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Exploring the Relationship between Critical Thinking Dispositions and Learning Styles in Junior High Science Classrooms

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Abstract
Critical thinking disposition is an essential 21st-century competency in science classrooms, as scientific inquiry requires students to analyze evidence, make observations, and draw conclusions. Students' understanding of scientific concepts may be influenced by their learning styles—visual, auditory, and kinesthetic—which shape how they process and engage with scientific information. This study aimed to describe students' critical thinking dispositions, analyze differences based on learning styles, and examine the relationship between the two variables. A quantitative approach was employed, using descriptive and correlational research designs. The research subjects consisted of 31 students from grades VII, VIII, and IX at SMPN 1 Arjasa, selected via simple random sampling. Research instruments included questionnaires on critical thinking disposition and learning styles, each comprising 15 Likert-scale items. Data were analyzed using descriptive statistics and correlational analysis in SPSS version 27. The results show that students' critical thinking dispositions fall within the high category, and that students demonstrate relatively balanced preferences across visual, auditory, and kinesthetic learning styles. A strong positive relationship was found between learning styles and critical thinking disposition ($r = 0.758$, $p < 0.001$). These findings highlight the need for science instruction that incorporates differentiated and multi-modal inquiry approaches to accommodate students' learning style tendencies and foster the development of critical thinking dispositions.

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INTRODUCTION

Disposition refers to an inclination or internal attitude that drives an individual to consistently act and think in particular ways, including in the context of critical thinking. Critical thinking disposition reflects a person's willingness to actively engage in critical thinking, such as curiosity, openness to new ideas, carefulness, and persistence in seeking evidence before making decisions (Fianingrum et al., 2023). This tendency represents an internal attitude that is influenced not only by cognitive processes but also by the motivation to analyze information deeply. The manifestation of these dispositions is intrinsically linked to individual learning styles-visual, auditory, and kinesthetic-as these modalities act as cognitive mechanisms that shape how students receive, process, and respond to information during scientific inquiry. When instructional methods align with students' learning style tendencies, they are more likely to ask questions, reflect on ideas, and evaluate information critically, thereby fostering the development of stronger critical thinking dispositions.

Critical thinking (CT) is an essential 21st-century competency that must be fostered through learning. Ennis defines critical thinking as reflective and rational thinking focused on

deciding what to believe or do (Ennis, 1985). Critical thinking is the ability to process information systematically to generate valid facts and conclusions based on research, experience, and observation (Barid et al., 2025). The outcomes of critical thinking then serve as the basis for decision-making or action. This systematic process involves five important stages, namely clarifying issues, gathering information, reasoning from multiple perspectives, conducting further analysis, and formulating and communicating decisions. These stages represent key characteristics of scientific inquiry and provide an essential framework for scientific reasoning in science classrooms. Through understanding and applying this critical thinking framework, students can develop more mature and effective thinking skills in dealing with complex problems (Lismaya, 2019).

Critical thinking can be examined through indicators proposed by various scholars that describe the cognitive processes involved in evaluating information. Ennis (1985) identifies several indicators of critical thinking, including providing simple explanations, focusing and formulating questions, analyzing arguments, identifying conclusions and inaccuracies, giving examples, and evaluating sources of information. These indicators represent the cognitive aspects required to systematically analyze and evaluate information (Nahadi et al., 2021). However, while these indicators describe the cognitive components of critical thinking, critical thinking disposition refers to the tendency or willingness of individuals to apply these processes in reasoning and decision-making. Therefore, critical thinking involves not only the cognitive aspects of analysis and evaluation but also the disposition to engage in these processes logically, reflectively, and systematically to produce accurate and accountable conclusions.

The way individuals process and respond to learning environments is known as their learning style. Learning styles influence how students approach different learning situations. Generally, learning styles can be understood as a set of relatively stable cognitive, affective, and physiological traits that shape how individuals perceive, engage with, and respond to their learning environment. Since each individual processes information differently, understanding learning styles plays an important role in designing more effective learning experiences. Through differentiated instructional design properly teachers can deliver material more optimally (Azizah et al., 2023).

