KEMAMPUAN KOMUNIKASI MATEMATIS PADA SISWA KELAS VIII SMP DITINJAU DARI GAYA BELAJAR DAN *SELF REGULATED LEARNING*

TESIS

Diajukan untuk memenuhi sebagian syarat untuk memperoleh gelar Magister Pendidikan pada Program Studi Pendidikan Matematika

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PROGRAM STUDI PENDIDIKAN MATEMATIKA
FAKULTAS PENDIDIKAN MATEMATIKA DAN ILMU PENGETAHUAN ALAM
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LEMBAR HAK CIPTA

KEMAMPUAN KOMUNIKASI MATEMATIS PADA SISWA KELAS VIII SMP DITINJAU DARI GAYA BELAJAR DAN *SELF REGULATED LEARNING*

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Sebuah tesis yang diajukan untuk memenuhi salah satu syarat memperoleh gelar Magister Pendidikan (M.Pd) pada Program Studi Pendidikan Matematika

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ABSTRAK

Nazla Nurul Aulia Panggabean (2023). Kemampuan Komunikasi Matematis Pada Siswa Kelas VIII SMP Ditinjau dari Gaya Belajar dan *Self Regulated Learning.*

Penelitian ini bertujuan untuk memperoleh deskripsi mengenai bentuk komunikasi matematis siswa ditinjau dari gaya belajar dan *self regulated learning* pada siswa kelas VIII SMP. Penelitian ini menggunakan metode kualitatif dengan pendekatan fenomenologi. Subjek penelitian ini adalah siswa kelas VIII di salah satu SMP Negeri di Kabupaten Ciamis yang melibatkan 28 siswa. Kriteria pemilihan subjek didasarkan pada tipe gaya belajar siswa (auditori, visual dan kinestetik) dan tingkat *self regulated learning* siswa (tinggi, sedang dan rendah). Teknik pengumpulan data melalui angket gaya belajar, angket self regulated learning, pemberian tes kemampuan komunikasi matematis dan wawancara. Data yang sudah terkumpul dianalisis dengan metode analisis data Miles dan Huberman, yakni tahap reduksi data, penyajian data dan penarikan kesimpulan. Hasil penelitian menunjukkan bahwa; Kemampuan komunikasi matematis siswa ditinjau dari gaya belajar dan *self regulated learning* pada materi segiempat diperoleh delapan kategori yaitu siswa dengan gaya belajar visual dan *self regulated learning* kategori tinggi memiliki kemampuan komunikasi matematis kategori tinggi, siswa dengan gaya belajar visual dan *self regulated learning* kategori sedang memiliki kemampuan komunikasi matematis kategori tinggi, siswa dengan gaya belajar visual dan *self regulated learning* kategori rendah memiliki kemampuan komunikasi kategori rendah. Kemudian, siswa dengan gaya belajar auditori dan *self regulated learning* kategori sedang memiliki kemampuan komunikasi matematis kategori sedang, siswa dengan gaya belajar auditori dan *self regulated learning* kategori rendah memiliki kemampuan komunikasi matematis kategori rendah. Siswa dengan gaya belajar kinestetik dan *self regulated learning* kategori tinggi memiliki kemampuan komunikasi matematis kategori tinggi, siswa dengan gaya belajar kinestetik dan *self regulated learning* dengan kategori sedang memiliki kemampuan komunikasi matematis kategori sedang dan siswa dengan gaya belajar kinestetik dan *self regulated learning* kategori rendah memiliki kemampuan komunikasi matematis kategori rendah.

Kata kunci: Kemampuan Komunikasi Matematis, Gaya Belajar, *Self Regulated Learning*

ABSTRACT

Nazla Nurul Aulia Panggabean (2023). Mathematical Communication Ability in Grade VIII Junior High Students in terms of Learning Styles and Self Regulated Learning.

This study aims to obtain a description of the form of students' mathematical communication in terms of learning styles and self-regulated learning in class VIII students of junior high school. This study uses a qualitative method with a phenomenological approach. The subjects of this study were class VIII students at one of the public junior high schools in Ciamis Regency which involved 28 students. Subject selection criteria are based on the type of student learning style (auditory, visual and kinesthetic) and the level of student self-regulated learning (high, medium and low). Data collection techniques through learning style questionnaires, self-regulated learning questionnaires, giving tests of mathematical communication abilities and interviews. The data that has been collected is analyzed using the data analysis method of Miles and Huberman, namely the stages of data reduction, data presentation and drawing conclusions. The research results show that; Students' mathematical communication abilities in terms of learning styles and self-regulated learning on quadrilateral material obtained eight categories, namely students with visual learning styles and high categories of self-regulated learning have high category mathematical communication abilities, students with visual learning styles and self-regulated learning medium categories have the ability high category of mathematical communication, students with visual learning styles and low category self regulated learning have low category of communication skills. Then, students with auditory learning styles and self-regulated learning medium category have medium category mathematical communication abilities, students with low category auditory learning styles and self regulated learning have low category mathematical communication abilities. Students with kinesthetic learning styles and self-regulated learning in the high category have high category mathematical communication abilities, students with kinesthetic learning styles and self-regulated learning in the medium category have moderate category mathematical communication abilities and students with kinesthetic learning styles and low self-regulated learning have the ability low category mathematical communication

