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Responses of 11th Grade Students to the Implementation of Innovative Methods and Media in Mathematics Learning during Teaching Assistance Activities

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ABSTRACT. This study aims to describe the response of students in class XI to the application of innovative methods and media in learning mathematics in teaching assistance activities at SMA Negeri 1 Batu. The background of this study is the low motivation of students to learn caused by the lack of variety in learning methods and media. The approach used in this descriptive research is a qualitative, with a subject of 36 students (13 male students and 23 female students) in class XI. Data were collected through validated questionnaires and structured interviews. The results of the analysis showed that students gave a positive response, with a score of 85%, to the application of the discovery learning model, independent learning, the use of student worksheets, and interactive media such as Quizizz and snakes and ladders games. These innovations encourage students to be more active, motivated, and assisted in understanding mathematical concepts. Overall, the findings of this study indicate that the application of method and media innovations in teaching assistance activities can increase student involvement and understanding in learning mathematics in a more meaningful and enjoyable way.

Keywords: assisted teaching program; discovery learning; interactive media; learning motivation; mathematics education; student response; worksheet based learning

ABSTRAK. Penelitian ini bertujuan untuk mendeskripsikan respons siswa kelas XI terhadap penerapan inovasi metode dan media dalam pembelajaran matematika pada kegiatan Asistensi Mengajar di SMA Negeri 1 Batu. Latar belakang penelitian ini adalah rendahnya motivasi belajar siswa yang disebabkan oleh kurangnya variasi dalam metode dan media pembelajaran. Pendekatan yang digunakan dalam penelitian deskriptif ini adalah kualitatif, dengan subjek sebanyak 36 siswa (13 siswa laki-laki dan 23 siswa Perempuan) kelas XI. Data dikumpulkan melalui angket dan wawancara terstruktur yang telah divalidasi. Hasil analisis menunjukkan bahwa siswa memberikan respons positif, dengan skor sebesar 85%, terhadap penerapan model *discovery learning*, pembelajaran mandiri, penggunaan LKPD, serta media interaktif seperti Quizizz dan permainan ular tangga. Inovasi-inovasi tersebut mendorong siswa untuk lebih aktif, termotivasi, dan terbantu dalam memahami konsep matematika. Secara keseluruhan, temuan penelitian ini menunjukkan bahwa penerapan inovasi metode dan media dalam kegiatan asistensi mengajar mampu meningkatkan keterlibatan dan pemahaman siswa dalam pembelajaran matematika secara lebih bermakna dan menyenangkan.

Kata kunci: asistensi mengajar; *discovery learning*; lembar kerja peserta didik; media interaktif; motivasi belajar; pembelajaran matematika; respon siswa

INTRODUCTION

Education plays a vital role for every individual, as they are expected to contribute and develop strategies to support national development and enhance the nation's intelligence (Cikka, 2020). The goal of education is to equip students with knowledge, skills, and strong attitudes so they can face

future challenges (Ningkrum, Riswari, & Najikhah, 2024). In formal education, one of the subjects taught is mathematics. Mathematics is a vital subject and is taught from elementary school through to university. To support the success of mathematics learning in schools, careful and systematic educational planning is required. As explained by (Widyaningrum & Suparni, 2023), the educational planning model serves as a reference for determining the direction of policies and strategies to implement teaching and learning activities more effectively and efficiently. A common problem in the education sector is low student participation during the learning process, which affects their understanding and learning outcomes. That is supported by the findings of Putri, dkk. (2024) who revealed that even though some students have good grades, that knowledge does not last long due to a lack of active engagement in learning. This phenomenon highlights the importance of planning and implementing learning strategies that can encourage students to be more active, ask questions, and think critically, making learning meaningful and sustainable. At the elementary school level in Indonesia, mathematics is a fundamental part of the curriculum because it helps develop logical, systematic, and critical thinking skills. Through learning mathematics, students are trained to solve problems, recognise patterns, and build the foundational knowledge needed for the next level of education (Anisa, Sumaji, & Riswari, 2024).