Learning styles are generally categorized into three types: visual, auditory, and kinesthetic. This classification suggests that individuals tend to prefer different modalities when processing information, although these preferences are not rigid, and individuals may possess more than one dominant modality (Supit et al., 2023). Visual learners rely on media such as charts, graphs, and illustrations to understand information. Auditory learners depend on listening, including tone, rhythm, and verbal explanations. Meanwhile, kinesthetic learners understand information through physical movement and hands-on activities (Asnawi et al., 2023, pp. 45, 50, 56). Earlier literature, such as De Porter (2009) and Hasrul (2009) also highlighted the importance of recognizing students' dominant learning modalities at the beginning of the instructional process.

Science classrooms at the junior high school level serve as key settings for fostering students' scientific thinking, curiosity, and critical disposition. These classrooms require students to observe, question, reason, and communicate information logically. Although critical thinking skills have been widely studied, most existing research focuses on cognitive skills rather than on critical thinking disposition, which reflects students' internal tendency to apply these skills (Mulyawati & Us, 2023). Studies that specifically examine students' critical thinking dispositions based on learning style categories within science classroom settings are still limited. Analyses of students' critical thinking dispositions in science learning show that these dispositions often fall within the sufficient category, indicating that they remain below the critical criteria required for effective scientific inquiry and problem-solving. Average scores for indicators such as seeking clear reasons and using credible sources suggest that while students demonstrate some level of critical thinking, it is not yet sufficient for advanced scientific analysis (Verawati et al., 2024). In

addition, instructional methods interact with VAK learning styles to influence learning outcomes: Flip Classroom instruction was found to be the most effective method across all learning styles, whereas Traditional Lecture methods were less effective, particularly for kinesthetic learners (Matazu & Ismail, 2023). By directly examining this critical gap, the present study uniquely investigates how students' visual, auditory, and kinesthetic learning preferences are associated with their critical thinking dispositions in junior high school science classrooms, providing new insights into adaptive instructional strategies.

The research problems examined in this study involve the unclear portrayal of students' critical thinking dispositions in the science classroom, the unidentified differences in these dispositions among visual, auditory, and kinesthetic learning styles, and the limited comprehensive understanding of how learning styles relate to students' critical thinking dispositions. In response to these issues, this study aims to describe junior high school students' critical thinking dispositions in the science classroom, to analyze differences in critical thinking dispositions based on visual, auditory, and kinesthetic learning styles, and to determine the relationship between learning styles and students' critical thinking dispositions.

METHODS

This study employed a quantitative research approach using descriptive, comparative, and correlational designs. The descriptive approach was used to portray specific conditions or phenomena, while the comparative approach was applied to compare students' data across different grade levels (Ulandari et al., 2024). The participants were students of grades VII, VIII, and IX at SMPN 1 Arjasa, Jember Regency. The total population consisted of 650 students, from which 31 students were selected as respondents through simple random sampling using a random number generator. The relatively small sample size reflects the limited number of students who participated in the study, and therefore, this research can be considered a preliminary investigation. The respondents consisted of 14 students from grade VII, 9 students from grade VIII, and 8 students from grade IX. Based on gender, the respondents comprised 11 male and 20 female students, with variations across grade levels occurring naturally according to the random sampling process.

