

THE ANALYSIS OF POOR COMMUNICATION IMPACT ON STUDENTS' INTEREST IN LEARNING EXPONENT TOPIC

Al Ainaa Almardhiyyah¹, Fitria Sulistyowati^{2*}, Krida Singgih Kuncoro³,
Zahra Nugraheni⁴, Nadya Amalia Putri Hapsari⁵

^{1,2,3}Universitas Sarjanawiyata Tamansiswa, Jl. Batikan, UH-III Jl. Tuntungan, Yogyakarta, Indonesia

⁴Institut Agama Islam Negeri Ponorogo, Jl. Pramuka No.156 Ronowijayan, Jawa Timur, Indonesia

⁵Universitas Negeri Yogyakarta, Jl. Colombo No.1, Karang Malang, Yogyakarta 55281, Indonesia

*E-mail: fitria.sulistyowati@ustjogja.ac.id

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ABSTRACT

Classroom learning requires effective communication between teachers and students to create a conducive environment and enhance learning. This study analyzes the impact of teacher communication on students' interest in learning exponents using a descriptive approach. Data were collected through observation, interviews, and documentation involving 10th-grade students and a mathematics teacher at a vocational school in Yogyakarta, selected via purposive sampling. The findings show that effective communication increases students' motivation, active participation, and understanding of exponents. Interactive methods, such as discussions and Q&A sessions, foster student engagement and improve their grasp of the material. These results highlight the critical role of teacher-student communication in creating an enjoyable and effective learning experience, ultimately supporting better academic outcomes.

Pembelajaran di kelas memerlukan komunikasi yang efektif antara guru dan siswa untuk menciptakan suasana kondusif dan mendukung proses pembelajaran. Penelitian ini bertujuan untuk menganalisis dampak komunikasi guru terhadap minat belajar siswa pada topik eksponen dengan pendekatan deskriptif. Data dikumpulkan melalui observasi, wawancara, dan dokumentasi, melibatkan siswa kelas X dan seorang guru matematika di salah satu SMK di Yogyakarta yang dipilih menggunakan teknik purposive sampling. Hasil penelitian menunjukkan bahwa komunikasi yang efektif meningkatkan motivasi, partisipasi aktif, dan pemahaman siswa terhadap eksponen. Metode interaktif, seperti diskusi dan tanya jawab, mendorong keterlibatan siswa dan mempermudah pemahaman materi. Temuan ini menegaskan pentingnya komunikasi guru-siswa yang baik dalam menciptakan pembelajaran yang menyenangkan sekaligus mendukung pencapaian hasil belajar yang optimal.

How to Cite

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1. INTRODUCTION

According to Ki Hajar Dewantara, education is humanizing or humanizing humans. As the next generation, students need attention and guidance in the process of maturity (Ahmad & Asdiana, 2019). One guidance students need when learning in the classroom is communication between teachers and students to achieve learning goals. Communication between teachers and students can be one of the keys to successful learning in the school (Said, 2021). Effective communication between teachers and students helps transfer knowledge, builds a conducive learning environment, stimulates interest in learning, and encourages students to be actively involved in the learning process (Hotimah, 2020). However, many teachers are not optimal in building communication, especially in mathematics subjects, which are often considered challenging. As teachers and mentors, teachers play a central role in education that helps students develop their potential. Teachers must be able to transfer knowledge and encourage students' potential to learn (Arifin, 2022). One of the teachers who must transfer the knowledge is a mathematics teacher. Mathematics teachers are expected to master knowledge well, have an understanding of the material, and teach technique skills (Turmuzi & Kurniawan, 2021). Thus, it will directly affect the learning outcomes of mathematics.

Mathematics is often perceived as complicated, primarily abstract concepts such as exponents, which are the basis for more complex topics in many applications, both at intermediate and advanced levels. A good understanding of exponents is needed so that students can apply them to other mathematics topics such as algebra and logarithms (Rostiana & Aini, 2022). However, students' understanding of exponents is often constrained by unclear teacher explanations and the lack of two-way communication.

