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EXPLORING MATHEMATICS LEARNING PRACTICES AT SMA NEGERI 1 LALOLAE

Imelda*[1], Tahir[2], Chairuddin[3], Karunia[4]
[1,2,3,4] **Universitas Sembilanbelas November Kolaka**

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ABSTRACT

This study aims to analyze mathematics learning strategies at SMA Negeri 1 Lalolae by exploring teaching methods, learning media, and student responses to identify more effective strategies for improving learning quality. This study employed a qualitative descriptive approach with an exploratory design. Data were collected through classroom observations, interviews with mathematics teachers, and questionnaires completed by 80 students. The findings reveal that lecture and problem-solving methods are most preferred by students, whereas discussion and project-based approaches are still rarely applied. Visual media were found helpful in supporting understanding; however, the use of digital applications remained limited. Students generally responded positively to learning, although their active participation and conceptual understanding still need improvement. The study concludes that the application of varied and appropriate methods and media can foster active student engagement and improve motivation and understanding in learning mathematics.

Corresponding Author:
Imelda,
Departement of Mathematics Education,
Universitas Sembilanbelas November Kolaka, Indonesia
Email: dimel5578@gmail.com

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1. INTRODUCTION

Mathematics learning ideally takes place actively, interactively, and meaningfully, where students not only understand concepts procedurally but also connect those concepts to everyday life. According to Shifa et al. (2024), effective mathematics learning should encourage contextual understanding. The teacher, as a facilitator, is expected to design effective learning strategies. Teachers are expected to design effective learning strategies by utilizing varied methods, relevant learning media, and creating a conducive learning environment (Andini et al. (2024). In the context of the Merdeka Curriculum, which emphasizes differentiated and participatory learning, teaching

strategies must be tailored to the characteristics and needs of students to encourage active participation and optimal enhancement of numeracy competencies (Nurani & Susanti, 2025).

In practice, the learning strategies used in schools often do not reach the ideal condition (Intan et al. 2022). In several educational units, including those in remote areas or with limited resources, teachers tend to use conventional methods such as lectures or assignments without adequate media support (Hendra Widayat et al. 2024). This results in low student participation in the learning process, a lack of motivation to learn, and a weak understanding of abstract mathematical concepts (Tandirogang et al., 2025). Students' passive responses and suboptimal learning outcomes indicate the need for an evaluation of the learning strategies used (Tandirogang et al., 2025).

As an effort to address this issue, an exploratory study is needed on mathematics learning strategies comprehensively, including the methods used by teachers, the learning media applied, as well as students' responses to the learning process. This research can provide a complete picture of the actual learning conditions and open avenues for improving strategies that are responsive to students' characteristics. Exploratory research is crucial to gain a deeper understanding of the learning dynamics that occur (Fernando et al., 2025).

As in the research conducted by Nasution (2025), teachers who apply varied learning methods are able to increase student motivation and learning achievement at SMA Negeri 1 Panyabungan Barat. Conversely, previous studies have also shown that many problems in mathematics learning in schools include low student understanding of the material, lack of teacher involvement in facilitating the learning process, and the use of ineffective methods (Al Husna et al. 2021). Furthermore, the results of systematic observations conducted by Adrillian et al. (2024) show that low motivation, interest, and boredom among students in mathematics learning are caused by the use of methods, approaches, and learning models that lack innovation.

Meanwhile, Yani & Matondang (2024) found that students had difficulty understanding concepts and material because learning media were not used during the learning process. Fernando et al. (2025) The results of the study show that students have difficulty understanding new material and complex formulas, and need more interactive and engaging learning media. This indicates the need to implement learning media that is relevant to the characteristics of students in each school as a solution.

However, no previous study has explicitly analyzed mathematics. This study uses a comprehensive approach to analyze mathematics learning strategies at SMA Negeri 1 Lalolae by exploring the interrelation among methods, media, and student responses. Learning strategies at SMAN 1 Lalolae. This research not only examines the effectiveness of methods or media separately but also explores the relationship between both and student responses. With this approach, it is hoped that a more comprehensive understanding of the most appropriate learning strategies for application in schools will be obtained.

The purpose of this research is to analyze the mathematics learning strategies applied in SMA 1 Lalolae, particularly in the aspects of methods, media, and student responses. Theoretically, this study contributes to the development of effective mathematics learning strategies. Practically, the results can guide teachers in designing more engaging and contextually relevant instruction. Additionally, the results of this research can also provide input for education policymakers in formulating strategies to improve the quality of learning in remote areas.