To implement the Merdeka Belajar Kampus Merdeka (MBKM) program, Universitas Negeri Malang, notably the Mathematics Education Study Program, has developed a Teaching Assistance program that allows students to be directly involved in learning activities while contributing to partner schools. Field Supervising Lecturers and Mentor Teachers support this program from the respective schools. One of the main objectives of implementing this program is to improve and promote the quality of education in partner schools, while also serving as a forum for knowledge development and student learning experiences (Risnadia dkk., 2025). In the context of this research, the primary focus is on program structure, the application of innovative teaching methods and media in mathematics learning, and the significant benefits gained by students, pupils, and partner institutions. Mathematics learning plays an important role in life as it helps develop logical thinking and problem-solving skills. However, in reality, this subject is often less attractive because it is still considered difficult by most students (Hasanah & Purwasih, 2022). That happens because students often see mathematics as a complex and intimidating subject. This assumption arises because learning mathematics is identified with a series of formulas and complex numerical calculations, especially when solving problems (Ningkrum dkk., 2024). Students' learning motivation is strongly influenced by the teacher's role in fostering their enthusiasm, particularly in how the teacher delivers the material (Safaringga, Lestari, & Aeni, 2022). One important factor is the use of varying approaches in learning media. This variation strategy aims to help achieve the established learning objectives. Students' enthusiasm for the learning topic becomes one of the keys to the success of the learning process (Rimahdani, Shaleh, & Nurlaeli, 2023). That is because learning media helps increase students' motivation and creativity (Putra & Afrilia, 2020). To facilitate the mathematics learning process, effective media are needed to enhance students' motivation to learn. One learning media innovation is games, which can boost students' motivation to learn and improve their learning outcomes. Therefore, using various learning techniques, along with adjustments to the material and media used, can increase students' interest and engagement in learning. Innovations in mathematics teaching methods are an important effort to create a more relevant and contextual learning process for students, one of which is by linking learning materials to everyday life through an ethnomathematics approach, so that mathematics is not merely seen as a set of formulas, but also as part of reality that is close to students' experiences (Rudyanto, Kartikasari Hs, & Pratiwi, 2019). Learning strategies include using various techniques, such as delivering material, explaining concepts, providing examples, and assigning activities to students as learning tools. Their implementation can be carried out through various methods, such as lectures, discussions, question-and-answer sessions, self-directed learning, simulations, case studies, problem-solving, role-playing, and projects. Each approach has its own advantages and disadvantages and can be used flexibly based on the material's characteristics and students' needs.

To improve learning quality, various approaches have been developed, including the Teaching Assistance program. This program aims to support teachers in the learning process while providing teaching experience for prospective student teachers. Previous studies have shown that Teaching Assistance can positively contribute to students' academic achievement through increased learning motivation (Risnadia dkk., 2025). However, these studies have generally focused on student learning outcomes, and few have examined in depth how innovations in teaching methods and learning media used in Teaching Assistance affect students' learning motivation, particularly in mathematics subjects. In fact, learning motivation is an important factor that influences student engagement and achievement in mathematics, a subject known to be challenging. Therefore, this research was conducted as a development of previous studies to examine the relationship between learning motivation and innovation in the methods and media of mathematics learning, as applied through the Teaching Assistance program.

Several previous studies have highlighted the importance of a creative approach in mathematics teaching. However, most have been limited to the junior high school level and have not explicitly addressed 11th-grade high school students. Mardianto, Azis, & Amelia (2022) studied a contextual approach to comparison and scale materials in the 7th grade of junior high school, and concluded that the approach can help in concept understanding. However, this research has not addressed innovative learning media or the role of mentoring teachers. Hasanah & Purwasih (2022) explored the habits of mind abilities of junior high school students in mathematics learning, but did not discuss contextual teaching strategies or the utilisation of interactive media. The Snakes and Ladders game media for elementary school students showed an increase in learning motivation, but have not yet integrated constructivist learning models, such as discovery learning. Andriani, Prasetyo, & Astutiningtyas (2020) discussed students' responses to online mathematics learning, but the focus was more on technical facilities and obstacles, rather than on method and media innovation. Meanwhile, Nasution, Novita, & Hafiz (2023) reviewed the implementation of the Teaching Campus program in North Sumatra and found benefits in terms of management and literacy improvement, but did not specifically examine its contribution to mathematics teaching in the classroom. Therefore, there are still gaps in previous studies, namely the lack of research directly examining the responses of 11th-grade high school students to the use of innovative methods and media for mathematics learning in the context of teaching-assistance activities by prospective teachers.

