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THE INFLUENCE OF LEARNING MOTIVATION AND LEARNING ACTIVENESS ON THE MATHEMATICAL COMMUNICATION ABILITY OF GRADE VIII STUDENTS AT MTSS MIFTAHUSSALAM IN THE 2024–2025 ACADEMIC YEAR

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Abstract
This study aimed to determine the description of learning motivation, learning activeness, and mathematical communication ability of Grade VIII students at MTs Miftahussalam Medan, as well as to examine the relationship among these variables. This research used a quantitative approach with a correlational method. The population of this study consisted of all Grade VIII students totaling 91 students, while the research sample consisted of 30 students who were selected using a simple random sampling technique. Data were collected using questionnaires to measure students' learning motivation and learning activeness, and tests to measure students' mathematical communication ability. The data obtained were analyzed using descriptive statistics and the Spearman correlation test with the assistance of the SPSS program. The results of the study showed that students' learning motivation, learning activeness, and mathematical communication ability were in the moderate category. In addition, the results of the correlation analysis indicated that there was no significant relationship between learning motivation, learning activeness, and students' mathematical communication ability. These findings suggested that students' mathematical communication ability was influenced by other factors beyond motivation and learning activeness.
Keywords: *Learning Motivation, Learning Activeness, Mathematical Communication, Mathematics Learning.*

1. INTRODUCTION

In the era of globalization, it has been widely observed that the rapid development of science and technology has created various problems faced by society in Indonesia. Problems frequently occurred in the field of education, which continued to develop in accordance with the progress of time. Therefore, every Indonesian citizen was required to keep up with the ongoing development of education. The objective was to create qualified generations who possessed broad knowledge and were able to think logically, critically, and systematically in dealing with problems that arose in society. Therefore, education was required to keep pace with the development of science and technology in order to support educational progress, which continued to experience changes (Pristiwanti et al., 2022).

Education was a process of improving, strengthening, and perfecting all abilities and potentials possessed by every human being (Nurfuandi, 2020). Education had a very important role for humans as it improved the quality of individuals themselves. The implementation of education, as mandated in Law Number 20 of 2003 concerning the National Education System, was expected to develop the quality of students as the next generation of the nation who would determine the future development of Indonesia. In order to improve students' skills and creativity, innovations in education were considered necessary (Wungguli, 2020).

Students were required to possess competencies that enabled them to survive and compete in a healthy manner in a global world that continued to develop, change, and become increasingly competitive. These competencies included the ability to think critically, logically, creatively, and the ability to collaborate proactively (Ansari, 2016).

Education could train and develop students through learning activities, particularly in mathematics learning. This was possible because mathematics learning essentially served as a means of thinking that trained students to act based on systematic, logical, rational, analytical, and critical thinking. In addition, mathematics learning also developed creativity, cooperation, perseverance, and self-confidence in solving real-life problems. Therefore, students were required to have strong mastery of mathematics.

Mathematics originated from the Greek words "Mathein" or "Mathenin," which meant "to learn." Mathematics was a science of logic. Learning mathematics involved studying theories, hypotheses, and formulas. The concepts in mathematics were abstract. Mathematics functioned to develop abilities in counting, measuring, deriving formulas, and applying simple mathematical formulas needed in daily life (Nurhayanti et al., 2021).

Furthermore, mathematics was considered an important subject to learn. This was indicated by the government's policy of making mathematics one of the compulsory subjects taught to students from elementary school to senior high school. According to the 2013 Curriculum, the objectives of mathematics learning were to enable students to understand mathematical concepts, develop reasoning abilities, solve problems, appreciate the usefulness of mathematics in daily life, communicate ideas and reasoning, and construct mathematical proofs to solve problems. These objectives indicated that important aspects of mathematics were not only conceptual understanding and problem solving but also mathematical communication ability (Anggraena, 2016). One of the abilities that needed to be developed in mathematics learning was mathematical communication ability. Mathematical ability included the capacity of students to organize ideas in both oral and written forms. This meant that students needed to possess mathematical communication skills, both verbally and in writing, to express ideas and strengthen understanding so they could comprehend and accept mathematical ideas from others accurately, analytically, critically, and evaluatively (Ulyawati et al., 2020).