2. METHOD

This study employs a descriptive qualitative approach with an exploratory design to gain an in-depth understanding of mathematics learning strategies at SMA Negeri 1 Lalolae, focusing on teaching methods, learning media, and students' responses. The research was conducted from June 9, 2025, to August 29, 2025, at SMAN 1 Lalolae, East Kolaka Regency, Southeast Sulawesi Province. The research subjects consisted of two mathematics teachers and eighty students selected using purposive sampling based on their involvement in the mathematics learning process. Data were collected through classroom observations, semi-structured interviews with teachers, and student questionnaires designed to capture their learning experiences and responses. The instruments used were an observation sheet, interview guide, and student response questionnaire. Each instrument was validated through expert judgment by two senior mathematics educators to ensure content validity.

Data analysis followed Miles and Huberman's model (Wanda et al., 2024), including data reduction, data display, and conclusion drawing. During data reduction, irrelevant information was discarded, while key patterns related to teaching strategies and student responses were coded and categorized. In the data reduction stage, the researcher selected, simplified, and organized the observational and interview data relevant to the research focus. The second stage, data display, is done by presenting the results of observations and interviews from the reduced data. The third stage, the researcher draws conclusions based on the data obtained. To ensure data validity, triangulation of data sources and methods was employed by comparing findings from observations, interviews, and questionnaires.

The research procedure consisted of three stages: (1) preparation, including instrument development and validation; (2) implementation, involving data collection in the field; and (3) analysis and reporting of findings.

3. RESULTS AND DISCUSSION

3.1. Results

Based on the results of the exploration conducted at SMAN 1 Lalolae regarding the methods, media, and student responses to mathematics learning, a variety of results were obtained. The exploration results provide a real picture of the mathematics learning conditions at the school.

Direct observations have been conducted on classroom learning, document reviews, and interviews with mathematics teachers. The observations revealed that teachers employed various methods depending on the topic, predominantly lectures and example problems, while group discussions and projects were less frequent. It was discovered that teachers use several teaching methods, including group discussion, providing example problems, lectures, and project-based learning. Students provide varied responses to the methods used by the teachers as seen in Table 1.

As shown in table 1, most students responded positively to the use of example problems and lectures, indicating these methods are perceived as the most effective for understanding mathematical concepts. In the first indicator, it is known that 31.25% of students stated that they strongly agree and 40% agree, resulting in a total positive response of 71.25%. Meanwhile, 21.25% of students chose neutral, and only 2.5% disagreed and 5% strongly disagreed.

Table 1. Student Response to Learning Methods

No	Methods	SS	S	N	TS	STS
1.	The teacher explains the math material in an easy-to-understand way.	31,25%	40%	21,25%	2,5%	5%
2.	Teachers often use group discussion methods in learning.	13,75%	32,5%	38,75%	7,5%	7,5%
3.	I feel more understanding when the teacher uses example questions in the lesson.	46,25%	35%	13,75%	1,25%	3,27%
4.	The lecture method used by the teacher helped me understand the material.	31,25%	33,75%	26,25%	6,25%	2,5%
5.	I have experienced project-based learning in mathematics.	2,5%	22,5%	51,25%	12,5%	11,25%

In the second indicator, a strong agreement response of 13.75% and an agreement response of 32.5% were obtained, resulting in a total positive response of 46.25%. As many as 38.75% of students chose neutral, while 7.5% expressed disagreement and 7.5% strongly disagreed. The third indicator received a response of 46.25% strongly agree and 35% agree, resulting in a total positive response of 81.25%. Only 13.75% of students chose neutral, while 1.25% disagreed and 3.27% strongly disagreed. In the fourth indicator, the lecture method used by the teacher received a response of 31.25% strongly agree and 33.75% agree, with a total positive response of 65%. A total of 26.25% of students chose neutral, while 6.25% disagreed and 2.5% strongly disagreed. Finally, in the fifth indicator, 2.5% of students stated strongly agree and 22.5% agree, resulting in a total positive response of 25%. Meanwhile, 51.25% of students chose neutral, and only 12.5% disagreed and 11.25% strongly disagreed.

