# Analysis of Student Activeness in Learning Mathematics at Junior High Schools

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## Abstract

This study aims to analyse student activeness in learning mathematics at the junior high school level. Using a descriptive qualitative research design, the study focused on 15 ninth-grade students selected through purposive sampling. Data were collected through classroom observations and structured interviews to capture both observable behaviours and students' reflections on their engagement during mathematics lessons. The collected data were analysed using descriptive qualitative techniques based on observation records and interview results. The analysis revealed that overall student activeness in mathematics learning was categorized as "active," with an activity level of 60%. The most frequently demonstrated indicator of activeness was student participation in solving mathematical problems, either independently or collaboratively. Conversely, the least observed behaviour was students initiating questions to the teacher during lessons. These findings indicate that while students are actively involved in completing mathematical tasks, they tend to be more passive in interactive aspects of learning, such as asking questions or engaging in dialogue. This suggests a need for instructional strategies that foster more active classroom communication, critical thinking, and student-driven inquiry to enhance overall engagement in mathematics education at the junior high school level.

## Keywords

Student activeness, mathematics learning, junior high school, student engagement, descriptive research

## Introduction

Mathematics is one of the core subjects taught at elementary to middle school (Kemendikbud, 2020). The primary objective of mathematics instruction is to develop students' critical and systematic thinking skills, enabling them to solve real-life problems effectively (Hanan & Alim, 2023; Utari & Gustiningsi, 2021). To achieve this goal, students must be trained to think and reason by connecting abstract mathematical concepts with concrete experiences, thereby making mathematics more comprehensible (Priatna &

Yuliardi, 2018). Such a learning process requires active participation from both students and teachers in classroom interactions (Prasetyo & Abduh, 2021).

Student activity is a crucial indicator in creating a productive and conducive learning environment. It can be observed through student involvement during learning activities, such as taking notes, reading, asking questions, seeking information, and engaging in discussions with peers or teachers (Karima & Hardini, 2024; Sihaloho et al., 2021). According to Sudjana (2005), students are considered active when they are directly involved in completing assignments, solving problems, asking questions, participating in discussions, and applying learned material to real-life situations. This activeness supports the achievement of instructional objectives and contributes to improved academic performance (Ningsih & Berek, 2023; Ningsih, 2018).

In practice, however, not all students exhibit activeness during the learning process. Some students tend to remain passive due to low self-confidence, fear of making mistakes, or embarrassment (Lathif et al., 2023). This passivity can lead to negative behaviours such as drowsiness, lack of focus, frequent requests to leave the classroom, and difficulty in completing assignments. Several factors may contribute to low student activeness, including a lack of interest in learning, unengaging teaching methods, poor teacher-student relationships, and students' physical or emotional conditions during class (Risanatul & Junaidi, 2022).

Teachers play a vital role as facilitators in fostering student activeness. This role can be implemented in various ways, such as posing thought-provoking questions, using engaging learning media, and adopting interactive teaching methods. One effective method is interactive lecturing, which encourages active two-way communication between teachers and students (Prijanto & Kock, 2021; Sari et al., 2022; Rikawati & Sitinjak, 2020).

Numerous previous studies have examined the importance of student engagement and activeness in mathematics learning. For example, Karima & Hardini (2024) investigated how student activeness in classroom activities contributes to improved learning outcomes through the use of Problem-Based Learning models. Similarly, Prasetyo & Abduh (2021) found that interactive and discovery-based learning approaches increase student activeness and motivation. However, these studies tend to focus on intervention-based strategies rather than providing a descriptive analysis of how activeness naturally manifests in classroom settings.

In contrast, this study offers a qualitative perspective focused on identifying and categorizing the actual behaviours that signify activeness during regular mathematics instruction (Miles, Huberman, & Saldaña, 2020). Moreover, while much of the existing literature is based on public school contexts (Naziah, Maula, & Sutisnawati, 2020), this study explores the dynamics of student activeness within a private Islamic junior high school, offering contextual insights that remain underrepresented in research (Ningsih & Berek, 2023).