Mathematical communication ability referred to students' ability to express mathematical ideas both orally and in writing. This ability could be developed through learning processes in schools, particularly through mathematics learning. This occurred because mathematics contained logical elements that developed students' thinking skills. Therefore, mathematics played an important role in developing students' mathematical communication abilities. Considering the importance of mathematical communication, students needed to understand its aspects and indicators so that mathematics learning could be designed properly to achieve the objective of developing students' mathematical communication abilities (Hodiyanto, 2017).

According to the National Council of Teachers of Mathematics (NCTM), the indicators of mathematical communication included: (1) organizing and consolidating mathematical ideas through communication, (2) communicating mathematical ideas clearly and coherently to others, including teachers and peers, (3) analyzing and evaluating the mathematical ideas and strategies of others, and (4) using mathematical language to express mathematical ideas precisely. Aminah et al. (2018) also explained several indicators of mathematical communication, including: (1) connecting real objects, images, or diagrams into mathematical ideas, (2) explaining mathematical situations and relationships orally or in writing using algebraic expressions, images, or equations, (3) translating everyday situations into mathematical language or symbols, (4) listening, writing, and discussing, (5) reading written mathematical presentations and constructing relevant questions, and (6) formulating definitions and generalizations.

Wardhana (2018) stated that mathematical communication was important because it enabled individuals to express ideas through conversation, writing, demonstrations, and visual representations. Mathematical communication needed to become a central focus in mathematics learning because through communication students could organize and consolidate their

mathematical thinking (Umar, 2012). Mathematical communication ability was very important in mathematics learning because it helped students expand their understanding of mathematics (Wijayanti et al., 2019). Motivation was defined as an internal drive that encouraged individuals to carry out certain activities enthusiastically (Sulistyawati, 2020) and also as a driving force within students that stimulated learning activities (Setiani et al., 2019). This meant that students with high learning motivation tended to engage in various learning activities to achieve their desired goals. The greater the motivation students had, the stronger their desire to learn, persist, and improve their academic achievement (Dewi et al., 2019).

Learning motivation could be categorized into two types: intrinsic and extrinsic motivation. Intrinsic motivation emerged from within students without external stimulation, as they learned because they needed knowledge rather than rewards or praise. Extrinsic motivation, on the other hand, arose from external stimuli, such as the desire to obtain high scores, degrees, or other achievements (Azhar, 2018). In the learning process, motivation was considered an important dynamic aspect because it guided individuals in making decisions and achieving desired goals (Idzhar, 2016). Motivation acted as a driving force that encouraged individuals to achieve predetermined targets and fostered commitment in pursuing goals (Nurhayati, 2021). Therefore, students with low academic achievement were often not limited by their abilities but rather by a lack of motivation, which made them unwilling to make efforts in learning (Emda, 2017).

Motivation also played an important role in developing students' resilience and self-confidence (Purba, 2022). With sufficient motivation, students tended to be more confident and persistent when facing learning difficulties. Confidence also supported effective communication in learning activities. Besides learning motivation, the success of the learning process could also be observed from students' learning activeness. Learning activeness occurred because knowledge could not simply be transferred but needed to be constructed by students themselves.

Based on observations and interviews conducted with the mathematics teacher of Grade VIII at MTsS Miftahussalam on January 25, 2024, the researcher obtained information that approximately 50% of Grade VIII students achieved the minimum mastery criteria (KKM) in mathematics, while the rest had not yet reached the required score. These learning outcomes reflected students' mathematical abilities, including their mathematical communication ability. The teacher stated that students' mathematical communication abilities varied. Some students demonstrated good, moderate, and low communication abilities. Some students were able to apply mathematical formulas correctly and explain them appropriately, while others still had difficulties applying formulas accurately. Some students were able to express daily events in mathematical form, such as sets, while others were not yet able to translate real-life situations into mathematical representations. There were also students who could explain their mathematical solutions clearly, whereas others could only provide answers but found it difficult to explain the reasoning behind their solutions. According to the teacher, these differences were influenced by various learning factors.