Communication is in the form of teacher and student interaction, an essential factor in the learning process. Lack of interaction inhibits communication, reduces student engagement, and hinders the development of critical thinking skills. Without sufficient interaction, it is difficult for teachers to know students' understanding of the material, so they cannot provide additional explanations or different approaches if needed. In addition, when teacher-student interaction is minimal, students often feel ignored or unnoticed; they tend to be passive, lose motivation, lose curiosity and enthusiasm in learning mathematics, and find it difficult to understand the relevance of mathematical material in real life (Pramesti & Musslifah, 2024). Therefore, quality interactions are needed to create a learning atmosphere that supports, motivates, and encourages active student participation and fosters student interest in learning mathematics.

Learning interest dramatically affects student learning outcomes. Students interested in mathematics tend to be more enthusiastic about understanding the material, but monotonous and difficult-to-understand learning methods often cause a lack of interest. Interest allows the concentration of the mind; it will also cause excitement in learning efforts (Saleh & Malinta, 2020). Therefore, teachers must create fun and engaging learning to arouse students' interest in mathematics.

2. METHODS

This research method is qualitative research with a descriptive approach that aims to describe the effect of teacher communication on students' interest in learning mathematics, especially on the topic of exponents. The research subjects were grade X students at one of the vocational schools in the Yogyakarta Special Region who had studied the topic of exponents. The research subjects were 1 teacher and 32 students, selected using a purposive sampling technique based on the student's ability in the

written test working on exponent problems. The instruments used in this study include observation sheets, interviews, and documentation of student answers. Observations were made directly during learning to observe the extent to which teachers involve students in interactive communication, such as discussions and questions and answers (Istiqomah *et al.*, 2023). Interviews were conducted with teachers and students to find out how communication between the two (Limbong *et al.*, 2020). Meanwhile, documentation of student answers was carried out after students took the test given by the teacher (Nurjanah *et al.*, 2022). The data analysis technique used is qualitative. Qualitative data from observations, interviews, and student answers were analyzed to determine the importance of teacher communication in influencing students' interest in learning.

2.1. Respondent

The subjects of this study were grade X students in one of the vocational schools in the Yogyakarta Special Region who had studied the topic of exponents in mathematics. This study involved one teacher and 32 students as samples. The selection of subjects was carried out using the purposive sampling technique, which is a sampling technique based on specific criteria relevant to the research objectives (Firmansyah & Dede, 2022). In this case, students were selected because they had participated in learning about exponents and were considered ready to work on problems related to the topic. In contrast, the teacher was chosen because he was in charge of teaching mathematics and played an active role in interactive communication during the learning process, especially on exponents. The purposive sampling technique ensures that the subjects involved can provide in-depth and relevant information regarding the effect of teacher communication on students' interest in learning (Putra *et al.*, 2024). The students involved are expected to be able to describe their perceptions of the teacher's communication methods and how the communication affects their motivation and understanding of the exponent material.

2.2. Data Collection

This study collected data through three main instruments: observation, interviews, and documentation of student answers.

1. **Observation:** Data collection is done by directly observing the learning process in the classroom. Observations focused on communication interactions between teachers and students, especially on activities involving discussion, question and answer, and the application of other interactive communication methods that can affect students' interest in learning (Diu *et al.*, 2020). This observation aims to identify the extent to which teachers successfully engage students in learning through effective communication.
2. **Interviews:** Interviews were conducted with teachers and students to gain a deeper understanding of the influence of communication in the learning process. Interviews with teachers aimed to explore their views and communication strategies used in teaching mathematics, especially on exponents (Wirnoto & Ratnaningsih, 2022). Meanwhile, interviews with students were conducted to find out their experiences

of communication received from teachers and how it affects their interest in learning.

3. **Documentation:** Documentation was done by collecting students' answers after they had done the written test given by the teacher. This test focuses on the topic of exponents in mathematics. The results of this documentation are used to analyze students' understanding of the material that has been taught and relate it to the influence of teacher communication during learning.