Senior High School 1 Batu is one of the schools in Batu City and is a partner in the teaching assistance program. Based on initial observations at SMAN 1 Batu, several obstacles were found in mathematics learning in class XI. One of the main challenges is the low level of innovation in teaching methods and media, especially in mathematics. This finding aligns with research by Hasanah & Purwasih (2022), which shows that mathematics learning remains monotonous and lacks variety in media, thereby impacting students' motivation and understanding. Similarly, research by Putri, dkk. (2024) dan Kurabi, Azmi, & Sholeha (2025) revealed that the lack of active student involvement in the learning process is due to suboptimal teaching approaches and the absence of emphasis on using interactive media. Mathematics is often regarded as a complex subject by students, especially at the secondary school level. At SMAN 1 Batu, this situation affects students' low learning motivation and suboptimal learning outcomes. Various factors are suspected to be the causes of this problem, ranging from the lack of variety in teaching approaches to the minimal use of media that support concept comprehension.

The use of innovative methods and media in mathematics learning during Teaching Assistant activities at Senior High School is essential because it not only increases student motivation and engagement but also serves as a strategic means for prospective teachers to develop their pedagogical competencies directly. In the context of 11th-grade students, who are at the formal thinking stage and ready to face more complex academic challenges, the use of innovative methods such as Discovery Learning and interactive media like Student Worksheets and educational games can create a learning environment that is both enjoyable and meaningful. With this approach, it is

expected that students' understanding of mathematical concepts will improve and that a positive attitude towards the learning process will form, ultimately affecting the overall quality of learning outcomes.

However, in reality, the implementation of mathematics learning in the field still encounters various obstacles, one of which is the limited variety of methods and media applied by teachers in delivering the material, especially at the Senior High School level. This situation directly affects students' learning motivation, which tends to decline, making mathematics learning less interesting and difficult to understand. This condition is further exacerbated by the dominance of one-way lecture methods and the lack of utilization of interactive media that can engage students in the learning process. On the other hand, Teaching Assistance activities in the MBKM program provide opportunities for the teaching and learning process, including through more participatory methods and the use of digital and game-based learning media. Therefore, it is essential to analyse the extent of students' responses to the use of these methods and media to obtain a comprehensive picture of the effectiveness of mathematics learning produced through this assistance program.

Innovation in this study is implemented through the application of the Discovery Learning model, combined with interactive learning media such as worksheets, Quizizz, and the snakes-and-ladders game. This innovation is expected to create a more active, enjoyable learning environment and increase students' motivation and understanding of mathematical concepts (Sulfemi, 2019). Therefore, a classroom trial is needed to assess the effectiveness of implementing this innovation and to obtain students' real responses to the methods and media used. After the family, educational institutions have a significant responsibility in supporting student development, especially for students who face difficulties or have low achievement in the learning process (Risnadia et al., 2025). Based on this, the author is interested in further researching innovations in teaching methods and the use of learning media to increase students' enthusiasm for learning, strengthen their understanding of mathematical concepts, and foster active engagement, thereby providing more meaningful learning experiences for 11th-grade students. Appropriate learning innovations can encourage students to study more diligently, persistently, and with greater focus. Enhancing learning motivation is a key aspect of efforts to improve the quality of education in schools, including at SMAN 1 Batu, a partner in the Teaching Assistance program.

METODHS

This descriptive study used a qualitative approach that focuses on revealing the meanings and experiences of students directly through their perspectives, in order to provide a comprehensive picture of how innovations in mathematics teaching methods and media are first validated by supervising teachers to ensure the feasibility of the tools, and then implemented and analysed in terms of their responses during teaching assistance activities. The initial stage began with field observations in class XI at SMAN 1 Batu in the 2024/2025 academic year. Based on these observations, the research subjects were 36 students, comprising 13 males and 23 females, aged 16 to 17 years. In addition, three students (two females and one male) with average mathematical abilities were specifically selected for in-depth interviews.

The next stage is the development of research instruments, which involves preparing a questionnaire to measure students' responses to mathematics learning. The questionnaire consists of 20 statements, divided into 10 positive statements and 10 negative statements, and is complemented by an interview guide. Once the instruments are used, the data obtained are analysed. The data analysis process is conducted systematically by tracing and interpreting the results of questionnaires and interviews, and then presenting them in an easily understandable descriptive form. The researcher seeks to provide an in-depth description of the application of methods and media innovations in mathematics learning during Teaching Assistant activities.

