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**Professional
paper**

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Correlation between Mathematics and Music Teaching Content in the Lower Grades of Elementary School

Extended summary

The aim of the research presented in this paper was to determine the efficiency of an experimental program based on linking mathematics and music content in order to improve lower elementary school pupils' cognitive development and help them learn the material in both subjects more efficiently.

Modern teaching aims at linking the contents of different subjects to make pupils' knowledge more lasting and teaching more effective. The motivation of students to perceive different subjects as a system depends on teachers' expertise, creativity and methods. Rather than memorizing facts, students should be encouraged to ask questions and explore topics themselves, to apply their knowledge and identify the connections in places where it makes sense within one school subject, as well as among several school subjects. In the author's opinion, mathematics and music have many common traits: a tendency towards symmetry, harmony, order, the need for structure and patterns, abstract thinking, creativity, and the need for cognitive operations that precede the creation of the terms that are more or less abstract. In this paper, the focus is on contents of the two school subjects, such as fractions and duration of tones, between which there is a fundamental correlation and that can be linked meaningfully.

The aim of the research was the experimental testing and study of the effects of a teaching approach in which the teaching contents of mathematics and music are linked. An experimental method was used, working with parallel groups, and a survey was used as a test of

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knowledge - initial and final. The study sample consisted of 119 fourth-grade pupils (59 pupils in the control group and 60 pupils in the experimental group). Four classes were held within the experimental program, while pupils in the control group dealt with the same content, but without making connections between the two subjects. According to the obtained results, the knowledge of fractions is helpful in learning the tone duration (and vice versa). Given that we also observed a poor knowledge of the basic elements of musical literacy among students, we emphasize the possibility of improving students' learning motivation by applying the mathematics contents that are essentially related to specific music contents.

Music activities and content that are implemented in mathematics create conditions in which pupils come to essential understanding of the concepts that are equivalent to each other, which helps in the formation of concepts in both subjects and enriches the content. Student' interest in learning is increased, their math and music skills and accomplishments are improved, and they become active participants in the classroom. Therefore, we need to think in the direction of finding the common features of mathematics and music content to break the monotony and the "walls" placed between these two school subjects.

The author of the paper would like to stress that the essential correlation between fractions and tone duration contributes to the adoption of mathematical concepts and that the activities involving this correlation should be implemented in the process of developing the knowledge of both school subjects because, as we have shown, pupils learn from the above-mentioned activities more easily (the emphasis is on the integration fractions and tone duration) and classes get a new meaning because pupils are interested in learning something new, while and at the same time they have an opportunity to apply their knowledge of different subjects. But it cannot be expected from the pupils themselves to apply mathematics knowledge in music content. Teachers need to teach them how to apply that content in a meaningful way. In conclusion, it should be noted that it is not necessary to look for all possible connections between the two subjects, but only for those where the correlation is meaningful and purposeful.

Keywords: lower grades of elementary school, mathematics teaching, music teaching, interconnectedness of mathematics and music teaching content.

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