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The Effect of Diagnostic Assessment on Mathematics Learning Outcomes Using the Problem-Based Learning Model in Grade VII Students of Maubeli State Junior High School

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Abstract

Penelitian ini bertujuan untuk mengetahui pengaruh penilaian diagnostik non kognitif terhadap hasil belajar matematika menggunakan model pembelajaran *Problem Based Learning* (PBL) pada siswa kelas VII SMP Negeri Maubeli. Penilaian penilaian diagnostik non-kognitif dilakukan melalui instrumen yang mengukur gaya belajar dan minat belajar siswa yang digunakan sebagai dasar desain pembelajaran menggunakan PBL. Penelitian ini menggunakan penelitian eksperimental dengan pendekatan kuantitatif yaitu *quasi-eksperimental dengan* desain penelitian *Pretest-Posttest Non-Equivalent Control Group Design.* Populasi penelitian adalah siswa kelas VII. Pengambilan sampel menggunakan *teknik pengambilan sampel probabilitas* dengan *teknik pengambilan sampel yang dimaksud.* Sampel dalam penelitian ini adalah kelas VIIB dan kelas VIIC. Teknik pengumpulan data dengan kuesioner dan tes. Hasil penelitian menunjukkan bahwa: 1) rata-rata hasil belajar siswa di kelas eksperimen mencapai KKM. 2) Rata-rata hasil belajar dari kelas eksperimen berbeda dengan kelas kontrol. 3) variabel Independen memiliki efek yang signifikan secara bersamaan (bersama-sama) pada variabel Depeneden. Oleh karena itu, dapat disimpulkan bahwa terdapat perbedaan hasil belajar matematika yang signifikan antara siswa yang diberikan penilaian diagnostik nonkognitif dengan penggunaan *model pertahanan Problem Based Learning* (PBL) dengan siswa yang tidak diberikan penilaian diagnostik non-kognitif dan pembelajaran tanpa menggunakan model pembelajaran *Problem Based Learning* (PBL) dan terdapat pengaruh dari hasil penilaian diagnostik non-kognitif yang diimplementasikan melalu model pembelajaran PBL terhadap hasil belajar matematika siswa kelas VII SMP Negeri Maubeli.

Abstract

This study aims to determine the effect of non-cognitive diagnostic assessment on mathematics learning outcomes using the Problem Based Learning (PBL) learning model in grade VII students of SMP Negeri Maubeli. The assessment of non-cognitive diagnostic assessments is carried out through instruments that measure students' learning styles and learning interests which are used as the basis for learning design using PBL. This study uses experimental research with a quantitative approach, namely quasi-experimental with a Pretest-Posttest Non-Equivalent Control Group Design research design. The research population was grade VII students. Sampling uses probability sampling techniques with the sampling technique in question. The sample in this study is class VIIB and class VIIC. Data collection techniques with questionnaires and tests. The results of the study showed that: 1) the average learning outcomes of students in the experimental class reached the KKM. 2) The average learning outcomes of theexperimental class were different from the control class. 3) the Independent

variable has a significant effect simultaneously (together) on the Independent variable. Therefore, it can be concluded that there is a significant difference in mathematics learning outcomes between students who are given non-cognitive diagnostic assessments with the use of the Problem Based Learning (PBL) defense model and students who are not given non-cognitive diagnostic assessments and learning without using the Problem Based Learning (PBL) learning model and there is an influence of the results of non-cognitive diagnostic assessments implemented through the PBL learning model on the mathematics learning outcomes of grade VII students of SMP Negeri Maubeli.

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Introduction

Education is important for the life of every individual, the life of the nation and the state. According to Law Number 20 of 2003 article 3 concerning the National Education System. To achieve these national goals, one of the things that must be considered is to develop an educational curriculum. The independent curriculum is one of the efforts of the Ministry of Education and Culture to increase the innovation and creativity of students so that they are ready to face the industrial world and become a means to improve the quality of education in Indonesia today.

The independent curriculum was created to support educators and educational units in setting the goals of its implementation. In 2024, the new independent curriculum will be applied to all schools in Indonesia (Rahman & Ririen, 2023). The independent curriculum focuses on creative, free thinking and emphasizes the depth of the material rather than having to pursue material that is too broad. Mathematics is a science of skills and knowledge that is made deliberately that is obtained by thinking well, thoroughly, clearly, effectively and images on symbols or symbols that have meaning and are useful for solving a problem. Mathematics cannot be said to exist for itself, but mathematics has a role that is universal to other sciences as well as to the development of technology (Jeheman et al., 2019). Many students do not like and are afraid of math lessons, so not a few students complain about math lessons.