Qualitative data analysis in this study refers to the interactive model by Miles, Huberman, & Saldana (2019), which involves four main stages, namely: (1) data collection is carried out through

questionnaires and interviews; (2) data condensation is conducted by summarizing and focusing on questionnaire and interview data relevant to the research objectives; (3) data presentation is carried out by displaying the data in the form of descriptive narratives to facilitate interpretation; and (4) drawing conclusions and verification are performed continuously to ensure the validity of the findings based on patterns or themes that emerge from the collected data.

The processing technique used was Microsoft Excel to determine students' responses to innovations in media and mathematics learning methods. According to Hasanah & Purwasih (2022), the results of the analysis were then grouped using average score criteria for student responses. The criteria for student response scores are presented in Table 1.

Table 1. Criteria for Student Response Scores

No.	Student Response Category	Score for Statement	
		Positive	**Negative**
1.	Strongly Agree	4	1
2.	Agree	3	2
3.	Disagree	2	3
4.	Strongly Disagree	1	4

The results of the analysis were then grouped based on the average score criteria for student responses, followed by calculating the total score for each item in Table 2.

Table 2. Student Response Score Criteria

No.	Score	Criteria
1.	$85\% \leq$ Student Response $\leq 100\%$	Very Positive
2.	$70\% \leq$ Student Response $< 85\%$	Positive
3.	$50\% \leq$ Student Response $< 70\%$	Less Positive
4.	$0\% \leq$ Student Response $< 50\%$	Not Positive

This study uses a qualitative descriptive approach that focuses on revealing students' meanings and experiences from their perspective, to provide a comprehensive description of how innovations in mathematics teaching methods and media are implemented and received during teaching assistance activities.

RESULT AND DISCUSSION

The student response questionnaire used was a closed-ended instrument designed to measure students' responses to the learning of Tangent Identity, Cotangent, Reciprocal Identity, and Pythagorean Identity. The analyzed student responses are presented in Table 3.

Table 3. Results of Student Response Questionnaire Processing

No.	Indicator	% Score	Score Category
1.	Experience of XI grade students in understanding the material through the complete stages of Discovery Learning, combined with innovative learning media.	90	Very Positive
2.	Ability of XI grade students to understand the material independently through the stages of Discovery Learning supported by interactive media.	73	Positive
3.	Students' perception of the role of student worksheets in facilitating the understanding of mathematical concepts.	90	Very Positive
4.	Students' response to the use of Quizizz in helping to understand or test understanding of the material.	85	Positive
5.	Effectiveness of the Snakes and Ladders media in helping students understand the material through learn-and-play activities.	86	Very Positive

No.	Indicator	% Score	Score Category
6.	Impact of integrating the Discovery Learning model with interactive media on concept comprehension and active student involvement in mathematics learning.	87	Very Positive
Average		85	Positive

Table 3 shows that the average response of 11th-grade students at SMA Negeri 1 Batu to the implementation of learning innovations, which include the stages of Discovery Learning (stimulation, problem formulation, exploration, discussion, verification, and conclusion drawing), independent learning, as well as the use of interactive media such as student worksheets, Quizizz, and snakes and ladders games, is generally in the positive category. This indicates that these indicators reflect the intended innovations and that their implementation is feasible, as they receive positive responses from students. Figure 1 shows that Discovery Learning, learning independence, student worksheets, Quizizz, Snakes and Ladders, and the combination of methods and media receive responses ranging from positive to very positive.

