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APONTAMENTOS PARA UM DEBATE SOBRE TECNOLOGIA E EDUCAÇÃO MUSICAL

APUNTES PARA UN DEBATE SOBRE TECNOLOGÍA Y EDUCACIÓN MUSICAL

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RESUMO: Trata-se de artigo de reflexão teórica, originado em pesquisa de mestrado realizada na Universidade de Lisboa. O artigo analisará, a partir da revisão de literatura especializada disponível, as relações entre educação musical e o uso das novas tecnologias da informação e comunicação. Para isso, partindo de autores como Amato (2018), Bauer (2014), Chamorro *et al.* (2017) e Iazzetta (2009) procura-se situar o fenômeno da tecnologia na educação para, então, sinalizar o uso da tecnologia especificamente na educação musical problematizando a formação de professores na educação musical e a utilização de tecnologias.

PALAVRAS-CHAVE: Educação musical. Formação de professores. Tecnologia da informação e comunicação.

***RESUMEN**: Este es un artículo de reflexión teórica, originado a partir de una investigación de maestría realizada en la Universidad de Lisboa. El artículo busca analizar, a partir de la revisión de la literatura especializada disponible, la relación entre la educación musical y el uso de las nuevas tecnologías de la información y la comunicación. Partiendo de autores como Amato (2018), Bauer (2014), Chamorro (2017) e Iazzetta (2009), buscamos situar el fenómeno de la tecnología en la educación para luego señalar el uso de la tecnología específicamente en la educación musical y problematizar la formación de profesores en educación musical y uso de tecnologías.*

***PALABRAS CLAVE**: Educación musical. Formación de profesores. Tecnología de la información y la comunicación.*

***ABSTRACT**: This theoretical reflection article originated from a master's research at the University of Lisbon. From the review of available specialized literature, the article seeks to analyze the relationship between music education and the use of new information and communication technologies. For this, starting from authors such as Amato (2018), Bauer (2014), Chamorro (2017), and Iazzetta (2009), we seek to situate the phenomenon of technology in education to then signal the use of technology specifically in music education, problematizing teacher training in music education and the use of technologies.*

***KEYWORDS**: Music education. Teacher formation. Information and communication technology.*

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Introduction

This theoretical reflection article aims to analyze the relationships between certain information and communication technologies, notably present in devices such as tablets and smartphones and tools such as software and websites (blogs, vlogs), and their relationship with contemporary music education. For this, we will briefly introduce the use of technology in education, with a special focus on music education, and then discuss teacher training in music education and the use of technology in this training. The article is based on a theoretical and bibliographical reflection and is the result of research developed at the University of Lisbon.

Technology in education

The digital world, in which most day-to-day activities are performed through touches on screens in a practical and fast way, presents itself as one of the main demands of contemporaneity. The devices - computers, tablets, smartphones - are the center for performing several tasks, such as reading, researching, eating, buying, communicating, working, studying, and advertising services. Thus, the presence of these technologies, increasingly indispensable in everyday life, has instituted the need for educational institutions to adapt to the new demands.

Historical documentation tells us that if we could visit an educational institution in the 19th century, we would observe many of the same methodologies used in the present 21st century. However, technological innovations have promoted significant changes in several areas of society, changing the way subjects interact with each other, with themselves, and with the world, which gradually is also reflected in the educational field, generating the impulse to think about the role of technology in teaching and learning processes (OLIVEIRA; MOURA, 2015).

In the present work, we understand educational technologies as "intellectual tools, organizers, and instruments available to or created by those involved in the planning, practice, and evaluation of teaching" (SANCHO, 1998, p. 17, our translation). In this way, educational technologies such as blogs, vlogs, and new applications present themselves as auxiliary instruments in the educational process, enabling alternative and possibly effective methodologies for teaching and learning.

The invention of portable communication devices with easy access to the World Wide Web, the smartphones, despite the difficulties still found in the country's population because of the existing social inequality, has facilitated the access of people from different social classes

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and ages to the new means of communication. Having said this, we can see the opportunity for the democratization of knowledge from the dissemination of these devices and access to information. But for this to be possible, it is necessary to teach the very benefits of the tool for conscious and effective use. In this sense, Papert states that:

> The same technological revolution that was responsible for the strong need to learn better also offers the means to take effective action. Information technologies, from television to computers and all their combinations, open up unprecedented opportunities for action to improve the quality of the learning environment (PAPERT, 2008, p. 14, our translation).