Kata kunci: Mathematics Communication Ability, Learning Styles, *Self Regulated Learning*

DAFTAR ISI

DAFTAR PUSTAKA

Ab, J. S., Margono, G., & Rahayu, W. (2019, February). The logical thinking ability: Mathematical disposition and self-regulated learning. In *Journal of Physics: Conference Series* (Vol. 1155, No. 1, p. 012092). IOP Publishing.

Adam, N. L., Alzahri, F. B., Soh, S. C., Bakar, N. A., & Kamal, N. A. M. (2017, November). Self-regulated learning and online learning: a systematic review. In *International Visual Informatics Conference* (pp. 143-154). Springer, Cham.

Ahmad, F., & Aziz, J. (2009). Students' perception of the teachers' teaching of literature communicating and understanding through the eyes of the audience. *European Journal of social sciences*, *7*(3), 17-26.

Aliffianti, T. R., Kurniati, N., Salsabila, N. H., & Turmuzi, M. (2022). Analisis kemampuan komunikasi matematis ditinjau dari gaya belajar siswa kelas VIII SMPN 5 kota Bima tahun ajaran 2021/2022. *Griya Journal of Mathematics Education and Application, 2*(2), 461-475.

Altun, H., & Serin, O. (2019). Determination of Learning Styles and Achievements of Talented Students in the Fields of Science and Mathematics. Cypriot Journal of Educational Sciences, 14(1), 80- 89.

Al Rosyid, M. D., Ariyanto, L., & Nursyahidah, F. (2022). Profil Kemampuan Komunikasi Matematis Siswa SMP Ditinjau dari Kemandirian Belajar. *Imajiner: Jurnal Matematika dan Pendidikan Matematika*, *4*(2), 136-140.

Amelia, R., Kadarisma, G., Fitriani, N., & Ahmadi, Y. (2020, October). The effect of online mathematics learning on junior high school mathematic resilience during covid-19 pandemic. In *Journal of Physics: Conference Series* (Vol. 1657, No. 1, p. 012011). IOP Publishing.

Amin, A., & Suardiman, S. P. (2016). Perbedaan prestasi belajar matematika siswa ditinjau dari gaya belajar dan model pembelajaran. *Jurnal Prima Edukasia*, *4*(1), 12-19.

Amin, M. (2016). Pengaruh Mind Map dan Gaya Belajar terhadap Hasil Belajar Matematika Siswa. *Tadris: Jurnal Keguruan Dan Ilmu Tarbiyah*, *1*(1), 85-92.

Aminulloh, R., Jupri, A., & Juandi, D. (2021). Students' Self-Regulated Learning During Online Learning In Vocational High School Bandung. *(JIML) JOURNAL OF INNOVATIVE MATHEMATICS LEARNING*, *4*(1), 41-48.

Andi, M., Ahmad, R. 2017. Analysis of Mathematical Communication Skills of Junior High School Students of Coastal Kolaka. *Journal of Mathematics Education*. Vol.2(2), 45-51

Anintya, Y.A., Pujiastuti, E., & Mashuri, M. (2017). Analysis of Mathematical Communication Skills Viewed From Student Learning Styles in Eight Grader Students in Learning Resource Based Learning Model. *Unnes Journal of Mathematics Education*, 6(1), 37-43.

Ansari, Bansui. 2015. *Komunikasi Matematik Strategi Berpikir dan Manajemen Belajar Konsep dan Aplikasi*. Banda Aceh: Pena

Anzora, A. (2017). Analisis Kemandirian Siswa pada Pembelajaran Matematika dengan Menerapkan Teori Belajar Humanistik. *Jurnal Gantang*, *2*(2), 99-103.

Apipah, S. (2018, March). An analysis of mathematical connection ability based on student learning style on visualization auditory kinesthetic (VAK) learning model with self-assessment. In *Journal of Physics: Conference Series* (Vol. 983, No. 1, p. 012138). IOP Publishing.

Arraniri, I., Purba, S., Kussanti, D. P., Lisnawati, T., Kurniawan, A., Putri, Y. D. S., ... & Nurislamiah, M. (2021). *Tantangan Pendidikan Indonesia Di Masa Depan*. Penerbit Insania.

Asmana, A. T., Laili, N. H., & Ardiyansah, A. A. (2018). Profil komunikasi matematika tertulis dalam pemecahan masalah matematika di SMP ditinjau dari kemampuan matematika. *Inspiramatika*, *4*(1), 1-12.

