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The Influence of Learning Motivation on Students' Mathematical Communication Skills

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ABSTRACT

Mathematical communication skills are a fundamental component of mathematics learning because they enable students to express ideas, reasoning, and problem-solving processes clearly both orally and in writing. However, many junior high school students still show limitations in articulating mathematical concepts, and their level of learning motivation may influence this. This study aims to analyze the relationship between learning motivation and mathematical communication skills among eighth-grade students at SMPN 5 Sumedang. The research employed a quantitative approach with an experimental design. The subjects were 34 students from classes VIII-H and VIII-I, selected through cluster sampling. Learning motivation was treated as the independent variable, while mathematical communication skills were the dependent variable. Data were collected using two instruments: a Likert-scale learning motivation questionnaire and an essay test on exponents to measure mathematical communication skills. Data analysis involved descriptive statistics and Product-Moment correlation after satisfying the assumptions of normality and linearity. The results indicated that students' learning motivation was in the moderate category (mean = 77.33), as were their mathematical communication skills (mean = 71.77). Correlation analysis yielded r = 0.305, indicating a positive but weak relationship between the two variables, which was not statistically significant at the 0.05 level. These findings suggest that although learning motivation tends to be associated with mathematical communication skills, it is not a dominant factor. Therefore, efforts to improve students' mathematical communication should also consider other aspects such as instructional strategies, student engagement, and a supportive learning environment.

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1. INTRODUCTION

Mathematical communication skills are one of the important competencies that students must possess in mathematics learning [1]. These skills include the ability to convey

mathematical ideas, concepts, and reasoning both orally and in writing through symbols, tables, diagrams, and appropriate mathematical language [2]. Mathematical communication not only helps students understand concepts but also helps develop critical thinking and problem-solving skills [3]. Therefore, strengthening mathematical communication skills is an essential part of achieving the objectives of mathematics learning at the junior high school level [4].

From a theoretical perspective, mathematical communication is closely related to constructivist learning theory, which emphasizes that knowledge is actively constructed through interaction, discussion, and explanation [5]. According to this perspective, students learn mathematics more effectively when they are given opportunities to articulate their thinking, justify their reasoning, and engage in mathematical discourse [6]. In addition, social learning theory suggests that students' communication skills develop through interaction with teachers and peers in a collaborative learning environment.

One internal factor influencing students' success in learning mathematics is learning motivation [7]. Learning motivation refers to internal and external drives that generate enthusiasm, direction, and persistence in students' learning activities [8]. Students with high motivation tend to participate more actively in classroom discussions, feel more confident in expressing their ideas, and communicate more effectively when explaining mathematical concepts [9]. In contrast, students with low motivation are often passive, hesitant to speak, and less able to articulate their mathematical reasoning [10].

However, in practice, many junior high school students still experience difficulties in mathematical communication [11]. Common problems include inability to clearly explain solution steps, improper use of mathematical symbols, and difficulty translating word problems into mathematical expressions [12]. Preliminary observations at SMPN 5 Sumedang, particularly among eighth-grade students, revealed that some students tended to be passive during mathematics lessons, rarely asked questions, and lacked confidence in presenting their answers. These conditions indicate potential issues with learning motivation that may be affecting students' mathematical communication skills.

Several previous studies have shown a relationship between learning motivation and mathematical communication skills. A study by Kale and Nggaba [13] found that learning motivation significantly affects junior high school students' mathematical communication skills. Another study by Sahputri and Ilmi [14] also found that students with high learning motivation demonstrated better mathematical communication skills than those with low motivation. However, most of these studies used large sample sizes and correlational research designs and did not specifically examine small-class contexts using an experimental approach.

Despite these findings, there remains a research gap in the limited use of experimental approaches with small, localized samples, particularly in regional schools such as SMPN 5 Sumedang. In addition, few studies have applied regression analysis to quantify the magnitude of the effect of learning motivation on mathematical communication skills among eighth-grade students in this specific setting [15]. Therefore, the novelty of this study lies in its use of an experimental design with cluster sampling in a small-class context, combined

with regression analysis to examine the influence of learning motivation on mathematical communication skills in a specific regional school.