One of the main changes resulting from information and communication technologies (ICTs) in the educational field is the new modalities of distance and semi-attendance learning and their use as a complementary tool to formal education - this last possibility, the complementary use is, it is worth noting, the focus of this research.

Today, the use of ICT as a complementary process to education, in its various aspects, has a democratizing character due to the ease of access to these tools. These complementary tools can be used, for example, during the classes themselves or as support for continuing the studies at home. In this sense, by using at home a tool such as a cell phone, a tablet, or even a computer, students can set up their study schedule, and the materials can be studied anywhere, relativizing, certainly, the limits of space and time, so characteristic of learning inside the institutions. Moreover, the space of this complementary education becomes differentiated since classes taught in several regions, including outside the country, can be watched from anywhere via video classes, for example (AMATO, 2018).

For the construction of knowledge to be effective, a specific discipline is required of students when using ICTs, since, when thinking about the use of the tool as a complement to the classes, it is assigned to them the responsibility of managing time, watching the extra video classes, reading and consulting the materials, sending questions and participating in discussion forums to acquire the knowledge of what is proposed to them in addition to using the tools themselves, an integral part of the learning process (VENDRUSCOLO; BEHAR, 2016).

The student's autonomy and mastery over the technologies and tools needed to formulate works - texts, spreadsheets, slides, videos - and search available materials and use diversified tools (devices and programs) is a fundamental element in distance learning. Thus, for this teaching modality to verify the reality and the necessary depth in the approached contents, as happens in face-to-face teaching (SCHLEMMER, 2010), a development of fluidity in the use of technology is essential for teachers and professionals who work in this modality, thus

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culminating in the improvement of available materials and an effective teaching methodology. However, despite the great changes and achievements related to technology and education, it should be remembered that much still needs to be studied regarding the teaching methodologies carried out through technological mediation.

A importância do tema surge, principalmente, como uma alternativa ao ensino tradicional ainda realizado por diversas instituições. Reconhecer as tecnologias da informação e da comunicação (como *sites*, *blogs*, *vlogs* e novos programas para *smartphones*) como ferramenta para enriquecer o desenvolvimento didático na construção do conhecimento, tanto em ambiente educacional como complementar a este, tem muito a contribuir para o ensino, notadamente em países que se encontram em processo de desenvolvimento econômico e educacional, como o Brasil.

Universities focused on distance learning, both in Europe, such as the Open University in the United Kingdom or the UNED, in Spain, and in Brazil, with the Open University of Brazil (UAB), present themselves as an alternative in the process of democratization of education, since they seek to facilitate access to higher education courses and, in the Brazilian case, in a country that is still marked by deep social and economic inequality, presents itself, in these terms, as a tool for social justice (HICKEL, 2012). In this case, at the state level, there are the distance learning courses offered by CEDERJ, a consortium of public universities in the state of Rio de Janeiro, through the Center for Science and Distance Higher Education in the State of Rio de Janeiro (Fundação CECIERJ). The project offers undergraduate courses with face-to-face and distance tutoring, including free didactic material. The course planning is designed to include students in their most diverse social contexts, whether in the possibility of access to free higher education or to attend an undergraduate course that allows access to students who are also workers, which includes in-person exams on weekends and access to computer labs with Internet access to complete assignments and online activities in the centers in the program's partner municipalities.

It is worth remembering that the use of technology in the classroom, or in any teaching environment, as an aid is no guarantee of an effective teaching and learning process because, in the educational context, the teacher, even using new technologies, remains responsible for didactic decisions and pedagogical articulations in the classroom (GERALDI, 2017).

Therefore, considering the implications of ICTs in the educational context - its benefits, characteristics, and limitations - it will be sought next to bring to light some important considerations regarding the hybrid teaching of music, with technology as an adjunct.

The use of technology in music aducation

Music, in itself, has always been close to developing techniques, such as new singing techniques, for example, and technologies necessary for forming new instruments (RAYNOR, 1981). Although music education presents essentially conservative permanences, there has always been the need to perceive and welcome new possibilities, from which come influences on all levels related to art and musical knowledge, "the symphony orchestra itself is a showcase of complex technological developments without which Western music could not be what it is" (IAZZETTA, 2009, p. 17, our translation). Santos (2015) also makes an extremely important point about how technology influences have modified, over time, the main material of musical making, sound. With electronic and, later, digital devices, the sound that used to be produced only mechanically was modified. With the progress of current technologies, there has been a great change that has modified several other aspects related to music: listeners have a greater number of works at their disposal; the composer can test his music while still creating it; the musician, when recording himself, can analyze his interpretation, now as an external listener; even the conductor, among other options, no longer needs to use a paper score.