Astuti, A., & Leonard, L. (2015). Peran Kemampuan Komunikasi Matematika Terhadap Prestasi Belajar Matematika Siswa. *Formatif: Jurnal Ilmiah Pendidikan MIPA*, *2*(2).

Astuti, I. B., Sunandar, S., & Dwijayanti, I. (2017, September). Analisis Kemampuan Komunikasi Matematis Siswa dengan Gaya Belajar Visual pada Materi Pola Bilangan Kelas VIII SMP Negeri 2 Mranggen. In *SENATIK 2017*.

B. de Potter and M. Hernachi, *Quantum Learning.* Bandung: Kaifa, 2000.

Bansilal, S. (2015). Exploring student teachers' perceptions of the influence of technology in learning and teaching mathematics. *South African Journal of Education*, *35*(4).

Bayuningsih, A. S., Usodo, B., & Subanti, S. (2017, December). Analysis of junior high school students' problem-solving ability reviewed from self-regulated learning. In *International Journal of Science and Applied Science: Conference Series* (Vol. 2, No. 1, pp. 51-59).

Bire, A. L., Geradus, U., & Bire, J. (2014). Pengaruh gaya belajar visual, auditorial, dan kinestetik terhadap prestasi belajar siswa. *Jurnal Kependidikan: Penelitian Inovasi Pembelajaran*, *44*(2).

Boekaerts, M. (1999). Self-regulated learning: Where we are today. *International journal of educational research*, *31*(6), 445-457.

Bosman, A., & Schulze, S. (2018). Learning style preferences and Mathematics achievement of secondary school learners. *South African Journal of Education*, *38*(1).

Butler, D. L. (2002). Individualizing instruction in self-regulated learning. *Theory into practice*, *41*(2), 81-92.

Carter Jr, R. A., Rice, M., Yang, S., & Jackson, H. A. (2020). Self-regulated learning in online learning environments: strategies for remote learning. *Information and Learning Sciences*.

Clark, K. K., Jacobs, J., Pittman, M. E., & Borko, H. (2005). Strategies for building mathematical communication in the middle school classroom: Modeled in professional development, implemented in the classroom. *Current Issues in Middle Level Education*, *11*(2), 1-12.

D. C. Alexander and G. M. Koeberlein, Elementary Geometry for College Students (Fifth Edition), Canada: Cengange Learning, 2011

Damari, Ari. 2009. *KUPAS Matematika SMP Untuk Kelas 1,2&3*. Jakarta : Wahyu Media

Danaryanti, A., & Noviani, H. (2015). Pengaruh Gaya Belajar Matematika Siswa Kelas VII terhadap Kemampuan Komunikasi Matematis di SMP. *EDU-MAT: Jurnal Pendidikan Matematika*, 3(2).

De Poter, B. & Hernacki, M. (1999). Quantum learning. Yogyakarta: Kaifa.

De Villiers, M. (1994). The role and function of a hierarchical classification of quadrilaterals. *For the learning of mathematics*, *14*(1), 11-18.

Eddles-Hirsch, K. (2015). Phenomenology and educational research. *International Journal of Advanced Research*, *3*(8).

Efriyadi, D., & Nurhanurawati, N. (2021). Learning Motivation, Self-Regulated Learning, And Mathematical Communication Skills Verbal And Written By Students' In Learning Mathematics During The Covid-19 Pandemic. *Kreano, Jurnal Matematika Kreatif-Inovatif*, *12*(2), 264-275.

Ekaludini, U., & Darhim, D. (2020, April). Mathematical communication ability analysis of high school students on trigonometry learning. In *Journal of Physics: Conference Series* (Vol. 1521, No. 3, p. 032070). IOP Publishing

El-Adl, A., & Alkharusi, H. (2020). Relationships between Self-Regulated Learning Strategies, Learning Motivation and Mathematics Achievement. *Cypriot Journal of Educational Sciences*, *15*(1), 104-111.

Etuk, E. N., Afangideh, M. E., & Uya, A. O. (2013). Students' Perception of Teachers' Characteristics and Their Attitude towards Mathematics in Oron Education Zone, Nigeria. *International Education Studies*, *6*(2), 197-204.

Fahradina, N., Ansari, B. I., & Saiman, S. (2014). Peningkatan kemampuan komunikasi matematis dan kemandirian belajar siswa smp dengan menggunakan model investigasi kelompok. *Jurnal Didaktik Matematika*, *1*(2).

Fauzi, A., & Widjajanti, D. B. (2018, September). Self-regulated learning: the effect on student's mathematics achievement. In *Journal of Physics: Conference Series* (Vol. 1097, No. 1, p. 012139). IOP Publishing.

