DEVELOPMENT OF TEACHING KNOWLEDGE TO TEACH MUSIC IN ELEMENTARY SCHOOL

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Abstract

Guided by the question "What is the teaching knowledge developed by Art teachers and educators from a formative activity centered on the use of digital technologies?" we conducted an investigation in the context of a formative activity permeated by digital technologies. The activity involved eight teachers from the early years, focusing on the development of necessary knowledge for teaching music at school. The results point to the development of disciplinary knowledge related to the History of Music and Art, musical theory, musical practice and music teaching mediated by technologies; curricular knowledge related to musical writing (score), musical scale, rhythm, melody and harmony, folk music and the content of musical teaching; teacher education knowledge, particularly aspects related to didactic, that is, strategies and resources to develop music teaching; and experiential knowledge on students' learning challenges.

TEACHER • MUSICAL EDUCATION • PRIMARY EDUCATION • DIGITAL TECHNOLOGIES

DESENVOLVIMENTO DE SABERES DOCENTES PARA O ENSINO DE MÚSICA NOS ANOS INICIAIS

Resumo

Guiados pela questão "Quais são os saberes docentes desenvolvidos por professores de Artes e pedagogos a partir de uma atividade formativa centrada no uso das tecnologias digitais?", realizamos uma investigação no contexto de uma atividade formativa permeada pelas tecnologias com foco no desenvolvimento de saberes necessários ao ensino de música, que envolveu oito professoras dos anos iniciais. Os resultados apontam para o desenvolvimento de saberes da formação profissional, relativos às estratégias e recursos para ensinar música; saberes curriculares, relacionados à escrita musical, à escala musical, ao ritmo, à melodia e à harmonia, à música folclórica e ao conteúdo do ensino musical; saberes experienciais, sobre as dificuldades de aprendizagem dos alunos; e saberes disciplinares, relativos à História da Música e da Arte, à teoria musical, à prática musical e ao ensino de música mediado pelas tecnologias.

PROFESSOR • EDUCAÇÃO MUSICAL • ENSINO FUNDAMENTAL • TECNOLOGIAS DIGITAIS

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DÉVELOPPEMENT DES SAVOIRS PÉDAGOGIQUES POUR L'ENSEIGNEMENT DE LA MUSIQUE DANS LA PETITE ENFANCE

Résumé

Guidés par la question "Quels savoirs pédagogiques ont déployé des professeurs d'éducation artistique et des pédagogues, à partir d'une activité de formation visant l'utilisation des technologies numériques ?", nous avons mené une enquête auprès de huit professeures de la petite enfance engagées dans une activité de formation impliquant la technologie dont le but était de développer les connaissances nécessaires à l'enseignement de la musique. Les résultats ont montré une acquisition de savoirs de formation professionnelle, liés aux stratégies et aux ressources de l'enseignement de la musique; de savoirs curriculaires, liés à l'écriture et à l'échelle musicales, au rythme, à la mélodie et à l'harmonie, à la musique folklorique et au contenu du programme d'enseignement musical; de savoirs expérientiels concernant les difficultés d'apprentissage des élèves; et de savoirs disciplinaires, relatifs à l'histoire de la Musique et de l'art, la théorie et la pratique musicales, ainsi qu'à l'enseignement de la musique par moyen des technologies.

ENSEIGNANT • ÉDUCATION MUSICALE • ENSEIGNEMENT PRIMAIRE • TECHNOLOGIE NUMÉRIQUE

DESARROLLO DE CONOCIMIENTOS DOCENTES PARA LA ENSEÑANZA DE LA MÚSICA EN LOS AÑOS INICIALES

Resumen

Guiados por la cuestión "¿Cuáles son los conocimientos docentes desarrollados por profesores de Artes y pedagogos a partir de una actividad formativa centrada en el uso de las tecnologías digitales?", realizamos una investigación en el contexto de una actividad formativa permeada por las tecnologías, con foco en el desarrollo de conocimientos necesarios para la enseñanza de música, que involucró a ocho profesores de los años iniciales. Los resultados apuntan para el desarrollo de conocimientos de la formación profesional relativos a las estrategias y recursos para enseñar música; conocimientos cuanto al plan de estudios relacionados a la escritura musical, a la escala musical, al ritmo, a la melodía y a la armonía, a la música folclórica y al contenido de la enseñanza musical; conocimientos de experiencias sobre las dificultades de aprendizaje de los alumnos; y conocimientos de la materia relativos a la Historia de la Música y del Arte, a la teoría musical, a la práctica musical y a la enseñanza de la música por medio de las tecnologías.

PROFESOR • EDUCACIÓN MUSICAL • ENSEÑANZA PRIMARIA • TECNOLOGÍA DIGITAL

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T EACHING KNOWLEDGE, CONCEIVED AS A TEACHING BASIC ELEMENT, IS BUILT FROM PROCESSES and experiences of teacher education and professional practices, involving previous experiences to the initial teacher education, going through the teacher education process and extending along the professional trajectory. For Tardif (2002, p. 103, own translation), teaching knowledge underlies the school practice, which "serves as the basis for teaching"[1] at school and, *a priori*, comes from different social sources, such as family, school and university. This knowledge is also temporal because it is acquired in different social times (TARDIF, 2002).

The necessary knowledge for teaching, according to Tardif (2002), can be classified into four categories: knowledge of professional training (educational sciences and pedagogical ideology); curricular knowledge; experiential knowledge; and disciplinary knowledge. As they are fundamental to the teacher professional practice, these categories of teaching knowledge have interested researchers from different research fields, especially in education. Researchers around the world have sought to identify different aspects of this knowledge that are developed by teachers, as well as to examine ways of developing them.

On the other hand, educational changes, especially concerning school curricula, have introduced new themes and content in their programs, such as the teaching of music introduced in the context of the subject Art. These changes have brought new challenges to the elementary school teachers, who are faced with the task of teaching something for which they do not have the necessary and sufficient knowledge. In this sense, many Art teachers and pedagogues have faced challenges to teach music at school, especially in the development of musical practice activities.

This problem is aggravated by the lack of opportunity in initial and continuing education, since music education is not approached in the formation of the elementary school teacher and is also not privileged throughout the professional's carrer. Thus, although music education is a curricular component of the Art discipline and is also taught by elementary school teachers, who are mostly pedagogues, both initial and continuing teacher education have failed to provide opportunities for the development of necessary knowledge in music education (LOBATO, 2007; SALLES, 2014; OLIVEIRA, 2016). Due to this, the teacher continuing education plays an important role in the development of teaching knowledge as a way of providing the teacher with the necessary knowledge to face this challenge of promoting musical education at school.

Motivated by these issues, we carried out a research aiming to evidence and discuss the teaching knowledge developed from a teacher education activity with Art teachers and pedagogues, who teach in the early years at schools of the municipal public network of Faxinal dos Guedes, Santa Catarina. We consider that the development of music education at school requires teachers to mobilize different knowledge, and, in general, teachers who undertake this task do not have the training or knowledge to do so. This analysis is relevant because it allows discussions concerning the knowledge of teachers who teach music at school (Art teachers and pedagogues) developed from a formative action and for contributing, who contribute to the development of new understandings concerning this theme.

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1 In the original: "servem de base para o ensino".

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TEACHING KNOWLEDGE AND MUSIC EDUCATION AT SCHOOL

The development of teaching presupposes a repertoire of professional knowledge that underpins and guides the teacher's daily activity. Thus, to develop teaching practice, the teachers must know the content to be taught and need to be acquainted with the school program, school's political and pedagogical project, education guidelines, guidelines that lead teaching and learning of a specific curricular subject. Besides that, teachers need to know how to teach and which resources are adequate, how students learn and also how to promote student learning. In this perspective, the teaching of music at school, especially in the early years, has been a challenge, for both teachers and education managers, because it presupposes different knowledge from the professionals who assume this task.

