

Playfulness in Mathematics Education: Methodological Proposal for Teaching and Learning

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Mathematics, with each passing day, becomes more complex; therefore, it is necessary to innovate teaching methods, linking the importance of this area of knowledge to students' daily lives. This approach helps them become critical and participatory individuals, facilitating the teaching process so that learning flows naturally [1]. According to Sadovsky (2007) [5], low performance in mathematics is a reality not only in Brazil but in many countries. Therefore, this work aims to reflect on teaching mathematics through play. To demonstrate the practical application of this approach, we conducted a research and extension project in some public schools in the city of Caçador, targeting ninth-year elementary and first-year high school students. We implemented mathematical content through games and observed significant improvement in student learning. Our methodology included pre-tests, post-tests, and questionnaires to evaluate the effectiveness and satisfaction of students and teachers involved. To this end, we carried out pre-tests, post-tests, and questionnaires to evaluate the effectiveness and satisfaction of students and teachers involved in this project. In the pre-test, we administered a list of exercises with mathematical content. After this application, we analyzed the results to identify the areas where students had the most difficulties. We then conducted fun activities to help them improve these difficulties. Subsequently, we administered a new activity with mathematical content similar to the pre-test to check for any improvement, and the results were excellent.

In Figure 1, it is possible to observe the application of the operations board with the students. This tool transformed learning addition and subtraction into a fun and stimulating activity, increasing students' interest and curiosity. In Figure 2, we applied a game in which we worked on locating points on the Cartesian plane and graphically representing first-degree polynomial functions.



Figure 1: Application of the addition and subtraction operations board. Source: Sarah Souza (2022).

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Figure 2: Application of the board for teaching point location and graphing polynomial functions in first grade. Source: Sarah Souza (2022).

To assess the impact, we administered a post-test similar to the pre-test. The results indicated a significant improvement. Additionally, a questionnaire revealed that learning through play made the mathematical content more accessible. Teachers reported noticeable improvements in students' engagement and competency.

According to Parra [4], educators and schools must constantly evolve to meet the current educational context, serving students and society as a whole. Kishimoto (2011) [3] emphasizes that games are associated with each child's intelligence, fostering their creativity and learning. Kamii (1990) [2] asserts that mathematical relationships are constructed through comparisons and interactions with objects, enhancing logical-mathematical knowledge. Silva (2023) [6] highlights that integrating playfulness into pedagogical practices can significantly contribute to cognitive development and improve the teaching-learning process.

Therefore, the use of playful activities in mathematics teaching has proven to be an effective strategy for enhancing student learning and engagement. The data analyzed in the pre-tests, post-tests and questionnaires show a positive impact of this method. In this way, the use of Playfulness in education is of great importance in transforming the teaching-learning process, by allowing teachers and students to be connected inside and outside the classroom, in addition to providing increasingly innovative and meaningful learning.

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