Jurnal Akademika Kimia, 14(1): 34-39, February 2025
ISSN (online) 2477-5185 | ISSN (print) 2302-6030
http://jurnal.fkip.untad.ac.id/index.php/jak/

OPEN ACCESS

The Relationship Between Interest in Learning and Critical Thinking Skills of Junior High Students in Science Learning

***Ersa Ramadani, Frelyana Tiro, Haeruddin, Mohammad Jamhari, & Afadil**
Program Studi Pendidikan Sains/Pascasarjana – Universitas Tadulako, Palu – Indonesia 94119

Received 26 December 2024, Revised 28 January 2025, Accepted 17 February 2025
doi: 10.22487/j24775185.2025.v14.i1.pp34-39

Abstract

This study aims to determine the relationship between interest (X1) and critical thinking skills of seventh-grade students in science learning at SMP Negeri 4 Tanantovea. This study is a descriptive correlational study. The research sample was selected using total sampling, comprising all seventh-grade students from two classes, totalling 36 students. The instruments used in this study were a questionnaire on students' interest in learning and a critical thinking test. The questionnaire on interest in learning and the critical thinking test were subjected to content and construct validity tests. A field trial was conducted with 36 students, comprising 19 female and 17 male students. The instruments used in this study were a critical thinking test and a questionnaire on students' learning interests. The questionnaire on learning interest consisted of 20 statements, while the critical thinking test consisted of 10 essay questions. All instruments underwent content validity testing by experts, empirical validity testing using Pearson product-moment correlation, and reliability testing using Cronbach's Alpha. Prerequisite tests were conducted using the Shapiro-Wilk normality and linearity tests with SPSS 22 software. The study results in Grade VII of junior high school concluded a relationship between interest and critical thinking ability, with a correlation value of 0.402 and a regression equation of $\hat{Y} = Y = 57.813 + 0.165X1$. Furthermore, based on the calculated r value of 0.442, the criteria for the strength of the relationship between the variables of interest and critical thinking indicate a fairly strong relationship.

Keywords: Interest, critical thinking, science learning

Introduction

Quality education is demonstrated by producing students with skills that align with the demands of the times. Students can only master these skills if consistently practised and refined through the learning process (Zahranie et al., 2020; Badriyah et al., 2025). According to Rahmaniar et al. (2022), in the 21st century, students must have 21st-century skills, one of which is critical thinking. Critical thinking is the ability to reason and view problems objectively so that the results obtained align with reality. Critical thinking skills are essential for students to address various personal and social issues. Therefore, science education at junior high school is crucial for enhancing students' skills and understanding of the scientific process and natural phenomena. The presence and guidance of teachers in the classroom can positively impact students' learning interest, thereby influencing the development of their critical thinking skills.

The importance of critical thinking skills is also highlighted by Kusuma et al. (2024), Akbar et al. (2024) and Arda et al. (2024), who state that critical thinking skills enable students to engage in the learning process actively. They learn to synthesise information from various sources, identify an argument's assumptions, and understand concepts more deeply. A similar point is made by Yuono (2018), Fitriani et al. (2020), and Fathin et al. (2023), who state that critical thinking skills provide proper guidance in thinking and working, and help in determining the relationship between things more accurately. Critical thinking skills are essential in problem-solving/solution-finding and project management.

Rahmajati & Dewi (2024) and Hidayati et al. (2024) state that there is a more important factor within the learner: a strong motivation accompanied by feelings, determination, and a desire to improve learning outcomes. We often refer to this as interest. Students with a strong interest in a particular subject will continue to engage in that subject with enthusiasm. However, school issues indicate that middle school students' interest in learning science is still low. As stated by Mursabdoet et al. (2022) and Song & Cai (2024), studying science is a complex and unpleasant task for middle school students. There are many things to learn in science education, including memorising theories, formulas, and calculations involving mathematical principles, making the subject perceived as difficult. This aligns with classroom observations showing that students tend to be passive, less engaged, and lack interest in observing material related to the classification of living organisms and non-living objects.