Based on these considerations, this study aims to analyze the effect of learning motivation on the mathematical communication skills of eighth-grade students at SMPN 5 Sumedang. In terms of problem-solving efforts, the study is expected to provide empirical evidence that can help teachers design learning strategies that foster motivation, such as interactive discussions, problem-based learning, and collaborative activities that encourage students to communicate mathematically.

This research is expected to make theoretical contributions by enriching the literature on motivation and mathematical communication in mathematics education. In practice, the findings are expected to assist teachers and schools in developing more effective teaching approaches to improve students' motivation and communication skills, ultimately leading to better mathematics learning outcomes.

2. METHOD

This study employed a quantitative, experimental research design to analyze the effect of learning motivation on students' mathematical communication skills. The quantitative approach was chosen because the study focuses on measuring variables numerically and testing the causal relationship between the independent and dependent variables through statistical analysis.

The subjects of this study were eighth-grade students of SMPN 5 Sumedang. The research sample consisted of 34 students from classes VIII-H and VIII-I of SMPN 5 Sumedang. The sample was selected using a cluster sampling technique, given that these classes had relatively homogeneous characteristics and were representative of the research population. In this study, learning motivation was the independent variable (X), and students' mathematical communication skills were the dependent variable (Y).

Data were collected using two types of instruments: a learning motivation questionnaire and a mathematical communication skills test. The learning motivation questionnaire was used to measure students' levels of learning motivation and to strengthen the interpretation of the results of the mathematical communication skills test. The questionnaire was constructed as statements using a five-point Likert scale, with options strongly agree (SA), agree (A), undecided (U), disagree (D), and strongly disagree (SD). The learning motivation questionnaire consisted of 24 items, developed based on a combination of learning motivation indicators proposed by Sardiman and Uno, who conceptualize learning motivation as internal and external drives that generate enthusiasm for learning, sustain learning activities, and guide students' learning behavior.

The indicators of learning motivation used in this study included: (1) desire and willingness to succeed, which encompass the desire to achieve good learning outcomes and the effort to complete tasks earnestly; (2) drives and needs in learning, such as the perception that learning mathematics is important and the need to understand the material; (3) future hopes and aspirations, reflected in the ability to relate mathematics learning to academic or career goals and the presence of specific achievement targets; (4) rewards in learning, including positive feelings toward praise or good grades and motivation arising from

recognition of learning efforts; (5) engaging learning activities, indicated by enthusiasm for participating in lessons and interest in learning methods, media, or activities; and (6) a conducive learning environment, characterized by comfort, safety, and students' openness to asking questions and expressing opinions during the learning process.

The second instrument was a mathematical communication skills test comprising three essay questions. This test was designed to measure students' ability to express mathematical ideas through symbols, tables, diagrams, and logical written explanations. The test used exponentiation for eighth-grade junior high school students, implemented using a Problem-Based Learning (PBL) approach. The test questions were presented as contextual problems related to a paper-folding experiment to observe the relationship between the number of folds and the paper's thickness.

Question one aimed to measure problem comprehension, specifically students' ability to write a mathematical model and explain its meaning using the concept of exponents. Question two measured students' representational and mathematical reasoning abilities through presenting the relationship between the number of folds and paper thickness in the form of a table or diagram, as well as explaining the emerging pattern. Question three measured problem-solving and mathematical explanation skills, including the ability to write solution steps systematically and logically, accompanied by clear mathematical reasoning.

Each test item had a different weight based on the results of the item difficulty analysis. Questions one and two were each worth 20 points, while question three was worth 60 points. The scoring of students' mathematical communication skills was based on the rubric proposed by Cai, Lane, and Jakabcin (1996), which was then further developed and adapted to the needs of this research instrument. The scoring rubric included aspects such as the accuracy of the mathematical model, the use of symbols and notation, the clarity of visual representations, the accuracy of calculations, the completeness of solution steps, and the clarity of students' explanations and mathematical language.

The data obtained from the learning motivation questionnaire and the mathematical communication skills test were analyzed using regression analysis. Regression analysis was employed to quantify the effect of learning motivation on students' mathematical communication skills. The results of this analysis are expected to provide an empirical description of the relationship between the two variables examined.