Fauziah, I., Maarif, S., & Pradipta, T. R. (2018). Peningkatan kemampuan komunikasi matematis dan self regulated learning siswa melalui model problem based learning (pbl). *Jurnal Analisa*, *4*(2), 90-98.

Fauziyah, R. R., & Jupri, A. (2020). Analysis of elementary school students' ability on mathematical communication and mathematical representation. In *Journal of Physics: Conference Series* (Vol. 1521, p. 032080).

Fitrah, M., Luthfiah. 2018. *Metodologi Penelitian Kualitatif, Tindakan Kelas & Studi Kasus*. Sukabumi : CV Jejak

Fitriana, R. W., Isnarto, I., & Prabowo, A. (2018). The analysis of studentâ€™s mathematical communication ability viewed from learning styles through project based learning models on cylinder and cone materials. *Unnes Journal of Mathematics Education*, *7*(3), 156-163.

Gabriel, F., Buckley, S., & Barthakur, A. (2020). The impact of mathematics anxiety on self-regulated learning and mathematical literacy. *Australian Journal of Education*, *64*(3), 227-242.

Gardenia, N., Herman, T., Juandi, D., Dahlan, T., & Kandaga, T. (2021, March). Analysis of mathematical communication skills of class 8 students on two-variable linear equation systems (SPLDV) concept. In *Journal of Physics: Conference Series* (Vol. 1806, No. 1, p. 012073). IOP Publishing.

Glynn, S. M., Aultman, L. P., & Owens, A. M. (2005). Motivation to learn in general education programs. *The Journal of General Education*, *54*(2), 150-170.

Haerudin, H. (2013). Pengaruh Pendekatan Savi Terhadap Kemampuan Komunikasi Dan Penalaran Matematikserta Kemandirian Belajar Siswa Smp. *Infinity Journal*, *2*(2), 183-193.

Herlina, S., Juandi, D., Saputri, V., & Anwar, V. N. (2022). Self-Regulated Learning berdasarkan Kemampuan Akademik Matematika: Literatur Review. *PRISMA*, *11*(1), 113-121.

Hidayati, K., & Listyani, E. (2010). Improving Instruments of Students Self-Regulated Learning. *J. Pendidik. Mat. Univ. Negeri Yogyakarta*.

Ishartono, N., Faiziyah, N., Sutarni, S., Putri, A. B., Fatmasari, L. W., Sayuti, M., ... & Yunus, M. M. (2021, January). Visual, Auditory, and Kinesthetic Students: How They Solve PISA-Oriented Mathematics Problems?. In *Journal of Physics: Conference Series* (Vol. 1720, No. 1, p. 012012). IOP Publishing.

Jurenka, R., Stareček, A., Vraňaková, N., & Cagaňova, D. (2018, November). The learning styles of the generation group Z and their influence on learning results in the learning process. In *2018 16th International Conference on Emerging eLearning Technologies and Applications (ICETA)* (pp. 251-260). IEEE.

Kartinah, K., Prasetyowati, D., Sutrisno, S., & Haryan, E. (2018). Analysis of Mathematical Communication Ability of Junior High School Students in Learning using Three-Dimensional Teaching Materials. *International Journal of Innovative Science and Modern Engineering (IJISME)*, *5*(9), 7-11.

Kazu, I. Y. (2009). The effect of learning styles on education and the teaching process. *Journal of Social Sciences*, *5*(2), 85-94.

Khusna, A. H. (2020). Profil Kemampuan Komunikasi Matematis Siswa Ditinjau dari Gaya Belajar. *EMTEKA: Jurnal Pendidikan Matematika*, *1*(2), 105-111.

Krisdianti, M., & Prayogo, P. (2022). High Schools' Students Mathematics Communication Ability: Learning Style Perspective. *Journal of Education and Learning Mathematics Research (JELMaR)*, 3(1), 58-66.

Kumaralalita, C. (2022, February). Kemampuan Komunikasi Matematis Siswa Kelas X Ditinjau dari Kemandirian Belajar. In *PRISMA, Prosiding Seminar Nasional Matematika* (Vol. 5, pp. 619-626).

Kurniawan, A. P., & Hartono, S. (2020). The Effect of Learning Style on Academic Achievement of Prospective Teachers in Mathematics Education. *Journal of Mathematical Pedagogy (JoMP)*, *2*(1).

Kurniawati, F., Suyitno, H., & Mulyono, M. (2021). Mathematical Communication Ability in terms of Student Learning Styles in Inquiry Based Learning Assisted by Module. *Unnes Journal of Mathematics Education Research*, *10*(2), 202-210.

Kusumah, Y. S., Kustiawati, D., & Herman, T. (2020). The Effect of GeoGebra in Three-Dimensional Geometry Learning on Students' Mathematical Communication Ability. *International Journal of Instruction*, *13*(2), 895-908.

