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# Music Beyond...Therapy. An Educational Tool for Inclusion

## La musica oltre... la terapia. Uno strumento educativo per l'inclusione

**Annamaria Curatola**

University of Messina – curatola@unime.it

**Valentina Lamanna**

Pedagogista – va.lamanna@libero.it

**Tamara Zappaterra**

University of Ferrara – tamara.zappaterra@unife.it

Music is an integral part of every person's life. Scientific research has shown the effectiveness of music in medical-rehabilitation contexts to the extent that it is considered, for some categories of people (disabled, socio-cultural, elderly), for the exclusive use of the psychotherapeutic field. The purpose of this review is to demonstrate the importance that music has also in the educational and didactic field to "exploit" its peculiarities, "beyond" the therapeutic component to include the many different contexts of life. Among these, the "digital environments" make music the protagonist of a "world 2.0", within which, starting from the strengths of the differentiated Method of Maria Montessori, it is possible to create a union between pedagogy and musical education.

The last section deals with deafness and music as a specimen, highlighting how theoretical and empirical research on this topic has dealt with it from a threefold perspective: on the one hand, music as rehabilitation therapy for deaf people; on the other, music's contribution in the overall education of the deaf; finally, music as entertainment and its enjoyment as an expression of quality free time for deaf people.

**Key-words:** music; experience; deafness; teaching; education.

abstract

Revisione sistematica

(A. meta analisi; B. revisioni sistematiche; C. evidence based education)

The article is the result of a comparison and scientific collaboration between the three authors. However, the attribution of scientific responsibility is as follows: paragraphs 1, 2 are by Annamaria Curatola; paragraph 3 is by Valentina Lamanna; paragraph 4 is by Tamara Zappaterra.



## 1. Music and Children's Development

Music actively contributes to the development of children. All its elements, especially sound, are mainly considered as perceptual experiences (Brandi, 2004).

If we compare music to other kinds of art, we find that the former generates the higher number of emotions: one can avoid watching an image or touching an object, but it is impossible not to hear a sound.

Everything can be considered to be music. As a matter of fact sound is part of the environment and we are able to control it. Thereby, the environment we live in can be thought of as a "soundscape" (Schafer, 1985). By using the expression "soundscape" there is a change in the way people can interpret the relationship between men, music and acoustic environment (Disotoe, 2003). Music is omnipresent and because of this each and every place is able to produce emotions and feelings that can be compared to those generated by a song.

Children shape their emotional and perceptual experience through rhythm. This enables children to recognize both their place in the world and "the Other".

Music is essential to child's development. Maria Montessori (2000b; 1999b) claims the active role played by the body in the process of music learning. In fact, she conceived elaborate learning paths focusing on motor coordination, sensory stimulation and listening appreciation.

It is through music that children: master the skills of listening, discrimination and classification of sounds and noises, enhance their ability to focus and achieve their sense of order and psychic balance (Montessori, 2000a). Children refine their hearing sense and their language by "absorbing" stimuli coming from the environment (Montessori, 1999a).

Maria Montessori (2000a) stresses the important contributions offered by "The game of silence" which carries out two different functions. On the one hand, it allows the discrimination of little sounds and noises. On the other hand, it makes spiritual growth possible.

Given that music plays a central role in the educational process, the process of music learning must be "structured". Moreover it should start in the early stages of life.

In his theory of Genetic Epistemology, Piaget (2016) contributes to the study of the origins of knowledge and the methodologies through which human knowledge and cognitive skills are acquired and developed from birth. However, he does not explain how human thinking works while listening to music.

According to Piaget (1977), children start being aware of the surrounding world when they are approximately two years old. During this initial phase, children use their sensorimotor experience to gain knowledge about the environment enhancing their "sensorimotor schemes" at the same time. That is when they learn how to grasp and shake an object and become attracted by rattles (Federici & Valentini, 2008).

Piaget (1977) highlights the importance for children to play games because they represent a way through which motor abilities and needs are fully unleashed.

In the study of cognitive processes games play so pivotal a role that the process of development of such games is compared to the mental development. Such development in games allows the child to go from pragmatism to abstract ideas, therefore, from egocentricity to sociability.



