeneous or mono-cultural societies there is no longer a single musical 'code' which provides a common ground for musical experiences. Each sub-culture and sub-sub-culture develops its own code that separates the musical experience of one social group from another. Culturally diverse cohorts exist side by side

without little or no contact or exchange. For the most part, however, this is not an ethnic or social problem; it is a cognitive one, instead. Peers use the same term "music," but relate it to completely different features depending on their cultural socialization.

This situation is also seen in music classrooms. In the special type of German high school called *Gymnasien*, music curricula focus mainly on classical music, but also include all types of pop, rock, jazz, and non-Western music. However, one reason given for including music as a mandatory subject in schools is to establish and foster cultural identity. On the other hand, achieving this goal has become extremely difficult because of the diversity of cultural niches from which students come. Cultural identity is no longer grounded in commonly shared cultural traditions and values: a motet of Dufay or a madrigal of Monteverdi is only known to a small group of experts while most people have never heard of the composers' names or of these musical genres. It is just as obvious that students present teachers with an extreme diversity of cultural experiences, attitudes, and preferences. Therefore, when typical middle or high school students listen to a section from a mass, they cannot recognize a quotation from a Gregorian chant, or when listening to Alban Berg's violin concerto, they won't detect the tune of the Bach chorale because the cultural lineage between Bach and Berg has been broken for them. Trends and fashions in popular styles are fluid; what is "in" today will be "out" tomorrow. As music educators we are confronted with a pluralistic patchwork of diverging experiences and practices. Therefore, we have to develop educational strategies for building the groundwork of a common musical identity. This can only be achieved by developing concrete action-competence with music. Otherwise, music must be abandoned as a required school study.

Mediatization: Cultural mass production and new technologies

An analysis of behavioral attitudes regarding the use of media with 15.000 children and youngsters from 11 states in Europe and Israel (Livingstone & Bovill, 2001) revealed that television will replace reading and that digital media are already increasingly important: 80 percent of children have access to a computer and the Internet. Therefore, the goal of big electronic and media companies is to implement interactive systems that transform viewers into users, thus creating a new generation of "viewers." Although this mediatization affects

all aspects of daily life, it is also obvious that this behavioral change is age-dependent and most dramatically affects the younger generation.

A new philosophy of music education must take this change of students' media environment into account because it shapes their understanding of music and their various practices of using sounds embedded in different media. Although media make more kinds of music available to many people, this accessibility has not necessarily expanded the variety and richness of music experiences for many people. Can we simply hope that classical music alone can help compensate for the putative negative effects of musical mediatization about which musical cognoscenti complain? Can we expect that computers will support our traditional educational goals? Can we use computer music and home recording as a new means of musical expression? We have to deal with and to find appropriate answers to these and other questions related to mediatization.

3. PATTERNS OF ARGUMENTATION

Before we can carry out new perspectives and foundations for music learning in schools, it seems appropriate to take note of stereotyped patterns of argumentation commonly used to justify and require music education. I will just briefly mention the most common arguments.

Preservation of the cultural heritage – introduction to musical masterpieces
Since school music has developed from singing instruction to include other music, the main intention of school curricula was to introduce Western traditional high culture, as represented by musical works that are highly esteemed by a cultural elite in our society and, therefore, frequently reproduced in concerts and festivals. The introduction to theoretical foundations of Western classical music, its notation and syntax, styles and genres, structures and techniques was seen as a prerequisite for understanding or interpreting the spiritual and artistic intention said to be imprinted in musical works. Compositions were mainly seen as historical documents that preserved and transmitted the cultural value of the past. However, although many music teachers recognized an obvious separation of music in school from music in students' lives, they continued emphasizing the *cultural* value of art music.

Accordingly, school music became a synonym for teaching the kind of 'highbrow music' that was disconnected from real life and presented only for reasons of learning *about*

music in terms of background theory and history. As a result, 'school music' became a particular attitude for dealing with music in schools rather than with 'real' music. But students still grow up with their own music outside school, which is nothing to be learnt about in terms of theory; it is just used for and applied to such practices as dance, movement, fashion, mood control, and so on.

Music education according to the objective needs of the students

The sociocultural lifeworld (*Lebenswelt*) of students has changed. As a consequence, they are increasingly separated from the exponents of traditional European musical culture. Instead, pop and rock idioms, world music, and mass communication form the core of their musical experience. In Germany, educational conceptions of 'student orientation' (*Schülerorientierung*) and 'action orientation' (*Handlungsorientierung*) tried to respond to this change in the lifeworld of students.