In mathematics learning at MTsS Miftahussalam, some students liked mathematics, while others considered it difficult and intimidating. Some students received strong support from their parents, which motivated them to learn, while others lacked parental support and therefore showed low motivation. Some students preferred lecture methods, whereas others preferred varied learning methods. Some students were enthusiastic and diligent in completing assignments, while others were reluctant to do so. These conditions indicated that students possessed varying levels of learning motivation.

Regarding classroom activities, the teacher reported that some students actively took notes and participated in class discussions by asking questions when they encountered difficulties. However, some students were still hesitant to ask questions due to fear of making mistakes. This

indicated that students demonstrated different levels of activeness in mathematics learning, with some being active and others passive. Previous research conducted by Hermawan Susanto (2019) entitled "The Influence of Learning Motivation on Students' Learning Activeness in Economics Subject at Madrasah Aliyah Diniyah Puteri Pekanbaru" concluded that learning motivation had a significant influence on students' learning activeness. This was proven by the comparison between t-count and t-table values, where t-count was greater than t-table at both the 5% and 1% significance levels. The contribution of learning motivation to students' learning activeness was 47.3%, while the remaining 52.7% was influenced by other factors not discussed in the study.

Based on the explanation above, the researcher assumed that learning motivation and learning activeness influenced the mathematical communication ability of Grade VIII students at MTsS Miftahussalam. Therefore, the researcher was interested in conducting this study with the title "The Influence of Learning Motivation and Learning Activeness on Mathematical Communication Ability of Grade VIII Students at MTsS Miftahussalam."

2. METHODS

This study used a quantitative approach with a correlational research design that aimed to determine the influence of learning motivation and learning activeness on students' mathematical communication ability. The quantitative approach was used to analyze the relationship between variables objectively through statistical data processing (Sugiyono, 2019). The research was conducted at Madrasah Tsanawiyah Miftahussalam located at Jl. Darussalam No. 26 ABC, Sei Sikambing D, Medan Petisah District, Medan City, North Sumatra, during the odd semester of the 2024–2025 academic year. The population of this study consisted of all Grade VIII students totaling 91 students from three classes. The research sample was selected using the simple random sampling technique by drawing lots to determine the class, and class VIII-C consisting of 30 students was obtained as the research sample. This technique was used because each member of the population had the same opportunity to be selected as a sample (Arikunto, 2018). The research variables consisted of learning motivation (X1) and learning activeness (X2) as independent variables, and mathematical communication ability (Y) as the dependent variable.

Data collection in this study used tests and questionnaires. The test was used to measure students' mathematical communication ability and was designed in the form of essay questions based on indicators of mathematical communication, such as expressing mathematical ideas, using mathematical models, and explaining mathematical situations in the form of symbols, diagrams, or tables (NCTM, 2000; Wijayanto et al., 2018). The questionnaire was used to measure students' learning motivation and learning activeness using a Likert scale consisting of four answer choices. The Likert scale was used to measure attitudes, perceptions, and motivation toward a research object (Sugiyono, 2019). The research instruments were developed based on relevant theoretical indicators and were then tested for validity and reliability to ensure that the instruments used were appropriate and had a good level of reliability in collecting research data (Arikunto, 2018).

The data obtained were then analyzed using statistical analysis techniques with the assistance of the SPSS program. Before testing the hypotheses, prerequisite tests were conducted, including the normality test, linearity test, and multicollinearity test, to ensure that the data met the assumptions of regression analysis (Ghozali, 2018). Furthermore, hypothesis testing was conducted using simple linear regression analysis to determine the influence of each independent variable on the dependent variable. In addition, multiple linear regression analysis was used to determine the simultaneous influence of learning motivation and learning activeness on students' mathematical communication ability. Regression analysis was used to determine the relationship and the magnitude of influence among variables in quantitative research (Wijayanto et al., 2018).