The research instruments were developed by adapting items from the Science and Mathematics Integrated Questionnaire (SMIQ) by (Béchard et al., 2021) to the context of a junior high school science classroom. The adaptation involved modifying items to reflect critical thinking disposition, focusing on students' tendencies to reason systematically, demonstrate curiosity, and seek evidence before making decisions, rather than measuring interest or self-efficacy directly. Two questionnaires were used: a 15-item critical thinking disposition questionnaire and a 15-item learning style questionnaire covering visual, auditory, and kinesthetic styles, both using a four-point Likert scale (Strongly Agree-Strongly Disagree) (Ulandari et al., 2024). Content validity was established through expert judgment by two science education lecturers, who reviewed the items for clarity and alignment with the construct. The instruments underwent pilot testing with a small sample of students to ensure comprehensibility and appropriateness. Internal reliability was assessed using Cronbach's alpha, confirming that both instruments were sufficiently reliable for the study context. Construct validity was supported by the alignment of items with established indicators of critical thinking disposition (Ennis, 1985).

The extent of students' critical thinking dispositions and their preferred learning styles can be determined by descriptive analysis implementation. Based on the study by Triwarsana & Saputro (2024), the average score for each critical thinking disposition indicator was determined using the following formula:

$$\text{X indicator} = \frac{\sum \text{students' average scores}}{n}$$

The obtained average scores of critical thinking disposition were subsequently categorized into three levels, as shown in Table 1.

Table 1. Levels of Critical Thinking Disposition

Average Score ($\bar{x}$)	Level of Critical Thinking Disposition
$3 < \bar{x} \leq 4$	High
$2 < \bar{x} \leq 3$	Moderate
$1 \leq \bar{x} \leq 2$	Low

(Ulandari et al., 2024)

This study included 15 statement items, each representing one of three learning style categories: visual, auditory, and kinesthetic. Each item was scored by the researcher, and the obtained scores were converted into percentages using the formula:

$$\text{Item Percentage} = \frac{\text{Obtained Score}}{\textit{Maximum Score}} \text{ x } 100\%$$

The percentage results of each item were then grouped according to the learning style category. Items number 1, 4, 7, 10, and 13 belonged to the visual category; items number 2, 5, 8, 11, and 14 belonged to the auditory category; while items number 3, 6, 9, 12, and 15 represented the kinesthetic category. After grouping, all percentages within each category were summed and averaged. The mean value was calculated using the formula:

$$\text{Mean} = \frac{\sum \textit{Item Percentages}}{\textit{Number of Items}}$$

The data were first tested for normality using the Shapiro-Wilk test because the sample consisted of 31 participants; datasets with more than 50 individuals are generally tested using the Kolmogorov–Smirnov method. Before conducting the correlation analysis, the assumptions of linearity and homoscedasticity were examined using scatterplot analysis to ensure that the relationship between variables was linear. In this study, learning style was treated as a quantitative variable based on the total score obtained from the learning style questionnaire, while students' critical thinking disposition was measured using the average score of the disposition indicators. Correlation analysis was then conducted to examine the relationship between learning styles and students' critical thinking dispositions. If the data met the assumptions of normality and linearity, the Pearson correlation test was applied; otherwise, Spearman's rho correlation was used. The correlation coefficient (r) indicates the strength and direction of the relationship, while a significance level of Sig. < 0.05 indicates that the relationship between the variables is statistically significant.

RESULTS AND DISCUSSIONS

Critical thinking disposition in the science classroom is understood as students' tendency to be reflective, to evaluate information objectively, and to consider evidence carefully before concluding. Theoretically, an ideal critical thinking disposition develops through scientific inquiry activities and problem-solving tasks that require deep reasoning. In the context of science learning at SMPN 1 Arjasa, students engage in various classroom activities that potentially shape their tendency to question, analyze, and evaluate information. Differences in learning styles-visual, auditory, and kinesthetic-are viewed as factors that influence how students interpret and process information, which may contribute to variations in their critical thinking disposition. This conceptual framework is therefore used to interpret the relationship between learning styles and students' critical thinking disposition identified in the subsequent analysis.