Lanani, K. (2013). Belajar berkomunikasi dan komunikasi untuk belajar dalam pembelajaran matematika. *Infinity Journal*, *2*(1), 13-25.

Leasa, M., & Corebima, A. D. (2017). Emotional Intelligence among Auditory, Reading, and Kinesthetic Learning Styles of Elementary School Students in Ambon-Indonesia. *International Electronic Journal of Elementary Education*, *10*(1), 83-91.

Lenaini, I. (2021). Teknik pengambilan sampel purposive dan snowball sampling. *Historis: Jurnal Kajian, Penelitian dan Pengembangan Pendidikan Sejarah*, *6*(1), 33-39.

Lestari, Karunia Eka dan Mokhammad Ridwan Yudhanegara. (2018). *Penelitian Pendidikan Matematika.* Bandung: Pt Refika Aditama.

Liberna, H. (2018). Hubungan Gaya Belajar Visual dan Kecemasan Diri Terhadap Pemahaman Konsep Matematika Siswa kelas X SMK Negeri 41 Jakarta. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *2*(1), 98-108.

Lim, C. S., & Chew, C. M. (2007, December). Mathematical Communication in Malaysian Bilingual Classrooms. In *Paper APEC-Tsukuba International Conference* (pp. 1-2).

Maftuh, M. S. 2020. Komunikasi Matematis dalam Pemecahan Masalah Matematika Ditinjau dari Gaya Belajar. *Jurnal Pendidikan Matematika*. 8(2):241-252

Mardalis. (2006). Metode Penelitian (suatu pendekatan proposal). *Bumi Aksara, Jakarta.*

Mardawani. 2020. *Praktis Penelitian Kualitatif Teori Dasar dan Analisis Data dalam Perspektif Kualitatif*. Jakarta : Deepublish

Maulyda, M. A., Annizar, A. M., Hidayati, V. R., & Mukhlis, M. (2020, May). Analysis of students' verbal and written mathematical communication error in solving word problem. In *Journal of Physics: Conference Series* (Vol. 1538, No. 1, p. 012083). IOP Publishing.

McLoughlin, C. (1999). The implications of the research literature on learning styles for the design of instructional material. *Australasian Journal of Educational Technology*, *15*(3).

Meilantifa, dkk, 2018. *Geometri Datar*. Bahasa dan Sastra Arab, UIN Sunan Gunung Djati.

Mulyani, H. (2015). Penggunaan Pembelajaran Berbasis Masalah Untuk Meningkatkan Kemampuan Komunikasi Matematis Dan Pengaruhnya Terhadap Self Regulated Learningsiswa Sekolah Menengah Pertama. *Pasundan Journal of Mathematics Education Jurnal Pendidikan Matematika*, *5*(1).

Murphy, P. K., & Alexander, P. A. (2000). A motivated exploration of motivation terminology. *Contemporary educational psychology*, *25*(1), 3-53

Nartani, C. I., Hidayat, R. A., & Sumiyati, Y. (2015). Communication in Mathematics Contextual. *International Journal of Innovation and Research in Educational Sciences*, *2*(4), 284-287.

NCTM. (2000). Principle and Standards for School Mathematics. United States of America : The National Council of Teachers of Mathematics, Inc.

Nopiyani, D., Turmudi, T., & Prabawanto, S. (2016). Penerapan pembelajaran matematika realistik berbantuan geogebra untuk meningkatkan kemampuan komunikasi matematis siswa SMP. *Mosharafa: Jurnal Pendidikan Matematika*, *5*(2), 45-52.

Nugroho, A. D., Zulkarnaen, R., & Ramlah, R. (2021). Analisis Kemampuan Komunikasi Matematis pada Materi Bangun Ruang Sisi Datar Ditinjau dari Gaya Belajar Siswa SMP. *Jurnal Pendidikan Matematika Raflesia*, *6*(2), 81-98.

Nurhasanah, R., & Zanthy, L. S. (2019). Pengaruh Kemandirian Belajar Siswa SMA Terhadap Kemampuan Komunikasi Matematik. *Journal On Education*, *1*(3), 366-372.

Nurjanah, N., Herman, T., & Prabawanto, S. (2019). Analysis of Student Mathematical Communication Ability. In *J. Phys.: Conf. Ser* (Vol. 1157, pp. 1-7).

Okazaki, M., & Fujita, T. (2007, July). Prototype phenomena and common cognitive paths in the understanding of the inclusion relations between quadrilaterals in Japan and Scotland. In *Proceedings of the 31st Conference of the International Group for the Psychology of Mathematics Education* (Vol. 4, pp. 41-48)

Orona, H. M. O., Maldonado, G. S., & Martínez, N. P. S. (2015). Kinect team: Kinesthetic learning applied to mathematics using kinect. *Procedia Computer Science*, *75*, 169-172.

Ostergaard, E., Dahlin, B., & Hugo, A. (2008). Doing phenomenology in science education: A research review. *Studies in science education*, *44*(2), 93-121.