This research is motivated by the gap in existing literature that overlooks a detailed classification of student activeness behaviours without the influence of structured interventions (Risanatul & Junaidi, 2022; Hanan & Alim, 2023). Understanding how students naturally engage in class activities—through asking questions, collaborating, or remaining passive—can help educators develop more responsive teaching strategies (Priatna & Yuliardi, 2018; Sari, Yusnan, & Matje, 2022).

The novelty of this study lies in its focus on a holistic mapping of activeness indicators in mathematics classrooms through naturalistic observation and student reflections. It provides grounded insights that can serve as a reference for developing student-centered instruction, particularly in culturally integrated educational settings (Nurhayati, Khoirotunnisa, & Yunita, 2024; Utari & Gustiningsi, 2021).

Therefore, this study aims to analyse the level and forms of student activeness in mathematics learning among Grade IX students at a private Islamic junior high school. The findings are expected to offer a comprehensive overview of student engagement and serve as a foundation for teachers and school stakeholders to develop more effective and responsive instructional strategies.

## Methods

This study employed a descriptive qualitative approach to explore students' activeness in mathematics learning. The research was conducted from September 10 to November 8, 2024, involving a total of 15 students who were selected purposively based on their varying levels of classroom participation (low, medium, high) to ensure representativeness from Class IX B at a private Islamic junior high school.

The selection of 15 students was based on purposive sampling, involving all students from one intact class. This class was chosen to represent the research setting because, in the school where the study was conducted, there were only two ninth-grade classes, each with

a relatively small number of students. Class IX B was selected considering its accessibility and the recommendation of the mathematics teacher, who noted that the class exhibited varied levels of activeness, thus providing rich data for qualitative analysis. This sampling approach ensured manageable data collection while allowing for in-depth observation and interviewing in accordance with the qualitative nature of the study.

Data collection techniques included classroom observations and interviews, allowing the researcher to obtain in-depth insights into students' learning behaviours and participation during mathematics lessons. Classroom observations were carried out during five regular mathematics lessons over a period of two months. Observers took structured field notes based on the predefined indicators of student activeness. During the observation process, the researcher positioned themselves unobtrusively in the classroom to minimize interference.

Following the observations, semi-structured interviews were conducted with the same 15 students to validate and enrich the observational data. Interviews were held individually, each lasting approximately 15–20 minutes, and were audio-recorded with consent. To ensure validity, data triangulation was applied by comparing the observation results with student interview responses. Member checking was also conducted by summarizing the interview content and confirming its accuracy with the students.

The research instrument was developed based on key indicators of student activeness adapted from Sudjana (2025). These indicators reflect active participation during learning, such as engaging in tasks, problem-solving, questioning, discussing, and applying knowledge. The eight specific indicators used in this study were as follows:

1. Listening attentively to the teacher's explanations,
2. Responding to teacher questions,
3. Asking questions during the learning process,
4. Taking notes on the lesson material,
5. Reading material from textbooks,
6. Asking the teacher questions during exercises,
7. Asking peers questions during exercises, and
8. Completing practice problems.

To analyse student activeness, a scoring rubric was used to determine the Student Activeness Percentage (SAP) based on the number of indicators fulfilled by each student Miles, Huberman, & Saldaña (2020). The SAP was calculated using the following formula:

$$SAP = \left(\frac{Number\ of\ indicators\ achieved}{Total\ number\ of\ indicators}\right) x\ 100\%$$

Students were then categorized into levels of activeness based on their scores, as presented in Table 1.

**Table 1.** Students' activeness category

| Percentage Score | Category |
|---|---|
| 75 % < score ≤ 100 % | Very active |
| 50 % < score ≤ 75 % | Active |
| 25 % < score ≤ 50 % | Fairly active |
| 0 ≤ score ≤ 25 % | Less active |

Data analysis followed the Miles, Huberman, & Saldaña (2020), consisting of data reduction, data display, and conclusion drawing/verification. The reduction phase involved organizing and simplifying the raw data, followed by presenting the data in descriptive form. Finally, conclusions were drawn to interpret students' activeness levels based on the observed indicators and interview findings.

