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THE INFLUENCE OF PROBLEM BASED LEARNING ON CRITICAL THINKING SKILL REVIEWED FROM GENDER

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Abstract

This research highlights the need for the application of learning models that can improve critical thinking skills. The model that is believed to be able to improve critical thinking skills is Problem Based Learning (PBL). The purpose of this study was to determine 1) the effect of PBL learning model on critical thinking ability; 2) the effect of gender differences on critical thinking ability; 3) the effect of PBL learning model on critical thinking ability; thinking ability in terms of gender differences. The purpose of this study was to determine the difference and effect of problem-based learning and conventional learning models on critical thinking ability in terms of gender. This research used quantitative approach with quasi experiment design. This research instrument used an essay test of 5 questions. The data analysis used was normality test, homogeneity test, and 2-way anova test. The results showed that 1) PBL model has an effect on students' critical thinking skills; 2) there is an effect of gender on students' thinking skills; 3) there is no effect of PBL learning model on critical thinking skills in terms of gender differences.

Keywords: Problem Based Learning, Critical Thinking, Gender

INTRODUCTION

Amidst the complex dynamics of society and the rapid evolution of technology, modern education highlights the importance of high critical thinking skills. Critical thinking individuals enables to manage information from various sources. including social media and the internet, with the aim of making decisions based on facts and logic (Herman et al., 2024).

Critical thinking skills will encourage the acquisition of high student learning outcomes. This is key in shaping individuals who are able to make a positive contribution to society (Pattiran et al., 2024). Through positive social interactions, students can learn to collaborate. show empathy, and understand the needs of others (Han et al., 2024: McMahon & Isik, 2023: Roth & Peng, 2024; Sudariyanto, 2020). In addition, it can develop skills to resolve conflicts constructively, build healthy relationships, and appreciate diversity society (Istianah, Maftuh, & in Malihah, 2023).

High critical thinking ability is not only the key to success in academia, but also an indispensable skill to face complex challenges in personal and professional life. Therefore, education needs to emphasise the development of this aspect through student-focused learning approaches, collaborative learning, and learning experiences relevant to real life (Musyafak & Subhi, 2023; Suyuti et al., 2023). As such, individuals will be prepared to face the ever-changing and dynamic demands of the modern world.

In fact, the critical thinking skills of students in Indonesia are still in the low category. This is evidenced by the PISA (Program for International Student Assessment) survey initiated by the OECD (Organization for Economic Cooperation and Development) in 2022 for critical thinking skills ranked 72 out of 78 countries (OECD, 2022). This proves that students' critical thinking skills are still far from average. Despite the available evidence, most educators and managers of educational institutions in Indonesia are reluctant to apply available Learning models or methods. In fact, instead of implementing learning that activates critical thinking, educators in Indonesia tend to do the opposite. Mayasari et al. (2016) Indonesian reported that most educators prefer traditional rote methods and direct teaching over approaches student-centred methods.

Therefore, it is necessary to apply a learning model that can improve critical thinking skills. The model that is believed to be able to improve critical thinking skills is Problem Based Learning (PBL). Slavin (2015)explained that the PBL model has several advantages, including 1) stimulating students' abilities and giving satisfaction to discover new knowledge; 2) increasing students' activities; 3) helping how to transfer knowledge their to understand problems in real life; 4) helping participants gain new knowledge and be responsible for the learning they do; and 5) encouraging students to think critically by adjusting the new knowledge gained.

There are many studies related to the effect of PBL learning models. Some studies show that PBL models/methods affect students' critical thinking skills, especially junior high school students (Aswan, Lufri, & Sumarmin, 2018; Yolanda, 2019). Although there are several predictors that influence the PBL model such as age, gender. achievement, academic and educational background, there are several predictors that influence the PBL model (Darmaii. Astalini. Kurniawan, & Putri, 2022).

The role of gender has an influence on critical thinking skills, although this influence may vary depending on other factors such as social environment, parenting, and learning methods applied.

According to some experts, gender is considered to have an influence on emotional growth, a person's critical interests abilities. and learning outcomes (Isslamiyah & Wijayanti, 2022). Research conducted bv Mawaddah et al. (2018) mentioned that female students' critical thinking skills are better than male students. In addition, research conducted by Hafidz (2019) that female students' learning outcomes are better than male students. However, there are other studies that contradict these results such as those conducted by Rodzalan & Saat (2015) and Ro & Knight (2016) which resulted in the critical thinking skills of male students being higher than female students. These studies show that the critical thinking skills of male students are different from female students. This states that male and female students have different critical thinking skills (N.-Y. Liu, Hsu, Hung, Wu, & Pai, 2019; Rød & Calafato, 2023).

