Revista ARACÊ
ISSN: 2358-2472

THE MATHEMATICAL KNOWLEDGE PROFILE OF STUDENTS IN THE 9TH GRADE OF ELEMENTARY SCHOOL IN A MUNICIPAL SCHOOL IN FLORIANO-PI: AN ANALYSIS OF THE SAEPI TEST

https://doi.org/10.56238/arev6n3-243

Submitted on: 19/10/2024 **Publication date:** 11/19/2024

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Revista ARACÊ
ISSN: 2358-2472

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ABSTRACT
The current educational context has in the teaching of mathematics the main challenges that culminate in the barriers to scientific and technological development, as well as the difficulties of full exercise of citizenship by society. From this perspective, the analysis of the results of evaluation systems is a necessary condition for the planning and execution of public policies to improve educational results in mathematics. Thus, this work has as its general objective to analyze the main results of the Basic Education Evaluation System (SAEPI), for the distribution of the averages obtained in Mathematics by the students of the 9th grade of Elementary School of a given school in the city of Floriano-PI. In order to analyze the performance of students in the assessment in the year 2023, the methodological path was marked by a quantitative research that was based on the mathematics proficiency scale, with parameters for describing skills and competencies to be developed by the student in line with the age/grade articulation under the terms of the national curriculum guidelines for basic education. The research showed that there is a significant improvement in students' skills and abilities with regard to some mathematics concepts, however, a long way is still needed to solve problems and challenges that still persist in mathematics teaching.

Keywords: Mathematics Teaching. Institutional Evaluation Systems. SAEPI.

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Revista ARACÊ
ISSN: 2358-2472

INTRODUCTION

Brazilian education after the 1988 Constitution has come to be seen as a priority in the current educational scenario, when it comes to the issue of the quality of basic education and public education policies, it has been gaining significant space in national and international discussions, which to ensure quality and excellence public education is still a great challenge to be achieved. In view of the above, there was a need to create an instrument that would evaluate the educational index and quality, with the aim of knowing and monitoring the performance of students, to improve the quality of education. (Gonçalves; Days; Peralta, 2019).

Based on this, we know that Mathematics plays a crucial role in society, being a fundamental science for humanity. Its influences have been evident throughout the history of civilization. Thus, the involvement of human beings with mathematics is not limited to the subjects taught in schools. Our daily lives are permeated by mathematical concepts that we apply daily, whether when shopping in supermarkets or estimating the costs of a home renovation. (Sassano, 2021).

Educational assessment is a method of evaluating the performance of students in general. One of the main objectives of educational evaluation is to ensure the quality of teaching. In this context, evaluation is understood as "a judgment on the quality of the relevant data, making a decision" (Luckesi, 2014). By making this municipal assessment, quality metrics can be built that contribute to the value of Educational Policies, Plans, Projects and Actions (Ferreira; Tenório, 2010). Through the analysis of educational data, it is possible to observe the performance of students and institutions, thus calculating quality indicators, in a given interval and context that will provide opportunities for decision-making to improve the teaching and learning process.

Therefore, such evaluations have been consolidating themselves as indispensable tools to make more accurate and safe diagnoses about the quality of education of Brazilian children and adolescents. In this way, evaluation becomes an important subsidy for the transformation of the State's obligation to provide free high-quality education and people's right to receive education. Standardized achievement tests verify a fundamental dimension of the right to education: adequate learning at an appropriate age. (Santos et al., 2022).

The difficulties faced in the teaching of mathematics are diverse and cover pedagogical, structural and social issues. Most educational institutions still use traditional and non-dynamic methods, which do not motivate students or encourage critical analysis

Revista ARACÊ
ISSN: 2358-2472

and problem-solving. This scenario can result in a superficial understanding of mathematical concepts. Mathematics is often approached mechanically, without connection to reality, which impairs student engagement and understanding (Paiva, 2018).

Often, the initial and ongoing training of teachers is inadequate. They may not have a deep mastery of the contents, resulting in student performance beyond expectations. Therefore, identifying difficulties in specific areas of Mathematics suggests the implementation of courses, workshops and other strategies that involve both mathematical content and effective teaching methodologies. It is evident that the lack of a solid foundation in didactic methods applied to Mathematics makes it impossible for educators to introduce innovative and effective practices (Silva; Sant'ana, 2022).