Piaget's classification of cognitive development allowed researchers working on different fields, such as music, to examine how children think throughout the different stages of development, especially when their approach to knowledge is intentional.

Beyer (1988) was one of the first researchers who, starting from Piaget's theories, supposed a relationship between music and psychogenetic.

Not only does she strongly criticize Brazilian music teaching methods but she also issued six guidelines for a musical cognitive theory. Such guidelines relate to: 1) the subordination of perception over knowledge; 2) the concept of music seen as a language; 3) analogies between ontogenesis and phylogeny in music; 4) the substitution of the inactive vision of knowledge with the interactional one; 5) musical objectiveness rather than subjectivity in the comprehension of musical language 6) a stage theory of music development.

Beyer (2001) considers children to be protagonists of the musical environment and highlights the importance that the first two years of life have in the formation and development of musical-cognitive processes.

Piaget's classification of children's kinds of play influenced Dalcroze (1925), Orff (Piazza, 1979) and Delalande's study on music psychology (1993), too.

Dalcroze's approach (1925), often identified as *Eurhythmic*, adapted a peculiar and creative practice to music: it focused on the development of body awareness, coordination, musicality, as well as motor skills (Pesci, 2011). Through the identification of "aural" movements produced by actions, such approach makes it possible for children to create "motor images". Such images need both students' body awareness and conscious involvement (Vanderspar, 2013). The method was developed starting in 1886 and it can be applied at every level of music education, from universities to colleges, public and private schools, kindergartens, and within private teaching (Juntunen, 2002).

Orff (Nattiez *et al.*, 2002) was sure that children's first approach to music had to be satisfying: children should have been put in condition to play music right away. He promoted the introduction of new musical instruments belonging to cultures whose products and songs were completely different from Western folk songs for children, who he himself used. His method is based on the use of special instruments such as maraca, the triangle and woodblocks. He also tried to encourage the creation of new instruments with elements taken from everyday life (Deriu, 2009).

According to Delalande (1993) Piaget's description of the types of plays children engage in match the different behaviours which are part of the musical activity: exploration, concrete manipulation and creativity.

Delalande compares the functional play to the behaviour of exploration (children use bodily-movements to discover and experience sounds); the symbolic play to the behaviour of concrete manipulation (children acquire the ability to represent through sounds); games with rules to the behaviour of creativity (children feel pleasure in organizing sounds based on rules established by themselves- such behaviour can be found also at older ages). The role of the teacher is that of building up a musical education syllabus so as to back up children in their musical growth. This can be achieved through observation which allows teachers to understand both how children experience objects and the evolution of their movements. By doing so teachers back up children's work and prompt them to create different sounds using the same material.

Theories developed by Delalande foster a process known as "l'éveil musical", a



sort of pedagogy of musical awakening based on the activation and gradual development of aptitude, motivation and abilities in the child.

Some childlike games such as “wallball”, “the week game” and games that require body movement or even playing a musical instrument contribute to the development of sensorimotor abilities in children (Delalande, 1993). The beauty of a performance is found in both the precision and in the self-confidence which arise from the sensorymotor schemes behind it.

Playing a musical instrument, whether stringed or not, or controlling the texture of an aerophone are ways children use in order to express themselves starting by the sensorimotor schemes that have already been experienced (Delalande, 2001).

The Twentieth Century is characterized by the introduction of an active pedagogic approach in which children find a central position. Attention is conveyed to new educational methods based on the freedom of action (Negro, 2013).

In such context, great importance is given to pedagogical aspects of teaching: teachers focus on students and take their abilities and values as starting points in order to gradually move forward (Montessori, 1970). Such teaching approach puts students in an unconscious condition of body awareness promoting peculiar physical exercises with the aim of enhancing both listening skills and the capability of inner listening (Vanderspar, 2013). An example can be seen when children who are listening to music start moving. Most people react to music by moving their bodies: some just clap their hands, some shake their bodies, some sing, still everyone finds a way to express themselves.