Research related to the application of PBL learning models in terms of gender has been conducted by several researchers. Tanaka (2023) In his research, he explained the relationship between PBL learning model with motivation learning and selfconceptual in terms of gender. Furthermore, research conducted by Hirshfield & Koretsky, (2017) and Pambudi et al., (2021) explaining interaction and communication skills in terms of gender through the PBL learning model. Then the research conducted by Ajai & Imoko (2015) and Patmawati et al. (2023) conducted research on student learning outcomes based on gender using the PBL learning model.

However, although several studies have been conducted on the application of the Problem-Based Learning (PBL) model in improving critical thinking research that skills. specifically assesses the impact of PBL based on gender on social problems material has never been found by researchers. Therefore, a more in-depth and comprehensive research is needed to identify how PBL affects critical thinking skills by considering gender differences. This research should include a more detailed analysis of how students of different genders respond and interact with the PBL model in the context of social problems. With a better understanding of the influence of gender in the application of PBL, it is hoped that more effective strategies can be found to improve students' critical thinking skills more fairly and equitably.This study aims to 1) determine the effect of PBL learning model on critical thinking skills. 2) Knowing the effect of gender differences on critical thinking skills. 3) To find out the effect of PBL learning model on critical thinking skills in terms of gender differences.

METHOD

This research uses a quantitative approach with a quasi experiment Quasi experiment is an design. experiment with elements of treatment, pre and post test but does not take samples (Wulandari random & Surjono, 2013). The research location is at the Social Studies Education Study Programme, State University of Malang. This material used social problem. The research subjects consisted of two classes, namely classes A and B, where class A consisted of 42 students and class B consisted of 40 students. Class A is an experimental class by applying a problem-based learning model and class B applies a conventional learning model.

The research design used a 2x2 factorial design (Febriani, Tawil, & Sari, 2021). There are three variables in this study, namely the independent variable, dependent variable, and moderator variable (Lestari, 2021). There are two independent variables, namely the problem-based learning model (A1), and the conventional learning model (A2), the dependent variable is critical thinking skills, while the moderator variables are male and female gender. More details, this research design can be seen in table 1.

Table 1. Research Design

Gender (B)	Learning Model (A)		
	Problem Based Learning (A ₁)	Conventional Learning (A ₂)	
Male (B_1)	$Y [A_1 B_1]$	$Y \left[A_2 B_1 \right]$	

Female (B ₂)	$Y [A_1 B_2]$	$Y [A_2 B_2]$	
Σ	$Y [A_1 B_1] + Y [A_1 B_2]$	$Y [A_2 B_1] + Y [A_2 B_2]$	

The data collection technique in the study used a test instrument. The test technique was used to determine the achievement of critical thinking skills. The test prepared was a written description test totalling 5 questions. The test of test instruments in this study includes validity, reliability, difficulty level of questions, and differentiating power of questions.

The results of the question validity test can be seen in table 2

	Item	Total	Conclusion	
P1	Pearson Correlation	.522**		
	Sig. (2-tailed)	.003	Valid	
	N	30		
P2	Pearson Correlation	.576**		
	Sig. (2-tailed)	.001	Valid	
	N	30		
P3	Pearson Correlation	.643**		
	Sig. (2-tailed)	.000	Valid	
	N	30		
P4	Pearson Correlation	.812**		
	Sig. (2-tailed)	.000	Valid	
	N	30		
P5	Pearson Correlation	.543**		
	Sig. (2-tailed)	.002	Valid	
	Ν	30		

Table 2. Validity Test Results

The validity test showed that the five question instruments were valid with value bigger than T table (0,204). Then,

the results of the question reliability test can be seen in table 3.

Table 3. Reliability Test Results				
Cronbach's Alpha N of Items Conclusion				
.601	5	Reliable		

The reliability test results show that the five questions can be declared reliable with value 0,601. Then, the results of

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the test of the level of difficulty of the questions can be seen in Table 4.

Table 4. Test Results of the Level of Difficulty
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		P1	P2	P3	P4	P5
N	Valid	30	30	30	30	30
	Missing	0	0	0	0	0
Mean		2.20	2.83	2.77	2.30	2.43

Maximum	4	4	4	4	4
Category	Good	Good	Good	Good	Good

In the level of difficulty test results, all five questions are categorised as good. Then, the results of the test of the differential power of the questions can be seen in Table 5.