*Correspondence:
Ersa Ramadani
ersaramadani111201@gmail.com

The lack of interest among students in biology lessons is because the average seventh-grade junior high school student believes that the material being studied is too extensive and abstract. For example, in the material on the classification of living things, students classify five kingdoms: monera, protista, fungi, plantae, and animalia. The large number of topics covered in science lessons in seventh grade bored students with the lessons given by teachers because they find it difficult to understand the material, and the lessons are monotonous and not interactive. Additionally, there is a lack of facilities or learning resources, such as projectors and internet access, at the school. At the same time, science education requires visual media to explain living organisms' classification clearly, further exacerbating the issue. Due to these factors, the problem is addressed by developing teachers' abilities, such as linking science education to real-world contexts by observing living organisms around the school, and motivating and supporting students on the importance of science education in daily life.

Science lessons challenge students to develop their curiosity about life and the universe. However, explanations and presentations of science material that are too complicated sometimes prevent students from understanding the material provided by teachers. This can reduce students' interest in learning. This situation should not be allowed to continue, and poses a challenge for science teachers to continue to motivate students to learn. Mustajab et al. (2023) state that students with a high interest in a subject, such as science, tend to be more diligent in their studies and enjoy attending classes. They also find it easier to overcome learning difficulties and can complete exercises and practical work well because of the appeal they feel when studying the subject. In studying Natural Sciences (IPA), children can develop critical and objective thinking skills.

According to Wulandari (2019), critical thinking is an individual's ability to solve problems, characterised by traits such as a high level of curiosity and imagination, a willingness to take risks, and an appreciation of the rights of others, as well as the ability to communicate and collaborate with peers in the learning process. When students can express their opinions and thoughts well and collaborate with their peers, it is said that they have an interest in science because of their active participation. However, not all biology material interests students; they tend to be less enthusiastic about difficult material with complicated scientific terms. Identifying students' interests based on the material they need will help teachers map out students' learning needs. Therefore, it is important to know the Biology topics students are interested in to support their learning needs.

Critical thinking aims to develop students to think neutrally, objectively, reasonably, logically, clearly and accurately. With this objective in mind, students are trained to make wise decisions by providing reasons for the truth of a statement and taking action in a given situation. Therefore, to achieve critical reading and critical thinking skills, students must also have an interest in reading, because critical reading skills can only be achieved if students have an interest in reading (Restuningsih et al., 2017). In Indonesia itself, students' critical thinking skills can be said to be low, according to the Programme for International Student Assessment (PISA) survey conducted in 2018, where Indonesia ranked 74th, or sixth from the bottom. These results indicate that students in Indonesia have relatively low critical thinking skills compared to students in other countries when solving test questions.

Several studies are relevant to the research conducted, namely the study by Mellysa (2019), entitled 'The Relationship between Interest and Critical Thinking Ability in the Cross-Interest Programme.' The results indicate a significant relationship between students' interests and their critical thinking skills in Biology for Grade X IIS. Barus et al. (2018) also conducted a study titled 'The Relationship Between Self-Concept and Critical Thinking Skills of Grade X MIA Students in Biology in the Interdisciplinary Programme.' The correlation analysis of Grade X MIA students between self-concept and critical thinking skills in biology revealed a positive relationship between self-concept and critical thinking skills in biology among students in the Cross-Interest Programme. It was also found that the relationship between self-concept and critical thinking skills is significant (Jamil et al., 2024).

Research conducted by Ningrum et al. (2023) and Jamil et al. (2023) titled 'The Relationship between Learning Interest and Mathematical Critical Thinking Ability of Fifth Grade Elementary School Students' states that interest in learning is positively and significantly related to mathematical critical thinking ability. An increase in students' interest in learning is accompanied by increased mathematical critical thinking skills. The practical implications of this research provide information that increasing students' interest in learning mathematics is important. As their interest in learning increases, their mathematical critical thinking skills will also improve.