On the other hand, the importance of music for the education of people has been recognized since antiquity (FONTERRADA, 2008) for its contribution to the aesthetic and historical development and in the individual's human education. In this sense, music education becomes relevant because it promotes the development of sensory, physical, spiritual and sentimental aspects (FONTERRADA, 2008).

In Brazil, the history of music education began with the arrival of the Jesuits in the 16th century (FONTERRADA, 2008), who used it with methodical rigor to sing, dance, represent and play instruments in the process of catechizing the Indians and in the imposition of European culture (GALIZIA, 2011). In the middle of the 19th century, music teaching in public schools took place at all teaching levels through singing exercises and theoretical knowledge (GALIZIA, 2011). In the 1920s and 1930s, music was part of the school curriculum through orphonic singing, a project designed and directed by Heitor Villa-Lobos, who valued Brazil as a homeland, its folklore and popular music (FONTERRADA, 2008).

Following this movement, in 1971 music was incorporated into the subject Artistic Education (BRASIL, 1971).This change weakened the musical education, once the teachers who taught this subject had more generalist artistic training and should develop all the different languages of Art in their classes (GALIZIA, 2011). In 2008, music education became a compulsory curricular component after the approval of the Law n. 11.769, which established that schools should adapt to the new guidelines within 3 years, i.e, until 2011 (BRASIL, 2008). Nevertheless, in 2016 this law was replaced by the Law n. 13.278, which kept music within the Art subject, but reduced it to one of the artistic languages that comprise it (BRASIL, 2016).

However, despite the high expectations in school community with the Law n. 11.769/2008, what is evident is that in most Brazilian schools the music teaching paradigms have not changed. In other words, in general, music education remained absent from school curricula or is being superficially developed in most schools, mainly in the public ones. One of the main reasons for this trend is the lack of teachers with adequate training or qualified to carry out music teaching in schools (GUIMARÃES, 2017).

Besides, school music teaching faces other challenges, including the insufficient training of the teachers who take on this task, which is developed in the elementary school by Art educators and pedagogues. Therefore, insofar as the Law n. 13.278/2016 establishes the compulsory music teaching in the elementary school and places it within the Art subject, the early years teachers face many challenges in the professional practice, mainly the lack of knowledge to promote musical education. Thus, it becomes necessary to promote spaces and activities that allow teachers to develop this knowledge.

In this perspective, research results indicate that digital technologies can further the professional development of elementary school teachers from teacher education activities by which Art teachers and pedagogues are prepared for this task (OLIVEIRA, 2016; SILVA, K., 2017), because these technologies allow the creation of distinct musical productions, audio editions and capture and synthesis of sound.

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Furthermore, discussions about teaching knowledge highlight the concern and interest in understanding the teaching base. Tardif, in his book named *Saberes docentes e formação profissional* (2002), that discusses the knowledge underlying the teacher professional practice, proposes some questions about this theme: "what are the knowledge, know-how, skills and abilities that teachers mobilize daily in classrooms and schools, to concretely carry out their various tasks? What is the nature of this knowledge?"[2] (TARDIF, 2002, p. 9, own translation).

The issues raised by Tardif (2002) focus on the dimension of the professional knowledge concerning teaching, i.e, deal with specific knowledge, teaching action knowledge, teacher experience knowledge, scientific knowledge, erudite knowledge, of cognitive or discursive nature. Regarding the distinction between teaching knowledge and knowledge,[3] we recur to Pimenta *et al.* (2005) to clarify the perspective underlying our work:

> By using the expression "pedagogical teaching knowledge" to designate the knowledge constructed by teachers in their daily work, we are differentiating it from pedagogical knowledge, developed by researchers and education theorists. We are not, however, reinforcing or even establishing the separation between those who think and those who carry out teaching and/or education. [...] When considering the teacher as someone who thinks his work and about his work, as someone who builds knowledge, we face the difference between teaching knowledge and knowledge.[4] (PIMENTA, 2005, p. 44, own translation)

According to the authors, teaching knowledge is part of the process of the development of knowledge, i.e, a stage of development of knowledge. Therefore, the teaching knowledge can be empirically developed at different moments during the teacher's professional and formative career, empirically, sometimes originated from the teaching practice and destitute and/or disconnected from scientific investigation and systematization. On the other hand, knowledge characterizes a deeper process of (systemic) organization of teaching knowledge, investigation, theoretical foundation, research, which requires a systematic organization of constitution, analysis and interpretation of data, and through which different teaching knowledge is characterized. Our research is based on Tardif (2002), who conceives teaching knowledge as a discourse or an action, which can be exposed through arguments, ideas, judgments or thoughts.

TEACHING KNOWLEDGE ACCORDING TO MAURICE TARDIF

Maurice Tardif (2002) proposes a categorization of teaching knowledge, which is organized according to the origin and the way they are integrated into the teacher's professional practice. This categorization proposes four types of knowledge: teacher education, disciplinary, curricular and experiential knowledge. This knowledge's base serves as "reinforcement" for the teacher to face professional challenges. Also, Tardif (2002) points out that the teaching knowledge comes from social sources, such as family, social context, education, school, specializations, courses, training,

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2 In the original: "quais são os conhecimentos, o saber-fazer, as competências e as habilidades que os professores mobilizam diariamente, nas salas de aula e nas escolas, a fim de realizar concretamente as suas diversas tarefas? Qual é a natureza desses saberes?".

3 In this case, the term "teaching knowledge" was employed to designate the concept of saber and the term "knowledge", to designate the term conhecimento, both from the original in Portuguese. (Translator's note)

4 In the original: "Ao usar a expressão 'saber pedagógico' para designar o saber, construído pelo professor no cotidiano de seu trabalho, estamos diferenciando-o do conhecimento pedagógico, elaborado por pesquisadores e teóricos da educação. Não estamos, no entanto, reforçando ou mesmo estabelecendo a separação entre os que pensam e os que executam o ensino e/ou a educação. [...] Ao considerar o professor como alguém que pensa seu trabalho e sobre seu trabalho, como alguém que constrói um saber, colocamo-nos diante da diferença entre o saber e o conhecimento".

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books, programs, practical and professional experiences, among others. He adds that teaching knowledge is a social knowledge, which results from sharing among peers, social practices, social objects, social changes and professional socialization.

The *teacher education knowledge* refers to the "knowledge's set taught by the institutions of teacher education", [5] such as schools, faculties and universities (TARDIF, 2002, p. 36, own translation). This category involves the knowledge of the education sciences and pedagogical ideology. This set of knowledge also comprises the know-how and the teaching approaches (pedagogical teaching knowledge). Besides, Tardif (2002) clarifies that although teachers come into contact with diverse teaching knowledge from education sciences during the professional training, they remain distanced from theoreticians and education sciences' researchers throughout their professional career because the teaching practice logic, in general, favors the knowledge execution, while the research practice favors the knowledge production.

The *disciplinary knowledge* characterizes knowledge that is defined and selected by teacher training institutions. This knowledge, which underlies teaching practice, is developed since the initial teacher education and/or throughout the teacher continuing education during the "various disciplines developed by the university"[6] (TARDIF, 2002, p. 38, own translation). Therefore, this teaching knowledge composes the disciplines of teacher training courses and represents basic knowledge fields of the teacher education process, which is manifested through cultural tradition.