Such thinking has opened German music education in two new directions: to the inclusion of all kinds of popular music and to the integration of new media (e.g., computers) in the classroom. The curricular inclusion of these domains is legitimate and necessary if music in school wants to correspond to students' needs and to address more than the classical canon advocated by musical and cultural cognoscenti. However, we must be aware that students' 'needs' often are defined by commercial companies such as software designers and computer companies rather than by educators and politicians; and attention to such 'needs' fails to address many pragmatic and other genuine educational needs of children and youth. Here, an extremely complex and difficult debate arises concerning the priority or balance of educational, individual, economic, and social needs.

With regard to such genuine needs, we have to differentiate between *subjective desires*, which describe needs within a subject and are directly related to an individual subject and its momentary feelings, and *objective needs,* which are defined by and related to the objects of a desire. This happens when certain educational content becomes attractive because it contributes directly to the practical life of an individual. In dealing with this issue, it seems inevitable that music educators will predetermine objective categories for music learning, and then attempt to point out the individual (i.e., subjective *and* objective) benefits that arise from such musical activities.

Need for new approaches to music

During the last two decades, two models have governed the discussion in Germany regarding a rationale for music education: *Handlungsorientierung* (action orientation), which refers learning to processes that result in a concrete product, and *Lebensweltorientierung*[4] (orientation to the actual life-experience), which uses a student's actually experienced real life situation as the starting point for promoting interest and as a background for understanding that student's lifeworld.

Action orientation is based on cognitive psychology where thinking directly derives from acting (Aebli 1980). In actions, one connects objects intentionally, that is with the purpose of establishing an order. Acting, therefore, cannot be separated from thinking. Rather, thinking means acting without actually doing something overt. In education, action-based pedagogy is used to stimulate students' thinking and to help them experience the power of "learning by doing". An 'action orientation' accords with the general principle of "learning by doing" that reigns in the different methods used in music classes. Very often, however, such 'activity' in class – so-called 'active learning' – is not a proper application of action theory; rather, it only pragmatically addresses educational problems that arise from traditional concerns of music in school and these are different from music in students' lives outside school. Projects and their products, then, only promise to motivate students to actively step into music; they mainly apply a tool for motivation instead of a principle of learning. In contrast, the orientation to students' personal life-experience liberates music making and understanding from the demands of an expert and puts learning in a general context of what is common and familiar to a learner's everyday experience.

Husserl (1954) introduced the term *Handlungsorientierung* at the beginning of the 20th century, complaining that the sciences had moved far away from the life-experience of each individual that shapes the context for their unique understanding. On his view, the pre-scientific naiveté of life becomes opposed to the rational abstraction of sciences. Therefore, he traced scientific understanding back to real life and accepted naïve life-experience as a legitimate category of knowledge and understanding. This model was appreciatively adapted to music education with the hope that it could turn away the crisis faced by music teachers. Music was no longer seen as a mere 'aesthetic object' that bears its value in itself, but as a

personal experience based on subjective life-experience brought to the musical object as a common meeting point where subjective experience and the art work coincide. It clearly follows that, in this case, music education is not directed toward the development of musical competence but rather to the confirmation of personal confidence in dealing with all kinds of music. It is no question that for students' own music, the music that belongs to their lives, musical practice is always related to actual life experience. However, real or virtual life experiences cannot replace the very basic development of musical competences that are prior to philosophical interpretations.

Music makes you smarter!

An old belief of mankind is that the arts – and music especially – can ennoble, strengthen, elevate, and even heal humans. In classical antiquity, it was a common pattern to connect the beautiful (e.g., music) with the good (e.g., personal correctness and integrity) so that the good (Gr. *agathós*) appeared as the beautiful (*kalós*) and formed the ideal of *kallokagathia* (*kallós kaí agathós*). Therefore, in Greek myths a hero was always beautiful and incorporated ethical values in a harmonious body, while a bad guy was ugly and disfigured and demonstrated his inferiority by a disharmonious appearance.

However, we all know that music can also be used for manipulation (in commercials), for the stimulation of trance (in ritual dance music), and for excitement and the establishment of political power (especially in totalitarian systems). Music obviously can be used for multiple purposes, for the good and for the bad, as Thomas Mann (1926) has put it in his novel *Der Zauberberg* (The Magic Mountain): "It is something dubious with music, gentlemen, I persist in my opinion that music is of ambiguous character, it is politically suspicious" (p. 193).