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Category
P1	10.33	10.437	.289	Low
P2	9.70	9.734	.312	Low
P3	9.77	9.220	.405	Quite
P4	10.23	7.220	.616	High
P5	10.10	9.679	.206	Low

Table 5. Differentiated Test Results

In the results of the test of the differential power of questions, 3 questions have low differences in numbers 1, 2, and 3. Then in question number 3 is categorised as quite. Question number 4 is categorised as high.

Data analysis in this study consisted of normality test, homogeneity test, and two-way ANOVA test. The data analysis test is based on the research hypothesis, which is as follows.

Hypothesis 1:

Ho1: there is no effect of PBL learning model on critical thinking skills. Ha1: there is an effect of PBL learning model on critical thinking skills. Hypothesis 2: Ho2: there is no effect of gender difference on critical thinking ability. Ha2: there is an effect of gender differences on critical thinking skills. Hypothesis 3:

Ho3: there is no effect of PBL learning model on critical thinking ability in terms of gender differences.

Ha3: there is an effect of PBL learning model on critical thinking ability in terms of gender differences.

RESULTS AND DISCUSSION

The results of the average value of critical thinking ability of experimental class (class with problem-based learning model) and control class (class with conventional model) can be seen in Figure 1.



Figure 1. Average Value of Critical Thinking Ability

Students with female gender when implementing learning with problembased learning model have an average critical thinking ability of 76.31. While when the application of learning with the conventional model has an average critical thinking ability of 74.15. Meanwhile, male students when applying the problem-based learning model had an average critical thinking ability of 75.77, and when applying coventional model of 72.29. Based on these data, it can be stated that: 1) the average critical thinking skills of both male and female students when learning with problem-based learning models are higher than when learning with conventional model; 2) there is no difference in the average critical thinking skills of male and female students both when applying problem-based learning and conventional model.

The results of the data normality test in this study can be seen in table 6 below.

Table 6. Data Normality Test Results			
Kolmogorov-Smirnov ^a			
Statistic	df	Sig.	
.048	89	$.200^{*}$	

Based on table 6 of the normality test results, it is known that the significance value of the critical thinking variable is 0.200 which shows the results of critical thinking>0.05. So the critical thinking ability data is normally distributed.

Furthermore, the results of the data homogeneity test in this study can be seen in Table 7 below.

Table 7. Data Homogeneity Test Results				
F	df1	df2	Sig.	
1.138	3	85	.338	

In table 7, the obtained value of critical thinking of students has a significance value of 0.338 > 0.05, which means that

the data has the same variance or homogeneous data. The results of the normality test and homogeneity test show that the prerequisite test for 2way anova analysis is fulfilled, so that the hypothesis test can be carried out two-way anova test. The results of the two-way ANOVA test can be seen in Table 8 below.

Table 8. Two-Way ANOVA Test Results					
Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	696.193 ^a	3	232.064	5.040	.003
Intercept	6199.808	1	6199.808	134.660	.000
Model Pembelajaran	446.974	1	446.974	9.708	.003
Jenis Kelamin	189.658	1	189.658	4.119	.046
Model Pemb. * Gender	4.515	1	4.515	.098	.755
Error	3913.448	85	46.041		
Total	13291.000	89			
Corrected Total	4609.640	88			

Based on table 8, the results of the analysis of the problem-based learning model on students' critical thinking have a significance value of 0.003 <0.05, which means Ho1 is rejected and Ha1 is accepted. This means that the PBL model affects the critical thinking skills of students. Furthermore, the results of the analysis of gender on the critical thinking skills of students have a significance value of 0.046 > 0.05which means Ha2 is accepted while Ho2 is rejected. This means that there is an effect of gender on the thinking ability of students. For the PBL learning model on critical thinking skills in terms of gender differences, has a significant value of 0.755 > 0.05which means Ho3 is accepted and Ha3 is rejected. This means that there is no effect of PBL learning model on critical thinking skills in terms of gender differences.

Students' critical thinking skills are higher when applying the problembased learning model than conventional learning because this method requires students to be more actively involved in the learning process. In Problem-Based Learning, students are faced with real situations that require in-depth analysis, problem identification, and the search for creative and logical solutions. This process encourages students to think critically independently, explore various sources of information, and work collaboratively with their peers to complete the task. The success of any learning model depends largely on how it is applied and therefore must be adapted to the characteristics of students, instructors, and available resources (Pinto, 2023).