3. RESULTS AND DISCUSSION

3.1. Results

Results of the Student Learning Motivation Questionnaire

The distribution of the learning motivation questionnaire to 34 students of class VIII-I at SMPN 5 Sumedang revealed variations in students' levels of learning motivation. The recapitulation of the learning motivation questionnaire results is presented in Table 1.

Based on Table 1, most students were in the moderate learning motivation category, totaling 16 students. 14 students were categorized as having low learning motivation, while 4 were categorized as having high learning motivation. Descriptive statistical analysis showed that the mean score for students' learning motivation was 77.33, with a high of 97

and a low of 61. These findings indicate that, in general, students' learning motivation was moderate, although some students with low motivation require special attention.

Table 1. Recapitulation of Students' Learning Motivation Results

Category	Number of Students
Low	14
Moderate	16
High	4
Total	34

Results of the Students' Mathematical Communication Skills Test

Students' mathematical communication skills were obtained through an essay test administered to 34 students. The results of students' mathematical communication skills are presented in Table 2.

Table 2. Recapitulation of Students' Mathematical Communication Skills Results

Category	Number of Students
Low	5
Moderate	2
High	27
Total	34

Based on Table 2, 27 students, or the majority, were in the high category of mathematical communication skills. Meanwhile, 5 students were in the low category, and 2 students were in the moderate category. The mean score for students' mathematical communication skills was 71.77, which falls within the moderate range. The highest score obtained by students was 100, categorized as high, while the lowest score was 0, categorized as very low. This variation in scores indicates differences in students' abilities to present, explain, and reason about mathematical ideas in written and visual forms.

Results of Hypothesis Testing

Before conducting hypothesis testing, the data were first examined through prerequisite tests, including normality and linearity tests. The results of these prerequisite tests indicated that the data met the assumptions required for correlation analysis. Hypothesis testing was then carried out using Product-Moment correlation analysis. The research hypotheses were formulated as follows:

H_0 : There is no positive relationship between learning motivation and students' mathematical communication skills.

H_a : There is a positive relationship between learning motivation and students' mathematical communication skills.

The results of the correlation test between learning motivation and students' mathematical communication skills are presented in Table 3.

Based on Table 3, the correlation coefficient obtained was r = 0.305, indicating a positive relationship with a low level of correlation between learning motivation and students' mathematical communication skills. The significance value of 0.269 (> 0.05)

indicates that the relationship is not statistically significant. Therefore, statistically, H_0 is accepted and H_a is rejected.

Table 3. Results of the Correlation Test between Learning Motivation and Mathematical Communication Skills

Statistic	Value
N	34
Correlation Coefficient (r)	0.305
Sig. (2-tailed)	0.269

Nevertheless, the positive correlation coefficient suggests a tendency that higher learning motivation is associated with higher scores in students' mathematical communication skills. The contribution of learning motivation to mathematical communication skills is reflected in a coefficient of 0.381, indicating a positive but relatively low influence.

The findings of this study indicate that students' mathematical communication skills are not determined solely by test scores but are also influenced by various other factors. Mathematics, as a subject, generally requires higher-order thinking skills, such as application and analysis; therefore, students are not only required to understand concepts but also to communicate mathematical ideas and reasoning clearly and coherently. The scores on the mathematical communication skills test reflect students' ability to interpret problems and convey mathematical solutions accurately. However, the limitations of this study, which was temporary and involved few variables, suggest that the test instrument may not fully represent students' mathematical communication skills. In addition, mathematical communication skills may be influenced by factors such as self-confidence, participation in discussions, attitudes toward mathematics, and students' behavior and diligence in learning. These factors are closely related to learning motivation and also contribute to students' overall achievement in mathematics.

3.2. Discussion

The results of hypothesis testing indicate a positive relationship between learning motivation and the mathematical communication skills of eighth-grade students at SMPN 5 Sumedang, with a correlation coefficient of $r = 0.305$. However, this relationship falls into the low category and is not statistically significant ($Sig. = 0.269 > 0.05$). These findings indicate that learning motivation tends to influence students' mathematical communication skills, but the effect is not strong enough to be considered statistically significant.