Nevertheless, music educators always hoped for beneficial cognitive side effects of musical practice to justify music in the public school curriculum. Supported by findings of the so-called "Mozart-Effect" (Rauscher, Shaw, & Ky, 1995) educators and politicians referred to such cognitive transfer-effects. It would be easy to argue for musical schooling if it could be proven that it actually enhances academic achievement. However, an extended meta-analysis (Winner & Hetland, 2000) could not confirm a robust effect, although some studies show a correlation between Mozart and a specific spatial-temporal task. However,

"the results . . . have primarily scientific rather than educational implications. The existence of a short-lived effect by which music enhances spatial-temporal performances in adults does not lead to the conclusion that exposing children to classical music will raise their intelligence or their academic achievement or even their long-term spatial skills" (Hetland, 2000).

From what we know today, then, we cannot generalize that music enhances intelligence or causes long-term benefits in academic achievement. That helps avoid the temptation to teach music for other than musical reasons.

Music education supports creativity

It seems obvious that music making affects many dimensions of creativity (Sullivan & Willingham, 2003). But this is only true if improvisation and composition are at the core of curriculum and if musical processes and products are more important than theoretical and historical knowledge about music. This would require a change of paradigm in terms of the curriculum: Introduction to cultural heritage, interpretation and explication of classical art works, and orientation in music history would be down-played in favor of creative explorations and musical experiments.

However, still to be clarified is exactly what is meant by creativity. Although I do not want to get into the entire debate about creative processes, I do want to make quite clear that creativity is based on explorative behavior that uses already existing ideas, concepts, models; but it arranges such existing cognitions in unpredicted, innovative combinations. In terms of neurobiology, mental representations need to be developed before they can be activated for initiating creative processes. Creativity *ex nihilo* cannot work, and unthinking activity using simple instruments or sound producers only generates noise that has nothing to do with musical creativity.

Aesthetic cultivation as counterpart to academic instruction

It has often been stated that schools need the arts and an artistic/aesthetic cultivation (*musisch-kulturelle Bildung*) to counterbalance the preponderance of intellectual, cognitive instruction. But this argument often uncovers a dangerous polarity between cognitive and emotional (affective) demands where the rationality of sciences is put on one balance pan and

the irrational power of the arts on the other. However, the arts and sciences each represent their own unique and uniquely valuable ways of thinking and cognition, and they are not contradictory but complementary. Therefore, it is a crude misinterpretation to use the arts as a supposed defense against excessive rationality. The arts engage rationality, just as the sciences are connected with emotions; but the arts and sciences have developed very specific cognitive structures. A broad concept of aesthetic education uses this argument, but accepting it would problematically turn music education into a different subject. Not genuine musical abilities, but aesthetic experiences, not musical contents, but personal perceptions, then, would account for credibility of music education in schools. Therefore, we need to find a social or cultural consensus about the purpose of general music in public schools.

INTERLUDE

If we review these common patterns of legitimation, it is evident that no one argument alone can build a new foundation of music education. Each pattern provokes critical questions that have to be answered:

1. What factors and conditions define cultural identity? How can the preservation of Western cultural heritage be based on a common musical experience? Is classical music suited to a sub-culture of only an elite minority? Are the musical art works that form a *musée imaginaire* of Western cultural tradition sufficient or appropriate as a foundation of general music education for everybody?

2. What are the *objective* needs of the young generation? Among these needs, which are developmental and therefore stable parts of schooling; and which are socio-cultural and therefore changing parts of schooling? Does the implementation of computer-based teaching strategies really enhance music learning? How can music educators influence the development of adequate materials and models for music education? What can be done to improve the interaction of educational philosophy and political decisions?

3. Action research and life experience are important concepts in education. But how can we assure that emphasis on life experience does not lead us away part from learning *music*, as such?

4. Although it is tempting to argue that music enhances cognitive abilities and equally tempting to use this argument strategically for as political advocacy for music in schools, we

intuitively know that this is not generally true, and it is not confirmed by research findings. Therefore, it is dangerous to build music education on such extra-musical purposes because other disciplines can easily promote such benefits as well as or better than music education. It might be more appropriate to focus on the artistic and specifically musical qualities that are developed and supported by musical practice.

5. How can we assure that creativity is not misused merely as a therapeutic concept to stimulate action and interaction? Is there a discernible threshold for determining when a musical action becomes creative? Is some action re-creative, and other action merely mindless activity? Are musical acts creative only when there is a listener?