Based on the analytical findings, this section presents the results related to students' critical thinking dispositions and learning styles. The mean score of the students' critical thinking disposition indicators was 3.1, indicating that the level of critical thinking disposition among students at SMPN 1 Arjasa is categorized as high. This result suggests that students demonstrate a strong tendency to analyze information and respond reflectively to the questionnaire items. Such a disposition supports students in understanding information more deeply and making well-considered judgments. This view is supported by studies emphasizing that critical thinking is an essential competence that should be developed in education (Bezanilla et al., 2019). Students' responses across the various indicators also show a positive tendency, reflecting their inclination to engage in reflective and analytical thinking. This finding suggests that the classroom learning process has provided students with opportunities to develop their critical thinking disposition.

The high category achieved by the students indicates that they demonstrate a strong tendency to process information more deeply and evaluate problems logically. This suggests that students not only understand the learning material but also show an inclination toward systematic and reflective thinking. Their consistent responses indicate that they may have become accustomed to engaging in critical thinking processes during learning activities. Although this study did not directly examine instructional strategies, the results may reflect a supportive pedagogical environment that encourages discussion, analysis, and reflection in the classroom. Such conditions are consistent with the inquiry-based nature of science learning, which promotes questioning, reasoning, and evaluation of evidence. Therefore, the findings suggest that students' critical thinking disposition is relatively well developed and has the potential to be further strengthened through continued learning experiences. This interpretation aligns with the emphasis on fostering critical thinking within educational settings (Kurniawan et al., 2021).

Previous studies indicate that some students in several schools still demonstrate critical thinking dispositions in the medium category, as reflected by incomplete responses and less in-depth analysis (Meryastiti et al., 2022). This condition differs from the findings at SMPN 1 Arjasa, where students' critical thinking disposition is categorized as high. This difference may be influenced by several contextual factors, such as variations in classroom learning practices, the learning environment, or the school culture that encourages students to engage more actively in discussion and analysis. In science learning contexts, opportunities for inquiry-based activities and collaborative discussions may contribute to strengthening students' tendency to question, analyze information, and evaluate evidence. Therefore, the findings of this study suggest that the learning environment at SMPN 1 Arjasa may provide conditions that are more supportive of the development of students' critical thinking disposition. This comparison highlights how different educational contexts can influence students' inclination to engage in critical thinking processes.

The outcomes of this study also align with previous findings of Sholikhah & Dimas (2022), who emphasize that the way students face problems determines their critical thinking disposition. Students with strong critical thinking tend to actively ask questions to obtain accurate information, complete tasks diligently to achieve reasonable answers, express opinions logically, and draw appropriate conclusions based on explanations. Although the students at SMPN 1 Arjasa did not explicitly use the structured worksheets described by (Siswanto et al., 2025), it is possible that similarly well-designed classroom activities and learning approaches contributed to their high critical thinking scores.

The data on learning styles show that students exhibit different tendencies across the three learning style categories: visual, auditory, and kinesthetic. The percentages for each category were obtained from the scores of the questionnaire items representing each learning style.

