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A classroom experience from the perspective of exploratory teaching

Carlos Eduardo Soares de María[1].

ABSTRACT
This paper presents a workshop conducted under the Exploratory Teaching approach, known for fostering active and meaningful learning through challenging tasks. Emphasizing student engagement and autonomy, this method encourages deep exploration and reflection on mathematical concepts rather than passive absorption. The study offers a detailed account of this teaching experience, employing interpretative analysis to highlight its theoretical foundations and practical implications. Participants actively investigated mathematical concepts, collaborating and employing diverse problem-solving strategies, thereby enhancing critical thinking and independence. Ultimately, Exploratory Teaching not only enriches educational dynamics but also equips students to tackle future academic challenges effectively, emphasizing their role as active learners and critical thinkers in the process.

Keywords: Exploratory Teaching. Teacher Training. Teaching methodology.

INTRODUCTION

This paper reports an enriching experience of a workshop held under the Exploratory Teaching approach. The choice of this methodology is justified by its proven ability to facilitate active and meaningful learning through challenging tasks, which not only stimulate the participation of students individually and collectively, but also position them as protagonists in the process of knowledge construction (Oliveira; Carvalho, 2014). Rather than just imparting content, Exploratory Teaching encourages students to explore mathematical concepts in an investigative and reflective way, preparing them not only to understand the topics covered, but also to apply this knowledge in a practical and autonomous way.

The main purpose of this study is to describe in detail the teaching experience from the perspective of Exploratory Teaching, providing a deep analysis of its interpretations and reflections on teaching practices. For this, an interpretative analysis was conducted based on the theoretical contributions of academics such as Canavarro, Oliveira and Menezes (2012, 2014), Oliveira and Carvalho (2014), Stein et al. (2008), among other scholars in the educational field. Initially, theoretical considerations about the potential of Exploratory Teaching in the classroom are presented, highlighting the characteristic elements that differentiate this approach from other traditional methodologies.

During the workshop, participants were engaged in activities designed to promote an active investigation of mathematical concepts, encouraging them to explore different solving strategies and to

[1] Federal Institute of Piauí – Piauí

collaborate with each other in the construction of knowledge. It was observed that the students not only showed greater engagement and interest in the proposed tasks, but also developed critical thinking and problem-solving skills independently. At the end of the experience, it was evident that Exploratory Teaching not only enriches the educational process by making it more dynamic and participatory, but also prepares students to face more complex academic challenges in the future.

MATERIALS AND METHODS

Exploratory teaching emerges as a contrasting approach to the traditional expository method, which is characterized by the simple mechanical reproduction of procedures without a deep reflection on the mathematical meanings involved (CANAVARRO; OLIVE TREE; MENEZES, 2014). On the other hand, this new form of teaching seeks to create a learning environment where the student is the protagonist, focusing on their active engagement in the educational process.

According to Canavarro, Oliveira and Menezes (2014), exploratory teaching provides a space where students are encouraged to actively participate, both individually and collectively, in inquiry activities. This means that students are encouraged to explore, question, formulate hypotheses, and investigate different mathematical approaches. Not only does this approach make it easier to understand the concepts, but it also promotes deeper and more meaningful learning.

Oliveira and Carvalho (2014) add that, in the context of investigative teaching, knowledge is acquired through concrete and engaging situations, which allow students to apply their personal experiences in solving mathematical problems. These personal experiences serve as a starting point for deeper questioning and the development of investigative skills. In this way, exploratory teaching not only transfers knowledge but also empowers students to become autonomous and critical learners.

Exploratory teaching represents a significant transformation in the approach to mathematical concepts, placing the student as the protagonist in the learning process and stimulating him to develop fundamental investigative skills not only to understand mathematics, but also for his academic and professional trajectory. According to Canavarro, Oliveira and Menezes (2012), an exploratory teaching class is structured in four distinct phases: 1) introduction of the task, 2) completion of the task, 3) discussion of the task and 4) systematization of mathematical learning.

The workshop took place within a formative process aligned with Smith's (2001) professional learning guidelines, which involve conducting a cycle of pedagogical practice composed of planning, application and reflection. This cycle was distributed over five meetings: the first three dedicated to the elaboration of the planning, the fourth to the practical implementation of the workshop, and the fifth reserved for critical reflection on the process experienced.

In the fourth meeting, the workshop was applied, marking the beginning of the crucial phase of Exploratory Teaching described by Canavarro, Oliveira and Menezes (2014). At this time, the aim was not only to carry out the activity, but also to ensure the engagement and understanding of the participants. It was evident that those involved established connections between the proposed activity and their previous knowledge, demonstrating an adequate understanding of the proposal. Most were able to associate the activity with specific concepts, such as sequences and arithmetic progression, as planned.