Theoretically, learning motivation is an internal factor that plays an important role in encouraging students' engagement in the learning process. Sardiman [16]states that learning motivation functions as a driver of learning activities, a guide for learning behavior, and a determinant of students' persistence in achieving learning objectives. In line with this view, Uno [17] emphasizes that students with high learning motivation tend to be more active, more confident in expressing opinions, and better able to communicate their ideas. In the context of mathematics learning, motivation should encourage students to engage more in

thinking processes, discussions, and the expression of mathematical ideas, both orally and in writing [18].

The results of this study, which show a positive relationship between learning motivation and mathematical communication skills, support these theoretical perspectives, although the relationship is weak. This finding is consistent with the study by Kai et al. [19], which found that learning motivation positively affects junior high school students' mathematical communication skills. However, unlike that study, which reported a significant effect, this study found that learning motivation is not statistically significant [20]. This difference may be due to variations in sample size, student characteristics, and the learning context used. Another study by Rohman et al. [21] also showed that learning motivation contributes to mathematical communication skills but is not the sole determining factor. They concluded that students' mathematical communication skills are influenced by a range of factors, including learning models, prior mathematical ability, self-confidence, and social interaction in the classroom. These findings reinforce the results of this study, which show that although learning motivation has a positive relationship, the strength of this relationship is relatively low due to other factors that also influence students' mathematical communication skills [22].

The low strength of the relationship in this study can also be explained by the characteristics of mathematical communication skills themselves [23]. Mathematical communication skills are not only related to students' willingness to learn but also to cognitive ability, mastery of concepts, and the ability to represent ideas in various forms, such as symbols, tables, diagrams, and mathematical language [24]. According to the National Council of Teachers of Mathematics [25], mathematical communication is a complex ability that requires continuous practice and support from an interactive learning environment. Therefore, high learning motivation does not necessarily lead directly to high mathematical communication skills unless appropriate learning strategies accompany it.

The results of this study are also in line with the research by Sulistyowati et al. [26], which found that learning motivation has a positive relationship with mathematics learning outcomes, but its contribution tends to be moderate to low when analyzed separately. This suggests that learning motivation plays a supporting role in strengthening the influence of other factors, such as learning methods and student engagement, rather than serving as a primary, standalone factor.

Thus, the findings of this study confirm that learning motivation is one of the factors that contribute to students' mathematical communication skills, but it is not a dominant factor. These findings imply that efforts to improve students' mathematical communication skills cannot rely solely on increasing learning motivation but must also be supported by the implementation of learning models that encourage interaction, discussion, and active expression of mathematical ideas, such as problem-based learning or cooperative learning.

4. CONCLUSION

Based on the study's results and the data analysis, it can be concluded that the learning motivation of eighth-grade students at SMPN 5 Sumedang is generally in the moderate category. Similarly, students' mathematical communication skills are average in the

moderate category, with variation in achievement among students. This indicates differences in the levels of learning motivation and mathematical communication skills among students within the same class.

The results of a Product-Moment correlation analysis indicate a positive relationship between learning motivation and students' mathematical communication skills, with a correlation coefficient of r = 0.305. However, this relationship falls into the low category and is not statistically significant. These findings suggest that learning motivation tends to be associated with improvements in mathematical communication skills, but this association is not strong enough to be statistically significant.

Therefore, learning motivation is not the sole factor determining students' mathematical communication skills. Mathematical communication skills are also influenced by other factors, such as understanding of mathematical concepts, self-confidence, active learning, and the strategies and learning models applied by teachers. Consequently, efforts to improve students' mathematical communication skills should be carried out through a comprehensive approach, not only by enhancing learning motivation but also by implementing learning practices that encourage active engagement and optimal expression of students' mathematical ideas.

REFERENCES

[1] H. Faizah and E. Sugandi, ‘Analisis Kemampuan Komunikasi Matematis Tulis Siswa Smp Pada Soal Cerita Bentuk Aljabar Dalam Pembelajaran Daring’, *AKSIOMA J. Program Studi Pendidik. Mat.*, vol. 11, no. 1, pp. 291–304, Mar. 2022, doi: 10.24127/ajpm.v11i1.4429.