## Results

This study employed a descriptive qualitative approach to explore students' activeness in mathematics learning. Data were collected through classroom observations and interviews with the mathematics teacher. The study was conducted over three class meetings during the odd semester of the 2024/2025 academic year. Each session consisted of two class periods, each lasting 35 minutes. The topics covered included "Exponents" and "Quadratic Equations & Functions."

The teaching method used in this study was conventional direct instruction, primarily lecture-based, utilizing the whiteboard and a standard mathematics textbook. This approach was chosen to reflect the natural teaching practices commonly used by the mathematics teacher in this classroom, thereby providing an authentic context for observing student activeness under typical conditions. By employing a familiar instructional method, the study aimed to examine how students engage within the established classroom culture, making the observations more ecologically valid.

This method of implementation was also aligned with the data collection techniques described in the methods section, where one researcher acted as the teacher while another observed student behaviours using predefined indicators of activeness.

The learning process typically began with an explanation of the topic along with example problems, followed by additional exercises for students to complete. Student activeness was assessed based on their fulfilment of eight predetermined indicators. Table 2 below summarizes the percentage of students who met each indicator.

**Table 2.** Summarizes of percentage of student's achievements

| Indicator | Number of Students | Percentage |
|---|---|---|
| 1. Paying attention to the teacher's explanation | 11 | 73.3% |
| 2. Answering the teacher's questions | 3 | 20% |
| 3. Asking questions during the lesson | 0 | 0% |
| 4. Taking notes from the lesson | 13 | 86.7% |
| 5. Reading textbook material | 1 | 6.7% |
| 6. Asking the teacher questions during exercises | 13 | 86.7% |
| 7. Asking peers questions during exercises | 10 | 66.7% |
| 8. Completing assigned practice problems | 15 | 100% |

Table 2 illustrates the percentage of students in Class IX B who demonstrated specific indicators of activeness during mathematics learning. The highest levels of engagement were observed in completing assigned practice problems (100%), asking the teacher questions during exercises (86.7%), and taking notes from the lesson (86.7%). A majority of students also paid attention to the teacher's explanation (73.3%) and interacted with peers during exercises (66.7%). However, verbal participation during the lesson was notably low, with only 20% of students answering the teacher's questions and none asking questions during the instructional phase. Additionally, reading the textbook independently was the least frequent activity, performed by only 6.7% of students. Based on the total number of fulfilled indicators, students were categorized into four levels of activeness.

**Table 3.** The student's activeness

| Category | Number of Students | Percentage |
|---|---|---|
| Very active | 3 | 20% |
| Active | 9 | 60% |
| Fairly active | 3 | 20% |
| Less active | 0 | 0% |

To explore individual behaviours more deeply, one student was selected from each category: APH (Very Active), AS (Active), and MFAS (Fairly Active). Their fulfilment of the eight indicators is presented Table 4, below.

**Table 4.** Achievement of Learning Activeness Indicators Across Student Categories

| Indicator | APH | AS | MFAS |
|---|---|---|---|
| 1. Paying attention to the teacher's explanation | ✓ | ✓ | – |
| 2. Answering the teacher's questions | ✓ | – | – |
| 3. Asking questions during the lesson | – | – | – |
| 4. Taking notes from the lesson | ✓ | ✓ | ✓ |
| 5. Reading textbook material | ✓ | – | – |
| 6. Asking the teacher questions during exercises | ✓ | ✓ | – |
| 7. Asking peers questions during exercises | ✓ | – | ✓ |
| 8. Completing assigned practice problems | ✓ | ✓ | ✓ |

### APH (Very Active)

APH was classified as a very active student, fulfilling 7 of the 8 activeness indicators. APH demonstrated high academic ability and confidence, actively participating in discussions and completing exercises accurately. The student attentively listened to the teacher, took comprehensive notes, and frequently assisted peers. However, APH did not ask questions during the teacher's explanation, which may be due to high self-confidence and prior understanding of the material. The teacher affirmed APH's strong engagement and consistent attention during the learning process.