This process is known as “internalization” (Dalcroze, 1925) and, as shown by Taylor (2004), who directed Western people attention to the power of sounds produced both by animals and people’s body, it can influence our emotions and spirit.

During the early 1950s, music pedagogy, meant as music education for kids and teenagers, started to take into account an intellectual ability regarding all human beings at different levels: creativity (Schafer, 1976; Self, 1967; Dennis, 1970; Paynter & Aston, 1970).

From the 1960s different educational programs started to enhance students’ creativity even though music education had been studied long before, and the influence of past times was still very strong (Dalmonte, 1978; Deriu, 2009).

The link between listening activities and creativity was also highlighted by Frapat and Souchon (1991), who considered the construction of a symbolic background essential for the music experience of every child. Every activity had to be started using a fantastic element (e.g. a story, a puppet). Children would then work on this element using techniques belonging to musical language such as rhythm and timbre. Movement and images became part and parcel of the learning activities<sup>2</sup> (Nattiez *et al.*, 2002).

The importance of music learning in children’s development of cerebral pursuits has been the subject matter of Gordon’s research (2003).

According to the American professor, children must be neared musical stimuli at an early age. This is due to the fact that during the first 18 months of life, children listen to music more carefully. The same importance is given to parents’ voices and singing which through affectivity are at the base of an interactive relationship.

1 One must not forget that Dalcroze and Orff had already considered all of this.



After this phase, children will focus on the acquisition of the language, and listening will have a secondary role. According to Gordon's *Music Learning Theory*, music can be learned through the same patterns used to learn a language: listening-speaking-reading-writing (Gordon, 2003).

Music education plays an important role in adolescence, too. It was proved that during this period not only does music affect brain development but it also affects the acquisition of different cognitive skills (Gaser & Schlaug, 2003, Musacchia et al., 2007; Ott et al, 2013).

## 2. Music Beyond Therapy: A Way to Spend Leisure Time, to Grow, and to Learn

Music has a psychotherapeutic function (Casetta & Rizzi, 2018; Ruggiero & Bruni, 2015). Research carried out at Brunel University during 2015 highlights how listening to music, before, during and after surgery helps patients' recovery process. However, operating theatres are not the only places where music can produce a positive effect. It is known that singing helps the production of Oxitocyn, a hormone that reduces stress and anxiety (Straus *et al.*, 2018).

Research published by Schellenberg (2004) illustrates the advantages and benefits of music in childhood. Schellenberg affirmed it was possible to notice a rise in the IQ test scores in groups of children who played music. They gained 7 points, against the 4.3 points gained by those children who had done non-musical activities. Moreover, Schellenberg promotes individual activities due to the fact that these enhance learning strategies and motivation.

Music is often used in medical-rehabilitation contexts especially for elderly people, disabled people or people with socio-cultural issues. However people very often tend to be considered only music's therapeutic function and this specific perspective "is almost used to say that if a disable person is involved then a new specific wording is needed" (Medeghini, 2006, p, 107). One risks to call "therapy" what can be considered as a "normal activity".

However, it is right and proper to go beyond therapy and start considering music even as a pleasant experience, that makes people feel good and through which one can learn, socialize, share (Schafer, 1985) with no need to state its "medicalisation".

Music can be considered as a mediator for human relationship, "a resounding thread" which works within different kinds of context, even informal (such those relating to everyday situations), and whose aim is to valorize the person (Bertazzoni, Filippa & Rizzo, 2019).

The importance of music in educational contexts and in culture is determined by its essential role in the overall development of the person even in informal contexts (such as those related to everyday situations). This is due to the fact that it helps people to develop morals such as: freedom, independence, collaboration, involvement, respect and solidarity (De Napoli, 2014).

Sloboda's empiric research (1996) has focused on the function of music in everyday life. He focuses on the importance of music in cognitive processes highlighting how these processes are used to analyse many environments, not just those connected to music. According to him: "musical abilities are developed from innate abilities and talent" (Scalgioso, 2008, p.226). So, early abilities are developed during



early stages of life, then life-experience and growth help children in the development of permanent interpretation.