6. Why should music educators support the foolish conception of opposed dimensions of humans' brains which suggests that mathematics and sciences are good for the left hemisphere because they enhance rationality, logic thinking, and reasoning whereas music is good for the right hemisphere because it arouses emotions and affections? Is music taught in schools just because academic subjects (like math and science) call for emotional compensation? Shouldn't we better ask what is wrong with so-called rationality so that it needs emotional compensation?

Now that we have raised these questions (see Gruhn, 2003 for more details) we can start to outline principles of a new foundation for music education.

4. BENCHMARKS FOR A NEW FOUNDATION OF MUSIC EDUCATION

The definition of a theoretical framework for music education is closely related to a general philosophy of education. To ground music teaching and learning on a solid fundament we will base it on three pillars: anthropological origins of music, general principles of learning, and neurobiological foundations of learning music.

Anthropological origins

In the context of European high culture, we immediately think of music in terms of artistic contemplation of 'works'. However, in most world cultures musical knowledge is transmitted in practical terms and ways, and the entire body of music is based on oral tradition. In all societies, music appears as an anthropological constant. The oldest musical instruments (bone flutes) go back more than 50.000 years; that is, to long before the development of human 'high' cultures. Sounds produced by early instruments (drums, flutes) functioned as signals in

communication or as spiritual expressions in magic procedures (shamans) and ritual religious ceremonies (priests). The human voice is a bodily organ for producing sound – singing, chanting, or shouting – that embodies symbolic meaning which transcends materiality.

In the anthropological perspective of ethnomusicology, music is always related to humans, to the human being as music-maker (Blacking, 1973). Therefore, ethnomusicology and music pedagogy share the same interest about how, in regard to music, humans develop. A theory of education has to take into account the phylogenic dimension of music that is anchored in mankind. This approach is consequently developed by bio-musicology (see Wallin, 2000) where evolutionary aspects of the origins of music are related to recent neuro-physiological and neuro-psychological findings.

Accordingly, music must be seen as an epigenetic process by which a gradually proceeding differentiation of sounds is based on social interaction. From an evolutionary point of view, this process starts with unarticulated animal sounds, goes on to articulated animal 'songs' (e.g., gibbons, whales, birds) and culminates in the articulated sound production of human languages and artificial songs. Formally, music constitutes a system of discrete sounds that afford endless combinations, but psychologically it represents a social artifact for expression and communication.

For music education purposes the following very general questions become crucial:

- What are the connections between music making and other (social, cultural, educational) activities?
- What originally motivated the genesis of music?
- Have these motivations stayed unchanged over the course of history?
- What kind of bodily dispositions were involved at the earliest stages of music making?
- How is music making differently organized in different societies and social groups?
- How and why is music delivered to the next generation?
- What modes of informal musical acculturation have developed?
- How is formal music learning organized and structured in different cultures and social groups?

Music is anchored in the human body and therefore represents a human capacity for expressing thoughts, imaginations, and emotions. The strong body component of music mediates the outer and the inner self. It is the total or holistic human body that experiences the environment and that subsequently develops mental images of the environment and the experiential knowledge which is individually gained from the physical world. Only when this human potential has been developed can one proceed to experiences where music attains a self evident existential value as an art form which transcends mere practical functions. Music education, however, can only work if it is based on students' basic musicalization.[5]

Principles of learning

According to new biological theory, music learning is a process by which mental representations (genuine musical conceptions) are developed and gradually altered, differentiated, extended, and refined. In order to recognize something as what it is, we activate already established representations. *Procedural learning* 'of' music derives from action and must be distinguished from *declarative learning* that consists of verbal information 'about' music. *Knowing how* and *knowing what* (or *that*) are two different kinds of knowledge and, depending on whether the learning process focused on action or words, musical learning can be retrieved as action or as verbal terminology.

Based on Piagetian psychology, Jeanne Bamberger (Bamberger, 1991) ascribed these two kinds of knowledge to processes of *figural* and *formal* representation. A representation is called *figural* when musical activities are coded in a series of concrete actions (e.g., fingerings, movements). Music, then, results from adding one action to the next, then the next, and so on. In *formal* representation, a musical *gestalt* becomes independent of any concrete and practical performance; it is processed as a complex unit in the mind. This corresponds to what Piaget describes as a *formal operation*.