The data obtained from these three instruments were then analyzed qualitatively to identify the relationship between teacher communication and students' interest in learning and to describe how the communication influenced the learning process on exponents.

2.3. Data Analysis

Data analysis in this study used a qualitative approach based on the steps described by **Moelong** (Septiahani *et al.*, 2020). The first step is data reduction, filtering, and simplifying raw data from observations, interviews, and documentation to select relevant information. The data focused on teacher communication patterns and student responses to exponent learning. The next step is data presentation, where the reduced data is organized as descriptive narratives or tables. This presentation facilitates the identification of patterns and themes, such as the type of communication used by the teacher (question and answer, discussion) and its impact on student engagement. The final stage is conclusion drawing, which is done inductively to ensure the findings accurately reflect the data. Conclusions were drawn by comparing the results of observations, interviews, and documentation to ensure the validity of the research results. This process produces descriptive findings that describe the relationship between communication and student interest in learning, providing insight into how effective communication can increase student motivation and understanding of learning exponents. Through the steps described by **Moelong**, data triangulation was used to make the research results more reliable. This technique involves comparing information from observations, interviews, and documentation to ensure consistency. For example, observations recorded teacher communication patterns during exponent learning, interviews explored teacher and student opinions, and documentation provided additional evidence such as student answers or learning notes. This triangulation helps produce more accurate conclusions about how teacher communication affects students' interest and understanding of exponents.

3. RESULTS AND DISCUSSION

3.1. Results

The results of the research subjects were based on a purposive sampling approach, where the subjects were selected by considering criteria relevant to the research objectives. In this case, grade X students in one of the vocational high schools in the Yogyakarta Special Region were selected because they had studied the topic of exponents, which is the focus of the study. Students were chosen to represent different levels of understanding and motivation in learning exponents, thus providing the

variety of data needed to analyze the effect of teacher communication on their learning interests. Teachers were selected based on their active involvement in the learning process and interactive communication in the classroom. The teachers involved were mathematics teachers who had experience in teaching exponents. Thus, the teachers and students selected are expected to provide in-depth and relevant information, strengthening the validity of the research results that explore how teacher communication affects students' motivation and understanding of exponent concepts.

3.1.1 Observation Results

Two-week observations show minimal interaction between teachers and students in learning exponents. Teachers mostly use the lecture method as the primary approach without providing adequate space for students to ask questions or discuss (Grahmayanuri *et al.*, 2024). When students encounter difficulties, teachers tend to give short answers without in-depth explanations that can help students understand concepts better (Ruhma *et al.*, 2023). This situation shows a lack of two-way communication, which should be essential to learning.

This lack of interaction has a significant impact on student interest in learning. Most students feel that learning exponents is monotonous and less interesting (Prastika *et al.*, 2024). Based on survey results, only about 20% of students actively asked questions or gave responses during the learning process (Purwanto, 2021). Most of the others look passive, showing signs of low learning motivation, such as not paying attention to the teacher's explanation, not recording the material properly, or even not participating in solving the problems given (Hasibuan, 2018). This inactivity further indicates barriers to building a healthy interest in learning.

Barriers in communication also impact students' understanding of the concept of exponents. Many students claim to be confused with the basic concepts of exponents, especially in their application to story problems or more complex contexts (Runturambi *et al.*, 2022). The lack of communication makes students reluctant to ask questions or ask the teacher for a re-explanation (Lubis *et al.*, 2020). As a result, misunderstandings of the material often occur, affecting students' learning outcomes and hindering their ability to master advanced math topics, such as logarithms and algebra.

In addition, the lack of teacher-student communication can also be seen from the teacher's low effort to relate the concept of exponents to real life (Yanti *et al.*, 2019). In observations, teachers rarely provide examples of exponents' application in everyday contexts relevant to students (Ivanka *et al.*, 2024). As a result, students feel that the material learned has no practical value or relevance (Hamid, 2024). Thus, it further reinforces the notion that exponents are a complex and boring topic. This lowers students' curiosity and motivation to delve deeper into the material.

