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Mathematics Learning Experience: Students' Perspectives on Teachers' Teaching Approaches in the Classroom

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ABSTRACT

This study explores students' perspectives on the mathematics learning process in the classroom, highlighting the importance of effective teaching methods. The purpose of this study is to understand students' preferences and needs regarding the teaching styles of mathematics teachers that can improve their interest and understanding. Using a qualitative approach with a descriptive phenomenological design, data were collected through semi-structured interviews with high school students. Thematic analysis identified three main themes constructed from interview transcripts. The results showed that students desired a more student-centred mathematics learning process with a focus on practical experience and personal support. This study concluded that students desired a more intense and actual integration of the mathematics learning process with technology. Constructive feedback from teachers to students is essential for identifying errors and correcting students' work. A teacher's enjoyable learning style will leave a positive impression of mathematics for them in the future.

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1. INTRODUCTION

Mathematics learning plays a crucial role in developing students' strong thinking processes, characterized by systematic mathematical problem-solving abilities (Tambychik & Meerah, 2010; Sachdeva & Eggen, 2021). The digital era has increased the importance of mathematics in various aspects. Mathematics learning requires serious attention, as all computations are based on quantitative data, necessitating a thorough understanding of mathematical concepts. Teachers' methods of teaching mathematics need to be improved to encourage students to be more active in learning math, fostering motivation, enthusiasm, and persistence (Cho et al., 2021; Attard & Holmes, 2022; Frommelt et al., 2024; Kim et al., 2024).

Previous studies have examined the impact of various mathematics learning methods on diverse student abilities and mathematics learning outcomes (Yang & Kaiser, 2022; Zhu & Kaiser, 2022). These studies have explored mathematics teaching strategies and

delivery strategies that consistently focus on innovation in mathematics learning. One example is a discussion of research on learning mathematics using technology, including both augmented and applied approaches. However, despite these diverse studies, none have addressed students' perspectives on learning mathematics and their expectations regarding the quality of mathematics learning (Frenzel et al., 2021; Lauermann & ten Hagen, 2021). Previous studies have not adequately incorporated students' perspectives on learning mathematics, even though students, as subjects in the mathematics learning process, require a broader understanding of the subject. The hope is that students will become more enthusiastic about learning mathematics.

Understanding students' perspectives on learning mathematics is crucial because they are the ones who directly receive and experience the impact of a quality mathematics education. The experiences they receive during the learning process will influence their perspectives on mathematics, and these experiences will also impact their future academic and career choices (Hurst & Cordes, 2017; Goff et al., 2020). Some students become enthusiastic about mathematics after being exposed to a particular learning approach. However, some students experience a lack of enthusiasm when learning mathematics through innovations (Grecu et al., 2022). Various factors, both external and internal to the students, influence these differences in student experiences (Karakose et al., 2023; Alasmari & Althaqafi, 2024). Researchers can take advantage of this gap to explore students' perceptions of mathematics and their expectations during the learning process.

The novelty of this research lies in its primary focus: understanding students' perspectives on mathematics learning. Unlike previous research that has focused on improving the quality of mathematics learning, this study emphasizes the social, emotional, and psychological aspects of mathematics learning for students. This study delves into the subtleties of mathematics learning, exploring strategies to enhance students' enjoyment and ease of adaptation.

This study will examine students' perspectives on learning mathematics. This research will gather important information for improving the quality of mathematics learning. By understanding students' perspectives, teachers can provide a learning plan or approach tailored to the needs of the class. Understanding students in the context of mathematics learning is crucial, as it allows teachers to understand their actual needs. Teachers get to know their students, enabling them to adapt to increasingly rapid changes.

2. METHOD

This study used a qualitative approach with a descriptive phenomenological design to explore students' subjective experiences of how mathematics teachers teach. This design was chosen because it allowed the researchers to capture the essence of students' interpretations of the dynamics of mathematics teaching, thus understanding how students interpret the learning process.