The results of the analysis were then used as the basis for drawing conclusions regarding the relationships among variables in this study.

3. RESULTS

This study was conducted on Grade VIII students of MTs Miftahussalam with a total sample of 30 students. The study aimed to determine the relationship between learning motivation and learning activeness and students' mathematical communication ability. Before the instruments were used, validity and reliability tests were conducted first.

Table 1. Results of Instrument Validity Test

Variable	Number of Items	Valid Items	Invalid Items
Learning Motivation	30	15	15
Learning activeness	30	22	8
Mathematical Communication	3	3	0

The results of the validity test showed that in the learning motivation instrument, 15 statement items were valid out of 30 statements. Meanwhile, in the learning activeness instrument, 22 statement items were valid out of 30 statements. In the mathematical communication ability test instrument, which consisted of 3 questions, all questions were declared valid. These results indicated that the instruments used in the study were appropriate for data collection. In addition to the validity test, a reliability test was also conducted to determine the consistency level of the research instruments.

Table 2. Results of Reliability Test

Variable	r_{11}	Category
Learning Motivation	0.895	Very High
Learning activeness	0.881	Very High
Mathematical Communication	0.695	High

Based on the results of the reliability test, the reliability coefficient of learning motivation was 0.895 with a very high category, learning activeness was 0.881 with a very high category, and mathematical communication ability was 0.695 with a high category. Thus, the instruments used in this study had a good level of reliability and could be used to measure the research variables. Furthermore, descriptive statistical analysis was conducted to examine the general description of the research data.

Table 3. Descriptive Statistics of Research Variables

Variable	N	Minimum	Maximum	Mean	Std. Deviation
Learning Motivation	30	44	56	51.93	3.463
Learning activeness	30	59	112	87.13	14.364
Mathematical Communication	30	30	53	100	10.629

The results of the analysis showed that the average score of students' learning motivation was 51.93 with a minimum score of 44 and a maximum score of 56, and a standard deviation of 3.463. Students' learning activeness had an average score of 87.13 with a minimum score of 59 and a maximum score of 112, and a standard deviation of 14.364. Meanwhile, students' mathematical communication ability had an average score of 77.30 with a minimum score of 53 and a maximum score of 100, and a standard deviation of 10.629. These data indicated that, in general, students' learning motivation, learning activeness, and mathematical communication ability were in the moderate category.

Table 4. Categories of Research Variables

Variable	Low	Medium	High
Motivation to Learn	16.7%	63.3%	20%
Active Learning	10%	60%	30%
Mathematical Communication Skills	20%	60%	20%

Based on the data categorization, most students had learning motivation in the moderate category with a percentage of 63.3%, while 16.7% were in the low category and 20% were in the high category. In the learning activeness variable, most students were also in the moderate category at 60%, with 10% in the low category and 30% in the high category. Meanwhile, students' mathematical communication ability was mostly in the moderate category at 60%, with 20% in the low category and 20% in the high category. Furthermore, a normality test was conducted using the Kolmogorov–Smirnov test.

Table 5. Results of Normality Test

Variabel	Sig. (2-tailed)	Keterangan
Motivation to learn	0.007	Tidak normal
Active learning	0.200	Normal
Mathematical communication	0.002	Tidak Normal

The test results showed that the learning motivation variable had a significance value of 0.007, learning activeness had a significance value of 0.200, and mathematical communication ability had a significance value of 0.002. Based on these results, some variables were not normally distributed because the significance values were less than 0.05. Therefore, further analysis was conducted using a non-parametric test, namely the Spearman Rank correlation.