As for the fact in the field that mathematics learning outcomes in Indonesia are still low, as according to the results of PISA research, In 2022 where the mathematics score of Indonesian students reached 366, the score decreased when compared to the results of the PISA study in 2018, which was 379. The findings of AKM show that the ability to count students in Indonesia is still relatively lacking. According to (Anggraini & Setianingsih, 2022) the results of the AKM test on 15 students showed that 11 students had low numeracy skills, three students had moderate numeracy skills, and one student had good numeracy skills. Based on the results of an interview with a mathematics teacher at Maubeli State Junior High School, the teacher revealed that the implementation of diagnostic assessments had been carried out, but focused more on cognitive diagnostic assessments and paid less attention to non-cognitive diagnostic assessments. This condition shows that the learning process has not paid attention to the non-cognitive characteristics of students. The teacher also said that there are still many students

who are not able to solve math problems and most of the students' exam scores have not reached the Minimum Completeness Criteria (KKM). The KKM assessment standard applied at Maubeli State Junior High School is 75.

To achieve maximum learning outcomes, an efficient and creative learning plan system is needed. In the process of identifying the extent of students' needs and readiness cognitively and non-cognitively, it is necessary to carry out an assessment. Assessment is an important part that needs to be considered and implemented to support success in the learning process (Jufriadi et al., 2022). Diagnostic assessments are carried out before starting the learning material and have the aim of collecting initial data on student understanding. There are two types of diagnostic tests: cognitive diagnostic assessments and non-cognitive diagnostic assessments. Non-cognitive diagnostic assessments are assessments that aim to provide a profile of students in the form of their background and initial abilities in order to formulate learning content according to their interests, learning styles, talents, and daily situations (Kasman & Lubis, 2022). One of the non-cognitive diagnostic assessments related to psychology or social problems of students is to look at students' learning styles (Barlian et al., 2022). After conducting a non-cognitive diagnostic assessment that is operationalized through the measurement of students' learning styles and learning interests and the results of these measurements as learning design. Learning that considers the characteristics of students can be implemented through innovative learning models, One of them is the learning model *Problem-Based*. Siti Aisyah Hanim (2021) revealed that there is an influence of PBL's teaching strategies and learning styles on student learning outcomes. Research that specifically integrates non-cognitive diagnostic assessments as the basis for problem-based learning design is still limited.

Based on the information on these problems, the researcher felt it was important and interested in conducting research with the title: "The Effect of Non-Cognitive Diagnostic Assessment on Mathematics Learning Outcomes Using the *Problem Based Learning* (PBL) Learning Model in Grade VII Students of SMP Negeri Maubeli".

Method

A quantitative approach was used in this study. This research method is *quasi experimental with* a Pretest-Posttest Non-Equivalent Control Group Design *research design.* (Sugiyono, 2016). The research design can be seen in table 1 below.

Table 1. Pretest-Posttest Non-Equivalent Control Group Design Experimental Research Design

Groups	Pretest	Treatment	Postest
Eksperimen	O1	X	O2
Controls	O3	-	O4

Description:

O1 : Pretest given to experimental classes

O2 : The final test (Postest) given to the experimental class

X : Were given learning treatment for the experimental class in accordance with the results of non-cognitive diagnostic assessments using PBL

O3 : Pretest given to the control class

O4 : The final test (Postest) given to the control class

\- : Learning as usual in the control class

The population of this study is all grade VII students of SMP Negeri Maubeli in the even semester of the 2024/2025 school year. The Sampling Technique uses *a probability sampling* technique with a type of *purposive sampling technique.* Purposive sampling is a sampling technique of data sources with certain considerations. So the sample in this study is class VII B as the experimental class and class VII C as the control class.

The data collection techniques used in this study were questionnaires and tests. The instruments used in this study were test questions, questionnaire sheets and questionnaire sheets. After carrying out treatment in the form of providing learning according to the results of non-cognitive diagnostic assessments using the PBL learning model, the data and data were obtained. The first stage of data analysis was carried out with prerequisite tests, namely normality tests, homogeneity tests and linearity tests. Furthermore, the second stage of data analysis was carried out with two pretest samples (Independent Sample T-Test) and the final data analysis was a hypothesis test which included; One sample t-test, two-sample t-test in posttest, multiple linear regression test and F test. All tests were carried out with the help of *the IBM Statistic SPSS* 26 application.