The *curriculum* knowledge constitutes the corresponding knowledge "to the speeches, objectives, contents and methods from which the school institution categorizes and presents social knowledge defined by it and selected as models of erudite culture and education for erudite culture"[7] (TARDIF, 2002, p. 38, own translation). During the professional career, teachers come into contact with curriculum knowledge and, from their professional experiences, they have the possibility of appropriating it, incorporating, replicating and giving new meaning to it in their practice. Therefore, similarly to professional education knowledge and disciplinary knowledge, curriculum knowledge needs to be appropriated by the teacher as a way of supporting, for instance, the planning and development of the classroom activities.

Experiential knowledge consists of teachers' specific knowledge, which is developed in the professional practice. They are based on "daily practice and contexts' knowledge, [...] they come from experience and are validated by it. They are incorporated into the individual and collective experience in the form of *habitus* and skills, of know how to make and know how to be"[8] (TARDIF, 2002, p. 39, own translation). Thus, they can also be named practical knowledge.

Tardif (2002, p. 39, own translation) points out that the "multiple articulations between teaching practice and teaching knowledge make teachers a social and professional group whose existence depends mainly on their ability to dominate, integrate and mobilize this knowledge as necessary for their practice".[9] Briefly, in order to develop the classroom teaching, to teach the contents of their discipline, to develop theoretical-practical activities and curricular objectives, to carry out the teaching and learning assessment, to develop the planning and teaching strategies, teachers need to mobilize *a priori* knowledge concerning the teaching of the discipline (TARDIF, 2002).

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5 In the original: "conjunto de saberes transmitidos pelas instituições de formação de professores".

6 In the original: "diversas disciplinas oferecidas pela universidade".

7 In the original: "aos discursos, objetivos, conteúdos e métodos a partir dos quais a instituição escolar categoriza e apresenta os saberes sociais por ela definidos e selecionados como modelos da cultura erudita e de formação para a cultura erudita".

8 In the original: "trabalho cotidiano e no conhecimento de seu meio, [...] brotam da experiência e são por ela validados. Eles incorporam-se à experiência individual e coletiva sob forma de *habitus* e de habilidades, de saber-fazer e de saber-ser".

9 In the original: "múltiplas articulações entre a prática docente e os saberes fazem dos professores um grupo social e profissional cuja existência depende, em grande parte, de sua capacidade de dominar, integrar e mobilizar tais saberes enquanto condições para a sua prática".

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Tardif (2002, p. 40, own translation) indicates that the knowledge from teacher professional training, as well as the disciplinary and curricular knowledge, "seems to be rather second-hand"[10] because they are not produced by teachers, even if they are incorporated into the teaching practice. Furthermore, he states that teachers establish an external relationship with professional knowledge because they do not participate in the "production and legitimization of scientific and pedagogical knowledge"[11] (TARDIF, 2002, p. 41, own translation), although this knowledge is central in the teacher education process.

LITERATURE REVIEW ON TEACHING KNOWLEDGE CONCERNING MUSIC EDUCATION

The literature review on school music teaching pointed out several aspects concerning teaching knowledge mobilized by teachers in different teacher training stages, some in initial training and others in continuing training. The results of these researches point to changes concerning school music education through the use of several resources. These researches show that formative experiences permeated by digital technologies, which are performed in other ways, enable teachers to develop teaching knowledge, in synergy with the challenges and possibilities of the contexts in which they perform.

By developing an investigation concerning collaborative musical learning and students' motivation to learn from digital technologies in the context of basic education, Cernev (2015) presents a collaborative teaching proposal mediated by technologies, pursuing to constitute a collaborative network for musical teaching. The researcher, following the perspective of action research, carried out an intervention with teachers and students of a public school in Paraná. She concluded that planning based on collaborative musical learning with digital technologies favored the integration between teachers and students. Students were interested in the activities and considered this experience an innovative practice, which motived most of them to autonomously develop the activities. Finally, she points out that for Art teachers, the use of technologies allowed them a significant musical learning, highlighting that these resources can facilitate music teaching and learning.

Searching to understand the teachers' perception of music education mediated by technologies, and also to make them aware of the importance of these resources in music education in early childhood education, Chamorro (2015) has proposed a teacher continuing training workshop for five teachers from a public school in São Paulo, aiming to identify the teachers' initial conceptions and the possible changes in their conceptions about musical teaching permeated by technologies. Through the use of three learning objects (software "Zorelha",[12] website "Creative Practices on the web 2.0"[13] and "Gen Virtual"), Chamorro concluded that the participating teachers had difficulties to develop the curricular contents of music education because they did not have the necessary knowledge to teach music. Also, the researcher highlights that, although technologies contribute to children's education, most teachers had difficulty to incorporate these resources in the school context and to use learning objects in the classroom practice.

Gislene Silva (2017) developed a research aiming to explore audiovisual resources available on the internet to support Art teachers and students' school musical learning. From a qualitative research, Silva sought and analyzed learning virtual objects available on the website of the

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10 In the original: "parecem ser mais ou menos de segunda mão".
11 In the original: "produção e legitimação dos saberes científicos e pedagógicos".
12 Available at: http://rived.mec.gov.br/atividades/concurso_2007/zorelha/index.html. Access on: June 22, 2019.
13 Available at: http://www.nuted.ufrgs.br/oa/criativas/index.html. Access on: June 22, 2019.

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Ministry of Education and on other websites,on digital applications for smartphones and tablets. From musical games, software and learning digital objects, the author presented strategies for the use of technologies in music teaching considering that theses resources can favor music teaching and learning, as well as the development of new musical practices. However, the research shows that even though technologies have potential, they should not replace formal music education. On the contrary, the technologies should provide new musical environments and new learning opportunities.

Using the #musicanaescola social network for the utilization of video resources to promote musical instruments learning andbased on the digital ecosystems theory (learning collaborative environment), Salles (2014) sought to evidence musical learning possibilities with children from 5 to 12 years old using technologies to teach and learn piano. The results show that the music teaching and learning processes and the development of individual and group musical *performance*, mediated by technologies, are effective. Also, Salles concludes that the use of videos, the creation of a digital ecosystem and the musical games made possible and potentiated musical learning, insofar as students had the opportunity to repeat the exercises as many times as they wanted. Furthermore, the development of musical games and the digital ecosystem provided the sharing of knowledge and the interaction between parents, students, and teachers.

Lobato (2007) conducted an analysis of teacher perception and classroom pedagogical practice of pedagogues in the elementary school, based on a study centered on the objective of reflecting about the possibilities and limits of pedagogical musical training in a Pedagogy course and its implications for pedagogical practice in the early years.As a result, the research points out that the music knowledge developed in the Pedagogy course motivated the teachers and encouraged them to include music teaching in their practice. However, she concluded that music education promoted in the course has its limits, such as the absence of the students' pre-university music training, the restriction of music education to a single discipline, among others. Also, she shows that the teacher education conditions and the valuation of the student integral education are essential to the insertion of music in the school practices.

Oliveira (2016) analyzed the possibilities and challenges related to teacher musical learning from a course named "Experiences with Musicalization", considering the musical pedagogical proposal underlying it, the activities developed and teachers' perception concerning the knowledge developed. The research evidenced that stimulating musicality favors mobilization and appropriation of the necessary knowledge to musical practice. Besides, the experiences shared in the course provided possibilities for teachers to promote self-esteem, to develop the necessary knowledge for music teaching and to achieve professional recognition. Finally, it shows that interactions among teachers was relevant because it led them to share knowledge and experiences and, simultaneously, to develop musical pedagogical, musical and professional knowledge.