Music, in fact, cannot be circumscribed in specific areas, as a matter of fact its characteristics are available and can be used in various contexts of life.

For instance, music can be used in schools where the environment is organised so as to develop both children's musical intelligence (Pace, 2012) and cross-curricular activities in order to enhance a pleasant meeting with "the other" and allow a joyful learning at the same time.

Music has an "across-the-board" educational function: cognitive-cultural function, linguistic-communicative function, emotional-affective function, intercultural and identitarian function, relational function, critic-aesthetic function (MIUR, 2012).

Not only does Oliva (2017) reflect on the possibility to experience elements of the musical language first-hand, but he also reflects on the possibility to find a new, deep, significant learning process which is able to develop children's expressive potential.

The same opinion is shared by Orff (2005), according to whom, "music material" can be used to understand not only aural and rhythmical language, movement, melody in language and singing, free or circadian rhythm but also human beings' natural elements. Examples are represented by the way we walk using the basic motor system, or to the preliterate phase when children write graphemes following a rhythm, as they do when they breathe (Valentini & Lamanna, 2018).

As far as this is concerned, tasks can be trialled at school in order to facilitate the cursive learning writing process in kids attending the first year of elementary school: in a different environment than that of the classroom, for example the gym, kids are asked to lay down supine on an exercise mat and are given a balloon, which they will keep on their abdomen. Attention is given to the abdomen and its movements, which will determine the movements of the balloon.

The "concept" of rhythm can be trialled in the classroom, as well. Workshops can be set up through the listening of classical music, in a determined order: starting from an easy pace like that of "Waltz of the Flowers" by Čajkovski (1892), then going on with the refrain of "The Blue Danube" by Strauss (1866) and concluding with "Ride of the Valkyries" (1854-1956) by Wagner.

The main aim is to involve the whole body, which is a mean of expression and conveyance of rhythm. Rhythm, in turn, can be considered in its entirety so as to pour everything in a walk, a run or leaps to the rhythm of music.

It may be engaging to use rhythm and movement by making children write a series of "graphemes" in the correct line. This will help children enhancing some abilities such as the eye-hand coordination, the identification of the correct line where to write and will help them mastering both wrist movement and their handgrip of pens.

Another activity may be that of organizing a school trip to parks with specific paths that allow children to experience peculiar characteristic of the sound through games in order to better understand the soundscape we live in.

One of the first activities to be carried out may concern the exploration of everyday objects and their acoustic timbre recognition, getting to understand how sound (keynote sounds, sound signals and soundmarks) can change based on different materials children would also be able to examine in depth other characteristic such as: rhythm, speed, dynamics and silence (Schafer, 1985).



To conclude, the path children may be given recognizes time to produce an instinctive performance carried out through rhythmic exercises, body percussion exercises, and vocal performances.

The aforementioned activities are part of the so called *Orff Schulwerk* pedagogical framework launched by Orff in 1924 (Piazza, 1979). Such methodology focuses on the importance of “making music” rather than learning the rules. People involved in such contexts have an active role. Moreover, the didactic material (Orff instruments) is built *ad hoc*, even though other musical instruments can be used as well.

Such approach, meant in order to achieve holistic education, “allows students to learn music through practice and not through theoretical abstract concepts. The process is integrated with language, movement, images and dance which together result in performances, dramatizations, pantomime, choreographies, elementary musical theatre” (Piazza, 2010, p. XXII). The functionality of such approach must be highlighted due to its versatility in classes where one can find students with Special Needs (Pace, 2017).

All types of musical activities promote cognitive, linguistic and social-emotional abilities paying attention to differences but promoting preferential, inclusive methods (Chiappetta Cajola, 2013).

As stated in *Indicazioni Nazionali* (2012) and in *Indicazioni Nazionali e Nuovi Scenari* (2018), music is considered a fundamental and universal part of human experience due to the fact that “it represents a favourable symbolic and relational space where cooperation and socialization processes can be activated, knowledge and techniques can be acquired, creativity and participation can be enhanced, the sense of belonging to a community and the interaction between different cultures and communities can be developed (MIUR, 2012, p.71; MIUR, 2018, p. 14). Music is a mean of communication and represents a way through which people can express themselves, as such, it constantly interacts with other kinds of art and favours exchanges and interaction with different areas of knowledge (MIUR, 2012, p. 71).