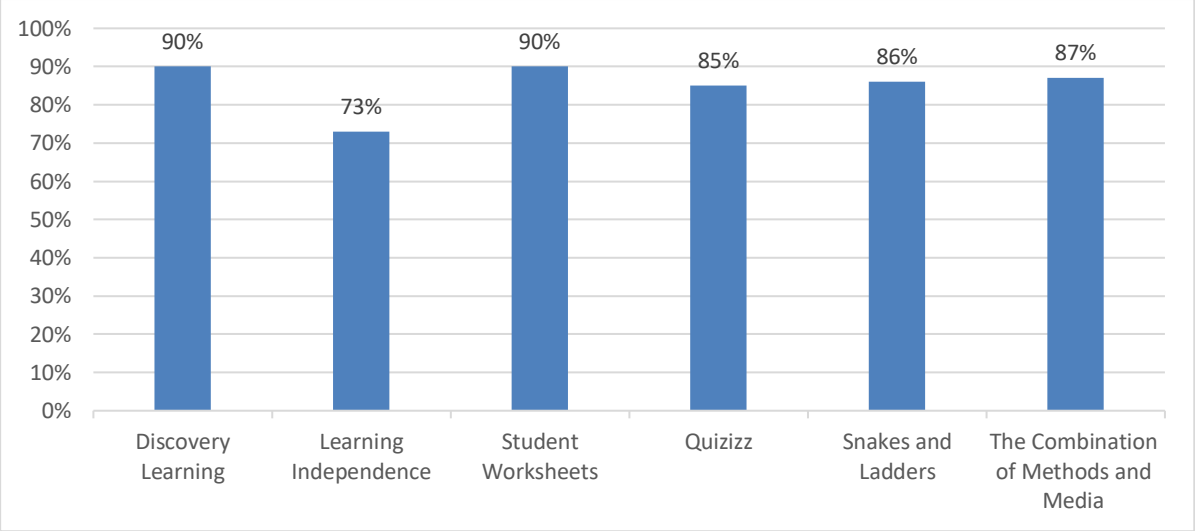

Figure 1. Results of Student Response Analysis at SMAN 1 Batu

Based on Table 3, the first and third indicators obtained 90% and are categorized as very positive. These findings indicate that during the learning process, the XI students had an enjoyable learning experience and were enthusiastic about understanding the material through exploration and discussion activities (Discovery Learning) and student worksheets that facilitate understanding of mathematical concepts. In addition, students also gave positive perceptions of mathematical concepts, such as finding the material easier to understand, more enjoyable to learn, and more relevant to their learning experiences through the use of student worksheets and the stages of Discovery Learning.

Figure 2 shows that students begin to perceive learning mathematics as something enjoyable and are motivated to put in more effort. That reflects students' positive experiences in understanding the material through exploration and discussion activities, and is supported by the use of student worksheets that facilitate the understanding of concepts.

Figure 2. Students begin to show a positive attitude and motivation in understanding concepts through exploration, discussion, and the use of student worksheets.

Based on the second indicator, the score was 73%, indicating that students' understanding through independent learning before or after the teacher's explanation remains suboptimal. That is because most students feel more supported when using the Student Worksheets with teacher facilitation. That does not imply that the student worksheets is unsuitable, as the supervising teacher has previously validated the materials, but rather reflects the students' need to obtain concept reinforcement at each stage of learning. Therefore, the implementation of innovations through Discovery Learning and interactive media remains feasible, and this study focuses on students' responses to their application, in line with previous research that emphasizes validating instructional materials before classroom trials (Afifah & Hartatik, 2019).

Figure 3 shows that students find it easier to understand the subject matter through the stages of Discovery Learning, combined with student worksheets media. Through this activity, students can formulate problems, explore data, discuss findings, and draw conclusions. This innovation has proven more effective than conventional methods (lectures), as it encourages active student involvement in understanding mathematical concepts independently and meaningfully.

Figure 3. Students understand the material through self-directed learning after the teacher explains it.

The fourth and fifth indicators show student responses with the highest score percentages, namely 85% and 86%, which fall into the very positive category toward the use of the Quizizz media, which not only functions as a quiz, but also as an interactive learning tool because it provides immediate feedback, presents explanations for each question, and creates a competitive and enjoyable learning atmosphere. That helps students review and understand the material they have learned, and it demonstrates the effectiveness of the Snakes and Ladders media in supporting comprehension through play-based learning. The high interest and enthusiasm of students toward learning using interactive media such as Quizizz and the Snakes and Ladders game are reflected not only in the optimistic categories but can also be directly observed during the learning process. Here are some documents showing positive student responses to the implementation of both media.

Figure 4 shows the students' courage in presenting the results of their understanding, which reflects the reflection stage in contextual learning. This courage arises alongside the students' interest in learning mathematics, supported by interactive media such as Quizizz, which help them understand and test the material enjoyably.