Research Results

The research was carried out using two classes, namely class VIIB as an experimental class and VIIC as a control class. The experimental class and the control class also have two different treatments, namely the experimental class is given treatment in the form of learning according to the results of non-cognitive diagnostic assessments using the PBL learning model, while the control class is given learning treatment in the form of group discussions. The description of the research results.

Description Results Data pretest, postest experimental class and control class

The following is presented the data *of pretest*, postest students of the experimental class in the following table:

Table 2. *Pretest data , postest* test class

No	Student Name	Pretest	Postest
1	AJS	10.00	63.33
2	AE	40.00	100

3	BKC	13.33	76.67
4	CNXK	30.00	73.33
5	CJR	50.00	83.33
6	CKHS	36.67	90.00
7	CL	33.33	83.33
8	JGOW	40.00	80.00
9	JIF	36.67	76.67
10	KAR	46.67	100
11	NMR	23.33	76.67
12	PAAS	10.00	56.67
13	RAM	13.33	76.67
14	RMR	33.33	80.00
15	SAB	46.67	90.00
16	TYB	43.33	100
17	FLAS	26.67	
18	YAN	40.00	80.00
Average		$= 31.85$	$= 81.56$

The following is presented the pretest, postest data of the control class students as follows:

Table 3. *Data pretest, postest* control class

No	Student Name	Pretest	Postest
1	APA	40.00	43.33
2	AU	33.33	40.00
3	CAA	23.33	36.67
4	DAS	6.67	33.33
5	EAF	10.00	30.00
6	FPB	20.00	46.67
7	FTT	26.67	20.00
8	FKS	36.67	43.33
9	IN	23.33	46.67
10	JK	16.67	43.33
11	JKP	40.00	40.00
12	JAN	20.00	30.00
13	MET	13.33	36.67
14	ODA	40.00	50.00
15	RB	16.67	23.33
16	VK	20.00	20.00
17	VVB	36.67	40.00
18	YAF	13.33	20.00
Average		$= 24.25$	$= 35.74$

Description of Prerequisite Test Results

The first stage of data analysis was carried out with prerequisite tests, namely normality tests, homogeneity tests and linearity tests.

The results of the normality test with the help of the IBM SPSS 26.0 Statistics application are as follows:

Table 4. Normality Test *Pretest of* experimental class and control class

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	*Df*	*Say.*	*Statistic*	*Df*	*Say.*
Experimental Class Pretest	.156	18	.200*	.911	18	.091
Control Class Pretest	.151	18	.200*	.919	18	.122

Based on table 4, a significant value for the experimental class *pretest* data is 0.091 > 0.05 and the *control class pretest* is 0.122 > 0.05, then it is accepted and it can be concluded that the experimental class H_0*pretest* data and the control class *pretest* data are normally distributed.

Table 5. Postest Normality Test *of* experimental class and control class

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	*Df*	*Say.*	*Statistic*	*Df*	*Say.*
Postest Experiment Class	.165	17	.200*	.932	17	.232
Postest Control Class	.168	18	.195	.912	18	.094

Based on table 5, the significant value obtained for the *postest data of* the experimental class is 0.232 > 0.05 and *the postest* of the control class is 0.094 > 0.05, then it is accepted and it can be concluded that H_0 *the postest* data of the experimental class and the postest data of the control class are normally distributed.

Table 6. A Measure of Students' Interest in Learning

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	Df	Say.	Statistic	Df	Say.
Students' Learning Interests	.123	17	.200*	.967	17	.763

Based on table 6, a significant value for student learning interest data is 0.763 > 0.05, so it is accepted and it can be concluded that H_0student learning interest data is normally distributed.

The results of the homogeneity test with the help of the IBM SPSS 26.0 Statistics application are as follows:

Table 7. Pretest Data Homogeneity Test

		Levene Statistic	*df1*	*df2*	*Say.*
Experimental Class Pretest and *Control Class* Pretest	*Based on Mean*	458	1	34	.503
	Based on Median	.280	1	34	.600
	Based on Median and with adjusted df	.280	1	32.198	.600
	Based on trimmed mean	.412	1	34	.525

Based on table 7, a significant value (Based on Mean) for the experimental and control class *pretest* data is 0.503 > 0.05, then it is accepted and it can be concluded that the H_0 *experimental class and control class pretest data are homogeneous.*

Table 8. Postest Data Homogeneity Test

		Levene Statistic	*df1*	*df2*	*Say.*
Student Learning Outcomes	*Based on Mean*	.112	1	33	.740
	Based on Median	.075	1	33	.786
	Based on Median and with adjusted df	.075	1	30.344	.786
	Based on trimmed mean	.140	1	33	.711

Based on table 8, the significant value (Based on Mean) for the *postest data of* the experimental and control class is 0.740 > 0.05, then it is accepted and it can be concluded that H_0 *the postest data of* the experimental and control classes is homogeneous.