In PBL learning to improve critical thinking skills, there is no need to separate groups based on gender because gender differences do not determine one's critical thinking skills. Although there are differences in the wav male and female students approach problems and communicate, these are more related to individual preferences than cognitive abilities. Therefore, the main focus of problem based learning is to create an equitable and inclusive learning environment, where every student, whether male or female, has an equal opportunity to actively engage develop. and contribute to collaborative problem solving.Students who are female or male do not have differences in critical thinking skills because this critical thinking ability is not determined by gender factors.

Critical thinking skills are more influenced by factors Critical thinking skills are more influenced by factors such as: 1) psychological factors which intellectual, include motivation, physiological factors anxiety and include physical, which learning independence, interaction with others (Dores et al., 2020; Sutriyanti & Mulyadi, 2019; Liu et al., 2024); 2) education and knowledge (Sitio, Setiawan, & Rusdhiati, 2022); 3) learning environment (Xu, Wang, & Wang, 2023). Critical thinking skills involve the ability to provide simple explanations, build basic skills, make inferences, make further explanations, and organise strategies and tactics. (Suciono, Rasto, & Ahman, 2021).

CONCLUSION

Based on the results of data analysis, it can be concluded that 1) PBL model affects the critical thinking ability of students. The results of the analysis of the problem-based learning model on students' critical thinking have a significance value of 0.003 < 0.05. 2) Gender affects the thinking ability of students. The results of the analysis of gender on the critical thinking ability of students have a significance value of 0.046> 0.05. 3) PBL learning model has no effect on critical thinking skills in terms of gender differences. The results of the analysis of the PBL learning model on critical thinking skills in terms of gender differences have a significant value of 0.755 > 0.05. Recommendations for further research to conduct research related to problembased learning models in terms of student learning styles.

REFERENCES

- Ajai, J. T., & Imoko, B. I. (2015). Gender Differences in Mathematics Achievement and Retention Scores: A Case of Problem-Based Learning Method. *International Journal of Research in Education and Science*, 1(1), 45–50.
- Aswan, D. M., Lufri, L., & Sumarmin, R. (2018). Influence of Problem Based Learning on Critical Thinking Skills and Competence Class VIII SMPN 1 Gunuang IOP 2016/2017. Omeh. Conference Series: Materials Science and Engineering, 335(1), 012128. https://doi.org/10.1088/1757-899X/335/1/012128
- Darmaji, D., Astalini, A., Kurniawan, D. A., & Putri, W. A. (2022). Science Skills and Critical Process Thinking Ability Assessed from Students' Gender. Jurnal Pendidikan Fisika Indonesia. 18(1), 83-95. https://doi.org/10.15294/jpfi.v18i 1.30534
- Dores, O. J., Wibowo, D. C., & Susanti, S. (2020). Analisis Kemampuan Berpikir Kritis Siswa Pada Mata Pelajaran Matematika. *J-PiMat* : *Jurnal Pendidikan Matematika*, 2(2), 242–254. https://doi.org/10.31932/jpimat.v2i2.889
- Febriani, F., Tawil, M., & Sari, S. S. Pengaruh (2021).Model Pembelajaran Berbasis Masalah terhadap Keterampilan Pemecahan Masalah Peserta Didik dalam Pembelajaran Fisika Ditinjau dari Gender. Al-67-82. Musannif, 3(2),https://doi.org/10.56324/almusannif.v3i2.42
- Hafidz, A. A. (2019). Pengaruh Jenis Kelamin Terhadap Hasil Belajar Matematika Siswa. *Buana Matematika : Jurnal Ilmiah*

Matematika Dan Pendidikan Matematika, 9(2), 69–72. https://doi.org/10.36456/buanama tematika.v9i2:.2118

Han, E., DeVeaux, C., Hancock, J. T., Ram, N., Harari, G. M., & Bailenson, J. N. (2024). The Influence of Spatial Dimensions of Virtual Environments on Attitudes and Nonverbal Behaviors During Social Interactions. *Journal of Environmental Psychology*, 95, 102269.