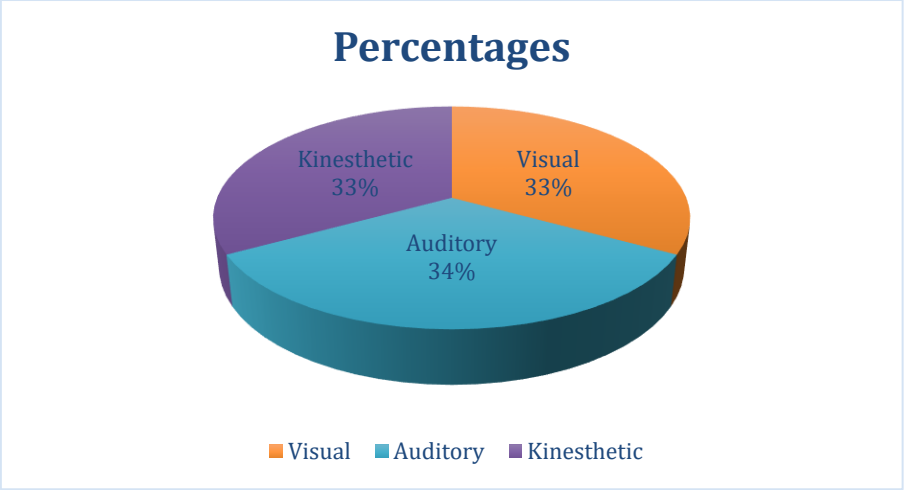


Figure 1. Percentages of Students' Learning Styles

The learning style data of students at SMPN 1 Arjasa indicate a balanced multimodal profile, with visual, auditory, and kinesthetic preferences scoring 33%, 34%, and 33%, respectively (Figure 1). The negligible variance shows that students do not rely on a single mode of learning, but rather integrate multiple approaches depending on the type of task and learning context. This combination of learning preferences is particularly beneficial for science education, which inherently involves multimodal experiences such as observing visual representations, listening to explanations, and engaging in hands-on experiments. Therefore, adopting diverse instructional methods can provide comprehensive support for all learners and enhance their understanding of scientific concepts.

Students with a visual preference (33%) process information more effectively through images, diagrams, colors, and other visual representations. For instance, concepts such as energy flow in ecosystems or chemical reactions are easier to comprehend when illustrated with diagrams or animations. Incorporating visual media not only aids comprehension but also helps students organize and retain information. This suggests that teachers should consistently include visual elements in lesson plans, such as infographics, charts, and multimedia resources, to optimize learning outcomes (Izzati & Masriyah, 2024).

Students with an auditory preference (34%) absorb material most efficiently through verbal explanations, discussions, lectures, question-and-answer sessions, or audio recordings. Activities such as classroom discussions, presentations, debates, or oral repetition of concepts allow these students to internalize information more effectively. Using auditory methods in combination with visual and kinesthetic approaches ensures that students can process content through multiple channels, reinforcing their understanding and retention. This highlights the importance of including structured verbal interactions and feedback in science lessons to maximize student engagement and comprehension (Safitri & Miatun, 2021).

Students with a kinesthetic preference (33%) learn best through direct involvement in practice, experiments, or activities that require movement. Hands-on activities, such as conducting laboratory experiments, creating models, or participating in simulations, allow students to experience scientific principles directly. Even though the percentage is slightly lower than the other styles, kinesthetic learning plays a crucial role in reinforcing theoretical knowledge through practical experience. Teachers should continue to design learning tasks that provide opportunities for active engagement, enabling students to apply concepts in real-world or simulated contexts, which strengthens understanding and develops problem-solving (Suprapto et al., 2024: 42-43).

The high tendency toward the auditory learning style among students at SMPN 1 Arjasa can be understood in relation to the teaching practices commonly applied in the classroom. This finding aligns with (Isnanto & Hamu, 2022), who reported that teachers at the school frequently employ instruction dominated by verbal explanations, in which the teacher presents material orally while students follow along using textbooks. Rather than being an innate trait, students' auditory preference appears to be shaped by the school's lecture-heavy culture, illustrating that learning preferences are not fixed but can develop in response to the instructional environment. When teaching is dominated by lectures, discussions, and oral instructions, students naturally become more accustomed to processing information auditorily. This perspective challenges the so-called "learning styles myth," highlighting that students' learning preferences often reflect adaptation to teaching methods rather than inherent characteristics.

The data obtained in this study were then subjected to a normality test using the Shapiro-Wilk method, with the following results.

Table 2. Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Critical_thinking	0.122	31	0.200*	0.968	31	0.469
Learning_styles	0.145	31	0.097	0.947	31	0.132

Based on Table 2, the data are normally distributed, as the significance value for critical thinking is 0.469 and for learning styles is 0.132, both of which are greater than 0.05. Next, to analyze the relationship between critical thinking and learning styles, a Pearson correlation test was performed.