In line with the Italian law 107/15 and legislation number 60/17, school institution has the possibility to strongly enhance practical and cultural musical competences (c.7 letter 3 law107/15).

The proposal *Index for Inclusion*, realized by Booth and Ainscow (2008) consists of a set of materials to guide schools through a process of inclusive school development. If such proposal is taken into account it is possible to create a curriculum or a PEI (an individualised education plan) characterized by music workshops based on ludic learning. That is why experienced support teachers who are musicians at the same time should work together with class teachers on the planning and realization of interdisciplinary workshops for “all” students (Rizzo, 2016).

It has been comprehensively shown (Branchesi, 2006; Rizzo & Lietti 2013; Ferrari & Santini 2014; Chiappetta Cajola, Rizzo & Traversetti, 2017) that workshops in which music is considered “a universal experience which is carried out through different genres of equal dignity, full of emotions and cultural tradition” (MIUR, 2012, p.27) make it possible to acquire knowledge through “living and doing” (Dewey, 1963) and favour inclusive and responsible behaviours even in unmediated situations (Chiappetta Cajola & Rizzo, 2019).

The planning of the aforementioned workshops must be led by organizational didactic choices whose aim is to promote school success of each and every student. That is why, in inclusive schools didactics must face complexity (Chiappetta Cajola,



2013) and provide for individualised education plans (Rizzo & Lietti, 2013) that respect and enhance each and every kind of diversity. During the process the careful and accurate monitoring of every action and the search for innovative and technological methodologies and musical resources are of fundamental importance. Such methodologies and resources should be able to engage students in, enhance students' potential and improve collaborative tasks carried out in small groups in class (Chiappetta Cajola & Rizzo, 2016).

Therefore, music becomes a quality indicator for diversity inclusion (Booth & Ainscow, 2014).

### 3. New Technologies, Music and Auto-Education in Schools

Our society is currently dealing with a social, cultural and economic growth: the transmission of information and the speed with which such information is processed among users are to be considered fundamental elements of every single information system. The educational institution takes an active role in this transformation process due to the fact that it must adapt to the changes happening in the society, which require information sharing on an ongoing basis and in which new technologies and traditional learning methods must be embedded.

The spread of Information and Communications Technology (ICT) poses the need for schools to adapt educational institutions to a society which is more and more digitalised (Calvani, 2007).

The *Council Recommendation of 22 May 2018 on key competences for lifelong learning*, has identified eight key competences needed for personal fulfilment, active citizenship, social inclusion and employability: literacy; multilingualism; numerical, scientific and engineering skills; digital and technology-based competences; interpersonal skills and the ability to adopt new competences; entrepreneurship; cultural awareness and expression.

Among those above mentioned, it is given great importance to the use of information and communication technologies which require the use of computers, specific software and internet in order to find, present and exchange information with users from all over the world.

The effect of ICT on the educational institutions can be positive as far as new technologies can settle in together with teaching methodologies in an environment open to changes (Ardizzone, 2008).

In this day and age, "educational technology" is often mentioned, in school related contexts, with regards to people having great digital competences and who use digital learning tools, such as computers and hand - held devices to carry out learning activities.

Actually, this must not be interpreted as an ability to "make it work" (where it represents a computer) rather, it represents so complicated an environment which introduces new learning methods and searches for rational and innovative solutions for learning (Fedele, 2007).

A specialist in ET must have an in-depth knowledge of technology, must be able to evaluate how and how long technologies have to be used in learning processes, must have adequate knowledge of the available resources (Internet, apps, software). Moreover, he or she must know how to create a didactic project and must



have knowledge of how such project will enrich students' knowledge with innovative contents (Persico, 2013).

In its early stages, ET developed as a way to support teaching by using different means, especially audio-visual contents. Then it went on taking on the features of both communication studies and systematic application of scientific and technological knowledge in teaching (Ingrosso, 2004).