In addition, some participants questioned the level of difficulty of the activity to understand what concepts would be necessary to apply. This behavior indicated a true role of learners, looking for interpretations and strategies to solve the challenge, showing themselves to be motivated and engaged in its execution. These attitudes were probably stimulated in the introduction of the task, when it was suggested that they should not limit the problem to a specific series, which could restrict the possible solutions to a concept or a small group of them.

During the execution of the task, in the second stage, what had been predicted was confirmed: most participants associated the problem with the concept of arithmetic progression. This was particularly intriguing, as this was not a conventional arithmetic progression, but rather a second-order one rarely addressed in Elementary School. Many participants questioned how to solve the problem, since the usual formulas did not apply to that specific context.

This point was crucial, as some participants failed to develop their initial ideas and chose to explore other resolution strategies and different forms of representation. One pair in particular used a resolution method that had not been considered during planning, using recurrence. Some participants tried to avoid the use of formulas, trying to establish a construction pattern for the figures, which allowed several approaches to the resolution. Few explanations were needed about the solutions elaborated, since the participants themselves were able to clarify and their colleagues understood. They explained well what they had built, and the suggestions of colleagues were incorporated collaboratively.

During the discussions on the systematization of mathematical learning, the participants established connections between concepts, procedures, strategies, interpretations and representations, exploring various aspects of the activity. At the end, there was a reflection on the approach adopted and its potential for the teaching and learning of mathematics.

RESULTS

During the application of the workshop, participants experienced a deep immersion in the different roles they play both as students and teachers. When they assumed the role of student, they were encouraged to explore the same mathematical situation through different interpretations, strategies, representations, and procedures. This multifaceted approach allowed participants to establish deeper

connections between mathematical concepts, demonstrating a more holistic and integrated understanding of the discipline.

By putting themselves in the position of teacher during the activity, the participants were challenged to reflect on their educational practice. The workshop provided a space to examine the diverse possibilities that arise during the teaching-learning process, highlighting the importance of adapting and structuring pedagogical approaches to better meet students' needs. This included understanding students' conceptual difficulties and developing strategies to promote more effective and meaningful mathematical learning.

FINAL THOUGHTS

In the context of professional development, the experience highlighted the need for careful and comprehensive planning on the part of teachers. It became clear that anticipating different scenarios in the classroom, along with predicting students' reactions and possible solutions, is crucial for effective teaching practice. Not only does this make it easier to address students' conceptual difficulties, but it also fosters a more solid connection between the mathematical concepts presented and students' individual experiences.

Finally, the experience with exploratory teaching reaffirmed that this approach not only strengthens students' conceptual understanding, but also empowers teachers to create dynamic and collaborative learning environments. From the presentation of challenging tasks that stimulate students' creativity to the collective discussions that consolidate mathematical knowledge, exploratory teaching has proven to be a valuable tool for promoting a more engaging and effective mathematics education.

REFERENCES

Canavarro, A. P., Oliveira, H., & Menezes, L. (2012). Práticas de ensino exploratório da Matemática: O caso de Célia. In L. Santos (Ed.), Investigação em educação matemática 2012: Práticas de ensino da matemática (pp. 255-266). Portalegre: SPIEM.

Canavarro, A. P., Oliveira, H., & Menezes, L. (2014). Práticas de ensino exploratório da Matemática: Ações e intenções de uma professora. In J. P. Ponte (Ed.), Práticas Profissionais dos Professores de Matemática (pp. 216-233). Lisboa: Instituto de Educação da Universidade de Lisboa.

Oliveira, H., & Carvalho, R. (2014). Uma experiência de formação em torno do ensino exploratório: do plano à aula. In J. P. Ponte (Ed.), Práticas Profissionais dos Professores de Matemática (pp. 465-487). Lisboa: Instituto de Educação da Universidade de Lisboa.

Miranda, T., & Assis, C. (n.d.). Módulo de Progressões Aritméticas. Retrieved March 20, 2024, from https://matematica.obmep.org.br/uploads/material/65wgrgbib3k8s.pdf

Smith, M. S. (2001). Practice-Based Professional Development for Teachers of Mathematics. National Council of Teachers of Mathematics.

Stein, M. K., Engle, R. A., Smith, M. S., & Hughes, E. K. (2008). Orchestrating Productive Mathematical Discussions: Five Practices for Helping Teachers Move Beyond Show and Tell. Mathematical Thinking and Learning, 10(4), 313-340.