### AS (Active)

AS was categorized as an active student, meeting 4 of the 8 indicators. Although AS followed the lessons and completed tasks correctly, the student did not actively participate in verbal interactions unless prompted by the teacher. AS did not read the material beforehand and hesitated to ask or answer questions. Nonetheless, AS was able to explain solutions to peers and solve exercises with occasional guidance. According to the teacher, AS was shy and lacked confidence, but could respond correctly when called upon directly.

### MFAS (Fairly Active)

MFAS was classified as fairly active, fulfilling only 3 of the 8 indicators. The student displayed limited focus during class, was occasionally distracted, and even fell asleep during instruction. MFAS did not engage in discussions or ask the teacher questions but did take notes and attempt the exercises. Due to poor preparation and inattentiveness, MFAS had difficulty completing the tasks and frequently sought help from peers. The teacher noted that MFAS required individual attention and needed to be called by name to stay focused and participate in class activities.

These findings suggest that student activeness in mathematics learning varies considerably and is influenced by factors such as academic ability, self-confidence, classroom engagement, and teacher support. Active engagement strategies and differentiated instruction are recommended to support the needs of both active and passive learners.

## Discussion

The results of this study underscore the multifaceted nature of student engagement in mathematics learning. While students exhibited active participation in structured tasks, such as completing practice problems and seeking assistance during exercises, their involvement in verbal interactions—like asking questions or responding during class discussions—was notably limited. This pattern suggests that engagement encompasses more than just task completion; it also involves cognitive and affective dimensions that influence how students interact with the learning process.

According to Table 2, no students asked questions during the lesson, and only 20% responded to the teacher's prompts. Additionally, only one student (6.7%) was observed reading the textbook. These findings suggest a substantial gap in verbal engagement and self-initiated learning. Several interrelated factors may explain this phenomenon. First, the use of conventional lecture-based teaching methods tends to centralize instruction around the teacher, reducing opportunities for students to ask questions or develop inquiry habits. As noted by Sudjana (2005), teacher-centered approaches often result in student passivity, as they do not foster curiosity or create space for student expression.

Second, the absence of student-initiated questions may be closely tied to the classroom climate and emotional factors. Previous research by Lathif et al. (2023) and Hanan and Alim (2023) found that students often avoid asking questions due to fear of being wrong, low self-confidence, or embarrassment. These tendencies are frequently linked to math anxiety and negative prior experiences. Similarly, Risanatul and Junaidi (2022) argue that a psychologically unsupportive learning environment may further discourage students from participating actively.

Third, the minimal use of textbooks may reflect students' over-reliance on teacher explanations rather than independent study habits. This aligns with the findings of Erniyanti, Zulkarnaen, and Supriyadi (2022), who emphasized that students' learning styles significantly affect their participation, especially regarding independent reading and written

responses. High dependence on the teacher may hinder the development of autonomous learning, particularly in settings that have yet to fully implement differentiated instruction or literacy-oriented learning (Kemendikbud, 2020).

The classroom environment and instructional strategies play a central role in shaping student engagement. The teacher's role as a facilitator is essential in fostering a safe and supportive learning atmosphere that encourages students to participate and reduces their fear of making mistakes. Interactive strategies, such as guided questioning or peer discussion, have been shown to increase verbal participation, particularly among more reserved students. This is consistent with findings by Prijanto and De Kock (2021) and Sari, Yusnan, and Matje (2022), who highlight the importance of the teacher's role in encouraging expression, building student confidence, and facilitating a participatory classroom culture.

The tendency for students to be more active during individual or small-group tasks than during whole-class discussions suggests that learners may feel more confident and secure in less public settings. Prasetyo and Abduh (2021) found that learning models that actively engage students in small groups or hands-on activities help boost confidence and participation. Likewise, Karima and Hardini (2024) demonstrated that approaches such as Problem-Based Learning promote deeper engagement by providing meaningful contexts for exploration and problem-solving.