Currently, there is a variety of hardware and software available for free that helps to expand and improve musical activities that used to be seen from a single point of view. In addition to these technologies, it is worth mentioning the range of options of games that have musical aspects as their theme. For example, from the famous 'Guitar Hero', through 'GNU Solfege', specialized in solfege and 'Voez', 'Lanota' and 'Beat MP3 2.0', rhythm games, the latter being a device that allows the user to play with music from his own cell phone, i.e., the user can play with specific songs or even composed by himself. There are also options of games that intend to help with score reading and 'ScoreCloud', which is not necessarily configured as a game, but as a program, specialized in creating scores through sounds.

In this way, the tools cited can assist in teaching and learning music, bringing them closer to practice and facilitating the experience with music. According to Machado (2015, p. 121, our translation):

> ICT enables a musical experience that stimulates students to make music: creating it, getting involved with it, that is, a teaching that is not limited to showing images and does more than require memorization from students, preferring to let them - challenged, guided - experiment and reach conclusions from their actions. [...] the advantages provided by ICT positively influence the teaching-learning process because they allow concentrating music, image, and movement in little space; they facilitate the teacher's work; they facilitate and motivate the knowledge and study of symphony orchestra instruments; they facilitate the study of music for those who have Internet; they are a

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starting point for vocal and instrumental expression activities; they facilitate musical knowledge and consumption.

ICTs have also provided a voluminous array of texts, videos, images, and general materials that can complement music classes. Blogs are tools for producing content with great potential for use by music fans, students, teachers, and musicians. Some of them are created to promote the release of new music worldwide, and others work with reviews, critiques, and even mapping of the Brazilian phonographic market, as is the case of "Notas musicais", created by music critic Mauro Ferreira[1]. Other blogs work as music and ciphers depots, offering album listings with musical reviews and analyses done collectively and made available for free.

Vlogs, whose communication is made through videos and not texts, as in blogs, have also made their presence felt in the musical area. Youtube channels focused on the music area deal with several interesting and relevant issues, not only for research but to understand the universe of the technological native, those born after the dissemination of information technology and that, therefore, have the interaction organically with technology, which accesses and consumes much of the content of this type of platform (SILVA; RICON, 2019). Some accounts even specialize in teaching music at a distance, providing videos of techniques to guide their subscribers to perform various tasks such as playing and composing.

According to Schramm (2009), when it comes to learning music, the use of ICTs, such as videos available online or digital tools that allow audio and video editing, makes it possible for subjects to work on the parts that make up a song, having this technology as an aid when dealing with topics such as musical analysis, counterpoint, harmony, and phrasing, allowing the learner to build new musical knowledge.

Both blogs and vlogs have social networks, such as Facebook, as their main allies in promoting their work. The trend for high visibility comes from sharing advertisements, sweepstakes, images with short explanatory texts about concepts, and even curiosities about the music itself or its characters. Even if formulated informally or non-methodologically, it provides a large audience, young or not, consumers of the information thus conveyed.

In research conducted by Kronbauer (2016) with guitar students from the "Talent School Project" in the municipality of Panambi, in the Rio Grande does Sul, it was possible to observe the development of classes with the use of music-themed vlogs and blogs. Through a questionnaire, the teacher-researcher aimed to understand if the students used material available on the Internet for musical studies, which tools were used, and, in the investigation, it was found

[1] Available at: http://www.blognotasmusicais.com.br. Accessed on: 12 Aug. 2021.

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that most students used online resources, among them the CifraClub (www.cifraclub.com.br), a resource specialized in guitar.

Thus, activities were proposed that consisted of using the website, and, in addition to the platform's written content (blog), video tutorial resources (vlogs) were also used to develop the activities. According to the teacher-researcher, the students found it easy to explore the resources available on the website, both the students already using it and those who got to know the platform through the proposed activities. Still, the teacher-researcher points out that, in some moments, it was necessary to intervene in the development of the activities since the platform presents some limitations regarding typing errors, chords, and melodies. In this sense, semi-attendance was the best option. It is undeniable, therefore, the democratizing character of these tools in the access to scientific and musical knowledge, previously considered accessible only to a small portion of the population that could afford to pay for studies and textbooks, as well as scientific journals.