Overall, these observations suggest that the lack of teacher-student communication in exponent learning not only hinders the process of concept understanding but also negatively impacts students' interest in learning (Nasriah *et al.*, 2024). To overcome this problem, a more interactive learning approach is needed (Wardani *et al.*, 2021), where students are given space to participate in discussions and problem solving actively (Rozali *et al.*, 2022). Teachers also need to relate the material to everyday life so that students can see the material's relevance and benefits. In this

way, it is expected that students' interest in learning exponents and mathematics in general can increase.

3.1.2 Interview Results

Three grade X students and a mathematics teacher from one of the vocational schools in Yogyakarta Special Region were interviewed to explore the impact of the lack of teacher communication on students' interest in learning, especially exponent material. The three students came from the same department, the Culinary class.

Interview with students

Researcher: "What do you think about the math teacher's communication when explaining the exponent material?"

Student 1 : "The teacher's explanation is often too fast, but I can still understand the explanation through the examples given."

Student 2 : "Sometimes I don't understand how exponents are used in problems. The teacher does not interact much with students. Therefore, I am often confused when doing assignments or tests."

Student 3 : "I find it difficult to understand the use of exponents in my work. The teacher also rarely explains the benefits in everyday life and asks how the learning is going, so I am less interested in learning."

Most students admitted to having difficulty understanding the concept of exponents. The three students also highlighted their lack of involvement in learning. Thus, exponent learning feels monotonous, decreasing students' interest in participating in the lesson.

Interview with a math teacher

Researcher: "What do you feel about student engagement in math learning, especially in the topic of exponents?"

Teacher : "Some students seem less interested in math, especially those who don't feel this material is relevant to their majors. I try to explain as best I can, but not all students are willing to ask when they don't understand."

Researcher: "How do you deliver math materials amid these challenges?"

Teacher : "The curriculum is quite dense, so I mostly use lectures to convey all the material. But I know this makes students bored quickly."

Mathematics teachers admit that effective communication is a big challenge, especially with SMK students with different learning interests according to their majors. Teachers also revealed that time constraints often hinder the implementation of more interactive teaching methods.

The interview results show that the lack of teacher communication in learning exponents directly impacts the learning interest of SMK class X students. Students find it difficult to understand the material because of the lack of in-depth explanation and active participation opportunities. They also do not see the relevance of exponent material to life or the field of work they will pursue, so their interest in learning decreases.

From the teacher's perspective, time constraints and lack of response from students are the main obstacles in establishing effective communication. To overcome this problem, teachers must explore more contextual and relevant approaches to students' majors. Examples of exponent applications in specific fields, such as computer networks, finance, or recipe calculations, can be used to attract students' attention. In addition, using

interactive learning methods, such as group discussions or educational games, is expected to increase student participation and create a more enjoyable learning atmosphere.

3.1.3 Students Answer

After the tests and assessments were conducted, the researchers surveyed the results of the students' answers. Based on the survey results, it was found that there were correct answers, half-correct answers, and wrong answers. The following are examples of these answers:

Students' answers are declared correct if they can explain the concept of exponents clearly and logically, apply the rules of exponents correctly, and solve the problem without errors in each calculation step. We can see this answer in Figure 1 below. The criteria for correct answers can be seen from several clear and precise steps as follows: 1) Students write the known, asked, and answered information clearly; 2) Students can identify numbers and construct equations correctly, such as connecting the value of $A = 405$ to the equation $405 = 5 \cdot 3^n$; 3) Students can do the calculation correctly, such as dividing both sides of the equation by 5 to get $3^n = 81$; 4) Students can solve the equation $n = 4$ because $3^n = 81 = 3^4$; 5) Students can count back 4 days from September 10, 2021, to September 6, 2021; and 6) Students provide logical and clear explanations, such as explaining the reasoning behind the solution and providing a conclusion at the end of the solution.