The results of the linearity test with the help of the IBM Statistics SPSS 26.0 application are as follows:

Table 9. Linear Learning Interest Test

ANOVA Table

			Sum of Squares	Df	Mean Square	F	Say.
Student Learning Outcomes * Students' Learning Interests	Between Groups	(Combined)	1274.793	10	127.479	.752	.671
		Linearity	834.558	1	834.558	4.926	.068
		Deviation from Linearity	440.235	9	48.915	.289	.953
	Within Groups		1016.567	6	169.428		
	Total		2291.360	16			

Based on Table 9, the significant value (*Deviation from Linearity*) is 0.953 > 0.05, so it can be concluded that there is a linear relationship between learning interest and mathematics learning outcomes.

Description of Pretest Independent Sample T Test Results

The second stage of data analysis was carried out a t-test test of two pretest samples (Independent Sample T-Test).

The following is a pretest data analysis to see the students' initial ability to use an independent sample t-test with the help of the IBM SPSS Statistics Ver.26 application

Table 10 Independent sample t-test results

		Levene's Test for Equality of Variances		*t-test for Equality of Means*		
		F	*Say.*	*T*	*Df*	*Sig. (2-tailed)*
Experimental class pretest	*Equal variances assumed*	.458	.503	1.886	34	.068

and control class	*Equal variances not assumed*			1.886	33.069	.068

Based on table 10, it was obtained that the significant value *(2-tailed)* was 0.068 0.05, so it was accepted and it can be concluded that there was no difference between the initial ability of the students of the experimental class and the control class.$> H_0$

Description of Hypothesis Test Results

The results of the last stage of data analysis were carried out with hypothesis tests, namely the t-test of one sample, the t-test of two samples in the posttest, the multiple linear regression test and the F test.

The following are presented the results of testing student learning outcomes in experimental classes using a single-sample t-test.

Table 11. One-sample t-test results

	T	Df	Sig. (2-tailed)	Mean Difference	95% Confidence Interval of the Difference	
					Lower	Upper
Postest experimental class	2.263	16	.038	6.56882	.4159	12.7217

Based on table 11, a significant value *(2-tailed)* was obtained was 0.038 0.05, so it was rejected and it can be concluded that the average learning outcomes of students in the experimental class reached the KKM.$< H_0$

The following are presented the results of testing student learning outcomes in the experimental class and the control class using an independent sample t-test.

Table 12. Independent sample t-test results

		Levene's Test for Equality of Variances		*t-test for Equality of Means*		
		F	*Say.*	*T*	*Df*	*Sig. (2-tailed)*
Learning outcomes of the experimental class and the Control Class	*Equal variances assumed*	.112	.740	12.415	33	.000
	Equal variances not assumed			12.344	31.019	.000

Based on table 12, the significant value *(2-tailed)* is 0.000 0.05, then it is rejected and it can be concluded that $< H_0$the average learning outcomes of the experimental class are different from the control class.

The multiple regression analysis of learning styles (X_1) and learning interests (on student learning outcomes (, carried out with the help of SPSS $X_2)Y)$Ver.26 is as follows:

Table 13. Multiple Regression Equation X_1, against X_2Y

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	T	Say.
		B	Std. Error	Beta		
1	(Constant)	111.968	13.295		8.422	.000
	D1	23.176	4.472	.954	5.183	.000
	D2	17.835	4.312	.767	4.136	.001
	Interest	-.910	.251	-.506	-3.629	.003

Based on the results of the calculation, , and so that the multiple regression equation is as follows: $\alpha_1 = 111.968, \alpha_2 = 23.176 \alpha_3 = 17.835\ \beta = -.910 Y_i = 111.968 + 23.176 D1_i + 17.835 D2_i - .918\ X_i$. The explanation of the regression equation is as follows:

a. Similarities in kinesthetic learning styles: $Y_i = 111.968 - .910\ X_i$
b. Visual learning style similarities: $Y_i = (111.968 + 23.176) - .910\ X_i$
c. Auditory learning style similarities: $Y_i = (111.968 + 17.835) - .910 X_i$.