The figure of the music teacher here becomes even more important. Given the diversity of sources and information present in virtual environments, it is up to the teacher to guide students to the most relevant research and themes in their paths, as well as the possible mistakes that can be found, as in the case of the mistakes present in the website used in Kronbauer's (2016) research. Thus, the contact between teacher and student is essential since it is precisely from this contact that the teacher will draw the necessary framework for the specificities of the students. Moreover, it is worth remembering that not all texts and hypertexts contained in cyberspace, as elements of ICTs, are reliable sources, weakening the possibility of using information without guidance. Besides using technology as a tool to assist in the teaching and learning processes, the teacher, in this way, teaches the students themselves to use this tool in their studies, giving them not only subsidies on to base their work but also giving autonomy to the subjects involved in the process.

The highest and most sophisticated level of technology integration is "The Pedagogical Summit", where technology is used to introduce, explain, reinforce, provide practice of concepts and skills, and assess learning. At this level, students use technology directly, and teachers apply educational theory, used as the foundation for their activities (DORFMAN, 2014).

Thus, the pedagogical, technical, and technological knowledge come together to realize an innovative teaching proposal. Bringing to the teaching and learning process, the modernities that are presented in the technological world cannot be based only on use (KRÜGER, 2006)

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because this way, teaching, and learning are not enriched. Moreover, since the planning of content, classes, activities, and evaluations, those two types of knowledge must be used and applied together so that the desired objectives are achieved and effective in the formation of the learner.

It is essential to emphasize that "like any musical practice, the interaction time between teacher/student is very important during learning" (SOLTI, 2015). Thus, the technophobia that comes from the fear of erasing the teacher's figure becomes a point to be always remembered and debated since the proposal presented is to use ICTs as aids to the teacher's indispensable pedagogical actions, not replacing them (GOHN, 2007). In the modalities that use ICTs as tools, in its most varied levels, for example, the teacher's role is indispensable since "teaching must be thought in both ways: teacher-student, making the contents available; and student-teacher, providing feedback with doubts" (AMATO, 2018, p. 42, our translation).

Given the diversity of resources, ICTs can be seen as aids, also, in the construction of musical knowledge as a whole, both in musical practices and in the conceptual and historical knowledge of music, in addition to the possibility of realizing the numerous methodologies that have been used around the world for studies focused on the field of music and its tributaries. Consequently, the classroom itself is broadened, making the teaching environment a broader place because, as already mentioned, one of the renovations related to the advances in Information and Communication Technology in the field of education is the break with the limits imposed by time and space.

Such radical, profound, and widespread changes in the social environment also bring about changes in the student's profile. And this is precisely the case with young students born in the era of technology diffusion. Therefore, the students who present this characteristic are so deeply inserted in the context of these new technologies that they do not perceive them differently than those born before their consolidation. Thus, it is necessary to reflect on technology and teacher education and training, an important point to glimpse a horizon for effective music teaching using technological tools.

Teacher training in music education and the use of technologies

Even in view of the notes, research conducted in Brazil about using ICTs in music education still needs to be more active. Generally, when talking about the subject, the subject's reactions are polarized in technophobia or technophilia (GOHN, 2007), that is, part rejects the use of these tools or takes them as a solution for any mishap. Therefore, it is convenient to

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clarify, besides what has already been done about the technologies used in subjects and the teaching and learning process, issues related to teacher training, the need to think about pedagogical work based on the analysis of reality, on a critical and reflective posture that directs teachers to an autonomous practice in the classroom.

To think and elaborate a lesson plan, activity or evaluation that uses technologies - hardware or software - is not only the use itself, so "we must be careful to avoid the use of technology as a mere transposition, to a new media, of existing books or exercises" (KRÜGER, 2006, our translation). Therefore, "for the teacher to effectively integrate technologies in the process of teaching and learning music, he/she needs to know them" (BAUER apud SANTOS, 2015, p. 11, our translation).

Santos (2015) points out that although the use of technologies integrated into music classes can offer other pedagogical dimensions for teaching, the technological training of the music teacher still does not happen consistently in undergraduate courses, as already investigated by Krüeger (2006), who proposes that undergraduate students need to go through training and experience with ICT during courses. Otherwise, their training will be incomplete.

It is also worth mentioning that the difficulty of many choir directors, as well as teachers, to adapt and pass the technology to their students stems much more from problems arising from a lack of understanding of the teachers and directors, of the technology itself, than from the students or choir members. We can also remember that it still seems a complex task for a choir entirely mediated by ICTs, since, for the performance of a work, the conductor and teacher must consider phenomena that still escape these technologies, such as breathing, accents, and enunciation.