Although studies on the relationship between learning interest and critical thinking skills in science learning have been conducted separately, research examining these variables and interest in science learning at SMP Negeri 4 Tanantovea is still limited. Therefore, comprehensive research is needed to reveal how students' interest in learning and critical thinking skills simultaneously influences their interest in learning science. Thus, this study aims to determine the relationship between students' interest in learning and critical thinking skills in Grade VII in science learning at SMP Negeri 4 Tanantovea.

Methods

This research was conducted at SMP Negeri 4 Tanantovea. The method used in this research was quantitative correlational. According to Arikunto (2018), the descriptive method with a correlational research design aims to determine the level of relationship between two or more variables without manipulating or changing existing data. The

independent variable and dependent variable are the variables used in this study. Critical thinking is the independent variable, while students' learning interest is the dependent variable. Therefore, this study aims to determine the relationship between students' interest in critical thinking in science education.

The research sample was taken using a total sampling technique: all 36 students in grade VII of SMP Negeri 4 Tanantovea, consisting of 19 female and 17 male students. The instruments used were a 20-item learning interest questionnaire and a critical thinking test consisting of 10 essay questions, which had been validated in terms of content and empirically tested for reliability.

The validity test in this study was an empirical validity test calculated using Pearson's product-moment correlation. The instrument's reliability and prerequisites were tested using Cronbach's alpha formula. The hypothesis was tested using simple regression analysis and Pearson's product-moment correlation. The material tested was the classification of living things. The learning interest questionnaire and critical thinking ability test instruments were tested for content and construct validity. After a field trial with 36 respondents, the learning interest data were tested for validity using Pearson's product-moment correlation, assisted by SPSS 22 software. The validity of the learning interest and critical thinking ability data was assessed for reliability using Cronbach's alpha calculation. The prerequisite tests used the Shapiro-Wilk normality and linearity tests with SPSS 22 software. The indicators for the learning interest variable in this study were feelings of interest, enjoyment, attention, and participation. The indicators for the critical thinking ability variable in this study were problem identification, information collection and evaluation, data analysis and interpretation, and problem-solving indicators.

Results and Discussion

The research results, which include the average data of the interest scale (X1) and the critical thinking ability score (Y) in class VII students of SMP Negeri 4 Tanantovea, are obtained in **Table 1.**

Table 1. Mean scores of learning interest

No.	Specialisation	Average Score	
		Interests	Critical Thinking
1	VII SMP	48.75	65.86

Based on the normality test results in **Table 2.** The Shapiro-Wilk significance value is obtained, namely on the student learning interest variable of 0.058 and critical thinking of 0.050. Sig. Shapiro-Wilk is higher than the 5 % significance level or sig. > 0.05. This illustrates that the data for the two variables are normally distributed. The normality test with the Shapiro-Wilk technique is used because the data tested is 36 respondents and < 50 samples.

Table 2. Normality test results

Test of Normality

	Klomogorov-Smimov[2]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Interest in learning	.112	36	.200*	.942	36	.058
Critical thinking	.190	36	.002	.940	36	.050

*. This is a lower bound of the true significance

a. Lilliefors Significance Correction

Table 3. Linearity test results

F_{hitung}	F_{tabel}	Description
0.514	2.225	Linear

The results obtained from the linearity test at a significant level of 5 % show that the coefficient value F_{hitung} = 0.514 is smaller than the coefficient value F_{tabel} = 2.225. So it can be said that interest in learning students' critical thinking skills has a linear relationship.

Table 4. Regression and correlation analysis

Class	Variables	r/R	Linear Regression Equation	thiy	ttab
VII	Learning Interest (X_1) on students' critical thinking skills (Y)	0.018/0.014	$Y = 57.813 + 0.165X_1$	0.777	0.000

Notes:

** = significant correlation at the 0.01 level

n = significant (real effect)

Table 4. Shows that the relationship between interest in learning (X_1) and critical thinking skills (Y) in the form of a regression equation can be written as follows: $Y = 57.813 + 0.165X_1$. The regression coefficient value of the independent variable is positive (+) 0.165. Then there is a significance value of 0.000 < 0.05, and the calculated t value > t table in the form of (0.777 > 0.000). Based on these two bases for decision making, it can be concluded that interest in learning has a positive and significant effect on students' critical thinking skills.