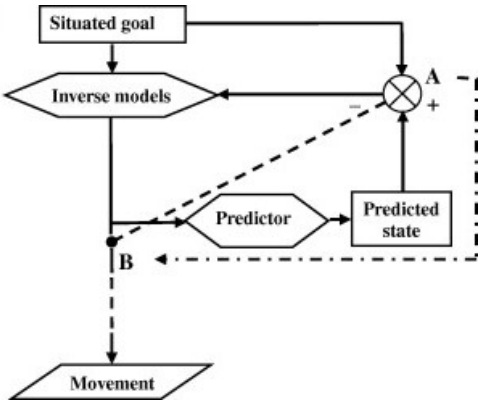

Figure 1. Phenomenological Design

The selection of research subjects used purposive sampling, where not all students were interviewed; instead, students with good communication skills were the primary consideration in selecting subjects. This was because they could provide descriptive and comprehensive answers to the questions posed, making it easier for the researcher to develop the research theme.

The data collection technique began with a strict research ethics and licensing process, including approval from the school, permission from the students' parents or guardians, and the signing of informed consent forms by the participants. Subsequently, individual semi-structured interviews were conducted with each participant, lasting 45–60 minutes, which were audio-recorded and transcribed. After each interview, the researcher conducted a field reflection. This interview process continued iteratively until data saturation was reached, ensuring completeness of the information.

Qualitative data from the interview transcriptions were analyzed using thematic analysis (Braun & Clarke, 2006). The analysis steps included familiarizing themselves with the data, creating initial codes, searching for and reviewing themes, and defining and naming themes. The report is presented with a rich narrative, supported by direct quotes from participants.

3. RESULTS AND DISCUSSION

The Importance of Interactive and Applied Teaching Styles

The findings of this study demonstrate that teachers' encouragement to engage students in the mathematics learning process motivates pupils to learn more and understand mathematical concepts more deeply. By providing sufficient time for students, teachers also create space for them to think, thereby motivating them by allowing them to consider their answers before responding. Student statements such as "*I'm more motivated when teachers permit us time to think and discuss so that we can use it in our daily lives*," and their enthusiasm for teachers who actively ask questions demonstrate their preference for participatory and relevant learning. Previous research (Hendrickson, 2021; Lugosi & Uribe, 2022; Reinholz et al., 2022; Aga, 2024) reinforces empirical evidence that active learning methods enhance student understanding and

interest. No contradictions were found; instead, our data reinforce existing evidence of the positive impact of interactivity and relevance in mathematics instruction.

These findings support constructivist theory, which suggests that students who learn independently can develop a more substantial and enduring understanding of mathematical concepts. Student participation in a discussion-driven learning process provides students with ample opportunities not only to think critically but also to discuss with their peers and seek other resources to solve math problems. The emphasis on real-world relevance and application also supports the idea that learning is more meaningful when material is placed in contexts that are familiar and relevant to students, which in turn can foster intrinsic motivation. This implies that students can directly observe these theories in their classroom learning experiences, not just at the conceptual level.

This research suggests that mathematics teachers should recognize that student-centered learning offers a distinctly different experience for students. Teachers should encourage activities that involve physical activity, including those within the mathematics learning process. It is also important to actively seek and present mathematical examples relevant to students' daily lives to stimulate their interest. For teacher professional developers and instructional materials designers, the focus should be on training and developing resources that support interactive and applicable teaching methods. This can improve the overall quality of mathematics learning, creating a more positive and empowering learning environment for all students.

The Role of Constructive Feedback and Teacher Patience

Students have a strong perception of their mathematics teacher's feedback. Students who receive constructive feedback tend to have a positive impact on their problem-solving abilities, as they are less likely to give up on tasks. This is supported by the timely feedback on their errors, which fosters a sense of motivation to improve. They feel more comfortable asking questions and participating when the teacher does not judge their mistakes but instead provides clear and supportive re-explanations. Expressions such as "*If the teacher patiently explains things over and over again until I understand, it makes me enthusiastic and less afraid to make mistakes*" (S09KG) and students' preference for teachers to "*tell me where the mistakes are and how to fix them, rather than just scribbling on my work*" (S02UB) demonstrate the crucial importance of targeted and corrective feedback. An example of encouragement is when the teacher says, *'Try again, don't just give up*.' (S06KG) and the teacher's willingness to take the time to explain difficult homework (S14UB) all highlight students' need for empathetic and ongoing support.