In this sense, Machado (2015) alerts us to the need to think about teacher training based on the activity of criticism and reflection on the artistic content and pedagogical practices undertaken. Thus, the educator starts not only to employ the practices with which he had contact in his training period but also starts to reflect on his pedagogical actions critically, trying to understand more and the learning process of his students. According to the author,

> Teacher who intends to use ICT in Music Education class must necessarily look at the technologies to use them in their activities, and for that, there is only one alternative besides investing time, training, and effort. If, on the one hand, it has been demanded professional autonomy of the Music Education teacher, which presupposes clarity and responsibility in decisions and choices of how and what to teach, on the other hand, it is necessary to invest in the training of the future teacher considering the importance of ICT in society and current education (MACHADO, 2015, our translation).

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A major impasse in allying ICTs to educational processes is the 'technophobia' presented by some teachers not considered 'technological natives' (TAJRA, 2012). For Gohn (2007), technophobia is not configured as an irrational fear. However, it is defined as “a dislike” or a distrust (GOHN, 2007, p. 163) that the best answer to the problems that arise in everyday life is only technology. That is why the importance of a teacher's education encourages critical and reflective thinking about pedagogical practice in music teaching and learning with ICTs.

As already presented, the conservatism adopted by music education institutions has proven insufficient to encompass the range of students who present themselves as technological natives. Coming from a historical and social context impregnated by technology in several areas, including the labor market, becomes discrepant an education that needs to consider the experience of these students with the world that presents itself to them in a highly technological way. Thus, changes in the educational field are inevitable and must be thought about so that the integration of ICTs is carried out effectively in what concerns teaching (OLIVEIRA; MOURA, 2015).

When researching the use of technology in music education with a group of teachers, Leme (2006) reports that they are driven to learn technologies by the need for improvement and updating, both for the use of instruments and for music lessons, since many times, the contact with ICTs arises from the interaction of teachers with the students themselves who already know some of these tools. According to the author, the teacher needs to assume a position in which they recognize themself as an educator and also as an educator in the pedagogical process and the use of technology in music education (LEME, 2006, p. 39), contributing to their education, improving the knowledge about ICTs and their potential in education.

The lack of knowledge related to the use or operation of technologies is a latent reality that must be analyzed from an educational and social point of view since Brazil's economic reality contributes to an inequality that prevents a significant number of people from having full access to the new tools that are being presented. Therefore, it is necessary to create plans to teach people how to use and process the devices and programs that will be used in the academic environment and music education. Thus, it is worth remembering the case of Free Software and the possibility of its use in the construction of knowledge and access to those who, either for personal, social, or economic reasons, do not have them. The role of institutions responsible for musical education is of utmost importance to propagate the use of these technologies and facilitate access to the necessary devices.

According to Chamorro et al. (2017), the main impasse found in the implementation of ICTs in the process of music education, from research conducted in the interior of São Paulo, is the lack of availability of devices that enable access to programs and applications, such as computers and Internet, which makes educators not approach technological knowledge due to the impossibilities of implementing technology in teaching. In this sense,

> It is important to emphasize that access goes far beyond acquiring equipment for educational institutions. This access must be accompanied by pedagogical and technological support as "cutting edge technology" and quality, including wireless network programs and internet access, to connect the world lived outside and inside the school. (ARALDI, 2013, p. 18, our translation).

It is up to teacher training courses the initiative to rethink the curricula, seeking to integrate future teachers into viable and effective alternatives of teaching that promotes the necessary framework for a coherent pedagogical practice that, through action and reflection, can research, problematize and find solutions for music teaching to integrate ICTs, as the needs that present themselves in everyday life.

In these terms, we can remember that in a recent study (CHAMORRO, 2017), a group of music teachers presented their views on the use of information and communication technology in music teaching in its most varied possibilities and what previously expressed fear, mainly due to the weakness of their respective training, generated expectation of improvement in the learning process after participating in formative workshops.

After the observations deemed relevant, the teaching of music that integrates technology aims to constitute and improve the methods of teaching and learning, aiming at a conception of music education that welcomes the characteristics of the social world, as well as its students, valuing the experience of the subjects so that their training is complete and consistent with the reality that materializes in various spheres of social life and, consequently, in education, since these same subjects constitute it.

Final considerations

This brief theoretical reflection article aimed to analyze the relationships between certain information and communication technologies, notably in devices such as tablets and smartphones and in tools such as software and websites (blogs, vlogs...), and their relationship with contemporary music education. For this, we present a brief introduction to the use of technology in education, with a special focus on music education. Then, we problematize teacher training in music education and the use of technology in this training. The article was

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based on a theoretical and bibliographical reflection, the fruit of research developed at the University of Lisbon. More than closing any possibility on the subject, we tried to start questioning.

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