It is known that the R Square value is 0.014, which indicates that the contribution of the influence of the learning interest variable on the critical thinking variable is 1.4 %. A value of 0.014 indicates that interest in learning contributes 1.4 % to students' critical thinking skills. The rest, 98.6 %, is influenced by other variables not included in this research model. Although the effect is small, interest in learning remains a relevant factor. Then, based on the calculated r value of 0.442 obtained, the criteria for the strength of the relationship between the variables of interest and critical

thinking indicate a reasonably significant relationship.

Critical thinking skills are also essential in science learning, given that this subject involves various scientific concepts, analysis of natural phenomena, and problem-solving. Therefore, Sari (2023) and Dewi et al. (2023) explain that critical thinking is a cognitive process that can guide the thinking process by designing a thinking framework in real-world activities. Thinking is an activity that involves cognitive processes carried out by an individual to obtain various pieces of information and determine appropriate actions to address a problem. Hasibuan et al. (2022) and Laila & Virgana (2020) argue that critical thinking is an activity through which one thinks about ideas or concepts related to a given concept or problem. This study shows that the critical thinking skills required include problem identification, information collection and evaluation, data analysis and interpretation, and problem-solving indicators.

Rahim (2023) and Pramugita & Nugraheni (2025) also state that when related to biology education, critical thinking can be divided into two categories: high-level thinking and low-level thinking. In 21st-century biology education, the focus is on developing students' ability to think critically, enabling them to apply critical thinking skills based on their acquired knowledge. This aligns with the educational objectives outlined in the 2013 Curriculum, which emphasises the importance of critical thinking through critical learning for students. Of course, learning interest is closely related to students' critical thinking skills, as stated by Anjelina et al. (2023) and Prihatin & Gunawan (2024), that one of the factors influencing critical thinking skills is students' learning interest.

Based on questionnaire scores and learning interest perspectives, it is evident that interest is an internal factor that plays a crucial role in the science learning process. Students with high learning interest demonstrate greater activity in learning, have better focus in understanding the material, and possess strong intrinsic motivation to explore science concepts. Putra et al. (2021) state that career aspirations influence students' interest in science learning. Students with career aspirations related to science learning are more interested in participating in learning, while those without such aspirations are less interested in science learning. Aspirations that require a deep understanding of science will increase students' interest in learning science, and vice versa. Wayudi et al. (2023) explain that learning interest refers to an individual's tendency to feel happy without coercion, leading to changes in knowledge, skills, and behaviour. Arfani et al. (2023) and Putri et al. (2023) state that students' interest in learning and critical thinking skills has an interrelated impact. Students' interest in learning can be a determining factor in improving the quality of learning and academic achievement in science. However, additional efforts are needed to develop evaluation, inference, and re-examination skills to achieve an optimal level of critical thinking skills.

The Kolmogorov-Smirnov normality test results are used as a prerequisite test to determine whether the data is typically distributed. In addition, linearity testing determines whether the relationship between variables is linear. The results of testing the normality of the data utilising the SPSS 22 application showed that the Shapiro-Wilk significance value, namely on the student learning interest variable, was 0.058, and critical thinking was 0.050, which means that both data were normally distributed. Data is normally distributed if the significance value is > 0.05 or the Asymp.Sig (2-Tailed) value > 0.05. The next test is the linearity test utilising the SPSS 22 application. The results obtained are the F-count coefficient = 0.514, smaller than the F-table coefficient value = 2.225. So it can be said that interest in learning students' critical thinking skills has a linear relationship. After the prerequisite test is achieved, the hypothesis test is carried out in **Table 4.** Shows that the relationship between interest in learning (X1) and critical thinking skills (Y) in the form of a regression equation can be written as follows: $Y = 57.813 + 0.165X_1$. The regression coefficient value of the independent variable is positive (+) of 0.165 Then there is a significance value of 0.000 < 0.05 and the value of t count > t table in the form of (0.777 > 0.000). Based on these two bases for decision-making, it can be concluded that interest in learning has a positive and significant effect on students' critical thinking skills. These results mean that students' science critical thinking skills increase along with the increase in the learning interest of seventh-grade students at SMP Negeri 4 Tanantovea.