Explicit verbal knowledge is concerned with symbolic and verbal codes, whereas implicit knowledge goes with actions and is embodied in meaningful, intended actions. Figure 2 shows two types of learning and knowledge acquisition and representation.
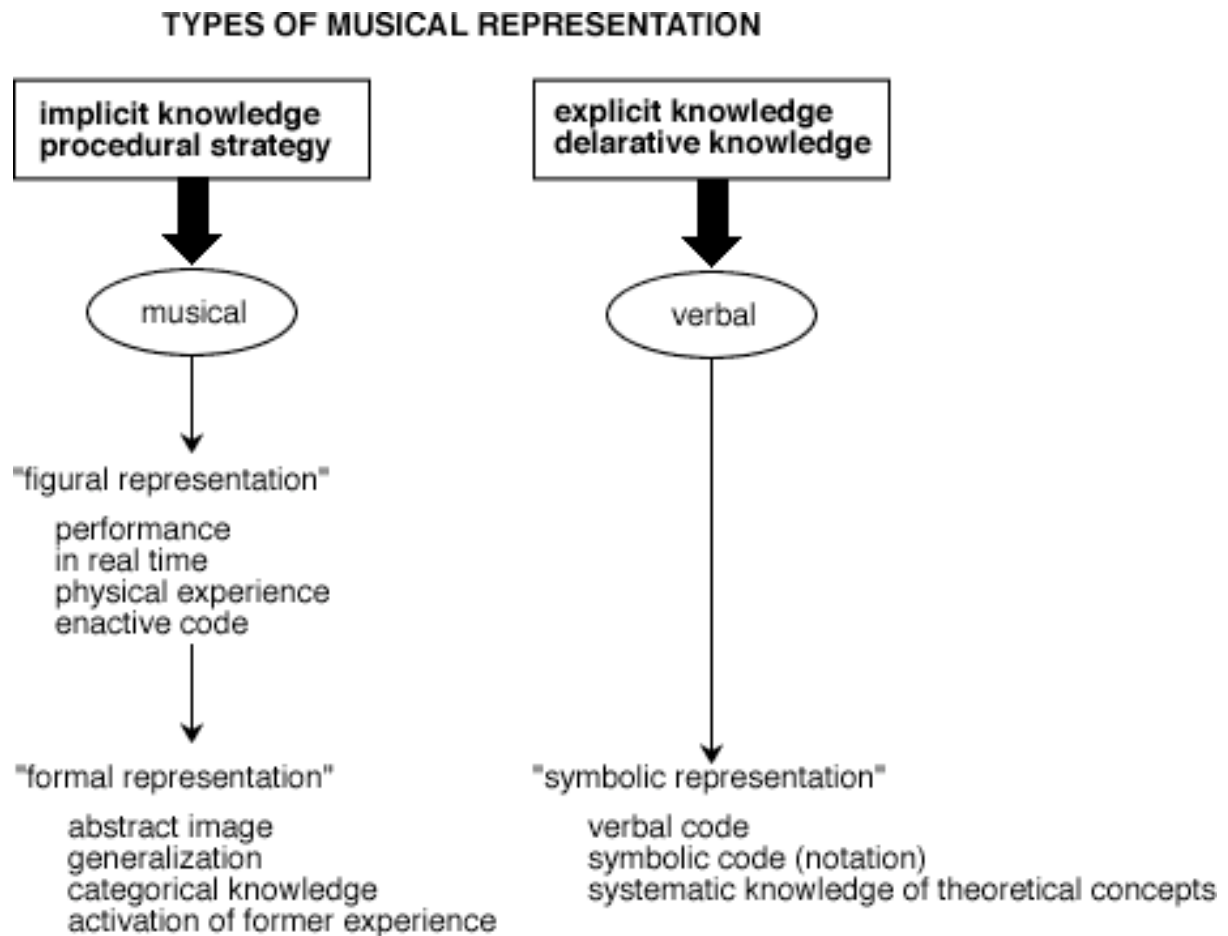
TYPES OF MUSICAL REPRESENTATION

implicit knowledge procedural strategy	explicit knowledge delarative knowledge

musical

verbal

"figural representation"

  performance
  in real time
  physical experience
  enactive code

"formal representation"

  abstract image
  generalization
  categorical knowledge
  activation of former experience

"symbolic representation"

  verbal code
  symbolic code (notation)
  systematic knowledge of theoretical concepts

Figure 2
Types of representation in relation to knowledge acquisition

Although music is not a language, the process of learning music is comparable. A child starts with building a "music-listening vocabulary" (Gordon, 1997) that varies according to the environment in which the child is raised. During the process of acculturation, children adopt the structural norms and sound properties of their musical culture. Through this process of acculturation they develop representations of characteristic structures of Western music so that they establish familiar patterns of tunes, rhythms, forms and instrumental sounds according to their presence in the environment. For music learning, therefore, it is crucial to expose children to a variety of models and patterns, because the brain does not depend on rules, but on appropriate models.