Table 3. Correlations

		Critical_thinking	Learning_style
Critical_thinking	Pearson Correlation	1	0.758**
	Sig (2-tailed)	0	<0.001
	N	31	31
Learning_style	Pearson Correlation	0.758**	1
	Sig (2-tailed)	<0.001	0
	N	31	31

As indicated in Table 3, the data show a significance value of <0.001, with a Pearson correlation coefficient of 0.758, demonstrating a strong positive association between students' learning styles and their critical thinking disposition. However, these results do not imply a causal relationship. Rather, they suggest that how students receive and process information through different learning styles is closely linked to their tendency to engage in critical thinking. This aligns with cognitive processing theory, which posits that the organization and handling of information affect how individuals analyze and evaluate content. The findings also support the principles of differentiated instruction and constructivist learning, in which tailoring learning experiences to students' cognitive and learning preferences can facilitate deeper understanding and critical engagement with the material.

Consistent with Hidayat et al. (2024) and Pratiwi et al. (2022), these results indicate that students' cognitive processing preferences are intertwined with their affective disposition to think critically. Similar findings have been reported by Fitrianti et al (2021), who emphasized that the development of students' critical thinking processes is influenced by the way material is presented according to learners' styles. Together, these studies suggest that aligning instructional methods with students' learning preferences through visual aids, discussions, hands-on activities, and other

differentiated strategies can provide optimal conditions for promoting critical thinking, without implying that learning styles alone cause higher critical thinking performance.

The implications of these results suggest that students at SMPN 1 Arjasa exhibit a balanced multimodal learning profile, in which visual, auditory, and kinesthetic preferences are nearly equal. Given this strong association between learning styles and critical thinking dispositions, teachers are encouraged to intentionally vary instructional modalities-for example, alternating between lectures, discussions, and hands-on laboratory activities-to engage students with different learning preferences and stimulate their critical thinking dispositions. Such an approach ensures that all learners have opportunities to process information in multiple ways, promoting higher-order thinking. Theoretically, the results reinforce the view that learning preferences influence the development of critical thinking dispositions, while practically, they provide a basis for teachers to design adaptive and responsive science instruction that accommodates diverse learning tendencies and optimizes students' critical thinking dispositions.

CONCLUSION

Students at SMPN 1 Arjasa generally exhibit positive critical thinking dispositions, showing a tendency to think analytically, evaluate information, and draw reasoned conclusions. Their learning profiles are multimodal, integrating visual, auditory, and kinesthetic preferences, and the findings indicate a positive association between these learning styles and critical thinking dispositions. This suggests that fostering higher-order thinking in science is most effective when instructional approaches are adapted to students' preferred modalities rather than relying on a one-size-fits-all method. While the study is limited by a small sample size and the focus on a single school, which may affect generalizability, the results provide insights for designing adaptive and responsive science instruction. These findings highlight the relationship between students' learning styles and their critical thinking dispositions in science learning.

SUGGESTION

This study is still limited as it only utilized questionnaires, which may restrict the depth of the findings. Future research is recommended to include larger samples and multiple schools to enhance generalizability. Researchers could also employ mixed methods approaches, such as interviews and observations, to obtain more comprehensive and in-depth data. Subsequent studies may develop learning models tailored to students' learning preferences to examine their direct impact on critical thinking dispositions and expand the research to other subjects to explore broader applicability.

REFERENCES

Asnawi, Sahudra, T. M., Ramadhani, D., Kenedi, A. K., Wardana, M. R., & Khalil, N. A. (2023). *Gaya Belajar Siswa Sekolah Dasar dan Tes Diagnostik: Membangun Pembelajaran Berdiferensiasi yang Efektif dan Inklusif*. Yogyakarta: Deepublish Digital.