Osterholm, M. (2006). Characterizing reading comprehension of mathematical texts. *Educational studies in mathematics*, *63*(3), 325.

Ozerem, A., & Akkoyunlu, B. (2015). Learning environments designed according to learning styles and its effects on mathematics achievement. *Eurasian Journal of Educational Research*, (61).

Padilla-Díaz, M. (2015). Phenomenology in educational qualitative research: Philosophy as science or philosophical science. *International journal of educational excellence*, *1*(2), 101-110.

Palobo, M., Pagiling, S. L., & Nur'aini, K. D. (2020, October). Analysis of Effect of Learning Style on Mathematics Learning Outcomes. In *3rd International Conference on Social Sciences (ICSS 2020)* (pp. 484-488). Atlantis Press.

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in psychology*, 422.

Paridjo, P., & Waluya, S. B. (2017). Analysis mathematical communication skills students in the matter algebra based NCTM. *IOSR Journal of Mathematics*, *13*(01), 60-66.

Peraturan Menteri Pendidikan dan Kebudayaan Nomor 58 Tahun 2014 Tentang Kurikulum 2013 SMP/ MTS.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of educational psychology*, *82*(1), 33.

Prabawanto, S. (2019). Enhancement Of Students'mathematical Communication Under Metacognitive Scaffolding Approach. *Infinity Journal*, *8*(2), 117-128.

Pradika, I. D., Amin, S. M., & Khabibah, S. (2019). Relational thinking in problem solving mathematics based on adversity quotient and visual learning style. *International Journal of Trends in Mathematics Education Research*, *2*(4), 161-164.

Prafianti, R. A., Dasari, D., & Jupri, A. (2018, December). Error analysis in solving mathematical communication problem of junior high school students. In *International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia* (Vol. 3, pp. 583-588).

Pratiwi, G., Sova, F., Putra, F. G., Putra, R. W. Y., Kusuma, A. P., & Rahmawati, N. K. (2020, February). The Influence of Project-based Learning (PjBL) and Learning Style om Mathematics Communication Skills of Junior High School Students. In *Journal of Physics: Conference Series* (Vol. 1467, No. 1, p. 012064). IOP Publishing.

Priyatna, Andri. 2013. *Pahami Gaya Belajar Anak! Memaksimalkan Potensi Anak dengan Modifikasi Gaya Belajar*. Jakarta : PT. Elex Media Komputindo

Purnama, I. L., & Aldila, E. (2016). Kemampuan komunikasi matematis siswa ditinjau melalui model pembelajaran kooperatif tipe complete sentence dan team quiz. *Jurnal Pendidikan Matematika Sriwijaya*, *10*(1), 26-41.

Puspaningtyas, N. D. The Profile Of Students'lateral Thinking In Solving Mathematics Open-Ended Problem In Terms Of Learning Style Differences. *Learning*.

Rahman, A., Ahmar, A., & Rusli, R. (2016). The influence of cooperative learning models on learning outcomes based on students' learning styles. *World Transactions on Engineering and Technology Education*, *14*(3).

Rahmawati, E., Hartoyo, A., & Yani, A. (2019). Kemampuan Komunikasi Tulis Menurut Gaya Belajar Siswa Dalam Materi Segiempat. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa*, *8*(9).

Rohmah, A., Darhim, D., & Jupri, A. (2018, December). Analysis of mathematical communication skill of junior high school studentsin geometry topics based on early understanding of mathematics. In *International Conference on Mathematics and Science Education of Universitas Pendidikan Indonesia* (Vol. 3, pp. 797-802).

Rakhman, P. A., Suryadi, D., & Prabawanto, S. (2019, February). Mathematical communication of junior high student based on the conceptual understanding of triangle. In *Journal of Physics: Conference Series* (Vol. 1157, No. 4, p. 042115). IOP Publishing

Rorong. 2020. *Fenomenologi*. Jakarta : Deepublish

Rukajat, Ajat. 2018. *Pendekatan Penelitian Kualitatif (Qualitative Research Approach)*. Bandung : Deepublish

Safithry, Esty A. 2018. *Asesmen Teknik Tes dan Non Tes*. Purwokerto : IDRH

Salido, A., & Dasari, D. (2019, April). Students' errors in solving probability problems viewed by learning style. In *Journal of Physics: Conference Series* (Vol. 1211, No. 1, p. 012067). IOP Publishing.

Saputri, F. I. (2016). Pengaruh Gaya Belajar Visual, Auditori, dan Kinestetik Terhadap Prestasi Bejajar Siswa. *Jurnal Prima Edukasia*, 3(01), 25-36.

Sarassanti, Y., Prabawanto, S., & Cahya, E. (2017). Penerapan pembelajaran kontekstual untuk meningkatkan kemampuan komunikasi matematis dan sikap siswa SMP. *Jurnal Penelitian Pendidikan*, *17*(3), 199-204.