The results revealed a significant correlation between learning interest and critical thinking skills. Students with a high interest in science show characteristics such as asking critical questions more often, actively seeking additional information, and relating learning concepts to everyday life. They also show better ability in analysing science problems and have curiosity that encourages critical thinking. Similar to research conducted by Purbaningrum et al. (2024), there is a positive and significant relationship between interest and students' critical thinking skills. Critical thinking skills in the classroom help learners achieve synergy through learning, access their current level of knowledge, and ultimately be creative and innovative in the learning process, facilitating critical thinking.

The findings in this study have important implications for the learning process. Teachers must design learning that can increase students' interest in learning through interactive learning methods, providing contextual examples, and developing enjoyable practicum activities. The learning environment also needs to be designed to support the development of critical thinking skills. The successful development of critical thinking skills through learning interest is supported by factors such as teacher quality and competence, availability of infrastructure, environmental support, and individual student characteristics. These factors need to be considered in an effort to optimise learning. Based on these findings,

some development recommendations that can be implemented include developing teacher training programs, providing varied learning resources, implementing learning evaluations that encourage higher-order thinking skills, and providing exploration opportunities for students. Supporting programs that stimulate students' interest in learning must also be developed to maximise students' critical thinking skills.

Conclusions

Based on the research results, it can be concluded that there is a positive and significant relationship between learning interest and critical thinking skills of students in science learning at SMP Negeri 4 Tanantovea. This indicates that the higher the students' learning interest, the higher their critical thinking skills. The better the students' learning interest, the better their critical thinking skills. This conclusion is supported by the results of data analysis, which yielded a positive correlation coefficient of 0.442 and a significance value of 0.00. The relationship between learning interest and critical thinking skills is fairly large based on the correlation coefficient value (0.442). This finding contributes to understanding the importance of learning interest and its influence on students' critical thinking skills in science education. It highlights the need for educators to build a supportive learning environment that encourages learning interest and integrates learning activities with the surrounding environment to improve students' critical thinking skills. Thus, educators can effectively conduct enjoyable learning for students and improve their interest and critical thinking skills.

Acknowledgment

The authors would like to sincerely thank the principal and the teachers of SMP Negeri 4 Tanantovea.

References

Akbar, I., Saputro, S., & Masykuri, M. (2024). Critical thinking in science learning research trend from 2014-2024: A systematic literature Review. *Jurnal Penelitian Pendidikan IPA, 10*(12), 1049–1059.

Anjelina, I. P., Amin, A., & Ariani, T. (2023). Pengaruh model learning cycle 7E terhadap kemampuan berpikir kritis dan minat belajar siswa kelas X SMA negeri 4 Lubuklinggau. *Journal Of Education And Instruction, 6*(2), 647–662.

Arda., Supriyatman., & Afadil. (2024). A review of students' critical thinking skills in science learning in Indonesia. *Jurnal Pendidikan MIPA, 25*(4), 1787–1798.

Arfani, F., Gibran, M. A., Wahyuni, N. I., & Marno. (2023). Penerapan model PBL dalam mengembangkan kemampuan berpikir kritis dan minat belajar pendidikan pancasila. *Madani: Jurnal Ilmiah Multidisipline, 1*(11), 274–285.

Arifin, E. G. (2020). Problem Based Learning To Improve Critical Thinking. Social, Humanities, And Education Studies (Shes): Conference Series, 3(4), 98–103.

Arikunto, S. (2018). *Dasar-dasar evaluasi pendidikan (edisi ke-3)*. Jakarta: PT Bumi Aksara.