Azevedo (2007), based on Maurice Tardif, discussed the concept of teaching knowledge, pedagogical action concept, and teacher knowledge nature, aiming to investigate how music prospective teachers developed their pedagogical action based on the teaching knowledge mobilized and socialized in the teaching internship. The study highlighted that the *formative and interactive context of teaching internship* and the *pedagogical practice development by prospective teachers* are interdependent dimensions, which are dialectically related between mobilization and socialization of knowledge. Moreover, it indicates that in the context of prospective teachers' pedagogical practice, the teaching knowledge developed reflects the interactive management, that this knowledge has an experiential nature and that, when validated from knowledge mobilization and socialization it can be characterized as knowledge of the musical pedagogical practice.

Katia da Silva (2017) formulated musical pedagogical proposals for basic education in order to to expand a microsongs' compositional method named "Cante e Dance com a Gente – CDG".

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She formulated a transposition of the adults' language to the children's language, gathering from teacher experience elements related to their performance and improvement of the creation of CDG microsongs in the classroom. The research showed the knowledge needed by Music teachers to support this teaching practice, based on teaching knowledge developed in the CDG project. She concluded that the knowledge mobilized belongs to three categories: musical, technological and pedagogical.

Cunha (2014) aimed to answer some issues concerning knowledge mobilized by early childhood teachers (non-specialists) when they teach music, concerning how to promote significant changes that contribute to musical practice development, and also concerning how to develop a proposal in which music is conceived as an area of knowledge. From a teacher education activity, based on musical knowledge, Cunha led teachers to reflect on their practices and encouraged them to teach from the perspective of infant music making. She concludes that the research contributed to the professional development of the participating teachers and made possible the development of a work with music.

In short, the mentioned researches evidenced the need to provide the teacher with teaching knowledge and the digital technologies' potential in the teacher education process.

METHODOLOGY

The developed qualitative research aimed to examine the teaching knowledge concerning school music teaching, mobilized from a teacher education activity based on digital technologies. The research pursued the action research perspective (THIOLLENT, 2011, p. 20, own translation), designed as an empirically-based social research approach, which is conceived and carried out "in close association with an action or with the resolution of a collective problem and in which researchers and representing participants of the situation or of the problem are involved in a cooperative or participatory way".[14] The investigation was carried out in the teacher education extensionist activity context, that totaled thirty hours distributed in five meetings of three hours each. Eight teachers participated in the teacher education activity – Amanda, Betina, Camila, Débora, Estela, Fernanda, Gabriela and Helena (fictitious names). Their ages vary between 29 and 46 years old. They teach in elementary school at municipal public schools in Faxinal dos Guedes, Santa Catarina. The participating teachers had professional experience ranging from five to twenty years, most of them (five teachers) have initial teacher education in Pedagogy, three have education in Art, from which two are a graduate in Visual Arts and one in Artistic Education (with Plastic Arts specialization). Among the eight teachers who participated in the research, only two had previously participated in some continuing education activity concerning school music teaching, although they considered the teacher education activity insufficient to prepare them to the challenge of teaching music in the classroom.

The empirical material was constituted from the conducting of interviews, application of questionnaire (not identified), fieldnotes and audio recordings. The analysis of the material pursued the perspective of Bogdan and Biklen (1994), which establishes the steps: reading of empirical material, identification of evidences regarding teaching knowledge, grouping evidences into central themes, and, finally, categorization. The categories were however previously defined based on the categories presented in Tardif (2002), because we consider his categories to involve many elements of teaching knowledge related to school music education, which is our investigation objective. Thus, based on the analytical process, we aimed to identify different aspects concerning the teaching knowledge, which constitute the subcategories associated to Tardif's categorization, according to

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14 In the original: "em estreita associação com uma ação ou com a resolução de um problema coletivo e no qual os pesquisadores e os participantes representativos da situação ou do problema estão envolvidos de modo cooperativo ou participativo".

Chart 1 below. evidences into central themes, and, finally, categorization. The categories were however previously defined based on the categories presented in Tardif (2002), because we consider his categories to involve many elements of teaching knowledge related to school music education, which is our investigation objective. Thus, based on the analytical process, we aimed to identify different aspects concerning the teaching knowledge, which constitute the subcategories associated to Tardif's categorization, according to Chart 1 below.

CHART 1

CATEGORIZATION AND SUBCATEGORIZATION OF THE DEVELOPED KNOWLEDGE

CATEGORIES	SUBCATEGORIES
Disciplinary knowledge	Music and Art History Music theory and perception Music education History in Brazil Instrumental practice Infant music Music and technologies
Curricular knowledge	Curricular contents Legal guidelines
Experiential knowledge	Students' learning difficulties perception
Teacher education knowledge	Didactic

Source: Sistematized by the autors from the knowledge developed by teachers.

TEACHING KNOWLEDGE MOBILIZED BY TEACHERS FROM TEACHER EDUCATION ACTIVITY

Our goal is to evidence aspects related to the teaching knowledge developed and/or mobilized by the teachers from teacher education activity, which was constituted in the context of our investigation. The analysis pointed out several aspects concerning music teaching, others related to teacher planning and curricular content, educational guidelines and the teachers' perception of music teaching. These aspects were organized into four groups that constituted the categories of analysis, namely: curricular knowledge, disciplinary knowledge, teacher education knowledge and experiential knowledge.

The categorization of disciplinary knowledge was based on the curricula of initial Music teachers' education, and the curricular knowledge was categorized from elementary school curriculum guidelines concerning Art subject. The didactic knowledge (related to classroom music teaching) was evidenced by different strategies, resources and knowledge used by teachers to develop classroom activities and by practices developed in teacher training activities.

DISCIPLINARY KNOWLEDGE

The development of the teacher training activities enabled teachers to mobilize and/or develop important disciplinary knowledge aspects, especially concerning Music and Art History, music theory and perception, music education History in Brazil, music and technologies, instrumental practice (keyboard, piano, drums) and infant music.

Regarding *Music and Art History*, the analysis showed that the teachers had the opportunity to review and deepen specific themes relative to Classical, Baroque and MPB (Brazilian Popular Music) Music History. From an activity based on research and presentation concerning musical styles from distinct historical moments, the teachers deepened the main characteristics of baroque, classical and bossa nova music, the main representative artists of each movement, including Mozart, Beethoven, Tom Jobim, João Gilberto and Vinicius de Moraes. This activity was based mainly on YouTube videos.

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We developed an activity dedicated to approach different musical styles through which we introduced the concepts of erudite and classical music, and from the teachers' questions we highlighted particular aspects of each music style. This dynamic led the teachers to deepen such concepts. Estela and Betina had the opportunity to better understand the definition of these two musical styles and the main characteristics associated with them. According to the teachers, classical music was related to "*More sophisticated music*"[15] (Estela, Meeting 4 Audio, Nov. 2018, own translation) and "*To me, erudite sounded like an uglier word. This was what I identified as erudite*"[16] (Betina, Meeting 4 Audio, Nov. 2018, own translation).

To promote better understanding concerning classical and popular music, we compared music to dance, asking what dance style could be considered as classical or popular. The teachers comprehended this distinction insofar as they identified ballet as a dance that appears to be more erudite and hip hop as a popular dance: "*The ballet* [is erudite]. *Because its moves are better built. It has body and facial expression* [more elaborate technique]"[17] (Estela, Meeting 4 Audio, Nov. 2018, own translation).

Finally, the teachers conceived erudite music as "*a well-elaborated composition that uses all the possible elements approaching each one within their own space in a harmonious way*"[18] (Amanda, Meeting 4 Audio, Nov. 2018, own translation).

From teacher Estela's question – "*What the other periods of erudite music were?*"[19] (Estela, Meeting 4 Audio, Nov. 2018, own translation) – we realized that the other teachers were also confused about classical music styles. Thus, from Estela's question we considered necessary to deepen the definitions and characteristics related to the musical styles of erudite music.