This study contributes to the literature by providing a behavioural-based assessment of student activeness in an Islamic integrated school setting, an area that remains underrepresented. By identifying specific indicators and mapping them to student categories, the research offers actionable insights for educators to tailor strategies that foster broader student participation. For instance, recognizing students who are less active in verbal interactions allows for targeted interventions, such as encouraging peer support or providing positive reinforcement, to enhance their engagement.

In the other hand, student engagement in mathematics is shaped by a dynamic interplay between individual factors—such as self-confidence and academic ability—and external influences, including instructional methods and classroom climate. The lack of verbal interaction and limited textbook usage, as highlighted in the findings, reveal critical areas where pedagogical innovation is needed. Incorporating student-centered, interactive teaching approaches—such as differentiated instruction (Nurhayati, Khoirotunnisa, & Yunita, 2024) or the Teams Games Tournament model (Teranikha, Fatonah, & Saputro, 2024)—could help bridge these gaps and promote more holistic student engagement. By

addressing these dimensions through thoughtful instructional design, educators can foster more inclusive and engaging learning environments, ultimately improving students' mathematics outcomes.

## Conclusion

Based on the results of observations and interviews, student engagement in mathematics learning among Grade IX B students at a private Islamic junior high school varied across specific indicators. The majority of students demonstrated good overall engagement, with 60% categorized as "good," 20% as "very good," and 20% as "adequate." When analysed per indicator, the highest level of engagement was observed in the "practicing problem-solving" indicator, which was achieved by 100% of students, reflecting strong task-oriented involvement. Additionally, 93.3% of students actively asked peers for help when encountering difficulties, and 86.7% showed persistence in completing tasks, indicating a generally high level of behavioural and cognitive engagement. However, only 20% of students responded to teacher questions, and none were observed initiating questions during the lesson, revealing a significant lack of verbal and participatory engagement. Moreover, only 6.7% of students were seen reading the textbook, suggesting minimal self-directed learning. These findings highlight that while students were active in completing assigned tasks, their verbal, reflective, and self-initiated learning behaviours were limited. This study has limitations in terms of the sample size, which only involved one class, and the data collection methods, which relied solely on observation and interviews. Therefore, it is recommended that future studies expand the sample size and duration to gain a deeper understanding of student engagement. Additionally, it is suggested that teachers implement more interactive teaching methods and create more opportunities for students to ask questions and engage in discussions. Schools should also provide training for teachers to create a more conducive learning environment that encourages student involvement.

## References

Erniyanti, Zulkarnaen, & Supriyadi, D. (2022). Analisis Pengaruh Gaya Belajar Terhadap Keaktifan Belajar Fisika Peserta Didik Kelas X-9 SMA Negeri 1 Samarinda. *Seminar Nasional Pendidikan Profesi Guru*, *2011*, 65–70.

Hanan, M. P., & Alim, J. A. (2023). Analisis Kesulitan Belajar Matematika Siswa Kelas Vi Sekolah Dasar Pada Materi Geometri. Al-Irsyad Journal of Mathematics Education, 2(2), 59-66.

Karima, A. I., & Hardini, A. T. A. (2024). Meningkatkan Keaktifan dan Hasil Belajar Matematika Menggunakan Model Problem Based Learning di Kelas II SD. *Jurnal Pendidikan Tambusai*, *8*(1), 10674-10683.

Kemendikbud. (2020). *Adaptasi Pembelajaran Berorientasi Literasi dan Numerasi*. *September*, 1–30. http://ditpsd.kemdikbud.go.id/upload/filemanager/buku/file/Panduan/Arah Kebijakan Adaptasi Pembelajaran.pdf

Lathif, M. I. A., Manjilah, E. L., Aguilera, F. V., Khayriyah, N. W., & Amaliyah, F. (2023). Pengaruh keaktifan siswa terhadap hasil belajar siswa pada mata pelajaran matematika di dalam kelas 5 SD 2 dersalam. *Proceeding Umsurabaya*.