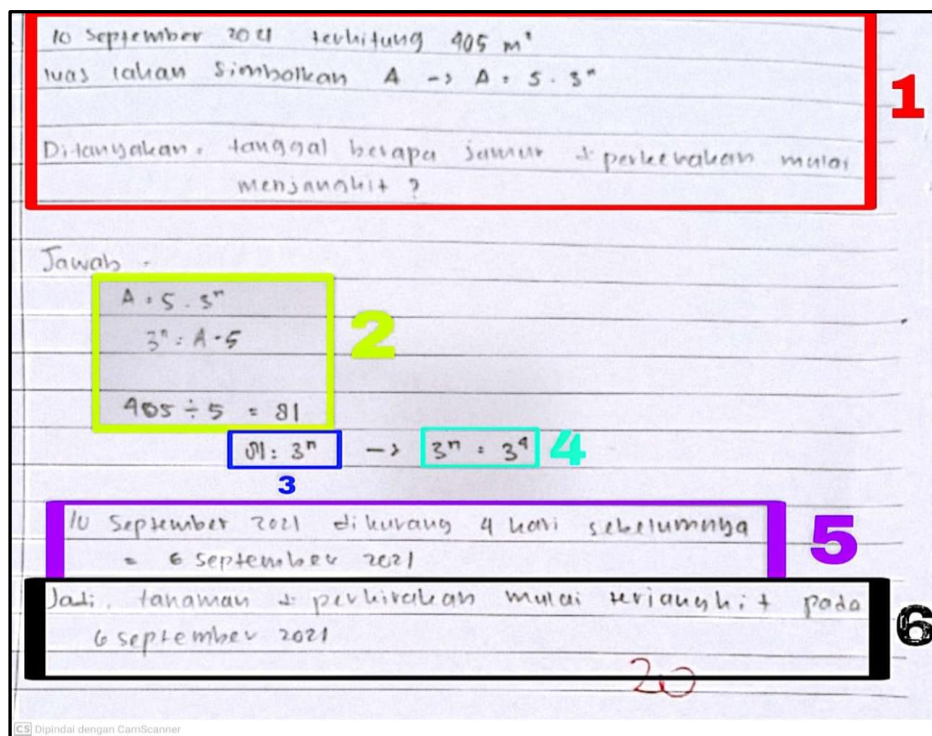


Figure 1. Correct Answer

A logical explanation and reasoning should follow each step. In the end, the correct answer is September 6, 2021, which shows a deep understanding of the concept of exponents and its application in the context of the problem.

If a student's answer is not completely correct, several criteria indicate a deficiency in understanding or applying the concept of exponents: 1) The student did not write down the information regarding what is known, asked, and answered clearly; 2) Students can identify numbers and construct equations correctly, such as connecting the value of $A = 405$ to the equation $405 = 5 \cdot 3^n$; 3) Students cannot divide both sides of the equation

correctly, so the value of 3^n obtained does not match 81; 4) Students can recognize the equation correctly but have difficulty in solving the exponent equation correctly, for example incorrectly calculating the exponent result or ignoring the basic rules of exponents; 5) Students had errors in time interpretation, where they miscalculated the date from September 10, which ultimately did not match the correct calculation; and 6) Students cannot provide logical and clear explanations, such as failing to explain the reasoning behind their solutions, including the rationale for reversing the date order and concluding at the end of the solution. This kind of answer can be seen in Figure 2 below.

Students lack a deep understanding of the application of exponential concepts, even though they recognize that the problem involves exponents. They struggle to apply the concept correctly within the context of the problem. Nevertheless, students who demonstrate partial understanding should be given feedback to help them correct their mistakes and improve their comprehension.

Handwritten student work on lined paper showing mathematical steps and a date calculation. The work includes:

- $A = 5 \cdot 3^n$ (yellow box, labeled 2)
- $405 = 5 \cdot 3^n$
- $3^n = \frac{405}{5} = 81$ (blue box, labeled 3)
- $3^n = 81$
- $n = \frac{81}{3} = 27$ (green box)
- $10 \text{ September} - 27 \text{ hari} = 13 \text{ Agustus}$ (purple box, labeled 5)
- Pertama kali terjangkit.