Table 6. Results of Spearman Correlation Test

Variable Relationship	Correlation Coefficient	Sig	Description
Motivation to learn - learning activity	0.314	0.091	Not Significant
Motivation to learn - mathematical communication	0.085	0.327	Not Significant
Learning activity - mathematical communication	-0.159	0.201	Not Significant

The results of the Spearman correlation test showed that the relationship between learning motivation and learning activeness had a significance value of 0.091 with a correlation coefficient of 0.314. The relationship between learning motivation and mathematical communication ability had a significance value of 0.327 with a correlation coefficient of 0.085. Meanwhile, the relationship between learning activeness and mathematical communication ability had a significance value of 0.201 with a correlation coefficient of -0.159. The significance values in all three relationships were greater than 0.05; therefore, it was concluded that there was no significant relationship among these variables.

4. DISCUSSION

The results of the study showed that the learning motivation of Grade VIII students at MTs Miftahussalam was in the moderate category with a percentage of 63.3%. This indicated that most students had a sufficient level of motivation in participating in the mathematics learning process, although it had not been fully optimal. Learning motivation was an important factor that influenced learning success because it encouraged students to be more diligent, active, and persistent in understanding the learning material. Students who had good learning motivation tended to show greater effort in completing tasks and participating in learning activities. This finding was in line with the opinion that learning motivation was an internal and external drive within students that generated enthusiasm for engaging in learning activities (Sardiman, 2018). In addition, research conducted by Emda (2017) also stated that learning motivation had an important role in increasing student involvement in the learning process.

Besides learning motivation, students' learning activeness in this study was also in the moderate category with a percentage of 60%. Learning activeness was one of the important indicators in learning that reflected students' involvement in the learning process, such as asking questions, answering questions, participating in discussions, and expressing opinions. However, the level of learning activeness that remained in the moderate category indicated that students had not been fully involved optimally in mathematics learning activities. This condition could have been influenced by various factors such as the teaching methods used by teachers, the learning environment, and the characteristics of the students themselves. In constructivist theory, effective learning occurred when students were actively involved in constructing their own knowledge through interaction and learning experiences (Susanti, 2021). Other studies also stated that students' learning activeness was strongly influenced by the learning strategies used by teachers in creating a participatory learning environment (Hamalik, 2019).

Furthermore, students' mathematical communication ability in this study was mostly in the moderate category with a percentage of 60%. Mathematical communication ability referred to students' ability to express ideas, concepts, and the process of solving mathematical problems both orally and in writing. This ability was very important in mathematics learning because it helped students understand concepts and explain problem-solving steps systematically. However, the results of the study indicated that students' mathematical communication ability was still not optimal. This could have been caused by the lack of opportunities for students to express their ideas or explain their thinking during the mathematics learning process. According to NCTM (2000), mathematical communication was one of the important competencies that students should possess so that they could express mathematical understanding clearly and logically. Research conducted by Hodiyanto (2017) also showed that students' mathematical communication ability was influenced by conceptual understanding and learning activities that involved discussion and presentation.

Based on the results of the Spearman correlation analysis, this study showed that there was no significant relationship between learning motivation and learning activeness, between learning motivation and mathematical communication ability, or between learning activeness and mathematical communication ability. This was indicated by the significance values of each variable, which were greater than 0.05. These results indicated that learning motivation and learning activeness did not directly influence students' mathematical communication ability. This condition could have been caused by several other factors such as the teaching methods used, the limited duration of the research, and the lack of practice given to students in communicating mathematical ideas. Previous studies also showed that students' mathematical communication ability was not only influenced by learning motivation and learning activeness but also by other

factors such as critical thinking skills, conceptual understanding, and the learning models used in the mathematics learning process (Hendriana & Kadarisma, 2019).

5. CONCLUSION

Based on the results of the study conducted on Grade VIII students at MTs Miftahussalam Medan, it was concluded that students' learning motivation, learning activeness, and mathematical communication ability were in the moderate category. This indicated that students had the motivation to learn and were involved in the learning process, although it had not been fully optimal in supporting their mathematical communication ability. Some students were able to express mathematical ideas and explain problem-solving steps, but there were still difficulties in expressing their thoughts clearly and systematically. The results of the correlation analysis also showed that there was no significant relationship between learning motivation and learning activeness and students' mathematical communication ability. Thus, students' mathematical communication ability was likely influenced by other factors such as learning strategies, conceptual understanding, and the teaching methods used in the mathematics learning process.