ET have been representing a new cultural approach for a long time. This new cultural approach towards didactics helps teachers in the process of evaluation of the degree of transfer of learning methodologies to students. (Brand-Gruwel *et al.*, 2005; Chen *et al.*, 2006; Kirschner *et al.*, 2006; Wood & Ashfield, 2008)

Such emphasis on the relationship between technology and learning is not supported by evidence based. Therefore, such a widespread use of technologies cannot be justified. Quite the opposite, using ET does not pledge an improvement in the students' advancement and persisting in using ET may even create more problems that it could solve (Bonaiuti *et al.*, 2017), arousing a cognitive excess load, as shown by John Sweller (1988) in his *Cognitive Load Theory*.

Research has shown that methodologies rather than technologies make a difference in learning results. (Clark *et al.*, 2006; Hattie, 2009; Calvani, 2013)

Therefore, ET support teachers as well as enriching and enhancing students' learning process only within technologically advanced, well structured and supported contexts where teachers are highly qualified (Marzano & Haystead, 2009).

However, the use of technological compensatory measures can intensify the extent to which the teaching action is considered inclusive (Rossi & Rivoltella 2012; Rivoltella, 2015) due to the fact that it offers "a significant added value as far as independence, work integration and social participation are concerned" (Calvani, 2013, p.40).

In the last few years many technologies, software and Apps were created, based on *Universal Design* criteria (Mace, 1985), in order to favour an inclusive didactic as far as both a specific curriculum and interdisciplinary and multidisciplinary methods are concerned.

An example of this kind of technology is the one developed by *Drake Music* organization: *Mi.Mu gloves* can be worn by everyone and allow users to create and play music through gesture control; Another example is represented by *Native Instruments*, which are accessible keyboards invented by Andre Louis, musician and sound designer; *Komplete Kontrol* instead, allows blind people to use the app without assistance, via a *Voiceover* system that describes what is selected.

The app *Musicbus*, used in Italy by *Gruppo Regionale Attività Musicali (USR Veneto)* (A regional organization meant to engage students in music activities) stimulates instrumental and vocal practising in elementary schools; *Ascoltiamo*, conceived by *Arnolfo Borsacchi and IStartApp*, brings out the differences in the features of music through listening.

Moreover, *De Agostini*, partner of the European project *weDraw*, coordinated by IIT (*Italian Institute of Technology*) has been promoting the widening of the educational offers by developing multimodal serious games to teach mathematical and geometric concept in elementary school by listening to sounds and using movements.

Teachers "must be able to identify the technological devices most suitable for students' needs and assess the optimal balance between the time devoted to digital media and that devoted to other activities" (Curatola, 2016, p. 48).



During the last years, the *American Montessori Society* has been promoting digital literacy, claiming its positive stand on the use of technologies in schools and producing Software or Apps which are able to reproduce Montessori material taking advantage of the digital potential.

“Learn and train our ears on how to identify differences in music sounds” (Montessori, 2000b, pp. 559-560).

For this purpose, Montessori suggests the use of “intended materials”, an example is the use of bells, which she describes as “a series of bells representing the whole tones and semi- tones of one octave. [...] We had a very simple support built: a 1,15 m long and 0.25 m wide wooden stand whose width allows for two bells to be positioned one in front of the other. The bells are on black and white cases. The white ones correspond to tones and the black ones to semi-tones. [...] A second series of bells, identical in sound, to set 1 are kept in order in the space above, secured to the stand. They are not identical but depending on the note can be of different dimension. [...] The exercises is described as follow: children strikes the bell from Set 1 with a hammer and then are encouraged to find the matching bell from Set 2. When they find the matching bell they must place the matching bells together, one in front of the other. At the beginning children will only use the tones on white cases. Only after will they start to use semi-tones, too” (Montessori, 2000b, pp. 559-560).

Starting from the theoretical basis of the *Montessori Method* (development of the senses, control of error, repetitive practice) Matteo Chen and Isenarda De Napoli have developed an app called: *MusicMontessori*, available for *Android* and *iOS*. It promotes listening activities based on bell sounds in which pupils have to match musical notations and fractions with the aim of getting to know the numerical value of the musical notations.

