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MUSIC AND MATHEMATICS: POSSIBLE DIALOGUES

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Abstract: This study investigated the relationship between mathematics and music, exploring their connections and possibilities for dialogue. Both play important roles in the cognitive and creative development of students, arousing interest in the educational context. The objective was to examine music as a pedagogical tool in the teaching of mathematics and the contribution of mathematics to the learning of music. Specific objectives were established, such as analyzing mathematical concepts present in music and presenting practical examples. A literature review was carried out, covering relevant studies in this field, including authors such as MIRITZ, SOUZA, PEREIRA, SARTORI & FARIA and MELO. The analysis allowed examining theoretical studies and activities that integrate the two disciplines in the educational context. It was found that music can be a powerful pedagogical tool in the teaching of mathematics, allowing the application of mathematical concepts and stimulating students' logical thinking and creativity.

Keywords: Mathematics. Music. Teaching. Interdisciplinarity. Pedagogical practices.

INTRODUCTION

The intersection between mathematics and music can provide excellent opportunities for teaching and learning in the classroom, considering that both disciplines play fundamental roles in the cognitive and creative development of students. Exploring the connections between them can promote more meaningful and stimulating learning.

The relevance of this study is due to the need for an interdisciplinary approach in teaching, which allows students to connect and explore mathematical and musical concepts in an integrated manner. By uniting these seemingly distinct disciplines, it is possible to broaden students' understanding of both fields and stimulate the development

of essential cognitive and creative skills.

To support our research, we conducted a literature review covering works in the field of the intersection between mathematics and music. We consulted studies by authors such as CABRAL (2015), MIRITZ (2015), SOUZA (2018), PEREIRA (2020), SARTORI & FARIA (2020) and MELO (2020). This review provided us with the theoretical basis to understand the interactions between mathematics and music, as well as their applications in the educational context.

CABRAL (2015) highlights the presence and importance of music in our society. Just like mathematics, music occupies a significant place in our lives, transcending cultural and social barriers.

MIRITZ (2015) argues that the study of music brings benefits not only to mathematics, but also to all curricular components and to the lives of students and teachers involved in school activities, including discipline and concentration:

MELO (2020) highlights the wide range of mathematical concepts present in music theory. The author emphasizes that from basic notions, such as geometric progressions used in the construction of the tempered scale, to advanced calculus concepts, music offers a wealth of concrete examples that can be explored by teachers to demonstrate the applicability of these concepts in everyday life.

By exploring music as a pedagogical tool in mathematics teaching, we can provide students with a new perspective on mathematical concepts, making them more concrete and accessible. For example, activities that involve creating musical compositions from numerical sequences can stimulate students' logical thinking and creativity. The overall objective of this work is to examine how music can be used as a pedagogical tool in mathematics teaching, and, in turn, how mathematics can contribute to music learning.

METHODOLOGY

The methodology used in this work was bibliographic research, which consists of the search, selection and analysis of written materials relevant to the topic in question. This approach was chosen with the aim of exploring the relationship between mathematics and music, considering the possibilities of dialogue and connections between these two disciplines.

The bibliographic research was conducted through a literature review, covering works, scientific articles and other relevant documents on the topic. The sources used included academic databases.

Thus, bibliographic research was essential to theoretically support this study on the relationship between mathematics and music.

RESULTS AND DISCUSSIONS

When examining the literature, it was found that music can be a powerful pedagogical tool in teaching mathematics. Exploring mathematical concepts through music, such as musical proportions and number sequences, can be effective in stimulating students' logical thinking and creativity. On the other hand, creating musical compositions from number sequences, for example, can allow for an innovative and engaging approach to teaching mathematics.

The results obtained corroborate the statements of several authors consulted in the literature review. MIRITZ (2015) highlighted the association between learning a musical instrument, spatial reasoning and performance in mathematics, emphasizing the benefits of this interaction for the cognitive development of students. SOUZA (2018) emphasized the importance of the hybrid teaching methodology, which combines the teaching of mathematics and music, providing active participation of students and more meaningful learning.

However, it is important to highlight that there are challenges and possible limitations to this interdisciplinary approach. PEREIRA (2020) highlighted the need for more in-depth studies to explore the connections between music and mathematics, emphasizing the importance of this research for basic education. SARTORI & FARIA (2020) pointed out that the relationship between music and mathematics has existed for centuries, but there is still much to be explored and understood at this intersection.

In short, the results and discussions of this study reinforce the importance of the relationship between mathematics and music in the educational context. The intersection between mathematics and music offers a vast field of possibilities to promote a more integrated, stimulating and inclusive education.

In view of this, it is recommended that future research be carried out to deepen knowledge about the relationships between mathematics and music, exploring different pedagogical approaches and investigating their effects on student learning. It is essential to develop teaching materials and educational resources that facilitate the integration of these disciplines, promoting a more comprehensive and enriching education.

PEREIRA's (2020) perspective on the possibility of new knowledge emerging when exploring the connections between music and mathematics reinforces the continued importance of research in this area. We believe that there is still much to be discovered and explored in the field of relationships between these disciplines.

Finally, the wide range of mathematical concepts present in music theory, mentioned by MELO (2020), highlights the applicability of mathematics in music. This two-way relationship allows teachers to use concrete examples from music to demonstrate the

applicability of mathematical concepts in everyday life, making learning more concrete and meaningful for students.

FINAL CONSIDERATIONS

The intersection of mathematics and music has proven to be a promising pedagogical approach that can enrich the teaching and learning process. By exploring the connections between these disciplines, we can see benefits that go beyond the development of mathematical skills. Music as a pedagogical tool provides engagement, creativity and a deeper understanding of mathematical concepts.

The literature review highlights the constant presence of music in our lives, its ability to transcend cultural barriers and its positive influence on various educational aspects. Music provides a practical and motivating

context for exploring mathematics, sparking students' interest and making learning more meaningful.

The intersection of mathematics and music also encourages critical thinking, problem-solving and collaborative work. This multidisciplinary approach allows students to have a more comprehensive view of knowledge, connecting concepts from different areas and promoting integrated learning.

In this sense, encouraging interaction between mathematics and music in the school environment is essential to expanding educational possibilities. By doing so, we can provide students with a more dynamic, creative and contextualized education, preparing them to face challenges. It is necessary to value and explore the potential of this intersection, offering students an enriching and meaningful education.

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