Children learn music according to their musical aptitude, which determines their potential to learn, as well as according to their environmental stimulation. The brain develops its neural network according to its experiences and forms a crystallized image of processing

specific tasks. Therefore, learning calls for both formal guidance and a stimulating, enriched environment that includes a variety of different tonal modes, rhythmic patterns, musical forms, and sound models. Teaching needs to be based on a profound knowledge of learners' developmental stages and should be arranged in a sequential order so that the musical mind can develop and grow most fully according to its neural capacity. This interaction of neurobiological foundations of brain development and its application to teaching principles (didactics) is recently elaborated by the new discipline of neurodidactics (Preiss, 1998).

Neurobiological foundations

Learning is based upon and enabled by the plasticity of the brain. The plastic adaptability of neural connectivity and synaptic density is reflected by structural and functional changes in the central nerve system. Neural interconnectivity, speed of information transmission, synaptic strength, coherence of neural activity, intensity and extension of activation all contribute to individual brain development and its cognitive capability. Given these neurobiological conditions, the capability for learning has its highest potential at birth and then gradually decreases if no environmental stimulation intervenes.

Brain research has shown that the density of synaptic connections increases rapidly during the first months of life. This exuberant burst of synapse formation peaks at the first year and remains stable for several years in childhood. Then, it gradually declines around year nine (Huttenlocher, 1979). The same developmental process is reflected by glucose metabolism, which indicates the degree of brain activation (Chugani & al., 1987). A short period of overproduction of glucose metabolism at birth is followed by a plateau-phase which then gradually decreases to its eventual mature level (Figure 3).

Therefore, the early years of life, when brain plasticity is most flexible and adaptable, are extremely important for learning. At this time, brains develop their neural network in response to stimulation. Within this neural structure, mental representations are achieved which provide the bases for further cognitive processes.

EEG studies demonstrate (Altenmueller & Gruhn, 1997; Altenmueller, Gruhn, Parlitz, & Liebert, 2000) that different teaching strategies affect the structure of cortical activation. Different types of learning cause different activation patterns. In general, long-term learning causes a decrease of activation, whereas short-term learning (memorization) causes an

increase of activation. Furthermore, there are indications that procedural learning strategies (i.e., musical learning through action) cause a better long-term effect than declarative strategies (i.e., verbal learning through explanations). We need much more brain research for a better understanding what happens with neural processes when a figural representation changes into a formal representation; that is when cortical activation decreases because of an internalized, automated process that takes place in sub-cortical regions.
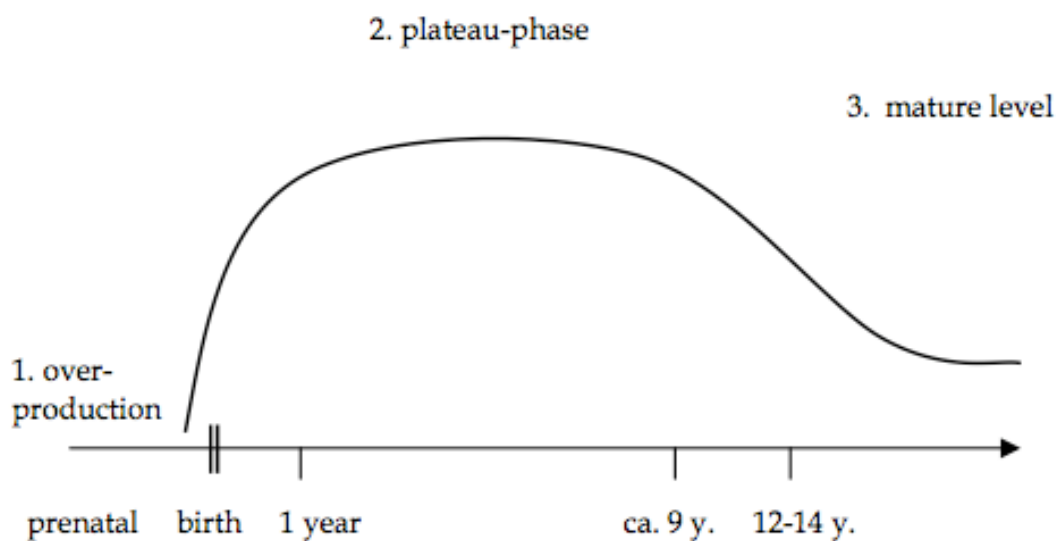

Figure 3
Structure of the development of synaptogenesis and glucose metabolism in the human brain over age, according to Huttenlocher and Chugani (from W.Gruhn (2003). Kinder brauchen Musik, Weinheim: Beltz, p. 22.