Moreover, the activity concerning popular music and bossa nova, carried out by Betina, allowed us to verify that the teachers overcame some questions about this musical genre:

> I already had some knowledge [about the bossa nova musical genre], I had already taught it in classroom, but from this activity I was able to better understand the musical characteristics of this movement, the themes focused by composers in their musical compositions and become familiar with some famous artists and names in this musical genre.[20] (Betina, Meeting 4 Audio, Apr. 2019, own translation)

In this sense, the activity led the teacher to deepen the knowledge about the bossa nova musical genre. Therefore, although Betina points out that she already knew this musical genre and had taught it in the classroom, this experience provided her a better understanding of some aspects related to bossa nova, specifically to the main composers, singers, theme compositions and characteristics of this movement.

Regarding *musical theory and perception*, the teachers evidenced important themes, such as the concept of sound, sound parameters, the elements of music, etc. Amanda, Helena and Betina highlighted these aspects: "[Before this experience] *I didn't have this knowledge relative to sound parameters as I now have from the course, and the next time this experiment is carried out, I will be able to enjoy much more of the sound parameter concept*"[21] (Amanda, Meeting 3 Audio, Nov. 2018, own translation).

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15 In the original: "Uma música mais sofisticada".

16 In the original: "Erudito, para mim, soava como uma palavra mais feia. Era isso que eu identificava como erudito".

17 In the original: "O balé. Porque ele tem os passos mais bem construídos. Tem expressão corporal e facial [técnica mais elaborada]".

18 In the original: "uma composição bem elaborada. Que usa todos os elementos possíveis trabalhando-os cada um dentro do seu espaço de uma forma harmoniosa".

19 In the original: "Quais foram os outros períodos da música erudita?".

20 In the original: "Eu já tinha algum conhecimento [sobre o gênero musical bossa nova], já havia trabalhado em sala de aula sobre ele, mas a partir deste trabalho eu pude compreender um pouco mais sobre as características musicais desse movimento, as temáticas que os compositores abordavam ao compor as suas músicas e familiarizar-me com alguns cantores e nomes con-sagrados dentro deste gênero musical".

21 In the original: "[Antes da formação] não tinha todo esse conhecimento dos parâmetros sonoros como agora tenho a partir do curso e, na próxima vez que essa experiência for realizada, poderei usufruir muito mais dos conceitos dos parâmetros sonoros".

Amanda says that the teacher education activity allowed her to learn about this topic of music theory, which is part of the curricular programs of Music degree courses and is also essential in classroom teaching. Answering the second meeting questionnaire, Amanda points out that she learned/deepened some aspects related to music basic notions, for providing "*clarity of* [sound] *musical parameters*". She stressed that digital applications corroborated to "*identify sounds and their musical elements*", as well as the learning developed in the teacher education activity enabled the development of new activities in classroom, such as "*the comparison of sounds from natural environment*" and activities of "*sound identification*"[22] (Amanda, Meeting 2 Questionnaire, Nov. 2018, own translation).

Betina highlights an important aspect related to learning about music theory and perception and classroom teaching:

> *I had difficulty at first; I thought I would never be able to work music with my students because I didn't have the basics. And after we did this training, I was able to understand the basics of music. [Today I'm] confident to work with this theme. Anyway, the teacher education contributed a lot to minimize the difficulties related to music teaching at school and I feel confident because nowadays I understand more.*[23] (Betina, Final interview, Dec. 2018, own translation)

She adds that she was able to learn and deepen about "*the elements that compose music and the concept of each one*"[24] (Betina, Meeting 3 Questionnaire, Nov. 2018, own translation). Therefore, according to the teachers, the activity provided them not only with opportunities to deepen theoretical aspects of music, but also teaching basic concepts developed in the initial Music teacher education.

Regarding the *music education History in Brazil*, teachers learned about music education history since the arrival of music in Brazil with the Jesuits, its introduction in the school curriculum as a subject and later as an Art subject component. In the first meeting, in which the Law n. 11.769/2008 was discussed, we promoted an activity aimed at sharing knowledge and experiences. From this activity, Amanda emphasized that she had already worked as a teacher in basic education and the changes imposed by Law n. 11.769 brought some challenges to the classroom practice, especially in regard to the teaching of music in the Art subject context. Finally, she revealed to have many questions about school music teaching:

> *We didn't know how to introduce music in the school curriculum. We thought about making available a class of Plastic Arts and another of Music. I lived that time, and in the public school where I worked it was discussed a lot. However, due to some operational problems, this discussion disappeared and no one paid attention to it anymore.*[25] (Amanda, Meeting 1 Audio, Nov. 2018, own translation)

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22 In the original: "clareza dos parâmetros musicais [sonoros]"; "identificar sons e seus elementos musicais"; "comparação de sons do nosso meio" e de "identificação dos sons".

23 In the original: "Eu tinha muita dificuldade no início, achava que jamais conseguiria trabalhar música com os meus alunos porque eu não tinha o básico. E depois que a gente fez essa formação eu consegui compreender o básico da música. [Hoje sinto-me] segura para trabalhar com eles. Enfim, a formação contribuiu muito para minimizar as dificuldades relacionadas ao ensino de música na escola e me sinto mais segura porque já compreendo mais".

24 In the original: "os elementos que formam a música e o conceito de cada um".

25 In the original: "Não sabíamos como colocar no currículo. Pensávamos em disponibilizar uma aula de Artes Plásticas e outra de Música. Vivi essa época e na escola pública onde eu trabalhava isso foi bastante discutido. Todavia, devido alguns problemas operacionais essa discussão acabou desaparecendo e ninguém mais deu atenção".

Estela added that "*the state government did not support school music teaching*"[26] after the promulgation of the Law n. 11.769 (Estela, Meeting 1 Audio, Nov. 2019, own translation). When we problematized the Law n. 13.278 (BRASIL, 2016), Estela highlighted that the music education and other artistic languages have already been included in the school curriculum of Santa Catarina, and also in book texts. According to Estela, "*for the past three years, we have taught Visual Arts in the first two bimesters of the school year, after we taught Art and finally Music*"[27] (Estela, Meeting 1 Audio, Nov. 2018, own translation). Therefore, the activity gave them the opportunity to share experiences related to the introduction of music education in school from the Law n. 11.769 (BRASIL, 2008) and deep aspects concerning school music education History.

Regarding the *instrumental practice*, the teachers developed and deepened this aspect of teaching knowledge from teacher education experience insofar as they used different digital applications. These practice activities allowed teachers to better understand how music is composed and/or structured, how musical elements compose it and the identification of sound parameters and musical writing. About this, teacher Betina concluded that:

> *The digital applications helped us a lot. Because, for example, playing a musical instrument, for me, as a teacher who had no idea what it was like, would be difficult, but with the help of the app's resources I was able to play it. And from that I was able to take, for example, a keyboard and also play some songs.*[28] (Betina, Final interview, Dec. 2018, own translation)

According to Betina, musical practice was facilitated through the use of the resources of digital applications. Helena adds that "[the applications] *contributed through the variety and ease of musical instruments, it is from there that we knew the various sounds through the applications and also developed through them the practical musical activities*"[29] (Helena, Final interview, Dec. 2018, own translation).

Therefore, the study showed that the teachers Amanda, Helena, Betina, Camila, and Estela had the opportunity to develop musical performance through digital applications, singing and musical games related to the music content addressed in the teacher education experience. The music practice, which is a fundamental activity in music education, was carried out by the teachers, contributing to developing music knowledge.

Regarding *infant music*, we promoted activities to develop music practice based on the infant music repertoire, i.e, for the early years of elementary school. Helena showed that from the teacher education experience she felt motivated to develop musical activities with the students. She performed an activity using infant music to explore musical notes: "*Today I took a real keyboard to the classroom. I introduced the seven musical notes and approached the numeral seven. We also sang a Brazilian infant song named* Eu tirei um dó da minha viola"[30] (Helena, Meeting 3 Audio, Dec. 2018, own translation).