https://doi.org/10.1016/j.jenvp.20 24.102269

- Herman, T., Akbar, A., Alman, Farokhah, L., Febriandi, R., Zahrah, R. F., ... Abidin, Z. (2024). Kecakapan Abad 21: Literasi Matematis, Berpikir Matematis, dan Berpikir Komputasi. Indonesia Emas Group.
- Hirshfield, L., & Koretsky, M. (2017). Gender and Participation in an Engineering Problem-Based Learning Environment. Interdisciplinary Journal of Problem-Based Learning, 12(1). https://doi.org/10.7771/1541-5015.1651
- Isslamiyah, N. I., & Wijayanti, P. (2022). Kemampuan Berpikir Kritis Siswa SMA dalam Menyelesaikan Soal Matematika Higher Order Thinking Skills (HOTS) Ditinjau dari Jenis Kelamin. *MATHEdunesa*, 11(3), 754–764. https://doi.org/10.26740/mathedu nesa.v11n3.p754-764
- Istianah, A., Maftuh, B., & Malihah, E. (2023). Konsep Sekolah Damai: Harmonisasi Profil Pelajar Pancasila Dalam Implementasi Kurikulum Merdeka Belajar. *Jurnal Education And Development*, 11(3), 333–342. https://doi.org/10.37081/ed.v11i3. 5048
- Lestari, S. (2021). Pengaruh model pembelajaran peer led guided inquiry terhadap kompetensi literasi sains ditinjau dari kemampuan akademik. *Jurnal*

Inovasi Pendidikan IPA, 7(1). https://doi.org/10.21831/jipi.v7i1. 29845

- Liu, J., Liu, Z., Wang, C., Li, X., & Xu, Y. Key factors (2024).and mechanisms affecting higherorder thinking skills of primary and secondary school students in the smart classroom environment. Current Psychology, 43(11), 9651-9664. https://doi.org/10.1007/s12144-023-05136-5
- Liu, N.-Y., Hsu, W.-Y., Hung, C.-A., Wu, P.-L., & Pai, H.-C. (2019). The Effect of Gender Role Orientation on Student Nurses' Caring Behaviour and Critical Thinking. *International Journal of Nursing Studies*, 89, 18–23. https://doi.org/10.1016/j.ijnurstu.2 018.09.005
- Mawaddah, Ahmad, A., & Duskri, M. (2018). Gender Differences of Mathematical Critical Thinking Skills of Secondary School Students. Journal of Physics: Conference Series, 1088, 012054. https://doi.org/10.1088/1742-6596/1088/1/012054
- Mayasari, T., Kadarohman, A., Rusdiana, D., & Kaniawati, I. (2016). Apakah Model Pembelajaran Problem Based Learning dan Project Based Learning Mampu Melatihkan Keterampilan Abad 21? Jurnal Pendidikan Fisika Dan Keilmuan (JPFK), 2(1), 48. https://doi.org/10.25273/jpfk.v2i1 .24
- McMahon, E., & Isik, L. (2023). Seeing social Interactions. *Trends in Cognitive Sciences*, 27(12), 1165– 1179. https://doi.org/10.1016/j.tics.2023 .09.001
- Musyafak, M., & Subhi, M. R. (2023). Strategi Pembelajaran Pendidikan Agama Islam dalam Menghadapi Tantangan di Era Revolusi Industri 5.0. Asian Journal of Islamic Studies and Da'wah, 1(2), 373–398.

https://doi.org/10.58578/ajisd.v1i 2.2109

OECD. (2022). PISA Scores By Country 2024. Retrieved March 22, 2024, from https://www.datapandas.org/ranki

https://www.datapandas.org/ranki ng/pisa-scores-by-country

- Pambudi. D. S., Aini. R. Q., Oktavianingtyas, E., Trapsilasiwi, D., & Hussen, S. (2021).Kemampuan Komunikasi Matematis Siswa SMP dalam Matematika Nalaria berdasarkan Jenis Kelamin. JNPM (Jurnal Pendidikan Nasional Matematika). 5(1), 136–148. https://doi.org/10.33603/jnpm.v5i 1.4206
- Patmawati, S., Windyariani, S., & Juhanda, A. (2023). Hubungan Hasil Belajar Kognitif Dengan Kreativitas Menggunakan Model Project Based Learning (PjBL) Berbantuan Media Assemblr Edu Berdasarkan Gender. Jurnal Pendidikan MIPA, 13(4), 903– 910.