5. FOUNDING MUSIC EDUCATION ON MUSIC LEARNING

In the 1920s, the German music educator Heinrich Jacoby (1889-1964) had already critiqued music education for always being associated with "music as an art form," despite the fact that music in most societies and cultures is used functionally as a means of personal expression and social communication. Music as art is a transcendent and highly elaborated development built on the ground of natural musical communication – as in language where verbal communication based on the ability to speak and understand precedes poetic elevation in poems and novels. The existence of artistic classical literature has never suspended the ability

to speak and understand otherwise. This basic ability alone enables poets to develop language artistically and to pursue their primary poetic intentions.

Why, then, does music education not first develop the ability to 'speak' musically before introducing sophisticated compositions? To understand music (a composition or improvisation) *musically* calls for such basic musical ability. Then, musicality is no longer predominantly associated with the reproduction of compositions (which means speaking the musical 'language' of a former time and author) and instead regards music as a manner of expression. Even today, professional musical training in conservatories and academies aspires to a technically perfect reproduction of a musical score; such musical practice is mainly concerned, therefore, with the development of executive skills necessary for reproduction. This can be compared to a person who memorizes an Arabic poem with authentic pronunciation but without any ability to understand and speak the Arabian language. Reproductive facility does not necessarily include appropriate understanding and, thus, a musical composition can be performed through brilliant technique, but without any musical understanding. From Jacoby's point of view – formulated nearly 100 years ago – music education should aim to develop musical understanding by learning how to 'speak' and 'think' musically.

This musical 'thinking' ability is fundamental to any musical understanding, and has been called audiation by Edwin Gordon (Gordon, 1997). "Audiation takes place when we assimilate and comprehend in our minds music that we have just heard performed or have heard performed sometime in the past" (4). Through audiation we bring meaning based on former experiences to bear on the present sound we perceive (i.e., the "music that we have heard performed sometime in the past"). Thus, musical practice initiates the development of the mental representations activated through audiation. Once a mental representation – for example, for a deceptive cadence or a chord progression – has already been formed, we can activate it while listening and recognizing a sound *as* a deceptive or authentic cadence. From this perspective, *understanding is always the recognition of something as something* (Gruhn, 1998).

The main goal of music education should be to establish genuine musical representations that enable students to audiate. In audiation, the listener adds something from past personal musical experience to the perceived sound. The audio data perceived by the ear

are always underdetermined. Perception never functions as a perfect mirror of the outside world in a one to one relation; rather, our representations have to be activated and brought to our already existing knowledge of the sound to become music – as opposed to a mere complex of sound (Figure 4). For example, one hears a tune and, because of familiarity with the tune from church, it is recognized as a Gregorian chant that has a particular *repercussa* (recitation tone) and a typical *phrygian* cadence. Through audiation, one gives meaning to a series of tones and makes it a tune. This tune (or any musical 'form') only exists through conscious mental operations that assimilate a perceived sound and then recognize it as something; otherwise, we have to accommodate our cognitive structure so that the musical form is adjusted to it.

In music education, all efforts should be undertaken to enable students to bring meaning to the music they listen to. For this, musical representations need to be activated. The process by which one initially develops and gradually alters and differentiates mental representations is properly called "learning." In this process, notation becomes secondary, and memorizing theoretical terms, analyzing or telling stories about what is going on in music are absolutely irrelevant. Rather, learning is always focused on music as a sound system.
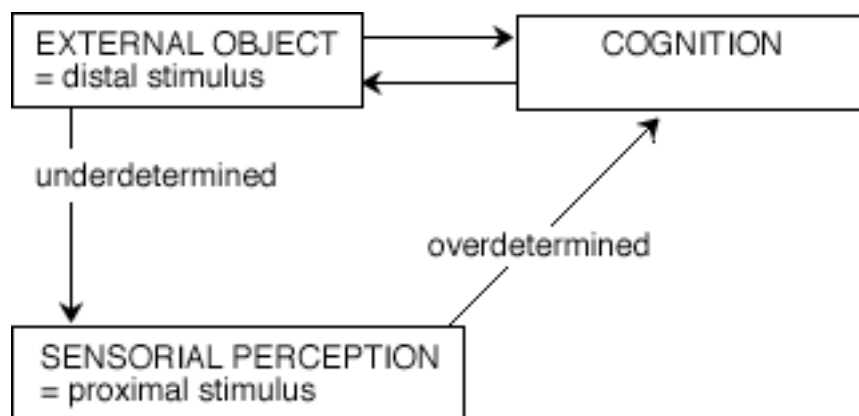