Sari, D. S., Kusnandi, K., & Suhendra, S. (2017, September). A cognitive analysis of students' mathematical communication ability on geometry. In *Journal of Physics: Conference Series* (Vol. 895, No. 1, p. 012083). IOP Publishing.

Sarosa, S. (2021). *Analisis Data Penelitian Kualitatif*. PT Kanisius.

Semiawan, C. R. (2010). *Metode penelitian kualitatif*. Grasindo.

Setiawan, W. Y., Rosita, N. T., & Putra, B. Y. G. (2020, October). The influence of learning styles on students' mathematical critical thinking skills in solving trigonometric problems. In *Journal of Physics: Conference Series* (Vol. 1657, No. 1, p. 012015). IOP Publishing.

Subadi, T. (2006). Metode penelitian kualitatif.

Subekti, F. E., & Jazuli, A. (2020). Peningkatan kemampuan pemecahan masalah dan kemandirian belajar mahasiswa melalui pembelajaran berbasis masalah. *JNPM (Jurnal Nasional Pendidikan Matematika)*, *4*(1), 13-27.

Sulastri, E., & Sofyan, D. (2022). Kemampuan Komunikasi Matematis Ditinjau dari Self Regulated Learning pada Materi Sistem Persamaan Linear Dua Variabel. *Plusminus: Jurnal Pendidikan Matematika*, *2*(2), 289-302.

Sumargo, B. (2020). *Teknik sampling*. Unj press.

Sumarmo,U., Hendriana, H., Ahmad., Yuliani,A., 2019. *Tes dan Skala Matematika Bernuansa High Order Thingking Skills*. Bandung: Refika

Sundayana, R. (2016). Kaitan antara gaya belajar, kemandirian belajar, dan kemampuan pemecahan masalah siswa SMP dalam pelajaran matematika. *Mosharafa: Jurnal Pendidikan Matematika*, *5*(2), 75-84.

Sulastri, E., & Sofyan, D. (2022). Kemampuan Komunikasi Matematis Ditinjau dari Self Regulated Learning pada Materi Sistem Persamaan Linear Dua Variabel. *Plusminus: Jurnal Pendidikan Matematika*, *2*(2), 289-302.

Sulhan, N., 2010. *Pembangunan Karakter Pada Anak: Manajemen Pembelajaran Guru Menuju Sekolah Efektif.* (Surabaya: Surabaya Intelektual Club)

Surya, E., Syahputra, E., & Juniati, N. (2018). Effect of problem based learning toward mathematical communication ability and self-regulated learning. *Journal of Education and Practice*, *9*(6), 14-23

Sutisna, A. (2021). *Metode Penelitian Kualitatif Bidang Pendidikan*. UNJ press.

Syarifah, T.J., Sujatmiko, P., & Setiawan, R (2017). Analisis Kemampuan Komunikasi Matematis Tertulis Ditinjau dari Gaya Belajar pada Siswa Kelas XI MIPA 1 SMA Batik 1 Surakarta Tahun Pelajaran 2015/2016. *Jurnal Pendidikan Matematika dan Matematika (JPMM) Solusi*, 1(2), 1-9.

Tahir, T. (2021). The Effect of Learning Styles on Students' Mathematical Communication Ability. *Journal of Medives: Journal of Mathematics Education IKIP Veteran Semarang*, 5(1), 13-21,

Tahmir, S., Ja'faruddin, J., & Abbas, N. F. (2019). Deskripsi Pemahaman Geometri Siswa SMP pada Materi Segiempat berdasarkan Teori Van Hiele ditinjau dari Gaya Kognitif Siswa. *Issues in Mathematics Education (IMED)*, *2*(1), 23-34.

Tahmir, S., Sahid, S., & Erjun, D. (2022). The Description of Student's Mathematical Communication Skills in Solving Circle Problems in Term of Learning Style. *SAINSMAT: Journal of Applied Sciences, Mathematics, and Its Education*, *11*(2), 63-72.

Takeuchi, M. A., & Liu, S. (2021). "I am more of a visual learner": The disciplinary values and identities in school mathematics learning and group work. *The Journal of Mathematical Behavior*, 61, 100835.

Tiffany, F., Surya, E., Panjaitan, A., & Syahputra, E. (2017). Analysis Mathematical Communication Skills Student at the Grade IX Junior High School. *Ijariie-Issn (O)-2395-4396*, *3*.

Triana, M., & Zubainur, C. M. (2019). Students' Mathematical Communication Ability through the Brain-Based Learning Approach Using Autograph. *Journal of Research and Advances in Mathematics Education*, *4*(1), 1-10.

Ulfatin, N. (2022). *Metode penelitian kualitatif di bidang pendidikan: Teori dan Aplikasinya*. Media Nusa Creative (MNC Publishing).