Azizah, S. A., Usman, A., Fauzi, M. A. R., & Rosita, E. (2023). Analisis Gaya Belajar Siswa dalam Menerapkan Pembelajaran Berdeferensiasi. *Jurnal Teknologi Pendidikan*, *1*(2), 1-12. https://doi.org/10.47134/jtp.v1i2.74

Barid, S. S. A. Q., Gunawan, A. S., Yusmar, F., Astuti, S. Y., & Wahyuni, S. (2025). A Systematic Review of Critical Thinking Assessment Instruments in Junior High School Science Education: Trends, Effectiveness, and Challenges. *Science Education and Application Journal (SEAJ)*, 7(2), 211-221. http://jurnalpendidikan.unisla.ac.id/index.php/SEAJ

Béchard, N., Langlois, S., Poliquin, G., & Cry, S. (2021). Development of the SMIQ Questionnaire Measuring Interest, Sense of Self-Efficacy and Perception of the Links Existing between Mathematics and Science in an Integrated Context. *Mesure et Évaluation en Éducation*, *44*, 129–165.

Bezanilla, M. J., Nogueira, F. D., Poblete, M., & Dominguez, G. H. (2019). Methodologies for Teaching-Learning Critical Thinking in Higher Education: The Teacher's View. *Thinking Skills and Creativity, 33*. 100584.

Ennis, R. H. (1985). A Logical Basis for Measuring Critical Thinking Skills. *Educational Leadership, 43(2),* 44-48.

Fianingrum, F., Pujiastuti, H., & Fathurrohman, M. (2023). Disposisi Berpikir Kritis Matematis dalam Pembelajaran Matematika: Systematic Literature Review. *JIIP-Jurnal Ilmiah Ilmu Pendidikan, 6(1),* 543-548. http://Jiip.stkipyapisdompu.ac.id

Fitrianti, N., Purwanti, J. I. S., & Sularmi. (2021). Studi Korelasi Antara Gaya Belajar dan Kebiasaan Membaca dengan Kemampuan Berpikir Kritis dalam Pembelajaran Ips di Sekolah Dasar. *Jurnal UNS, 9(4),* 1-6.

Hasrul. (2009). *Pemahaman tentang Gaya Belajar*. Jakarta: PT Rineka Cipta.

Hidayat, M. I., Jahidin, & Amiruddin. (2024). Hubungan Gaya Belajar dan Kepercayaan Diri dengan Pemahaman Konsep dan Kemampuan Berpikir Kritis, pada Materi Keanekaragaman Hayati Kelas X di SMA Negeri 10 Kendari. *Jurnal Biofiskim: Pendidikan dan Pembelajaran IPA, 6(1),* 87-109.

Isnanto, & Hamu, M. A. (2022). Hasil Belajar Siswa Ditinjau Dari Gaya Belajar. *Aksara: Jurnal Ilmu Pendidikan Nonformal*, *8*(1), 547–562. https://doi.org/10.37905/aksara.8.1.547-562.2022

Izzati, R. A. E., & Masriyah. (2024). Keterampilan Berpikir Kritis Siswa SMP dalam Menyelesaikan Masalah pada Materi Lingkaran Ditinjau dari Gaya Belajar Siswa. *MATHEdunesa*, *13*(2), 318–334. https://doi.org/10.26740/mathedunesa.v13n2.p318-334

Kurniawan, N. A., Hidayah, N., & Rahman, D. H. (2021). Analisis Kemampuan Berpikir Kritis Siswa SMK. *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan, 6(3),* 334-338. http://journal.um.ac.id/index.php/jptpp/

Lismaya, L. (2019). *Berpikir Kritis & PBL (Problem Based Learning)*. Surabaya: Media Sahabat Cendekia.

Matazu, S. S. & Ismail, A. (2023). Effect of Flipped Classroom Instruction and Enhanced Lecture Method on Academic Performance in Genetics Among Students with Visual-Auditory-Kinesthetic (VAK) Learning Styles in Gusau, Zamfara State, Nigeria. *Journal of Science, Technology and Mathematics Pedagogy, 1(2),* 1-20.