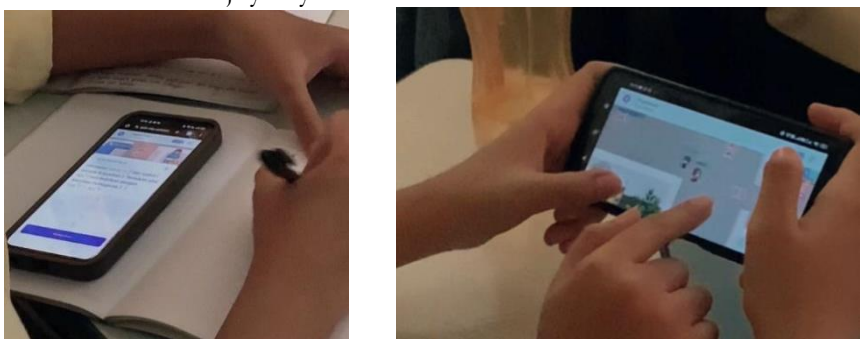

Figure 4. Students engage in interactive learning using Quizizz to understand and test the material.

In addition to digital media, learning can be supported by conventional educational games designed to reinforce understanding of concepts in a fun and collaborative way. Figure 5 shows students' enthusiasm and active involvement while playing Snakes and Ladders during mathematics learning. The enjoyable, interactive learning atmosphere encourages students to understand the material more easily and more pleasantly. That indicates that the Snakes and Ladders game is effective for use in play-based learning activities to strengthen understanding of learned concepts.

Figure 5. Students show enthusiasm as they play Snakes and Ladders during mathematics lessons.

The sixth indicator received a score of 87%, which is higher than those of the second, fourth, and fifth indicators and falls into the very positive category. This indicator illustrates the impact of integrating the Discovery Learning model with interactive learning media (student worksheets, Quizizz, and the Snakes and Ladders game) on students' conceptual understanding and active engagement in the mathematics learning process. A high score on this indicator indicates that learning innovations integrating various approaches can create a compelling, enjoyable learning environment for 11th-grade students.

Figure 6 shows the formation of cooperation among students during the learning process, as a result of the implementation of a combination of methods and media used. Unconsciously, students are encouraged to actively work in groups, which demonstrates the principle of collaboration in the Discovery Learning stage and is supported by innovative media. At this stage, the Student Worksheet guides problem-solving steps, Quizizz motivates students through feedback and healthy competition, and the Snakes and Ladders game creates a collaborative and enjoyable learning atmosphere. This combination of innovations systematically enhances students' engagement and understanding of mathematics.

Figure 6. Formation of student cooperation through group work

With an overall average score of 85%, which falls into the positive category, these results indicate that the implementation of innovative methods and media in mathematics learning through teaching assistance activities is well received by 11th-grade students. That shows that students prefer innovative learning approaches, such as contextual learning, over conventional methods.

The questionnaire results show that students gave positive to very positive responses to the implementation of innovative learning methods and media such as Discovery Learning, interactive worksheets, Quizizz, and ladder-and-snakes games. To strengthen these qualitative findings, in-depth interviews were conducted with three selected students to further explore their experiences and perspectives.

According to R (Subject 1), the most effective learning method, based on his experience, is through interactive media such as Quizizz and Snakes and Ladders. R feels that such game-based media makes the learning atmosphere more challenging and stimulates critical thinking. He expressed this through the statement, "Tense and timed, so you have to think critically." In addition, he also considers Quizizz the most engaging medium because of its fair, time-based system, which he believes provides an equal opportunity for all students. Furthermore, Subject 1 hopes to integrate digital media to make learning more practical. He suggested, "If there are assignments in the student worksheets, it's better to put them all on a single website, so that when we are going to take tests, we don't have to struggle to find the links one by one because they get lost." That indicates students' need for efficient access and a unified digital learning system.

Unlike Subject 1, according to K (Subject 2), he prefers direct teacher explanation accompanied by simple physical activities, such as writing on the blackboard and providing step-by-step introductions. For him, this method helps to understand the theory visually and gradually. He explained, "To better understand the depiction of the theory from the material being studied." In terms of media, K appreciates systematically designed colored worksheets, as well as the Snakes and Ladders game, which allows collaboration with friends. Both media are considered to make the learning process more enjoyable and easier to follow.