Figure 2. Not Entirely Correct Answer

If the student's answer is completely incorrect, several criteria indicate errors in understanding or applying the concept of exponents: 1) Students write the information about known, asked, and answered clearly; 2) Students can set up the equation correctly but perform incorrect operations, such as dividing or multiplying numbers incorrectly, which leads to incorrect answers; 3) Students make mistakes in calculating the exponent result, for example, they are wrong in multiplying powers or do not understand the basic concept of exponents, so they cannot solve the equation correctly; 4) Students are unable to connect the information given in the problem correctly, for example incorrectly understanding the relationship between the numbers or concepts involved, leading to errors in the solution process; 5) Students do not understand the concept of exponents when relating it to the problem context, which results in an overall wrong; and 6) Students lack in providing logical and clear explanations, such as not explaining the reasoning behind the solution, for example, the reasoning in the backward steps of the date and the conclusion at the end of the solution. This incorrect answer can be seen in Figure 3.

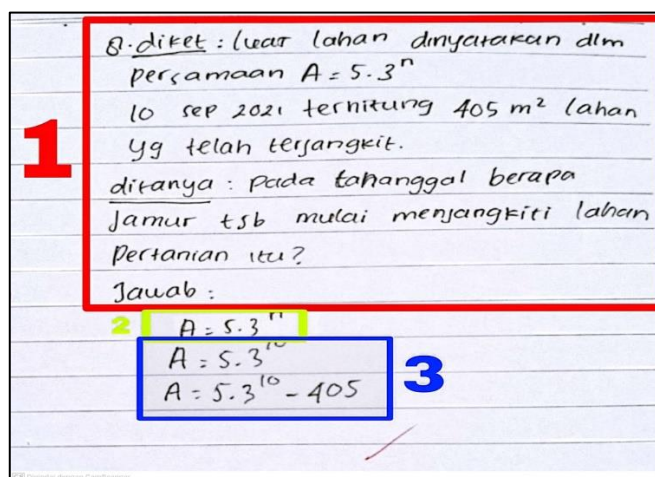


Figure 3. Incorrect Answer

3.2. Discussion

Observations show that communication between teachers and students in class X does not run optimally, especially when discussing exponent material. Teachers tend to dominate learning, while students only listen without being actively involved (Gafur, 2018). This situation makes students find it difficult to understand the basic concepts of exponents, such as power rules, properties of exponents, and their application to problems (Pinahayu, 2016). Many students are confused when given tasks that require a logical understanding of this material, indicating that classroom communication has not been effective in providing student understanding.

This condition is reinforced by observations of interactions during learning. Teachers provide material using the lecture method without involving students in discussions or providing space for questions (Rawa *et al.*, 2021). As a result, students look passive and tend only to record what is delivered without really understanding (Hataul *et al.*, 2021). This has a direct impact on student engagement in learning, which becomes less active and lacks the initiative to explore the material further (Hayya', 2023). This lack of two-way communication not only affects students' understanding but also reduces their interest in learning exponents (Fatmawati *et al.*, 2023). Without sufficient interaction, students lose the opportunity to clarify their difficulties or deepen the material, ultimately affecting their ability to answer tasks correctly.

The results of an interview with a mathematics teacher at the school said that he had tried to explain the exponent material coherently with systematic steps and example problems. However, the teacher admitted that communication in the classroom is often one-way, where the teacher talks more while students tend to be passive (Manurung & Listiani, 2020). Teachers feel that limited time and the amount of material that must be delivered are the main obstacles to creating more active interactions in the form of discussion rooms that involve all students (Amran *et al.*, 2021). Some students find it challenging to understand the material but are reluctant to ask questions or express their confusion (Rahma & Khabibah, 2022). This causes the learning atmosphere to be less interactive, and students depend more on the teacher's explanation without trying to understand independently (Oktavia & Qudsiyah, 2023).

This ineffective communication decreases students' interest in learning exponents and inhibits their active class participation.