[2] E. Sugandi, P. Prayogo, and H. Faizah, ‘Analisis Kemampuan Komunikasi Matematis Siswa Smp Melalui Pembelajaran Matematika Realistik Berbasis Etnomatematika Candi Tikus’, *JP2M J. Pendidik. Dan Pembelajaran Mat.*, vol. 9, no. 2, pp. 382–388, Oct. 2023, doi: 10.29100/jp2m.v9i2.4772.

[3] I. Maryati, Y. Suzana, D. Harefa, and I. T. Maulana, ‘Analisis Kemampuan Komunikasi Matematis dalam Materi Aljabar Linier’, *PRISMA*, vol. 11, no. 1, pp. 210–220, Jun. 2022, doi: 10.35194/jp.v11i1.2044.

[4] K. S. Sarumaha, R. Sarumaha, and E. Gee, ‘Analisis Kemampuan Komunikasi Matematis Siswa Pada Materi SPLDV Di Kelas VIII SMPN 3 Maniamolo Tahun Pembelajaran 2020/2021’, *J. Pendidik. Mat.*, vol. 1, no. 1, pp. 1–14, Apr. 2022, doi: 10.57094/afore.v1i1.432.

[5] T. Siregar, 'Effectiveness of the Problem-Based Learning Model in Improving Students' Mathematical Communication Skills and Learning Motivation', Oct. 20, 2025, *Preprints*: 2025101562. doi: 10.20944/preprints202510.1562.v1.

[6] J. W. Kusuma, 'Constructivism From Philosophy To Mathematics Learning', *Int. J. Econ. Educ. Enterpreneurship*, vol. 1, no. 2, Aug. 2021, Accessed: Feb. 04, 2026. [Online]. Available: https://doi.org/10.53067/ije3.vli2

[7] L. A. Fajrina, T. A. Arigiyati, and F. Sulistyowati, ‘Hubungan Motivasi Belajar dan Perhatian Orang Tua dengan Hasil Belajar Matematika Siswa SMP’, *Union J. Ilm. Pendidik. Mat.*, vol. 10, no. 3, pp. 347–356, Nov. 2022, doi: 10.30738/union.v10i3.13149.

[8] O. Rosfiani, D. A. Putri, N. Roismiati, S. F. Nurhaliza, and S. N. Ghofiya, ‘Hubungan Motivasi Belajar Dengan Hasil Belajar Siswa Pada Mata Pelajaran Bahasa Indonesia Kelas VIII SMP IT Al Madany Parung Panjang Kab. Bogor', *Alinea J. Bhs. Sastra Dan Pengajaran*, vol. 3, no. 3, pp. 624–637, Dec. 2023, doi: 10.58218/alinea.v3i3.743.

[9] R. Nugroho and A. Warmi, ‘Pengaruh Motivasi Belajar Terhadap Hasil Belajar Matematika Siswa Di SMPN 2 Tirtamulya’, *EduMatSains J. Pendidik. Mat. Dan Sains*, vol. 6, no. 2, pp. 407–418, Jan. 2022, doi: 10.33541/edumatsains.v6i2.3627.

[10] A. Waritsman, ‘Hubungan Motivasi Belajar Dengan Prestasi Belajar Matematika Siswa’, *Tolis Ilm. J. Penelit.*, vol. 2, no. 1, May 2020, doi: 10.56630/jti.v2i1.91.

[11] R. A. Lesh and H. M. Doerr, Eds, *Beyond constructivism: models and modeling perspectives on mathematics problem solving, learning, and teaching*. Mahwah, N.J: Lawrence Erlbaum Associates, 2003.