The results of the F-test test can be seen in the following table:

Table 14. Test F

Model		Sum of Squares	Df	Mean Square	F	Say.
1	Regression	1777.986	3	592.662	15.008	.000b
	Residual	513.373	13	39.490		
	Total	2291.360	16			

Based on the results of the calculation in table 14, a sig. value of 0.000 was obtained ($< 0{,}05$) so it is concluded that the Independent variable has a significant effect simultaneously (together) on the Depeneden variable.

To find out the magnitude of the influence of learning style and learning interest on mathematics learning outcomes, you can see from the following table:

Table 15. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.881a	.776	.724	6.28413

Based on the output, a determination coefficient (R Square) of 0.776 was obtained, which means that the influence of learning style and learning interest on mathematics learning outcomes was 77.6%.

Discussion

The research was conducted on two classes, namely the experimental class consisting of 18 students and the control class consisting of 18 students. The implementation of this research began by providing non-cognitive diagnostic assessments and *pretests* to measure students' initial abilities in the

experimental class and providing *a pretest* in the control class. Based on the results of the analysis, all data met the prerequisite test and information was obtained that *the pretest* data on the independent sample t-test had a significance value of > 0.05, this means that there was no significant difference between the initial ability of the experimental class students and the control class students.

Learning in the experimental class was carried out by applying the results of non-cognitive diagnostic assessments and the use of *the Problem Based Learning* (PBL) learning model, while learning in the control class was carried out without applying the results of non-cognitive diagnostic assessments and without using the PBL learning model. The learning process in the experimental class and the control class was carried out for four meetings and in the fourth meeting, the experimental class and the control class were given postest questions to measure the final ability of the students.

There are two aspects of assessment in the non-cognitive diagnostic assessment used in this study, namely learning style and learning interest. In terms of learning style, it is divided into three, namely visual, autitorial and kinesthetic learning styles. Based on the data obtained from the results of non-cognitive diagnostic assessments on the type of learning style, it can be grouped as follows: 6 people in the visual group, 8 people in the auditory group and 4 people in the kinesthetic group.

Based on the results of the *pretest,* initially the students of the experimental class were not able to complete the questions given correctly, but after the learning was given according to the non-cognitive diagnostic assessment that had been designed in the PBL learning model, there were 14 students who were able to complete the questions in the comparison material correctly and met the KKM score and there were 4 students whose scores did not meet the KKM. This shows that there is an increase in students in solving the given questions, in accordance with research conducted by Konita (2025) which concluded that diagnostic assessments make a significant contribution to improving mathematics learning outcomes through the identification of students' prerequisite abilities, mapping learning characteristics, and adjusting learning strategies.

The results of the hypothesis testing of the t-test of two samples in the postest obtained information that there was a significant difference between the average learning outcomes of the experimental class using the reference of non-cognitive diagnostic assessment and the PBL defense model different from the control class. This is in accordance with the research of Anisah, et.al., (2024) concluding that there is a positive and significant influence of the application of the PBL model on students' mathematics learning outcomes and the average learning outcomes of experimental classes are greater than those of the control class.

Based on the results of the multiple linear regression hypothesis test, it was obtained: 1) learning style that has a significant effect on mathematics learning outcomes. According to Zannurrain et al., (2023) In his research, it was concluded that there was a significant influence of variable X on variable Y. 2) interest in learning had a significant effect on mathematics learning outcomes. This is in accordance with research (Sirait & Apriyani, 2021) which concluded that there was a significant

influence of students' learning interests on the mathematics learning outcomes of private junior high school students.

Based on the results of the F test, information was obtained that learning styles and learning interests affect mathematics learning outcomes. This is in accordance with research conducted by Falah, B. N. (2019) which concluded that there is a significant influence between mathematics learning style and students' interest in learning mathematics on student learning outcomes. Although the results show that learning style has a significant effect on mathematics learning outcomes, it is more effective if adjusted to the learning method.

This fact shows that the learning outcomes of students who go through non-cognitive diagnostic assessments and the use of PBL learning models are better than students who learn without non-cognitive diagnostic assessments and without using PBL learning models. So that during the teaching and learning process, it can make it easier to understand a problem, solve the questions given and students actively participate, this is in accordance with the results of research conducted by Pramudita et al., (2023) that the application of the PBL learning model used with indicators of understanding problems, discussing in groups to plan solutions and explaining the answers obtained can improve students' problem-solving skills.