Regarding the use of learning media based on observation results, it was found that teachers used several types of learning media to support teaching and learning activities. The media used include visual media such as PowerPoint, videos, and images, as well as the assistance of other supporting applications or software. Interviews revealed that while teachers attempted to use digital media, its application was constrained by limited facilities and unstable internet connectivity. The utilization of these media helps teachers explain mathematical concepts more clearly, attractively, and understandably for students, as reflected in student responses to the use of learning media shown in table 2.

Table 2. Students' Response to Learning Media

No	Indicator	SS	S	N	TS	STS
1.	The teacher uses visual media (such as PowerPoint, videos, or images) while teaching mathematics.	3,75%	21,25%	47,5%	17,5%	10%
2.	The use of learning media makes me more interested in the material.	26,25%	42,5%	27,5%	2,5%	1,25%

3.	I have been taught with the help of math applications or software.	5%	20%	41,25%	20%	13,75%
4.	The media used by the teacher is in accordance with the material being taught.	36,25%	37,5%	26,25%	0%	0%
5.	I find it easier to understand math material if the teacher uses learning media.	26,25%	37,5%	35%	0%	1,25%

Table 2 illustrates a generally positive perception among students toward the use of visual learning media. In the first indicator, 3.75% of students strongly agreed and 21.25% agreed that the teacher used visual media, while 47.5% were in the neutral category and 17.5% and 10% disagreed or strongly disagreed. In the second indicator, the majority of students (26.25% and 42.5%) agreed that the use of learning media made them more interested in the material. However, in the third indicator, only 25% of students had been taught with the help of mathematics applications or software, while 75% had never done so or were neutral.

The fourth indicator shows a very positive response, where 73.75% of students agree that the media used by the teacher is appropriate for the material, and no students expressed disagreement. Lastly, in the fifth indicator, 63.75% of students stated that they agree that the learning media facilitates understanding of the material, although there are still 35% who are neutral.

Overall, classroom observations indicated that mathematics instruction at SMA Negeri 1 Lalolae remains predominantly conventional, although efforts toward more innovative practices have begun to emerge. This can be seen in Table 3 regarding students' responses to mathematics learning in class.

Table 3. Student Responses to Mathematics Learning

No	Student Responses	SS	S	N	TS	STS
1.	I feel happy when attending math classes.	42,5%	16,25%	38,75%	2,5%	0%
2.	I actively ask questions or discuss during math lessons.	11,25%	28,75%	50%	10%	0%
3.	I find it difficult to understand mathematics even though I have tried.	3,75%	23,75%	41,25%	17,5%	13,755
4.	I am doing my math homework or assignment seriously.	51,25%	37,5%	8,75%	1,25%	1,25%
5.	I feel motivated to learn mathematics because of the way the teacher teaches.	47,5%	16,25%	27,5%	3,75%	5%

Table 3 presents varied student responses, reflecting both enthusiasm and challenges in engaging with mathematics learning. In the first indicator, 42.5% of students Strongly Agree and 16.25% Agree that they enjoy attending mathematics classes, while 38.75% are Neutral and only 2.5% Disagree. The second indicator shows that active

participation is still classified as moderate, with 11.25% Strongly Agree and 28.75% Agree, while half of the students (50%) chose Neutral, and 10% Disagree. In the third indicator, there are 3.75% who Strongly Agree and 23.75% who Agree that they find it difficult to understand mathematics despite their efforts, while 41.25% are neutral, and 31.25% (a combination of Disagree and Strongly Disagree) stated that they do not experience significant difficulties. The fourth indicator shows a positive attitude towards the seriousness of doing assignments, with 51.25% Strongly Agreeing and 37.5% Agreeing, and only 2.5% disagreeing. Finally, in the fifth indicator, the motivation to learn due to the way the teacher teaches received a positive response from 63.75% of students (a combination of Strongly Agree and Agree), while 27.5% are neutral, and 8.75% disagree. The findings on teaching methods and learning media complement students' responses, indicating that instructional strategies strongly influence engagement and motivation.

3.2. Discussion

The findings reveal that students prefer the example-problem method, indicating that concrete examples enhance comprehension of abstract mathematical concepts (Rohman et al. 2021). Which states that the use of concrete examples can enhance students' understanding of abstract concepts in mathematics. Similarly, the lecture method still plays a role in supporting comprehension, especially when delivered communicatively and contextually (Maharani et al., 2025).