https://doi.org/10.37630/jpm.v13i 4.1119

- Pattiran, M., Songbes, A. M. H., Arrang, R., Herman, H., Vanchapo, A. R., & Muhammadong, M. (2024).
 Strategi Pendidikan Karakter: Membentuk Etika dan Nilai pada Generasi Muda. Journal on Education, 6(2), 11369–11376. https://doi.org/10.31004/joe.v6i2. 4933
- Pinto, B. L. (2023). Distinguishing between Case Based and Problem Based Learning. International Journal of Kinesiology in Higher Education, 7(3), 246–256. https://doi.org/10.1080/24711616. 2022.2111286
- Ro, H. K., & Knight, D. B. (2016). Gender Differences in Learning Outcomes from the College Experiences of Engineering Students. *Journal of Engineering Education*, 105(3), 478–507.

https://doi.org/10.1002/jee.20125

Rød, A. J., & Calafato, R. (2023). Exploring the Relationship Between Extramural English, Self-Efficacy, Gender, and Learning Outcomes: A Mixed-Methods Study in a Norwegian Upper-Secondary School. *Studies in Educational Evaluation*, 79, 101302.

https://doi.org/10.1016/j.stueduc.2 023.101302

- Rodzalan, S. A., & Saat, M. M. (2015). The Perception of Critical Thinking and Problem Solving Skill among Malaysian Undergraduate Students. *Procedia - Social and Behavioral Sciences*, 172, 725– 732. https://doi.org/10.1016/j.sbspro.2 015.01.425
- Roth, A. R., & Peng, S. (2024). Streams of Interactions: Social Connectedness in Daily Life. *Social Networks*, 78, 203–211. https://doi.org/10.1016/j.socnet.20 24.03.001
- Sitio, T., Setiawan, A., & Rusdhiati, F. (2022). Kajian Faktor yang Mempengaruhi Kemampuan Berpikir Kritis Perawat Klinis di Instalasi Rawat Inap. Journal of Telenursing (JOTING), 4(2), 998– 1011. https://doi.org/10.31539/joting.v4

https://doi.org/10.31539/joting.v4 i2.3798

- Slavin, R. E. (2015). Cooperative learning: Tepro, Riset dan Praktik. Bandung: Nusa Pedia.
- Suciono, W., Rasto, R., & Ahman, E. (2021). Analisis Faktor-Faktor vang Mempengaruhi Berpikir Kritis Keterampilan Siswa dalam Pembelajaran Ekonomi Era Revolusi 4.0. SOCIA: Jurnal Ilmu-Ilmu Sosial, 48–56. 17(1), https://doi.org/10.21831/socia.v17 i1.32254
- Sudariyanto. (2020). *Interaksi Sosial*. Semarang: Alprin.
- Sutriyanti, Y., & Mulyadi, M. (2019). Analisis Faktor-Faktor yang Mempengaruhi Penerapan Berpikir Kritis Perawat dalam Melaksanakan Asuhan Keperawatan di Rumah Sakit.

Jurnal Keperawatan Raflesia, *1*(1), 21–32. https://doi.org/10.33088/jkr.v1i1. 394

- Suyuti, S., Wahyuningrum, P. M. E., Jamil, M. A., Nawawi, M. L., Aditia, D., & Rusmayani, N. G. A. L. (2023). Analisis Efektivitas Penggunaan Teknologi dalam Pendidikan Terhadap Peningkatan Hasil Belajar. *Journal on Education*, 6(1), 1–11. https://doi.org/10.31004/joe.v6i1. 2908
- Tanaka, M. (2023). Motivation, Self-Construal, and Gender in Project-Based Learning. *Innovation in Language Learning and Teaching*, *17*(2), 306–320. https://doi.org/10.1080/17501229. 2022.2043870
- Wulandari, B., & Surjono, H. D. (2013). Pengaruh problem-based learning terhadap hasil belajar ditinjau dari

motivasi belajar PLC di SMK. Jurnal Pendidikan Vokasi, 3(2). https://doi.org/10.21831/jpv.v3i2. 1600

Xu, E., Wang, W., & Wang, Q. (2023). The effectiveness of collaborative problem solving in promoting students' critical thinking: A metaanalysis based on empirical literature. *Humanities and Social Sciences Communications*, *10*(1), 16. https://doi.org/10.1057/s41599-

023-01508-1

Yolanda, F. (2019). The Effect of Problem Based Learning on Mathematical Critical Thinking Skills of Junior High School Students. Journal of Physics: Conference Series, 1397(1), 012082. https://doi.org/10.1088/1742-6596/1397/1/012082