Conclusion

Based on the results of the research and discussion, the researcher concluded that the results of non-cognitive diagnostic assessments implemented through the *Problem Based Learning* (PBL) learning model had a significant effect on improving the mathematics learning outcomes of grade VII students at Maubeli State Junior High School.

References

Anggraini, K. E., & Setianingsih, R. (2022). Analysis of High School Students' Numeracy Ability in Solving Minimum Competency Assessment (AKM) Questions. Mathdunesa: Scientific Journal of Mathematics Education, 11(3), 837–849. 10.26 740/mathedunesa. v11n3.p837-849

Anisah, Kurniati, N., Triutami, T. W., & Azmi, S. (2024). The Effect of the Problem Based Learning (PBL) Model on the Mathematics Learning Outcomes of Grade VIII Students of Junior High School 11 Mataram for the 2024/2025 Academic Year. *Pendas : Scientific Journal of Basic Education*, *09*(04), 334–345.https://www.journal.unpas.ac.id/index.php/pendas/article /view/21125/10047

Barlian, U.C., Siti Solekah, P. R. (2022). Implementation of the Independent Curriculum in Improving the Quality of Education. *Journal of Educational and Language Research*, *1*(1), 1–52. https://doi.org/10.21608/pshj.2022.250026

Falah, B. N. (2019). The influence of learning styles and learning interests on students' mathematics learning outcomes. *Euclid*, *6*(1), 25. https://doi.org/10.33603/e.v6i1.1226

Jeheman, A. A., Gunur, B., & Jelatu, S. (2019). The influence of realistic mathematical approaches on students' understanding of mathematical concepts. Mosharafa: Journal of Mathematics Education, 8(2), 191–202. https://doi.org/10.31980/mosharafa.v8i2. 454

Jufriadi, A., Huda, C., Aji, S. D., Pratiwi, H. Y., & Ayu, H. D. (2022). Analysis of 21st Century Skills through the Implementation of the Independent Learning Curriculum of the Independent Campus. *Journal of Education and Culture*, *7*(1), 39–53. https://doi.org/10.24832/jpnk.v7i1.2482

Kasman, K., & Lubis, S. K. (2022). Teachers' Performance Evaluation Instrument Designs in the Implementation of the New Learning Paradigm of the Merdeka Curriculum. *Journal of Education: Journal of Research Results and Literature Review in the Field of Education, Teaching and Learning*, *8*(3), 760. https:/ /doi.org/ 10.33394/jk.v8i3.5674

Content. (2025). The Importance of Diagnostic Assessment for Mathematics Learning Achievement, Education Scholars 16, 1–8. https://doi.org/10.9644/sindoro.v3i9.252

Pramudita, M. D., Ambarwati, L., & Hidajat, F. A. (2023). Application of Problem Based Learning (PBL) Learning Model to Improve Mathematical Problem-Solving Ability of Class X Students of SMA Kristen Kasih Kemuliaan on SPLTV Materials. Journal on Education, 5(4), 13783– 13788. https:// doi.org/ 10. 3100 4/joe.v5i4.2391

Rahman, K., & Ririen, D. (2023). Implementation of Non-Cognitive Diagnostic Assessments in School Policies. *Educational : Journal of Educational Sciences*, *5*(5), 1815–1823. https:// doi.org/ 10.31004 /edukatif. v5i5.3954

Siti Aisyah Hanim. (2021). The Influence of Problem Based Learning (PBL) Learning Strategies and Student Learning Styles on Indonesian Language Learning Outcomes of Grade V State Elementary Students 064954 Medan City. *Journal of Education and Culture (JURDIKBUD), 1*(3), 39–54. https://doi.org/10.55606/jurdikbud.v1i3.94

Sirait, E. D., & Apriyani, D. D. (2021). The Influence of Google Classroom Learning Media and Learning Interest on Mathematics Learning Outcomes. *National Seminar on Research and Technology: National Seminar on Research and Technology*, 827–831

Sugiyono. (2016). Quantitative, Qualitative and R&D Research Methods, 24th Edition. Bandung: Alfabeta.

Zannurrain, M. F., Rezeki, S., Harahap, S. L., Akmal, R., Kuis, B., & Belajar, H. (2023). *THE INFLUENCE OF STUDENTS' LEARNING STYLES ON MATHEMATICS LEARNING OUTCOMES*. *3*(2).