Subject A (Subject 3) also emphasized the importance of the teacher's direct explanations on the blackboard in helping students understand the material. He stated, "I understand better if it's explained on the blackboard because later I can work on the questions in the student worksheets /link." He also liked the student worksheets media combined with the Snakes and Ladders game because, in his opinion, it offers challenges that make the learning process more interesting. He said that activities like answering questions and moving up or down the ladder create a fun and competitive learning atmosphere.

From the three interview results, methods involving direct explanation, educational games, and interactive visual media are beneficial for students in understanding mathematical material. Emphasis on interactive, systematic, and collaborative elements is the main factor that enhances student engagement and learning motivation. In addition, students' desire for learning media that are more integrated and easily accessible digitally is an important input for the development of future learning media.

Findings from the interviews indicate that students prefer interactive and technology-based learning media. That aligns with research by Alvareza dkk. (2025), who developed a Discovery

Learning-based E-Student Worksheet using Live Worksheets, which proved effective in improving students' mathematical problem-solving skills. Additionally, Kristanti, Pandra, & Mulyono (2024) highlight the importance of integrating values into learning media, finding that integrating Islamic values into student worksheets can make mathematics learning more meaningful and effective.

These findings support the survey results and align with previous research. For example, Afifah & Hartatik (2019) found that the Snakes and Ladders game media can increase students' motivation and encourage their active involvement in the mathematics learning process. Similarly, Putra & Afrilia (2020) stated that the use of digital quiz media such as Kahoot! or Quizizz can improve concentration, active participation, and create a competitive and enjoyable learning atmosphere. That reinforces students' statements that media like Quizizz provide a fair, challenging, and motivating learning experience.

Meanwhile, the self-directed learning indicator scored 73%, which is still categorized as positive, although lower compared to other indicators. That indicates that some students are starting to get used to independent learning, but support or reinforcement of individual learning strategies is still needed to increase their effectiveness. That aligns with the findings of Hasanah & Purwasih (2022), who stated that the habits of critical and independent thinking in mathematics (habits of mind) need to be developed through supportive media and gradual practice. In this context, the use of student worksheets serves as a bridge to foster students' learning independence.

In general, this study's findings indicate that integrating the Discovery Learning model with interactive learning media such as student worksheets, Quizizz, and the Snakes and Ladders game is highly effective in enhancing students' motivation, participation, and conceptual understanding. These results are in line with the findings of Sulfemi (2019), who demonstrated the effectiveness of Discovery Learning in increasing learning motivation, Afifah & Hartatik (2019), who proved that the Snakes and Ladders media can foster active student engagement, and Putra & Afrilia (2020), who confirmed that Quizizz can improve students' concentration and participation.

CONCLUSION

This study concludes that 11th-grade students' responses to the implementation of innovative methods and media in mathematics learning through teaching-assistance activities fall into the positive-to-very-positive range. More specifically, the Discovery Learning model encourages student involvement in exploration and in concluding, thereby enhancing critical thinking. The student worksheets media helps guide systematic learning steps, making it easier to understand concepts. The use of Quizizz has been proven effective in increasing motivation and concentration through a fun, competitive environment. At the same time, the Snakes and Ladders game fosters cooperation and active student engagement in learning. Thus, integrating these innovative methods and media can create a more meaningful and enjoyable mathematics learning experience while also improving motivation, active engagement, and student understanding. Through interviews, students conveyed that each medium has a specific role in helping them understand the material. For example, Quizizz keeps students more focused with its time limit and immediate feedback on answers, while structured, colourful worksheets make it easier for students to follow the steps to solving problems systematically. At the same time, the Snakes and Ladders game allows students to repeatedly encounter questions while playing, making concepts easier to remember. Thus, understanding the material is gained through a learning experience that is both enjoyable and challenging.

Based on these results, it is suggested that teachers and prospective teachers continue to develop innovative teaching methods and use interactive media that align with students' characteristics to create a more engaging and effective learning environment. Game-based student worksheets and digital platforms such as Quizizz have been proven to facilitate active student participation in learning. For future research, it is recommended that these innovative teaching methods and media be examined across different grade levels and subjects to gain a broader

perspective. Additionally, the further development of integrated digital student worksheets can be a focus of research, particularly in examining its impact on deeper student learning independence through a qualitative approach.

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