Ulfiana, E. (2019, October). Determining ways to improve critical thinking skills in the math mathematics in student style. In *Journal of Physics: Conference Series* (Vol. 1321, No. 2, p. 022098). IOP Publishing.

Umar, W. (2012). Membangun kemampuan komunikasi matematis dalam pembelajaran matematika. *Infinity Journal*, *1*(1), 1-9.

Utami, C. (2015). Pembelajaran model generatif dengan strategi group investigation untuk meningkatkan kemampuan komunikasi matematis siswa. *Unnes Journal of Mathematics Education Research*, *4*(1).

Vaishnav, R. S., & Chirayu, K. C. (2013). Learning style and academic achievement of secondary school students. *Voice of research*, *1*(4), 1-4.

Vale, I., & Barbosa, A. (2017). The importance of seeing in mathematics communication. *Journal of the European Teacher Education Network*, *12*, 49-63.

Viseu, F., & Oliveira, I. B. (2012). Open-ended tasks in the promotion of classroom communication in mathematics. *International Electronic Journal of Elementary Education*, *4*(2), 287-300.

Wahyuni, T. S., Amelia, R., & Maya, R. (2019). Analisis Kemampuan Komunikasi Matematis Siswa SMP pada Materi Segiempat dan Segitiga. *Jurnal Kajian Pembelajaran Matematika*, *3*(1), 18-23.

Wahyuni, Y. (2017). Identifikasi Gaya Belajar (Visual, Auditorial, Kinestetik) Mahasiswa Pendidikan Matematika Universitas Bung Hatta. *JPPM (Jurnal Penelitian dan Pembelajaran Matematika)*, *10*(2).

Widyanti, F. P., Abidin, Z., & El Walida, S. (2021). Analisis Kemampuan Komunikasi Matematika Ditinjau Dari Gaya Belajar Auditorial Dan Kinestetik Dalam Pembelajaran Daring Materi Turunan Kelas XI Bahasa SMAN 8 Malang. *Jurnal Penelitian, Pendidikan, dan Pembelajaran*, *16*(9).

Wijayanti, I. D., Hariastuti, R. M., & Yusuf, F. I. (2019). Kemampuan Komunikasi Matematis Siswa Ditinjau dari Gaya Belajar. *Indiktika: Jurnal Inovasi Pendidikan Matematika*, *2*(1), 68-76.

Waluya, S. B., & Suyitno, H. (2018, September). Assimilation and Accommodation Processes in Improving Mathematical Creative Thinking with Scaffolding According to Learning Style. In *Journal of Physics: Conference Series* (Vol. 1097, No. 1, p. 012156). IOP Publishing.

Winarso, W., & Supriady, D. (2016). Menilai Prestasi Belajar melalui Penguatan *Self Regulated Learning* dan Kecerdasan Emosional Siswa pada Pembelajaran Matematika. *Jurnal Didaktik Matematika*, *3*(2).

Wood, L. (2012). Practice And Conceptions: Communicating Mathematics In The Workplace. *Educational Studies In Mathematics*, 79(1), pp. 109-125.

Wulandari, N. A., Sunismi, S., & Khairunnisa, G. F. (2022). Analisis Kemampuan Komunikasi Matematis Dan Berpikir Kreatif Matematis Masalah Open Ended Pada Materi Perbandingan Ditinjau Gaya Belajar Peserta Didik Kelas VII A MTs Ash-Sholihuddin Dampit. *Jurnal Penelitian, Pendidikan, dan Pembelajaran*, *16*(32).

Wulandari, Stevanie, Ade Mirza, & Silvia Sayu. (2014). Kemampuan Komunikasi Matematis Siswa Ditinjau Dari Gaya Belajar Pada SMA Negeri 10 Pontianak. *Jurnal Pendidikan Dan Pembelajaran : Khatulistiwa*, 3(9):1–11.

Yilmaz, G. K., Koparan, T., & Hanci, A. (2016). Determination of the Relationship between 8th Grade Students Learning Styles and TIMSS Mathematics Achievement. *Online Submission*, *11*(1), 35-58.

Zahary, M. (2015). Meningkatkan Prestasi Belajar Matematika Siswa Melalui Strategi Self Regulated Learning. In *Seminar Nasional Matematika dan Pendidikan Matematika Uny* (Vol. 24, pp. 163-168).

Zapalska, A. M., & Dabb, H. (2002). Learning styles. *Journal of Teaching in International Business*, *13*(3-4), 77-97.

Zimmerman, B. J. (1990). Self-regulated learning and academic achievement: An overview. *Educational psychologist*, *25*(1), 3-17.

Zumbrunn, S., Tadlock, J., & Roberts, E. D. (2011). Encouraging Self-Regulated *Learning in the Classroom*: A Review of the Literature.