Miles, M. B., Huberman, A. M., & Saldaña, J. (2020). *Qualitative Data Analysis: A Methods Sourcebook* (4th ed.). SAGE Publications.

Naziah, S. T., Maula, L. H., & Sutisnawati, A. (2020). Analisis Keaktifan Belajar Siswa Selama Pembelajaran Daring Pada Masa Covid-19 Di Sekolah Dasar. *Jurnal JPSD*, *7*(2), 109–120.

Ningsih, A. (2018). Pengaruh keaktifan siswa terhadap hasil belajar ekonomi kelas x di sman 2 gunung sahilan. *Peka*, *6*(2), 157-163.

Ningsih, N. P., & Berek, F. (2023). Upaya Guru Dalam Meningkatkan Keaktifan Siswa Didalam Kelas Dan Implikasi Bagi Guru Masa Kini. *Jurnal Teologi Injili dan Pendidikan Agama*, *1*(3), 63-71.

Nurhayati, L., Khoirotunnisa, K., & Yunita, N. (2024). Penerapan Pembelajaran Berdiferensiasi untuk Meningkatkan Keaktifan Peserta Didik di SMAN 1 KAMAL. *Proceeding International Conference on Lesson Study*, *1*(1), 502. https://doi.org/10.30587/icls.v1i1.7421

Prasetyo, A. D., & Abduh, M. (2021). Peningkatan Keaktifan Belajar Siswa Melalui Model Discovery Learning Di Sekolah Dasar. *Jurnal Basicedu*, *5*(4), 1717–1724. https://doi.org/10.31004/basicedu.v5i4.991

Priatna, N., & Yuliardi, R. (2018). Pembelajaran Matematika. *Bandung: PT Remaja Rosdakarya*.

Prijanto, J. H., & De Kock, F. (2021). Peran guru dalam upaya meningkatkan keaktifan siswa dengan menerapkan metode tanya jawab pada pembelajaran online. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *11*(3), 238-251.

Rikawati, K., & Sitinjak, D. (2020). Peningkatan keaktifan belajar siswa dengan penggunaan metode ceramah interaktif. *Journal of Educational Chemistry (JEC)*, *2*(2), 40.

Risanatul, R., & Junaidi, J. (2022). Penyebab Peserta Didik Tidak Berpartisipasi Aktif dalam Pembelajaran Sosiologi di Kelas XI IPS 1 SMAN 4 Merangin Jambi. *Naradidik: Journal of Education and Pedagogy*, *1*(3), 327-335.

Sari, E. R., Yusnan, M., & Matje, I. (2022). Peran Guru Dalam Meningkatkan Keaktifan Belajar Siswa Melalui Media Pembelajaran. *Jurnal Eduscience*, *9*(2), 583-591.

Sudjana, N. (2005). Dasar-Dasar Proses Belajar Mengajar. *Bandung: Sinar Baru Algessindo.*

Sihaloho, I. M., Asyril, A., & Azainil, A. (2021, July). Pengaruh Keaktifan dan Minat Belajar Siswa terhadap Hasil Belajar Matematika. In *Prosiding Seminar Nasional Pendidikan Matematika, Universitas Mulawarman* (Vol. 1, pp. 33-42).

Teranikha, E., Fatonah, S., & Saputro, S. A. (2024). Penggunaan Model Teams Games Tournament untuk meningkatkan Keaktifan Siswa pada Mata Pelajaran Matematika. *Jurnal Inovasi, Evaluasi Dan Pengembangan Pembelajaran (JIEPP)*, *4*(1), 24-29.

Utari, R. S., & Gustiningsi, T. (2021). Developing of Higher Order Thinking Skill in Relation and Function to Support Student's Creative Thinking. *Jurnal Pendidikan Matematika*, *15*(1), 49–60. https://doi.org/10.22342/jpm.15.1.12876.49-60