Music education through the *Montessori Method* of Education affects that didactic frame of interaction made up by listening. Listening one’s work. Auto-education, which is entirely based on the relationship between teachers and learners, feeds listening, especially if it is carried out in a room filled with Montessori materials and supplies.

The relationship between the teacher and the learner is based on the presentation of the materials for development that invite children to engage in learning activities of their own individual choice following the instruction scheme they were proposed by the teacher.

Listening becomes a way through which the development of competences intertwines with the free, voluntary and auto-educating activities related to children’s interests and their developmental times. Basically, children can use material until they have acquired new competences.

The presence of a stirring that allows auto-education in a specific context prevents children from confusion and attentional dispersion at work.

The role of a Teacher who uses the *Montessori Method* takes place in a determined place and at a determined time. The space-time union allows students to make progress in the field of education, or better auto-education, on their own.

As far as music is concerned, it is noteworthy that students experiment on across the board auto-education to listening, employing features and acquisitions of every discipline.

It is also possible to learn about silence, through music.

In a silent environment, the ring of a bell draws students’ attention and lets them



remember that we all “possess” silence, we just need to “keep” it. Music auto-education starts from this.

Everything steers children to develop their listening skills.

Through listening children are given the possibility to sense themselves inside a space in which they belong.

This real space is a way to learn through listening, a place where harmony is achieved through music education.

“Media are, therefore, an approved teaching aid, but always on the condition that they complement other teaching aids and do not replace them. Their use must take place in environments that promote learning and through cooperation between students” (Curatola, 2016, p. 49).

## 4. Music and Deafness in Teaching: Beyond a Seeming Paradox

To discuss music means to speak about a universal human expression and an element that from a knowledge point of view is the subject of interdisciplinary study: music is at the same time art, culture, communication, entertainment, and education (Nelson, Wright & Parker, 2016).

The manifestations that music offers in the encounter with deafness are manifold. Certainly the foremost, which enjoys far more literature, is the use of music in the therapeutic field. For the deaf, the well-known benefits of enjoying music include overcoming problems in speech therapy and improving muscle coordination and rhythmic movement (May, 1961).

It is precisely these activities aimed at rehabilitation that have offered food for thought when we seek to understand the effectiveness of music in a didactic context. This has led to a paradigm shift on this theme - from believing that the deaf cannot perceive and enjoy music, we can now make this language a driving force in the construction of identity and the self-determination of the deaf person.

The literature is scarce regarding studying music as an end in itself for the deaf, for fun and without rehabilitative or educational purposes, although these latter focuses are so close that it is difficult to separate them, and according to some authors they should not even exist (May, 1961).

It is due to start our work with a premise. The pair deafness/music is an apparent paradox. In reality, it is only a preconception that deaf people cannot have access to music and enjoy a world of sound. Indeed, reversing the reasoning, we could say that in fact normal hearing is no guarantee of a good inclination for music. This preconception arises from the false belief, of the uninitiated, that by music we mean only listening and that of all the components of music the most important one is melody, or in any case that melody takes supremacy over other musical components, such as rhythm, tempo, intensity, and vibration. These additional components are absolutely accessible to the deaf. It is the presence/absence of vibratory stimuli that let the deaf person to determine whether or not there is silence. Furthermore, with practice it is also possible for the deaf to perceive differences in pitch (Tafari, 1991; Russo, 2000). To understand this, it is necessary to distinguish between auditory reception, specialized in the perception of frequencies starting from 125-250-500 Hz, and acoustic reception, which concerns the vibrotactile detection of low or medium-low frequencies. The latter is the only one accessible to a profoundly deaf person and allows the reception of low frequencies (Cavalieri, 2015).



Therefore, in relation to music, deafness does not equate to total sound loss, but it is necessary to assume a pluralistic understanding of music as a diverse set of experiences across the entire spectrum of listening. Deafness upsets the hierarchy of the senses. Deaf people reflect the musical aspects of orality in different ways, just as they offer a complex understanding of vision and touch (Holmes, 2017).