Badriyah, L., Tindangen, M., & Adji, S. S. (2025). Effect of canva application on learning interest and critical thinking of elementary school students. *ADPEBI International Journal Of Business And Social Science, 5*(1), 37–49.

Barus, E. M., Ritonga, I. S., & Siregar, C. D. (2018). Hubungan konsep diri dengan kemampuan berpikir kritis siswa kelas X MIA Pada mata pelajaran biologi program lintas minat. *JIFI (Jurnal Ilmiah Farmasi Imelda), 2*(1), 11-14.

Dewi, N. N. S. K., Arnyana, I. B. P., & Margunayasa, I. G. (2023). Project based learning berbasis stem: meningkatkan kemampuan berpikir kritis dan hasil belajar siswa. *Jurnal Ilmiah Pendidikan Profesi Guru, 6*(1), 133–143.

Sari, L. E. (2023). *Penerapan pembelajaran steam untuk meningkatkan minat belajar dan kemampuan berpikir kritis siswa SD*. Unpublished master's thesis: Jambi: Universitas Jambi.

Fathin, A. Z., Gunawan., Untarti, R., Kusuma, J. W., & Sugiastuti. (2023). Efforts to improve critical thinking skills and interest in learning mathematics using the integrated number head-together problem-based learning model. *International Journal Of Economy, Education And Entrepreneurship, 3*(3), 702–713.

Fitriani, A., Zubaidah, S., Susilo, H., & Muhdhar, M. A. (2020). The correlation between critical thinking skills and academic achievement in biology through problem based learning-predict observe explain (PBLPOE). *International Journal Of Learning And Teaching, 6*(3), 170–176.

Hasibuan, L., Elindra, R., & Harahap, S. D. (2022). Analisis kemampuan berpikir kritis di tinjau dari minat belajar matematika siswa selama pandemi. *Jurnal MathEdu (Mathematic Education Journal), 5*(1), 48–52.

Hidayati, N., Nugrahani, F., & Suwarto. (2024). Pengaruh kemampuan berpikir kritis dan minat baca terhadap kemampuan literasi digital. *Didaktika: Jurnal Kependidikan, 13*(3), 3201–3212.

Putra, I. P. O. P., Pujani, N. M. & Priyanka, L. M.. (2023). Analisis minat belajar IPA pada pembelajaran daring. *Jurnal Pendidikan Dan Pembelajaran IPA Indonesia, 11*(2), 22–31.

Jamil, A. F., Baiduri, B., & Pratiwi, A. E. (2022). Students' interest and critical thinking: the experimental teaching method in using online learning media YouTube. *Journal Of Education Technology, 6*(1), 12–18.

Jamil, M., Bokhari, T. B., & Rafiq, M. (2024). Critical thinking skills development for 21st century: An analysis of biology curriculum (2006). *Voyage Journal Of Educational Studies, 4*(1), 127–138.

Kusuma, E. S. J., Handayani, A., & Rakhmawati, D. (2024). Pentingnya pengembangan kemampuan berpikir kritis pada siswa sekolah dasar: Sebuah tinjauan literatur. *Jurnal Wawasan Pendidikan, 4*(2), 369–379.

Laila, D. N., & Virgana. (2020). Pengaruh Kecerdasan emosional dan minat belajar terhadap kemampuan berpikir kritis matematika. *Alfararisi: Jurnal Pendidikan MIPA, 3*(3), 81–92.

Mellysa, E. (2019). Hubungan minat dengan kemampuan berpikir kritis program lintas minat. *Proceedings of Seminar Nasional Teknologi Informasi Komputer dan Sains* (pp. 648–650). Medan: AMIK IMELDA

Mursabdo, W., Suendarti, M., & Virgana. (2022). Pengaruh persepsi atas kompetensi pedagogik guru dan minat belajar terhadap kemampuan berpikir kritis ilmu pengetahuan alam (survei pada SMP swasta di Jakarta Pusat). *Alfarisi: Jurnal Pendidikan MIPA, 5*(2), 170–186.