Social support in the mathematics learning process has a direct and positive contribution to the formation and construction of students' self-confidence in learning mathematics. Students who have sufficient self-confidence and social support will have a strong internal drive to correct any mistakes they make, thus becoming more resilient in facing math problems. Research by Bourne et al. (2021) and Täht et al. (2024) supports the notion that a positive learning environment offers robust internal and external support for students to continue learning mathematics.

The findings of this study provide a highly strategic idea: student errors in learning mathematics should be commonplace. What is remarkable is that students are capable and strive to correct their mistakes, and persist in facing math problems. Feedback strategies should focus on identifying the root cause and guiding improvement, not simply pointing out errors. Furthermore, the time teachers need to allocate to provide student feedback is a significant challenge.

Impact of Technology Utilization and Various Learning Resources

The diverse technology used by mathematics teachers has received significant attention and a warm welcome from students. Students now feel that technology is integral to mathematics learning. Teachers must prepare materials with the aid of technology, including assessments, comments, and attendance. Statements such as "*If teachers use applications and videos, it will be easier to visualize, especially if the concept or problem is difficult*" (S01TG) and the recognition that "*Learning isn't boring if there's a projector to show interesting images*" (S08SB) underscore the power of visualization in facilitating understanding of complex material. This fact reinforces the notion that learning mathematics with the aid of technology facilitates students' ability to process information and develop a more comprehensive understanding of mathematical concepts (Koparan et al., 2023; Poçan et al., 2023).

However, students also recognize the need for a balance between the use of technology and human interaction in the mathematics learning process. They noted that "*There still needs to be explanations from the teacher to avoid confusion, even after watching the video*" (S10TG). This statement offers a fascinating insight, as students recognize that technology is merely a tool to enhance the quality of mathematics learning, not a replacement for the teacher's crucial role in the classroom. Furthermore, students appreciate it when teachers complement traditional learning resources, such as textbooks, which are "*sometimes incomplete*," with "*additional materials from the internet or other modules*" (S04SB). This observation highlights the need for a variety of learning resources to comprehensively meet students' information needs.

This suggests that teachers are already aware of the integration of learning and technology (Rakes et al., 2022; Lim et al., 2024), which has played a significant role in improving the quality of mathematics learning. This marks a new era in which mathematics teachers are understood as facilitators in mathematics learning. This implication also provides the perspective that today's mathematics teachers must not only understand mathematical concepts and know how to teach mathematics effectively but also understand the various technologies required to learn complex mathematics.

4. CONCLUSION

This study successfully identified that interactive instruction, constructive teacher feedback, and the use of technology and a variety of learning resources are crucial factors shaping positive mathematics learning experiences for students. Student preferences indicate

that they learn most effectively when actively engaged, empathetically supported during difficulties, and presented with engaging and relevant ways. The mechanism behind this positive impact is the creation of a learning environment that encourages active student participation, builds their confidence through support and acceptance of errors, and facilitates the understanding of abstract concepts through visualization and access to diverse information.

To broaden understanding and address the limitations of this qualitative study, future research could include direct classroom observation to validate student perspectives in real-world contexts. Classroom action research is also recommended to test the effectiveness of student-centered teaching interventions. Understanding student perspectives in learning mathematics will make the learning process more adaptive, active, and collaborative. Teachers become orchestrators of the classroom learning process through their students' active involvement in mathematics. This equips them with the critical reasoning and problem-solving skills necessary for future success, while also fostering a lifelong love of learning and exploring mathematics.

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