Deaf listeners enrich our notions of musical competence. The deaf person does not live in a silent world, because a human being is the primal musical instrument. The human body vibrates and co-vibrates in receiving sound waves and reproducing them (Cremaschi Trovesi, 2001; Cavalieri, 2015). Laborit defines music as a universal language in which a kinesthetic component predominates, that is, relating to the sensations produced by sound vibrations. In this regard, the author says that music is able to physically make the human body vibrate (1998). These considerations are then corroborated by neurological studies that make use of neuroimaging techniques: the auditory nature of sound vibrations is explained by the fact that they are felt by deaf people in the same part of the brain that hearing people use for listening (Neves, 2010).

Therefore the combination of deafness and music is absolutely possible. As we have said, the literature has amply demonstrated the effective use of music in the therapeutic field for children with special needs. Even in the context of hearing difficulties, rehabilitation techniques mediated by the tools of musical language have shown the same effectiveness. In particular, deaf children with musical training have shown improvement in the development of linguistic processes, such as verbal articulation and phonetic discrimination, and cognitive processes such as working memory. In fact, music education has positive effects on the suprasegmental aspects of language, on the quality of the voice and on organizing simple sentences (Silvestre & Valero, 2005; Rochette, Moussard & Bigand, 2014).

A deaf child has difficulty developing the prosodic characteristics of language such as intonation and rhythm. Musical activities assist in the development of these components of spoken language. Body movement, used in Dalcroze and Orff's methods, is also capable of supporting speech therapy. Deaf children use their entire bodies in many rhythmic experiences before the rhythmic component is conveyed through language (Darrow, 1985).

Thus music can be an important tool for exploring new means of expression, for increasing auditory awareness, for improving cognitive and attentional skills, for recalling memory, and for expanding vocabulary (Butler, 2004; Guerra Lisi, 2018).

These practices have suggested a profitable use of music in a didactic context as well, going beyond the therapeutic aspect to further open up to learning objectives, in spite of encountering some criticisms and misconceptions in this regard. Music as a discipline in the educational curriculum is affected by an audiocentric perspective, since it is commonly conceptualized as an auditory practice that is expressed in listening to musical traditions. Such activities often constitute the core of music teaching/learning practices as a school discipline (Silvestri *et al.*, 2018).

More suitable for a broad view of the possibilities expressed by music is the space devoted to it in kindergarten. In preschool, music is one of the universal communicative languages, capable of conveying learning in the various developmental areas: linguistic, motor, cognitive, emotional-affective, and social. Motor activities can be performed that involve movements of various parts of the body in correlation with the vibratory sequences. This rhythmic gymnastics can accompany the perception of one's body pattern. In addition, the perception of vibratory stimuli produces vasomotor effects that cause positive moods (Russo, 2000).



Dalcroze showed that music education has great potential. His approach is based on rhythmic and consists in relating body movements with musical language and imaginative and reflective activity. It is therefore a methodology that promotes creativity and produces emotional and social benefits. For children with special needs, Dalcroze's approach can offer equal opportunities to develop skills, musical knowledge and agency. The activity of music/movement and enjoyment of the bodily experience are intertwined in processes of embodied musical interaction. These didactic experiences evoke emotions and promote reflective/self-reflexive and learning activities capable of promoting self-determination processes (Nelson, Wright & Parker, 2016; Sutela, Juntunen & Ojala, 2016).

The approach suggested by the Universal Design for Learning has also taken on a more universal definition of music. It is a global approach to inclusion that provides guidelines to enhance participation and motivate all students. There is a 'deafness approach' to musical enjoyment which, by providing multiple paths of enjoyment, destabilizes the merely auditory definition of music and unmasks its subjectivity (Silvestri *et al.*, 2018).

Therefore it is possible to conclude that music is a transversal component in preschool teaching and that the skills cultivated through musical activities are closely linked to all areas of education at this school level. We hope that the use of music can find adequate space and application also in the subsequent school grades of the curriculum, both as a discipline in itself and as a transversal language (Fix, 2008).

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