Evaluation system refers to a structured set of methods and resources designed to evaluate, analyze, and improve the performance of a person, employee, entity, or project. These systems are suitable for different fields such as education, business, government, etc. In education, they play a key role in monitoring students' learning progress, identifying needs for improvement, and guiding education policy development. "Well-structured evaluation systems such as this one provide critical quantitative and qualitative data for the development of effective educational policies, particularly in key areas such as mathematics" (Souza, 2018).

The SAEPI evaluation system has been essential in identifying deficiencies in mathematics education in the state. Created in 2021, this system evaluates the school performance of students in the subjects of Portuguese Language and Mathematics. In 2023, 140,000 students from Elementary School (6th and 9th grade) and High School (1st, 2nd and 3rd grade) were evaluated, from the 21 Regional Education Managements (Pessoa; Silva, 2017).

Early recognition of these difficulties helps to avoid the accumulation of significant failures in students' learning, which can interfere with their future performance. In addition, ongoing assessments provide valuable data that helps educators track student progress over time, adapting teaching strategies as needed (Jones; Brown, 2019).

The purpose of formative assessments is to monitor students' learning progress throughout the school year, providing continuous and individual monitoring, allowing teachers and leadership teams to carry out faster and more targeted interventions to assist in learning and daily observation in the classroom. (Oliveira; File; Faith, 2020).

Revista ARACÊ
ISSN: 2358-2472

The Platform is a good example of how assessment systems can be used to improve teaching and learning. "SAEPI has been crucial in identifying educational deficiencies in mathematics in the state of Piauí, providing relevant and detailed data that guide pedagogical decision-making" (Araújo, 2020).

METHODOLOGY

The work consisted of a documentary research whose approach was quantitative, made through the analysis of the results of a class of the 9th grade of Elementary School of a public school in Piauí submitted to the SAEPI evaluation.

The Educational Evaluation System of Piauí (SAEPI) aims to measure the performance of students from the state public network in the subjects of Portuguese and Mathematics, focusing on students in the 5th and 9th grades of Elementary School. The objective of this work, being a quantitative research where it aims to measure the performance of students in certain disciplines, especially mathematics.

This analysis was made based on the data platform of the (SAEPI) the School that was analyzed this data was the Jose Francisco Dutra Municipal School, located at Rua João Chico/Sn/ Manguinha neighborhood/city of Floriano-Piauí. Being an Elementary School, Early Years Final Years and Regular Education. It is worth mentioning that the students of the Francisco Dutra school are students who started their school life in it since the early years, which contributes even more to this result, in view of these facts we can identify the deficits of each student, based on these data to be able to intervene in the improvement of the learning of each student.

Data were collected through standardized tests applied annually to students. The collection instruments consist of multiple-choice and essay questions. The application of the tests took place during the month of November 2023, with the participation of all state schools in Piauí. Standardized performance tests such as these verify a fundamental dimension of the right to education: adequate learning at an appropriate age. In this way, evaluation becomes an important subsidy for the transformation of the State's obligation to provide free high-quality education and people's right to receive education.

In this context, based on the results achieved in this research, we were able to identify not only which criteria are being mobilized by this external evaluation system to measure what is called quality in Brazilian basic education, but also to perceive which

Revista ARACÊ
ISSN: 2358-2472

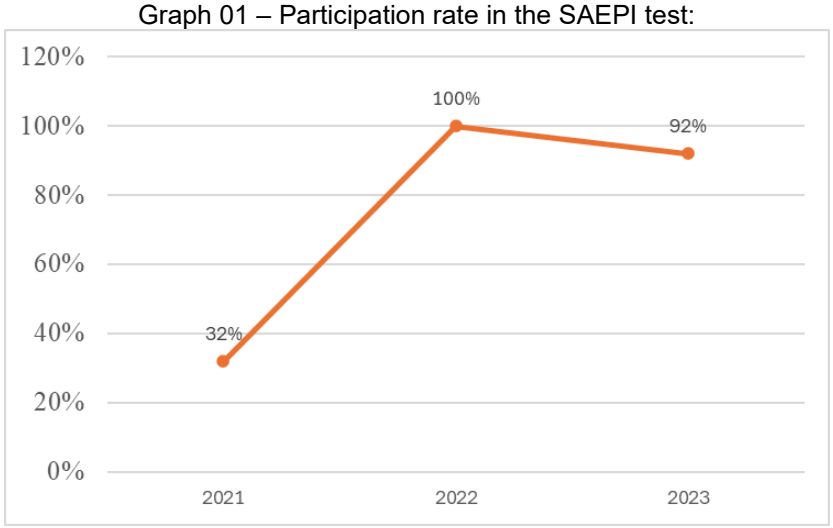
of these variables effectively impact the grades, discriminating more precisely the criteria that are defining and hierarchizing the different school performances.