This activity is very important due to the role of infant music in children's education, in the construction of values, rules and learning in the early years. Furthermore, promoting the music

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26 In the original: "Governo estadual também não deu suporte para o ensino de música na escola".

27 In the original: "já faz três anos que trabalhamos nos dois primeiros bimestres as Artes Visuais, após as Artes Cênicas e, por fim, Música".

28 In the original: "Os aplicativos ajudaram bastante. Porque, por exemplo, tocar um instrumento musical, para mim, como professora que não tinha ideia nenhuma de como era, seria difícil, mas com a ajuda dos recursos dos aplicativos consegui tocar. E, a partir disso, consegui pegar, por exemplo, um teclado e também tocar algumas músicas".

29 In the original: "[os aplicativos] contribuíram através da variedade e da facilidade de instrumentos musicais, é partir daí que nós conhecemos os diversos sons através dos aplicativos e desenvolvemos também através deles as atividades práticas musicais".

30 In the original: "Hoje eu levei para a sala um teclado de verdade. Apresentei as sete notas musicais e trabalhei com eles o numeral sete. Também cantamos uma canção infantil chamada Eu tirei um Dó da minha viola".

education in elementary school based on infant music allows the teacher to explore other forms of musical notation through the creation of rhythms and sounds, as well as ways to represent these sounds. Regarding this, Fernanda also recognized the importance of using infant music in the classroom (Fieldnotes of the meeting 4, Nov. 2018). Fernanda mentioned some activities involving infant music, which she started to develop in the classroom: "*In the classroom, to form a circle with the children. To sing infant songs reproduced by CD, making gestures according to the rhythm of each song; song* Palminhas, *sense's song, Xuxa's song named* Estátua"[31] (Fernanda, Lesson plan, Nov. 2018, own translation).

The development of a lesson plan to approach music in the 3rd year of elementary school led the teacher to use infant music as a strategy/resource to promote the music teaching and learning, but highlighted the infant music central role in this process.

Finally, regarding *music and technologies*, the analysis showed that teachers had the opportunity to glimpse the importance of digital technologies in teacher education, school teaching, and music learning. Débora concludes:

> *Thus, I agree that from the development of musical practice activities using digital applications' resources, the musical concepts became more noticeable, facilitating understanding. This will also help a lot there in the classroom afterwards, in the process of teaching music.*[32] (Débora, Final interview, Dec. 2018, own translation)

Débora considers that technological resources helped her to understand musical concepts, especially because it allows the development of musical performance activities. Similarly, Gabriela points out that:

> *Digital applications can support me in teaching practice in different activities involving the musical concept teaching, dialoguing with some other disciplinary content. It is a strategy that collaborated to music learning and that will help in the classroom.*[33] (Gabriela, Final interview, Dec. 2018, own translation)

Although the digital technologies were pointed out by the teachers as facilitators in the musical learning process, we noticed that this category was developed only in the context of the teacher education activity because they had no previous experience in music teaching from using these resources.

CURRICULAR KNOWLEDGE

By participating in teacher education activity, the teachers had the opportunity to develop different aspects of curricular knowledge related especially to the content and the curriculum guidelines.

Regarding the *contents*, the analysis showed that the teacher education activity enabled them to learn/ deepen fundamental issues related to the Art subject's school curriculum, such as the sound basic notions and their characteristics, melody, harmony and musical rhythm, Music History and musical writing. Amanda, Betina, and Estela explained some aspects related to the teaching knowledge developed from the teacher education activity, which were incorporated into a classroom activity promoted concomitantly by them.

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31 In the original: "Na sala de aula, formar uma roda com os alunos. Cantar músicas infantis com CD, fazendo gestos conforme o ritmo de cada música; música Palminhas, Música dos sentidos, música da Xuxa Estátua".

32 In the original: "Desta forma concordo que, a partir do desenvolvimento de atividades práticas musicais utilizando os recursos dos aplicativos digitais, os conceitos musicais ficaram mais perceptíveis, facilitando a compreensão. Isso também irá ajudar muito lá na sala de aula depois, no processo de ensinar música".

33 In the original: "Os aplicativos digitais poderão me auxiliar na prática docente em diferentes atividades envolvendo diretamente o ensino dos conceitos musicais, ou dialogando com um outro conteúdo disciplinar. É uma estratégia que colaborou para aprendizagem de música e que irá auxiliar na sala de aula".

> *At first, we propose to review the theoretical aspects concerning music elements: rhythm, melody and harmony, mentioning folk songs as examples to the students to identify music elements. Write the notes C D E F G A B C. Draw a score and place the musical notes in the appropriate lines and intervals.*[34] (Amanda, Art lesson plan, Nov. 2018, own translation)

Through this activity, Amanda developed some contents of Art such as musical scale, elements of music, folk music and musical writing. Estela adds: "*I developed a sound perception activity with my students, in which, based on a sound emitted by an application, they had to identify the source of the respective sound*"[35] (Estela, Meeting 2 Audio, Nov. 2018, own translation).

Based on this activity, Estela developed notions concerning sound parameters, especially the timbre concept related to each object executed. In this sense, it is worth mentioning that the sound is the music raw material, and to know its characteristics is very important in music education. Betina also developed an activity that aimed to stimulate the students' sound perception and to allow them to understand sound parameters.

> *At first, I talked to them about music and musical notes, and as the conversation flowed I changed my tone of voice until they realized that my voice was sometimes thick and sometimes thinner. I took the opportunity to explain that this phenomenon also happens with the sound, and from the use of a keyboard that I took to the classroom, I explained that the sound can be thick (low) or thinner (high). Afterwards each student was invited to approximate the keyboard and at the command of their colleagues produced the low or high--pitched sound.*[36] (Betina, School Planning, Nov. 2018, own translation)

From this activity, Betina provided students with learning about musical notes, sound parameters (especially pitch) and musical perception. Besides, Amanda approached distinct contents of Art's school curriculum and Estela emphasized the development of the sound perception of different sounds. Therefore, teachers mobilized/deepened distinct curricular knowledge aspects by developing music teaching in the classroom from the activities mentioned by them.

Concerning *legal guidelines*, we concluded that the formative activity corroborated to deepen aspects related to national guidelines that regulate the school music education, the curriculum parameters guidelines and guidelines concerning the objectives of education, educational resources, professional planning, content and teaching/learning music in the Art discipline. In this perspective, Helena comments:

> *[...] I did not have the clarity about it, about the guidelines, the musical content. I didn't know that [the musical content] was so important and that it made so much sense, that it was part of the guidelines and their validity. So, from then on, I also sought guidance from the school management, that provided me*

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34 In the original: "No primeiro momento, rever a parte teórica dos elementos da música: ritmo, melodia e harmonia, usando cantos folclóricos como exemplos para poderem identificar os elementos da música. Escrever as notas Do, Re, Mi, Fá, Sol, Lá, Si, Do. Desenhar uma partitura e colocar as notas musicais nas linhas e intervalos adequados".

35 In the original: "Desenvolvi uma atividade de percepção sonora com meus alunos, onde, a partir do som emitido por um aplicativo, eles precisavam identificar a origem do respectivo som".

36 In the original: "Ao iniciar, fui conversando a respeito da música e das notas musicais e, conforme a conversa fluía, ia mudando meu tom de voz, até chegarem à conclusão de que minha voz às vezes estava grossa e outras vezes mais fina. Aproveitei para explicar que acontece a mesma coisa com o som, como havia levado na sala um teclado, fui explicando que o som pode ser grosso (grave) e também mais fino (agudo). Após, cada aluno se aproximou do instrumento e ao comando dos colegas produzia o som grave ou agudo".