Meanwhile, according to information from class X, students at the school stated that they found it difficult to understand the exponent material because the teacher's explanation was considered less precise and detailed. Many students felt that the time given to discuss the material was minimal, so they did not have time to ask further questions (Rahim & Firdaus, 2023). Some students also mentioned that the classroom atmosphere was not supportive of discussion, so they hesitated to convey the difficulties they faced (Sembiring & Listiani, 2023). As a result, students tend to keep their confusion to themselves and do not gain sufficient understanding. They feel that the exponent material becomes more difficult because there is no additional discussion to clarify complicated concepts (Faris *et al.*, 2024). This condition shows that more interactive communication is needed so that students can better understand the material and increase their interest in learning.

The answers written by students on the exponent material assignment are divided into 3 categories: correct, half-correct, and incorrect. Students' answers were declared correct if they could explain and apply the concept of exponents correctly according to the given rules. Answers were not utterly correct if students could only complete some of the steps correctly but could not connect the other steps appropriately. Answers were incorrect if students made errors in applying fundamental exponent concepts or rules.

Students who answered correctly felt more confident because of the teacher's clear explanation and the opportunity to discuss. Students who did not answer correctly admitted that the exponent material was difficult and had difficulty remembering the steps to be taken due to the lack of in-depth explanation. Meanwhile, students who answered incorrectly stated that math lessons, especially on exponents, were confusing and difficult to understand, especially because there was no additional explanation or interaction with the teacher to clarify their difficulties.

This explanation shows that good communication between teachers and students is key to improving students' understanding of the subject matter. Teachers need to provide more detailed explanations and ensure that students understand each step of the concept being taught (Nurdin *et al.*, 2019). In addition, teachers need to provide opportunities for students to ask questions and discuss the difficulties they face during learning (Tabun *et al.*, 2020). Active two-way communication will create a more interactive and enjoyable learning atmosphere for students (Supriyatin, 2024). Effective communication motivates students to be actively involved in the learning process and increases their understanding of the material, which can affect learning outcomes.

It can happen otherwise if the lack of teacher communication in learning exponents directly impacts students' interest in learning. The results show that students often have difficulty understanding the basic concepts of exponents due to unclear or in-depth explanations. As a result, students feel confused and lose motivation to explore the material. In addition, minimal communication leads to reduced interactions such as discussions or question-and-answer sessions, so students become passive and less involved in learning (Handayani & Sulistiawati, 2019). Lack of communication also hinders the provision of feedback needed to improve understanding (Indriani *et al.*, 2024). Student's mistakes are not detected early, so learning difficulties accumulate and affect their interest in the lesson (Hamidah & Ain,

2022). Psychologically, minimal communication creates distance between teachers and students, making students feel less cared for and reducing their confidence.

Based on the observations, interviews, and analysis of student answer documentation, it can be stated that the lack of communication significantly impacts students' interest in learning and understanding of exponent material. Students tend to be passive in learning, find it difficult to understand the basic concepts of exponents, and are less motivated to participate in class actively. This can also be seen from the number of student answers that are not entirely correct or wrong because they do not get a clear enough explanation and opportunity to ask questions. Therefore, good communication between teachers and students is needed to create more interactive learning (Mulyati & Evendi, 2020). Two-way communication allows students to clarify their understanding, overcome confusion, and feel more involved in the learning process (Setyowati *et al.*, 2020). That way, the learning atmosphere becomes more enjoyable, students' interest in learning increases, and learning outcomes can be achieved optimally.

Overall, this study confirms that teacher communication is very important in building students' interest and understanding, especially in materials such as exponents that require logical and gradual mastery of concepts. With effective communication, students can better understand concepts, be actively engaged, and be motivated to learn better. Conversely, without good communication, students face academic obstacles and lose motivation and interest in learning.

4. CONCLUSION

From the previous discussion, we can conclude that ineffective communication hinders understanding the concept of exponents, lowers motivation, and reduces student participation. This also impacts students' interest, which tends to decrease due to difficulties understanding the material. This finding shows the importance of two-way communication in creating conducive learning. Good teacher communication is key to improving students' interest, engagement, and understanding of exponent topics.

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