Such types of evaluation as this brings a more detailed view of each student, as well as each school, making a comparison with the other schools in the municipality and also with the schools in the state of Piauí. It is worth mentioning that the students of the Francisco Dutra school are students who started their school life in it since the early years, which contributes even more to this result, in view of these facts we can identify which ones. In this way, evaluation becomes an important subsidy for the transformation of the State's obligation to provide free high-quality education and people's right to receive education.

RESULTS

Below, the percentages of participation of students from the school studied in the SAEPI evaluations of the years 2021, 2022 and 2023 will be presented in graph 01.

Graph 01 – Participation rate in the SAEPI test:

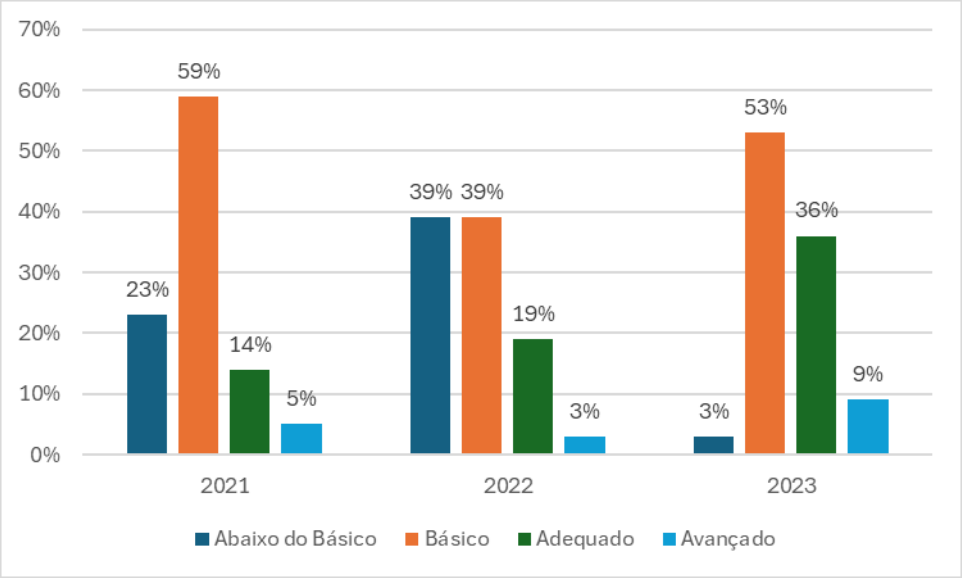


Source: The authors (2024)

In the graph above, the data regarding the participation of students in the evaluation are presented. The above participation rate in 2022 and 2023 was more than 90%. Which shows that in recent years there has been a greater involvement of students, as we can see.

Revista ARACÊ
ISSN: 2358-2472

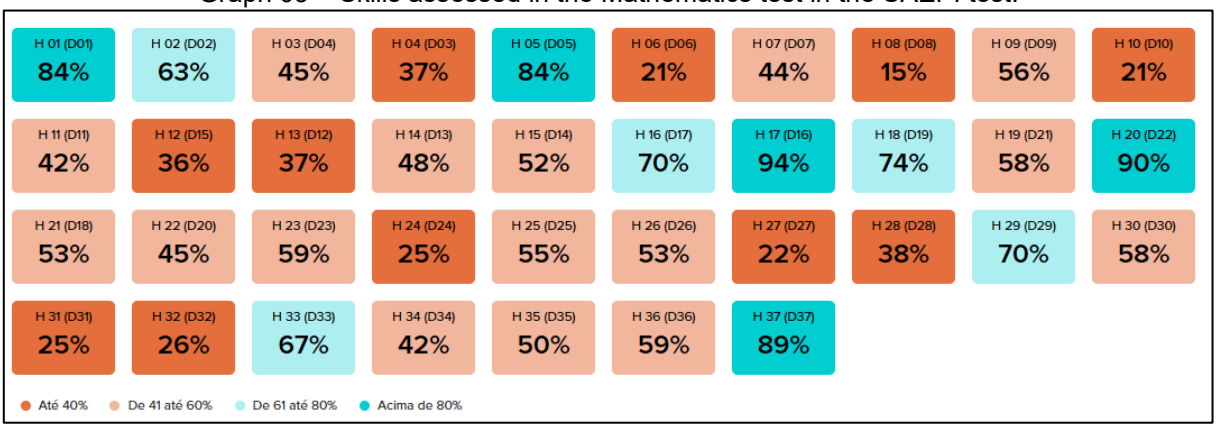
Graph 02 – Average Proficiency in Mathematics in the SAEPI test:



Source: The authors (2024)

In Graph 02 above, we can identify how the students' performance was, observing the percentage of proficiency of the students at each level, such as Below Basic, Basic Adequate and Advanced. It is worth mentioning that below the basic there was an increase from 2021 (23%) to 2022 (39%), however there was a significant reduction from 2022 to 2023 (3%). This proves that the actions of the institutions were successful.

Graph 03 – Skills assessed in the Mathematics test in the SAEPI test:



Source: The authors (2024)

Graph 03 shows the average result of correct answers in the skills assessed. On the small cards, the skill code and the corresponding hit percentage are presented. We can identify the percentage of correct answers in each skill, that is, the exact percentage of each content of the assessment.

Revista ARACÊ
ISSN: 2358-2472

Best hit rates are: In skill H17 – D16 the hit rate was (94% Identify the location of integers on the number line). In the H20 – D22 skill (90% Identify fraction as a representation that can be associated with different meanings). In the H37 – D37 skill (89% Associate information presented in lists and/or simple tables with the graphs that represent them and vice versa).

The worst hit rates are: In the skill H08 – D08 (15% Solve problem using polygon properties, sum of their internal angles, number of diagonals, calculation of the median of each internal angle in regular polygons). In the H10 – D10 skill (21% Use metric relationships of the right triangle to solve significant problems). In the H27 – D27 skill (22% Perform simple calculations with approximate values of radicals).

The data that were analyzed were data collected on the SAEPI platform, making a comparison of the last three years, analyzing the performance patterns. The interpretation of the results followed the performance criteria determined by the Department of Education, comparing the state averages with the established goals. Despite the large sample, it is important to consider possible biases due to non-response or inconsistent responses. It is worth noting that the results reflect the students of Piauí and may not be generalizable to other regions.

In view of this situation, the results of the data analyzed regarding the Jose Francisco Dutra Municipal School were satisfactory. In the Mathematics and Portuguese assessment, the students demonstrated a superior performance. The 9th grade classes showed considerable progress in mathematical knowledge.

CONCLUSION

After a detailed analysis of the results of the mathematics assessment, we came to the conclusion that most students reached the minimum passing grade, showing a particularly outstanding performance in a certain aspect. However, an area that needs greater attention was identified, with a considerably lower rate of correct answers. It is therefore recommended to implement specific reinforcement sessions and the use of interactive teaching materials in order to improve students' understanding. In addition, it is suggested to diversify the types of questions in the upcoming assessments to gain a more comprehensive view of students' abilities.

Continuous monitoring of students' progress will enable adjustments in teaching strategies, contributing to a more effective and inclusive education. It is crucial to constantly

Revista ARACÊ
ISSN: 2358-2472

improve educational practices and adapt teaching materials to overcome the individual obstacles of each student. Tracking to monitor student progress and adapt teaching strategies will all result in more efficient and inclusive learning, ensuring that all students have the chance to reach their full potential.

Implementing these guidelines will not only improve performance but also strengthen students' self-confidence in their math skills, preparing them for the challenges ahead. To establish a positive and inspiring educational environment, it is vital to foster collaboration between teachers, students, and guardians. Following this approach, the expectation is that students will improve not only their performance in mathematics, but also in other subjects, enabling the development of a more meaningful understanding of the different fields of knowledge, recognizing them as valuable and useful tools in various spheres of their lives, both academic and professional.

In view of the above, it is understood that it is important to emerge new research that can present solutions to the challenges that have been presented, as well as that can assist in the planning and execution of public policies that contribute to the development of mathematics teaching.

Revista ARACÊ
ISSN: 2358-2472

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