Figure 4

Process of perception and cognition. A proximal stimulus is underdetermined in perception (proximal stimulus = enervation of the cochlea, representation in cortex) and must be over-determined to become a gestalt that can be recognized as something.

The most efficient ways of establishing mental representations are playing an instrument, singing, and moving to music. Embodied musical gestures, durations, metric beats, and tonal relations form the praxial approach to developing musical understanding. The connection between tonal imagery and vocal production is reflected by the *phonological loop*. Vocal production of a pitch relies on the tonal imagery of that pitch. What is produced by the vocal fold must be aurally controlled and measured against the audiated image until the mentally intended (i.e., imagined) and the orally realized tones are identical. By this, fine motor activity and mental imagination interact in building a fund of mental representations.

Based on this theoretical background, we can state that music learning finally takes the form of *musical action competence* that is based on musical production rather than reproduction. This competence, which is the main purpose of music education, corresponds to a student's ability to audiate or to activate mental representations. All other activities in classroom teaching and learning may accompany and support this main goal.

6. CONCLUSIONS

Based on the foregoing considerations, I summarize my reflections on a new foundation for music education in the following ten statements.

1. Music in the school curriculum is not primarily aesthetic education or an introduction to art works; rather, it describes a learning process that is completely concerned with students' learning the structural roots of music.

2. Music education that aims for pragmatic music learning (*learning music* instead of *learning about music*) should be oriented to the psychological conditions described and elaborated in learning theory.

3. Music learning aims for the development, alteration, and differentiation of genuine musical representations, not the acquisition verbal knowledge as an end in itself.

4. In cognition, meaning is brought to the sound. In this process, a distal sound stimulus must be determined as *musical* (*as* "music"). This can happen when already established mental representations can be activated.

5. Understanding, therefore, takes place when we recognize something as being something. This cognitive activity generates meaning.

6. Learning, properly understood as the process of developing mental representations, is sequential and moves from one level to the next. Therefore, it is important for music educators to follow an effective order of sequential steps.

7. By this, students develop action competence with music. However, such action competence is not only needed for the reproduction of compositions but also for the expression and creation of students' own musical thinking.

8. When students have established a praxial approach to music, then musical analysis and music theory can assist further learning. Any theory provides a system with categories that are useful in connection with what we already understand in action terms.

9. The motivation to learn music arises when students actually learn music skillfully and praxially. The opportunity to experience and to learn something important to present life stimulates a learner's attention. Neither fashionable technologies nor the reinforcement of already familiar musical genres are sufficient to provoke such a long-lasting interest.

10. All of this calls for a school curriculum of music education that is founded on genuine music learning. This requires teachers who are qualified musicians, who know how to "think" and "speak" musically, and who have a grounded understanding of teaching that promotes designing and implementing an effective sequential learning process.

Notes

[1] The ideas and thoughts in this article address general aspects of a new philosophy of music education. However, these reflections are based on key educational features of the German school system and the function of music education in it. Therefore, not all particular observations can or should be generalized to other contexts. The article briefly summarizes the more extensive arguments of the author's recently published book, *Lernziel Musik. Perspektiven einer neuen theoretischen Grundlegung des Musikunterrichts* (Hildesheim: Olms 2003)

[2] Cf. in poetic literature, Karl Krolow's verbal "Fugue of Death" (*Todesfuge*) or Jean Tardieu's play "The Sonata and the Three Sirs, or: How to Speak Music" (*La sonate et les trois messieurs ou Comment parler musique*).

[3] This is also the core of Edwin Gordon's Music Learning Theory (Learning Sequences in Music, Chicago: G.I.A. Publications, 1980, 1997) where "audiation" refers to musical thinking and comprehension.

[4] The term "Lebenswelt" goes back to Edmund Husserl, a German Philosopher (1859 – 1938) and teacher of Martin Heidegger.

[5] The term "musicalization" (*Musikalisierung*) was introduced to the debate on educational aims of music education in Germany with the intent of determining the very basic ability to act musically; that is, analogous to language where one acts verbally

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