> *with some books to help me to deepen/observe a little more on this subject. Today, through this training, I can see how important music teaching is in the school environment.*[37] (Helena, Final interview, Dec. 2018, own translation)

Helena highlighted the lack of knowledge and clarity regarding the guidelines on school music teaching, and that she did not know the relevance of music education mediated by musical content. Thus, when Helena felt the need to deepen this knowledge, she sought further guidance from the school pedagogical team and from the literature of the area. In the same direction, Débora adds that:

> *Initially, I didn't even know that there were guidelines and basis that would support music education at school. So this was new, it was a great learning experience. It was also clear concerning the legal guidelines on school music teaching. Today I understand and would like music projects to be developed in schools.*[38] (Débora, Final interview, Dec. 2018, own translation)

Débora says that she better understood the legal support underlying music teaching at school and its importance in the education of the student, especially when she says she would like more musical projects to be developed in schools. This was possible also because they had the opportunity to study some legal documents which profess that the musical content is part of the Art subject.

Corroborating her colleagues, Gabriela recognizes that she was not aware of the official guidelines related to music teaching but, from the teacher education activity she had contact with these guidelines, which are the basis for planning Music lessons.

Finally, the teachers in general signaled that they were not clear about the legal guidelines concerning music education, except for Amanda, who informed that "*I had already read about the guidelines, laws and parameters related to the teaching of music at school*"[39] (Amanda, Final interview, Nov. 2018, own translation).

TEACHER EDUCATION KNOWLEDGE

Regarding didactic, teacher education activity gave teachers the opportunity to plan classes, to develop distinct strategies and resources for the music teaching and learning, and, at the same time, to accomplish interdisciplinary activities. Estela points out that when planning a class to address sound concept and sound perception for the 3rd year, she promoted an interdisciplinary activity with the Science discipline.

> *I took advantage since I was teaching the students the animals content in Science, to develop a sound perception activity concerning animal sounds, from which the students would need to identify the different characteristics of animals mentioned: if they were vertebrates, invertebrates or mammals.*[40] (Estela, Meeting 2 Audio, Nov. 2018, own translation)

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37 In the original: "eu não tinha a clareza a respeito disso, a respeito das diretrizes, dos conteúdos musicais. Não sabia que [os conteúdos musicais] eram tão importantes e que eles faziam tanto sentido, que estavam inseridos nas diretrizes e a sua validade. Então, a partir daí, também busquei orientação com a direção escolar, que me disponibilizou alguns livros para poder aprofundar/observar um pouco mais sobre esse assunto. Hoje, através dessa formação, eu consigo perceber o quão importante é o ensino de música no ambiente escolar."

38 In the original: "Inicialmente, eu nem sabia que existiam diretrizes e bases que amparassem a música na escola. Então isso foi novidade, foi um grande aprendizado. Ficou claro também em relação ao amparo legal sobre o ensino de música na escola. Hoje eu percebo e gostaria que fossem desenvolvidos projetos de música nas escolas".

39 In the original: "já havia lido sobre as diretrizes, leis e parâmetros relacionados ao ensino de música na escola".

40 In the original: "Eu aproveitei, já que estava trabalhando com os alunos sobre o conteúdo animais da disciplina de Ciências, para desenvolver uma atividade de percepção sonora dos sons dos animais, onde, a partir disso, eles precisariam caracterizar os diferentes aspectos dos animais: se eram vertebrados, invertebrados ou se eram mamíferos".

Estela planned a lesson using music as a teaching strategy to address other content in the Science subject and she also aimed to develop the students' musical perception from this learning context. This activity, in addition to focusing on sound perception, had the objective of promoting an interdisciplinary approach. Helen points out that:

> *Regarding lesson planning, the teacher education activity facilitated the understanding and clarification of the objectives related to the musical content that I would develop in the classroom and that I wanted to achieve by developing a certain activity. It also collaborated with the choice of resources and strategies that could be used in the school teaching and learning process and mainly in the comprehension of musical theory, which is fundamental to develop the planning and support us to achieve the proposed objectives.*[41] (Helena, Final interview, Dec. 2018, own translation)

Therefore, the analysis shows that the teacher education activity provided the teacher with some resources for understanding and developing a Music lesson plan. Helena also points out that learning music theory was a fundamental factor in preparing Music lessons. Regarding this aspect Amanda clarifies that: "*Today I'm able to use practical ways to teach music. So, in my planning I'm able to use the technologies that I didn't use before, I didn't know*"[42] (Amanda, Final interview, Dec. 2018, own translation).

Amanda highlighted an important aspect concerning the development of musical practice activities. According to her, the teacher education activity provided her with conditions to develop a lesson plan that evidences musical theory and practice.

Finally, according to the teachers, the technologies were constituted as facilitating resources in the music teaching and learning processes. In this sense, Camila says that she learned/deepened distinct aspects concerning digital applications and that they "*complement and encourage students. It is possible to use them in distinct classroom dynamics and as a basis for the content taught in the classroom*"[43] Camila, Meeting 2 questionnaire, Nov. 2018, own translation). Thus, according to the teachers, the technological resources play a fundamental role in the development of a class, as well as provide different teaching strategies and interdisciplinary activities.

EXPERIENTIAL KNOWLEDGE

We consider experiential knowledge the most complex category to investigate and to analyze, specifically because it constitutes a knowledge derived from each teacher's individual experience and because it would require more intense monitoring at school during the professional activity.

From this perspective, we identified in particular that the teachers developed the *perception of the learning challenges* of the students. Betina highlights this aspect when she comments on the difficulties that her students had recognizing animal sounds. She comments that:

> I was surprised. I thought it would be easier for students. They did not recognize the cow sound, had difficulties recognizing the farm animal sounds and were quite confused in the sound identification of the different timbres.[44] (Betina, Meeting 3 Audio, Nov. 2018, own translation)

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41 In the original: "Quanto ao planejamento de aula, a formação facilitou a compreensão e esclarecimento quanto aos objetivos relacionados aos conteúdos musicais que eu iria desenvolver em sala de aula, e que eu desejava alcançar desenvolvendo determinada atividade. Colaborou também em relação à escolha de recursos e estratégias que poderiam ser utilizados no processo de ensino e aprendizagem escolar e, principalmente, na compreensão da teoria musical, que é fundamental na hora de desenvolver um planejamento e ter condições para alcançar os objetivos propostos".

42 In the original: "Hoje eu consigo utilizar meios práticos para trabalhar música. Assim, nos meus planejamentos, eu posso estar utilizando as tecnologias que antes eu não utilizava, não conhecia".

43 In the original: "complement and encourage students. It is possible to use them in distinct classroom dynamics and as a basis for the content taught in the classroom".

44 In the original: "Eu fiquei surpreendida. Pensei que seria mais fácil para os alunos. Eles não reconheceram o som da vaca, tiveram dificuldades em reconhecer os sons dos animais do campo e se confundiram bastante na identificação sonora dos diferentes timbres".

Betina identified the students' difficulty recognizing the sounds of farm animals. According to her, students had this difficulty because they live in urban areas and, consequently, they are not familiar with these animals. Before that, she used a digital application, from which students had the opportunity to see the animals that produced the presented sounds and could better understand each sound. This aspect enabled the teacher to explore distinct sounds produced by different animals and to propose, with the children, ways to reproduce and represent those sounds.

Although we only highlighted this aspect, we believe that many experiential knowledge aspects were developed throughout the performance of each teacher in the classroom, especially knowledge related to students and their needs, which request daily pedagogical actions focused on these aspects.