Meryastiti, V., Ridlo, Z. R., & Supeno. (2022). Identifikasi Kemampuan Berpikir Kritis pada Pembelajaran IPA Siswa SMP Negeri 1 Glenmore Kabupaten Banyuwangi. *Saintifika*, *24*(1), 20–29. http://jurnal.unej.ac.id/index.php/STF

Mulyawati, M. S., & Us, S. (2023). Pengaruh Gaya Belajar terhadap Kemampuan Berpikir Kritis Siswa. *Strategy: Jurnal Inovasi Strategi Dan Model Pembelajaran*, *3(3)*, 243–249.

Nahadi, Purnawarman, P., Siswaningsih, W., & Lestari, T. (2021). *Asesmen Keterampilan Berpikir Kritis Kimia : Model Tes dan Pengembangannya*. Ponorogo: Uwais Inspirasi Indonesia.

Porter, D. (2009). *Quantum Learning: Membiasakan Belajar Nyaman dan Menyenangkan*. Bandung: Kaifa Learning.

Pratiwi, G. I., Nuriman, & Alfarisi, R. (2022). Korelasi Antara Gaya Belajar dengan Kemampuan Berpikir Kritis pada Pembelajaran Matematika Siswa Kelas IV SDN Dabasah 3 Bondowoso. *Jurnal Ilmu Pendidikan Sekolah Dasar*, *9*(1), 41-47.

Safitri, Z. D., & Miatun, A. (2021). Analisis kemampuan berpikir kritis matematis ditinjau dari gaya belajar siswa kelas VII SMP Negeri 1 Karawang Barat. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, *5*(3), 3222–3238.

Sholikhah, M., & Dimas, A. (2022). Profile of Critical Thinking Ability of Class VIII Junior High School Students in Science Learning on Simple Aircraft Materials. *Science Education and*

Application Journal (SEAJ), 4(2), 102-111. http://jurnalpendidikan.unisla.ac.id/index.php/SEAJ

Siswanto, G., Sunardi, & Sulistyowati, L. (2025). Development of CTL Approach Learning Tools to Improve Critical Thinking Skills and Science Learning Outcomes of Class V Primary School Students. *Science Education and Application Journal (SEAJ), 7(1),* 31-40. http://jurnalpendidikan.unisla.ac.id/index.php/SEAJ

Supit, D., Melianti, Lasut, E. M. M., & Tumbel, N. J. (2023). Gaya Belajar Visual, Auditori, Kinestetik, terhadap Hasil Belajar Siswa. *Journal on Education*, *5(3),* 6994–7003.

Suprapto, Y. A. I. M. R. S. B. B. H., Irfansyah, A., Rifa'i, M., Suhanto, & Bagus, B. H. (2024). *Gaya Belajar: Membangun Pendekatan yang Tepat untuk Sukses Belajar*. Jakarta Utara: Smart Global Nusantara.

Triwarsana, B., & Saputro, M. (2024). Analisis Kemampuan Berpikir Kreatif Matematis Siswa pada Materi Segi Empat dan Segitiga di Kelas VIII SMP. *Jurnal Inovasi Pendidikan Dan Pengajaran*, *3*(1), 42–54. https://journal.ikippgriptk.ac.id/index.php/JIPP/index

Ulandari, S., Pranata, O. D., & Kencanawati, I. (2024). Analisis Minat Siswa dalam Konteks Integratif: Studi Deskriptif dan Komparatif dalam Pembelajaran Biologi. *Jurnal Pendidikan Mipa*, *14*(1), 131–138. https://doi.org/10.37630/jpm.v14i1.1486

Verawati, N. N. S. P., Rokmat, J., Sukarso, A. A., Harjono, A., Makhrus, M. (2024). Analysis of Students' Critical Thinking Disposition in Science Learning. *Jurnal Pendidikan Fisika dan Teknologi, 10(1)*, 200-210. https://jurnalfkip.unram.ac.id/index.php/JPFT/article/view/7127