Mustajab, A., Bahri, S., & Apriani, V. K. (2023). Analisis minat belajar siswa pada mata pelajaran IPA dalam materi tumbuhan hijau di kelas V SDN 06 Pemodis. *QUANTUM: Jurnal Pembelajaran IPA dan Aplikasinya, 3*(1), 16–22.

Ningrum, M., Karsono., & Adi, F. P. (2023). Hubungan antara minat belajar dengan kemampuan berpikir kritis matematis peserta didik kelas V Sekolah Dasar. *Didaktika Dwija Indria, 11*(4), 31–36.

Pramugita, C., & Nugraheni, N. (2025). Pengaruh efikasi diri, minat belajar, dan kecemasan matematika terhadap kemampuan berpikir kritis matematis siswa sekolah dasar. *Jurnal Pendidikan MIPA, 15*(2), 624–634.

Prihatin, & Gunawan, W. (2024). The influence of E-PJBL and student learning interest on critical thinking skills. *Jurnal Inovasi dan Teknologi Pembelajran, 11*(1), 24–32.

Purbaningrum, A. D., Poerwanti, J. I. S., & Atmojo, I. R. W. (2024). Hubungan antara minat baca dengan kemampuan berpikir kritis dalam pembelajaran IPS di sekolah dasar. *Didaktika Dwija Indria, 12*(1), 31–36.

Putri, J. K., Gunawan, C. W., & Wiyatmo, Y. (2024). Implementation of guided inquiry to increase students' interest in learning physics and critical thinking skills. *Jurnal Pendidikan Fisika dan Teknologi, 10*(2), 257–263.

Rahim, A. (2023). Meningkatkan keterampilan berpikir kritis melalui pembelajaran kritis. *JSE: Journal Sains and Education, 1*(3), 80–87.

Rahmajati, D. A. R., & Dewi, K. K. (2024). Upaya meningkatkan minat belajar peserta didik dalam pembelajaran IPA melalui pendekatan pembelajaran contextual teaching and learning (CTL) pada kelas VII F di SMP negeri 11 Surakarta. *INKUIRI: Jurnal Pendidikan IPA, 13*(1), 84–91.

Rahmaniar, A., Purnamasari, S., Lestari, W. Y., Laelawati, M. S. S., & Nurdiana, R. (2022). Kemampuan berpikir kritis siswa dalam pembelajaran IPA dengan model problem based learning (PBL) terintegrasi pendidikan STEM. *Jurnal PGSD UNIGA, 1*(2), 45–52.

Restuningsih, M. A., Nyoman, D., & Sudiana, N. (2017). Kemampuan membaca kritis ditinjau dari kemampuan berpikir kritis dan minat membaca pada siswa kelas V SD kristen harapan Denpasar. *PENDASI: Jurnal Pendidikan Dasar Indonesia, 1*(1), 45–54.

Song, H., & Cai, L. (2024). Interactive learning environment as a source of critical thinking skills for college students. *BMC Medical Education, 24*(1), 1–9.

Wayudi, M., Akbar, A., & Wahyudi. (2023). Efektivitas metode problem solving dan problem based learning terhadap kemampuan berpikir kritis siswa dimoderasi minat belajar. *Journal on Education, 06*(01), 4586–4598.

Wulandari, I. P. (2019). Berpikir kritis matematis dan kepercayaan diri siswa ditinjau dari adversity quoti. *PRISMA*, Proceedings of *Seminar Nasional Matematika* (pp. 629–636). Surabaya: UNNESA

Yuono, H. (2018). Hubungan minat baca dan kemampuan berpikir kritis dengan hasil belajar peserta didik pada mata pelajaran bahasa Indonesia. *Jurnal Ilmiah Pendidikan Guru Sekolah Dasar, 3*(2), 181–200.

Zahranie, M., Andayani, Y., & Loka, I. N. (2020). Hubungan keaktifan bertanya dengan kecenderungan berpikir kritis siswa kelas XI IPA di SMA/MA se-kecamatan Narmada tahun ajaran 2019/2020. *Chemistry Education Practice, 3*(1), 5–11.