The use of group discussion methods shows moderate results. Although group discussions have the potential to enhance interaction among students and deepen understanding of concepts according to Andrianto & Awantagusnik (2025), these results indicate that their implementation has not been done consistently or is not yet fully optimized in mathematics lessons. The low score on the project-based learning (PjBL) indicator is a noteworthy result that warrants further attention. Although this method theoretically can encourage creativity and problem-solving according to Rahman et al. (2025), its implementation in mathematics lessons at SMA Negeri 1 Lalolae is still very limited. This limitation may stem from time constraints, limited resources, and inadequate teacher training, particularly in rural schools like SMA Negeri 1 Lalolae (Rosyadi et al., 2025).

The preferred method of teaching mathematics among students at SMA Negeri 1 Lalolae currently is the conventional method enhanced with the provision of example problems. However, there is a need for development and further training for teachers in adopting more innovative strategies such as active discussion and project-based learning to improve the overall quality of education (Talahatu et al., 2024).

Meanwhile, research results on learning media indicate that, in general, students respond positively to the use of media in mathematics learning, especially when the media is suitable for the material being taught. These findings align with the opinion of Masdar et al. (2024)) stating that the suitability of media with lesson content is a key factor determining the success of the learning process. Students also reported that the use of learning media increased their interest in learning (26.25% Strongly Agree and 42.5% Agree). This confirms that media can function as a motivational tool in mathematics learning, which is often perceived as difficult and boring by students (Gultom et al., 2025).

Despite positive perceptions, the actual use of visual and digital media remains limited due to infrastructural and pedagogical constraints (Azizah et al., 2024).

Nevertheless, data shows that students have a positive perception of the effectiveness of learning media in facilitating understanding of mathematics material. Although the frequency of use remains suboptimal, learning media hold significant potential to enhance mathematics instruction and should be integrated strategically (Nurhasanah & Meiliasari, 2025).

Overall, students demonstrated positive responses toward mathematics learning, confirming that motivation is largely influenced by teachers' instructional strategies (Mudzakkir & Darmawan 2024). That student motivation is greatly influenced by the strategies and teaching styles of teachers. Although students face difficulties in understanding the material, they still show a disciplined and responsible attitude towards academic tasks. This finding aligns with Apriani and Sudiansyah (2024), who emphasize that structured assignments foster students' responsibility and positive learning attitudes.

According to Andi Asrafiani Arafah et al. (2023), social interaction in learning plays an important role in students' cognitive development. Therefore, teachers need to provide space and strategies that encourage active student engagement, such as group discussions, presentations, and open-ended questions (Istiqomah & Azzahra, 2024). In summary, teachers play a central role in shaping students' motivation, engagement, and attitudes toward mathematics learning, underscoring the importance of pedagogical innovation and reflective practice. However, there is still a need for improvement in understanding the material and active student participation in mathematics learning.

4. CONCLUSION

This study provides a comprehensive overview of mathematics learning strategies at SMA Negeri 1 Lalolae, particularly in terms of teaching methods, learning media, and student responses. In terms of teaching methods, it was found that teachers mostly use lecture and example-giving methods in mathematics instruction. Group discussions have not yet been optimally applied, as students' responses suggest limited engagement during collaborative learning activities. Project-based learning remains rarely implemented due to limited practice and teacher readiness in applying it to mathematics lessons.

In terms of learning media, the use of visual media such as PowerPoint, videos, and images has been implemented by teachers; however, it is still dominated by neutral responses (47.5%), indicating that its utilization is not yet optimal. Most students perceived that the use of learning media increased their interest and facilitated comprehension. The media used by teachers is also considered appropriate for the material being taught, but the use of mathematical applications or software is still very minimal, as reflected by the low percentage of students who agree on that indicator. This finding underscores the need to enhance the integration of digital learning technologies in mathematics instruction to promote students' digital literacy.

Meanwhile, from the students' response to mathematics learning, most of the students enjoy attending the lessons, are serious about completing assignments, and are motivated by the way the teacher teaches. However, there are still some students who find it difficult to understand mathematics despite their efforts and show low participation in asking questions or discussing in class. Although students show positive motivation, their participation and comprehension can be further strengthened through more interactive methods and diverse media.

Overall, the combination of effective teaching methods and relevant learning media contributes significantly to students' engagement, suggesting the importance of ongoing pedagogical innovation and teacher development.

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