[12] I. Yulia, Aniswita, and G. H. Medika, ‘Hubungan Motivasi Terhadap Hasil Belajar Matematika Peserta Didik’, *EDUSAINS J. Educ. Sci.*, vol. 2, no. 1, pp. 28–36, Jun. 2024, doi: 10.57255/edusains.v2i1.1484.
[13] A. D. R. Kale and M. E. Nggaba, ‘Pengaruh Model Pembelajaran Kooperatif Tipe Jigsaw Terhadap Kemampuan Komunikasi Matematis Dan Motivasi Belajar Siswa’, *J. MathEdu Math. Educ. J.*, vol. 8, no. 2, pp. 153–162, Jun. 2025, doi: 10.37081/mathedu.v8i2.7379.
[14] R. G. Sahputri and N. B. Ilmi, 'Pengaruh Pembelajaran Berdiferensiasi terhadap Motivasi Belajar dan Kemampuan Komunikasi Matematis Siswa SMPN 4 Tulungagung: The Influence of Differentiated Learning on Learning Motivation and Mathematical Communication Skills of Students at SMPN 4 Tulungagung', *Edu Cendikia J. Ilm. Kependidikan*, vol. 4, no. 02, pp. 269–275, Jul. 2024, doi: 10.47709/educendikia.v4i02.4428.
[15] A. Syukri, J. Marzal, and M. Muhaimin, 'Constructivism-Based Mathematics Learning Multimedia to Improve Students' Mathematical Communication Skills | Indonesian Journal of Science and Mathematics Education', Sep. 2021, Accessed: Feb. 04, 2026. [Online]. Available: https://ejournal.radenintan.ac.id/index.php/IJSME/article/view/6201
[16] Sardiman, *Interaksi & motivasi belajar mengajar*. Rajagrafindo Persada (Rajawali Pers), 2011.
[17] H. B. Uno, *Teori Motivasi dan Pengukurannya: Analisis di Bidang Pendidikan*. Bumi Aksara, 2021.
[18] M. Biber, 'Constructing Mental Models: Mathematical Communication and Discourses in Conceptual Understanding', *Necmettin Erbakan Üniversitesi Ereğli Eğitim Fakültesi Derg.*, vol. 5, no. Özel Sayı, pp. 271–305, Oct. 2023.
[19] J. P. A. Kai, E. P. Hulukati, and I. Djakaria, ‘Pengaruh Kemampuan Komunikasi Matematis Dan Motivasi Belajar Terhadap Hasil Belajar Siswa’, *HISTOGRAM J. Pendidik. Mat.*, vol. 7, no. 2, pp. 65–76, Dec. 2023, doi: 10.31100/histogram.v7i2.2935.
[20] L. M. Angraini, N. Kania, and F. Gürbüz, 'Students' Proficiency in Computational Thinking Through Constructivist Learning Theory', *Int. J. Math. Math. Educ. IJMME*, vol. 2, no. 1, pp. 45–59, Feb. 2024, doi: 10.56855/ijmme.v2i1.963.
[21] P. S. Rohman, B. G. Kartasasmita, and I. I. Supianti, ‘Penerapan Model Pembelajaran Savi untuk Meningkatkan Kemampuan Komunikasi Matematis dan Motivasi Belajar Mahasiswa Ditinjau dari Jurusan Asal Sekolah’, *Pasundan J. Math. Educ. J. Pendidik. Mat.*, vol. 13, no. 2, pp. 98–114, Nov. 2023, doi: 10.23969/pjme.v13i2.9750.
[22] T. Siregar, 'The Effectiveness of Using GeoGebra Application with Problem-Based Learning Model on Students' Mathematical Communication Ability', Nov. 04, 2025, *Preprints*: 2025110106. doi: 10.20944/preprints202511.0106.v1.
[23] P. A. Luong, 'Applying the Concepts of "Community" and "Social Interaction" from Vygotsky's Sociocultural Theory of Cognitive Development in Math Teaching to Develop Learner's Math Communication Competencies', *J. Contemp. Educ. Policies Pract.*, pp. 209–215, Nov. 2022, doi: 10.52296/vje.2022.243.
[24] S. Wibowo, M. N. Wangid, and F. M. Firdaus, 'The Relevance of Vygotsky's Constructivism Learning Theory with the Differentiated Learning Primary Schools', *J. Educ. Learn. EduLearn*, vol. 19, no. 1, pp. 431–440, 2025.
[25] National Council of Teachers of Mathematics, *Principles and Standards for School Mathematics*. National Council of Teachers of Mathematics, 2000.
[26] E. D. Sulistyowati, N. Hariyati, and A. Khamidi, ‘Hubungan Lingkungan Belajar dan Motivasi Belajar terhadap Hasil Belajar’, *J. Educ. Res.*, vol. 5, no. 3, pp. 2506–2514, Jul. 2024, doi: 10.37985/jer.v5i3.1051.