DISCUSSION OF CATEGORIES OF EVIDENCED KNOWLEDGE

The *disciplinary knowledge*, fundamental for the teaching practice for being developed in the initial teacher education through the disciplines in universities and training institutions and also in the continuous formation (TARDIF, 2002), proved to be essential to the teacher who teaches music, because it provides the necessary subsidies for the development of school music content. In this sense, the study shows that the teacher education activities attended by teachers throughout their careers can contribute to developing the disciplinary knowledge which was not developed/deepened in initial teacher education. Besides, teachers can deepen this knowledge in professional groups constituted by teachers who have specific teacher education in the area (TARDIF, 2002).

The study pointed out that the teachers developed different aspects related to disciplinary knowledge such as the History of Music and Art, theory and musical perception, musical education History in Brazil, music and technologies, instrumental practice and infant music. They also learned about MPB and bossa nova, classical and baroque music, famous artists, characteristics of each musical style, and erudite and popular music.

Regarding knowledge related to the role of music in the students' education and the music education historical context in Brazil, the study points to the sharing of experiences and challenges related to the school music teaching (OLIVEIRA, 2016), insofar as the teachers had the opportunity to plan and discuss activities for the classroom, deepen aspects concerning this knowledge to support their pedagogical practice. Moreover, studying the school music education History and national guidelines related to musical education (SALLES, 2014; OLIVEIRA, 2016; SILVA, G., 2017), the teachers articulated this knowledge and mobilized other knowledge from reflection (TARDIF, 2002), aiming to reorganize the music teaching practice in that specific context.

About the development of knowledge concerning infant music, essential to student education, the study shows that the teachers comprehended that infant music can be used to teach music contents and concepts from the school curriculum. The relevance of infant music as a resource of interaction with music education (BRITO, 2003) was expanded for other disciplines as a way of developing aspects related to attitudes, habits, commemorative activities and routine conditioning (BRITO, 2003; CUNHA, 2014; CHAMORRO, 2015; SILVA, G., 2017), as well as to the music education development. Besides, the development of knowledge related to the use of digital technologies in school music teaching and teacher education (CERNEV, 2015; LOBATO, 2007; ESPERIDIÃO, 2011; SALLES, 2014) gave teachers the opportunity to use technological resources that aided them to achieve the goals of school music teaching and favored the student musical learning.

Curricular knowledge, which addresses objectives, content, methods and discourses adopted by an institution and defined as the base for student education (TARDIF, 2002), unfolded to be fundamental in the teacher knowledge composition and especially in the implementation of classroom music teaching. The analysis showed that the curricular knowledge developed by teachers,

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especially concerning the content of school music education and the legal guidelines for school music teaching, led them to comprehend the teaching bases of this topic, as well as the need to organize the school curricular program aiming to address each artistic language established by the official guidelines and prepare for this challenge. From the learning achieved in the formative experience, the teachers carried out classroom practices to address the music contents of the school curriculum. They used, mobilized and produced knowledge (TARDIF, 2002) related to musical writing (score), musical scale, music styles, etc., showing some advances in relation to the researches of Chamorro (2015) and Lobato (2007), once the teachers who participated in our study had little difficulty in approaching musical content and, at the same time, felt prepared and motivated to propose classroom activities.

The analysis also highlighted that the teachers developed knowledge related to music teaching guidelines (SALLES, 2014; OLIVEIRA, 2016; SILVA, G., 2017), especially relating to the Parâmetros Curriculares Nacionais (PCN) of the Art discipline and the Law n. 13.278 (BRASIL, 2016), that address explanatory elements concerning school music teaching and, equaly, underly teaching practice (TARDIF, 2002). By sharing experiences concerning school music teaching guidelines (OLIVEIRA, 2016) and deepening the learning related to these mandatory and effective guidelines of music teaching, teachers understood the role of this curricular topic in the child development. Furthermore, the study of these documents gave the teachers the opportunity to develop a critical posture regarding Art teaching guidelines, considering the real conditions of the Brazilian education system, especially about the need to organize the teaching program aiming to dedicate two academic months to address each one of the artistic languages, without taking into account that teachers are not trained for this task. Finally, the analysis shows that these documents are relevant, especially in the development of lesson planning and music teaching.

The *teacher education* knowledge, transmitted by universities and teacher formation colleges related to education sciences and the pedagogical ideology (TARDIF, 2002), specifically in didactic, proved to be essential to the practice of the theacher who teaches music. Our study highlights didactic as an essential dimension in teacher education and the defining dimension of pedagogical practice in music teaching. Although the knowledge concerning didactic occupies a central place in teacher education processes, the teaching knowledge aspects mobilized by the participating teachers in our study came from general didactic, which is developed in the Pedagogy or Art courses. Besides mobilizing this knowledge, teachers could give them new meaning insofar as they had the opportunity to discuss and plan classroom music education and also to recognize that the didactic's aspects are fundamental elements to teaching activity (TARDIF, 2002; PIMENTA, 2005).

Therefore, the didactic knowledge is fundamental in the formative activities that mitigate the difficulties and challenges faced by teachers in school teaching music. The teachers planned a lesson, used distinct teaching strategies and resources, especially digital applications (CERNEV, 2015; SILVA, G., 2017; SALLES, 2014), conducted evaluations pursuing different goals and organized activities according to the context of each students' class. These aspects need to be considered in the development of teacher education actions.

The *experiential knowledge*, which is specific of each teacher, connected to professional practice, developed/mobilized in their professional routine and assimilated according to the teacher and students' daily necessities, disclosed to be practical and interactive knowledge, syncretic and pluralistic, heterogeneous and complex (TARDIF, 2002). Our study showed an important aspect of experiential knowledge, which refers to the perception of students' learning difficulties and challenges. From this knowledge, the teachers proposed classroom activities which allowed them to explore non-traditional musical notation to address animal sounds. Thus, this aspect favored sound exploration, leading the children to experience sound parameters, specific ways of reproducing and representing them. This knowledge, differently from the others, proved to be a first-hand knowledge, i.e., which is produced by each teacher in the context of their own practice from the formative experience.

CONCLUSIONS AND FINAL REMARKS

The analysis and discussion showed that the participating teachers developed disciplinary, curriculum, teacher professional education and experiential knowledge. They developed learning associated with Music and Art History insofar as they understood the elements and contexts of different musical historical period, the musical theory basic concepts that govern compositions, artistic expression and musical interpretation, the History of music education in Brazil, musical interpretation and performance and music and technologies. This learning allowed teachers to comprehend the reality of school music education insofar as it provided them a deep understanding of the elements that underlie the music education and also provided the conditions to overcome the challenges faced in the classroom. Furthermore, they were able to plan activities and reformulate previously developed professional practices, as well as identify student learning challenges and propose strategies to overcome them. The participating teachers also developed didactic knowledge from lesson planning, hands-on activities, interdisciplinary activities, using music as a learning resource in another discipline and, especially, using technology in school music education, contributing to the musical content development.

 Also, our study points out that the teachers overcame the difficulties and challenges related to the musical knowledge domain, the use of materials available at school, the musical education development, the support from parents to provide their children with the necessary resources for the music practice. Summarily, they were able to accomplish distinct classroom activities aiming to highlight musical contents and/or musical activities and used different strategies and teaching resources, especially digital technologies, to promote music teaching in their classroom practice.

 Finally, digital technologies sustained the approach of musical knowledge that was developed and/or mobilized during the teacher education activity and school music teaching carried out by the teachers. In this process, different aspects of technological knowledge were developed as teachers performed different musical activities from the digital applications presented. Therefore, the study shows that teaching knowledge, associated with technological knowledge has a new meaning, resulting in a new perspective of teacher activity in music education, because the technologies enable new classroom practices.

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