REFERENCES

Aminah, S., Wijaya, T., & Yuspriyati, D. (2018). An analysis of students' mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 12(1), 45–54.

Anggraena, Y. (2016). An analysis of students' mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 10(2), 135–142.

Ansari, B. I. (2016). *Mathematical communication: Thinking strategies and learning management*. Banda Aceh: Pena.

Arikunto, S. (2018). *Research procedures: A practical approach* (Revised ed.). Jakarta: Rineka Cipta.

Azhar, A. (2018). *Learning media*. Jakarta: Raja Grafindo Persada.

Dewi, N. R., Wibowo, M. E., & Purwanto, E. (2019). The influence of learning motivation on students' learning outcomes. *Jurnal Pendidikan*, 4(2), 120–128.

Emda, A. (2017). The position of students' learning motivation in the learning process. *Lantanida Journal*, 5(2), 172–182.

Ghozali, I. (2018). *Multivariate analysis applications with the IBM SPSS program*. Semarang: Badan Penerbit Universitas Diponegoro.

Hamalik, O. (2019). *Teaching and learning processes*. Jakarta: Bumi Aksara.

Hendriana, H., & Kadarisma, G. (2019). *Self-regulated learning in mathematics learning*. Bandung: Refika Aditama.

Hermawan Susanto. (2019). *Learning and teaching theories*. Yogyakarta: Media Akademi.

Hodiyanto. (2017). Mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 7(1), 9–18.

Idzhar, A. (2016). The role of teachers in improving students' learning motivation. *Jurnal Office*, 2(2), 221–228.

NCTM. (2000). *Principles and standards for school mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Nurfuandi. (2020). The influence of learning motivation on students' learning outcomes. *Jurnal Pendidikan*, 5(1), 56–64.

Nurhayanti, E., Suryadi, D., & Turmudi. (2021). An analysis of students' mathematical communication ability. *Jurnal Pendidikan Matematika*, 15(1), 77–86.

Nurhayati, S. (2021). The influence of learning motivation on students' learning outcomes. *Jurnal Pendidikan*, 6(2), 145–153.

Pristiwanti, D., Badariah, B., Hidayat, S., & Dewi, R. (2022). The concept of education. *Jurnal Pendidikan dan Konseling*, 4(6), 7911–7915.

Purba, J. (2022). The influence of learning activeness on students' learning outcomes. *Jurnal Pendidikan*, 7(1), 34–41.

Sardiman. (2018). *Interaction and motivation in teaching and learning*. Jakarta: Rajawali Pers.

Setiani, R., Suryadi, D., & Turmudi. (2019). An analysis of students' mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 13(2), 102–110.

Sugiyono. (2019). *Quantitative, qualitative, and R&D research methods*. Bandung: Alfabeta.

Sulistyawati, E. (2020). The influence of learning motivation on students' mathematics learning outcomes. *Jurnal Pendidikan Matematika*, 8(1), 65–72.

Susanti, L. (2021). *Active learning strategies*. Yogyakarta: Deepublish.

Ulyawati, D., Suryadi, D., & Turmudi. (2020). An analysis of students' mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 14(1), 50–58.

Umar. (2012). *Research methods for business theses and dissertations*. Jakarta: Raja Grafindo Persada.

Wardhana, I. (2018). The influence of learning motivation on students' learning outcomes. *Jurnal Pendidikan*, 3(1), 21–29.

Wijayanti, R., Suryadi, D., & Turmudi. (2019). An analysis of students' mathematical communication ability in mathematics learning. *Jurnal Pendidikan Matematika*, 13(1), 11–19.

Wijayanto, A. D., Fajriah, S. N., & Anita, I. W. (2018). An analysis of junior high school students' mathematical communication ability on triangle and quadrilateral material. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 2(1), 97–104.

Wungguli, A. (2020). The influence of learning motivation on students' mathematics learning outcomes. *Jurnal Pendidikan Matematika*, 4(2), 88–95.