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SUMMARY FOR THE EDITOR

This article offers an important reflection on the integration of the STEM approach into mathematics education in higher education, highlighting both its potential and the challenges involved. It addresses a highly relevant and necessary topic, especially in light of the technological and social changes that demand more active and interdisciplinary pedagogical practices. The introduction is well constructed and adequately contextualizes the study's objectives.

On the other hand, the manuscript presents certain methodological limitations that deserve attention. There is a lack of clear information regarding the data collection and analysis procedures, and the results are not organized into analytical categories. Although the conclusion reinforces the benefits of the STEM approach, it is repetitive and fails to provide more practical contributions or suggestions for educational policy.

Nevertheless, the text is theoretically well-grounded and provides a relevant contribution to the debate on innovation in mathematics teaching. A more rigorous methodological review and a stronger conclusion are recommended to enhance the scientific impact of the article.

ARTICLE ANALYSIS

INTRODUCTION

This article focuses on the integration of the STEM approach into the educational process of mathematics disciplines in higher education institutions, as well as its advantages and limitations in implementation.

The introduction fulfills its purpose effectively by contextualizing the reader, presenting key concepts, and substantiating the need for the study:

- It clearly and appropriately articulates the research problem that motivates the investigation;
- It coherently emphasizes the necessity for a shift in educational focus.

CRITICAL ANALYSIS

The manuscript provides a necessary and relevant discussion on mathematics teaching methods. Throughout the text, it successfully highlights the importance of STEM education as a strategy to enhance mathematics learning. Moreover, the examples presented enrich the analysis and demonstrate the feasibility of implementing such active methodologies in higher education.

However, the article makes overly broad statements about the contemporary world and the growth of information. It also does not specify whether the content was organized into categories or how qualitative data were interpreted.

Finally, the conclusion—while reiterating the benefits of the STEM approach—does not offer guidelines, practical recommendations, or implications for international educational

policies. Instead of presenting new ideas, it merely repeats points already made earlier in the text.

STRENGTH OF THE ARGUMENT

The text effectively substantiates the advantages of the integrated model, such as fostering analytical skills, increasing student motivation, and enabling the application of knowledge in real-world contexts. At the same time, it discusses the challenges faced, including inadequate teacher training, resistance to paradigm shifts, resource constraints, and the need for structural policies to make STEM implementation feasible.

LIMITATIONS AND OPPORTUNITIES

Although the discussion is relevant to the field of mathematics education, the study presents several limitations that could be improved:

- The methodology is overly descriptive and lacks operational depth;
- There are no clear data collection instruments or empirical analyses presented;
- The results could be better organized into subthemes or analytical categories;
- The manuscript lacks a critical reflection on the methodological constraints of the research.

DIALOGUE WITH OTHER AUTHORS

Studies by various authors highlight different dimensions of the STEM approach in education. According to Marchenko (2022), STEM is a learning process that benefits from the visualization of scientific phenomena, facilitating the understanding of both knowledge and processes involved. Harrington (2024) broadens this perspective, arguing that STEM extends beyond a set of academic disciplines, representing a way of thinking that significantly impacts real life by enabling an understanding of natural phenomena, applying them across diverse fields, and developing technologies with direct societal impact.

Goos, Carreira, and Namukasa (2023) observe that, globally, governments and business sectors have joined forces to integrate STEM into school curricula, encourage youth participation, and promote careers in the field. Along similar lines, Polikhun et al. (2019) argue that, at the secondary level, students should be encouraged to make informed choices for specialized studies based on their understanding of the physical, scientific, and technological world, in addition to mastering scientific methodology, which is essential for grasping global economic systems.

Stohlmann (2020) underscores that the STEM approach is also pertinent to higher education, particularly in mathematics teacher training programs. Tezer (2020) emphasizes the importance of problem-solving as a central element in the learning process within the STEM framework.

CURRENT RELEVANCE

The STEM approach in mathematics education at the higher education level is highly significant, especially in the face of ongoing social, technological, and economic transformations worldwide. This method proves to be an effective strategy for connecting theoretical knowledge to practice, fostering meaningful and interdisciplinary learning.

FINAL REMARKS

The article presents a relevant discussion on the integration of the STEM approach into mathematics teaching in higher education. The introduction fulfills its role by contextualizing the reader and substantiating the need for the study. The text articulates the importance of STEM education coherently and provides examples that enrich the analysis.

However, the study reveals important methodological shortcomings, such as the absence of analytical categories, insufficient details on data collection and interpretation, and a lack of critical reflection on the research's limitations. The conclusion, in turn, is repetitive and fails to offer practical recommendations or implications for educational policies.

The dialogue with key authors strengthens the theoretical framework, and the topic is both timely and relevant given technological and social transformations. Despite its weaknesses, the article contributes to the debate on active methodologies and teacher training in higher education, particularly in the field of mathematics.

MANDATORY REVISIONS

We request that the revisions made be highlighted in yellow in the manuscript. Key aspects that require adjustments include:

- The results should be better organized into subthemes or categories;
- The manuscript contains overly broad statements about the contemporary world and the growth of information—adjustments in the organization of ideas are necessary.

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