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The Effect of the *Liveworksheet* Media-Assisted Problem Based Learning *Model* on the Ability to Write Explanatory Texts of Grade IX Students at UPT SMP Negeri 8 Medan

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A B S T R A C T

This study aims to determine the effect of the Problem Based Learning model assisted by Liveworksheet media on students' ability to write explanatory texts. This study uses a quantitative approach with an experimental method. The research design used is a Two Group pretest-posttest group design. Data collection techniques through tests, interviews, and observations. The results of the study from the application of the Problem Based Learning model assisted by Liveworksheet media show that: 1) Before being given treatment, the ability to write explanatory texts in both groups was in the low category with an average pre-test of the experimental group of 55.67 and the control group of 57.50. 2) After being given treatment, the experimental group experienced a significant increase to the good-very good category with an average post-test reaching 81.17, far exceeding the average post-test of the control class which only reached 66.67. 3) Based on the hypothesis test (Independent Sample T-test), a significance value of <0.001 was obtained, and the N-Gain Score test results indicated an effectiveness level of 58.18% for the experimental class (fairly effective), while the control class was only 20.76% (ineffective). Based on the research results, it can be concluded that the implementation of the Problem-Based Learning model assisted by Liveworksheet media has a significant impact on the writing ability of ninth-grade students at the UPT SMP Negeri 8 Medan.

Keywords: *Problem-Based Learning, Liveworksheet, Writing, Explanatory Text*

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INTRODUCTION

Education is the main key in building a quality future for the young generation. Through education, it is hoped that individuals will be able to develop their potential knowledge, skills, and character optimally. This is in line with the national education goals stated in the National Education System Law, which is to develop students to become human beings who have faith, piety, noble character, health, knowledge, creativity, independence, and become democratic and responsible citizens (Wurdianto et al. 2024). In an effort to achieve this goal, the government continues to innovate, one of which is through the development of a curriculum that is adaptive to the needs of the times.

The curriculum that is currently being implemented is the Independent Curriculum which emphasizes freedom of learning, creativity, and student-centered learning (Paino et al., 2024). This curriculum provides space for teachers to develop innovative learning strategies, methods, and media to suit the needs and characteristics of students (Aryani et al., 2022). Therefore, teachers are required to be able to design learning that is not only results-oriented, but also on meaningful processes.

In learning Bahasa Indonesia, there are four main skills that students must master, namely listening, speaking, reading, and writing. Writing skills are complex productive skills because they involve critical thinking skills, language mastery, and precision in drafting ideas (Saragih and Wuriyani 2024). One form of writing skills taught in grade IX of junior high

school is writing explanatory texts. Explanatory texts require students to be able to explain a phenomenon logically, systematically, and sequentially.

However, the reality is that students' ability to write explanatory texts is still relatively low. Based on the results of initial observations, the average score of students did reach 81.05, but there were still many students who obtained scores below the Minimum Completeness Criteria (KKM), which was 75. This low ability is influenced by internal factors, such as lack of interest in learning, low concentration, and difficulty in understanding the structure and linguistic rules of the text. In addition, external factors such as the lack of optimal selection of learning models and limited media also affect student learning outcomes.

To overcome these problems, an innovative and student-centered learning model is needed. One of the models that can be used is Problem-Based Learning (PBL). PBL is a learning model that uses real problems as a context to develop students' critical thinking and problem-solving skills (Riyanto 2023). Recent research shows that PBL is effective in improving high-level thinking skills and writing abilities because students are actively involved in the problem-based learning process (Fitriani et al., 2022; Hidayat et al., 2023).

In addition to the learning model, the use of digital media is also an important factor in improving the quality of learning. Digital media allows the learning process to be more interactive, interesting, and flexible (Sari et al., 2023). One of the media that can be used is Liveworksheet, which is a web-based platform that allows teachers to turn conventional worksheets into interactive worksheets with automatic evaluation features (Le and Prabjandee 2023). This media supports various types of activities such as multiple choice, matching, drag and drop, to sentence preparation, so that it can increase student involvement in learning.

The integration of the Problem-Based Learning model with digital media such as Liveworksheet is believed to be able to create more effective learning. This combination not only helps students understand the material in depth, but also increases their motivation to study and write skills systematically (Putra and Anggraini 2024). Therefore, the implementation of PBL assisted by digital media is a relevant solution in improving students' explanatory text writing skills.

Based on this description, the researcher is interested in conducting a study entitled "The Effect of the Problem-Based Learning Model Assisted by Liveworksheet Media on the Ability to Write Explanatory Texts of Class IX Students at UPT SMP Negeri 8 Medan". The formulation of the problem in this study is: (1) how the ability to write explanatory texts of students before and after the application of the Problem-Based Learning model assisted by Liveworksheet media; and (2) how the Problem-Based Learning model assisted by Liveworksheet media affects students' explanatory text writing skills.

This research is important because the selection of the right learning model and media can be a solution to students' low writing skills. It is hoped that the results of this research can contribute to improving the quality of learning Indonesian language, especially in explanatory text writing skills.

METHOD

This study uses a quantitative approach with an experimental method. The research design used is *Two Group pretest -posttest design*. This design was used to test the effect of treatment by comparing the posttest results of the two groups after being given *a pretest* to control for differences in initial conditions. The following is the pattern of the research design that will be conducted.

Table 1. Table 1

Groups	***Pre-test***	**Treatment**	***Posttest***
Experiments (E)	O1	*X*	O3
Control (K)	O2	-	O4

This research was conducted at UPT SMP Negeri 8 Medan, this school is located at Jl. Turi Ujung No. 96, Sudirejo I, Kec. The research time was carried out in the even semester of

the 2025/2026 school year (January-March 2026). The population in this study is grade IX students at UPT SMP Negeri 8 Medan which consists of 10 classes, with a total number of students of 300 people. The sampling technique in this study uses a stratified random *sampling technique*. The selected classes are class IX-9 and class IX-7, with a total number of students of 60 students. Class IX-9 as an experimental group that will use *the Problem-Based Learning* model assisted by *Liveworksheet* media. Meanwhile, classes IX-7 as a control group will use an expository model.

The data collection techniques used in this study include interviews, observations and tests. The analysis technique in the study was carried out to process the data of *pretest* and *posttest* score results to test the hypothesis that has been set. The analysis techniques used in this study are entirely carried out with the help of statistical software (SPSS) to ensure the accuracy of the calculation results. The steps of data analysis consist of descriptive statistical analysis, analysis prerequisite tests, and hypothesis tests. Descriptive analysis is used to provide an overview of the characteristics of the data, including minimum, maximum, *mean*, and standard deviation. Furthermore, a requirement test was carried out using the normality test and the homogeneity test. Finally, a hypothesis test was carried out through three stages, namely *the Paired Sample T-test*, the *Independent Sample T-Test,* and the *N-Gain Score test.*

FINDINGS AND DISCUSSION

After conducting research based on the problems taken, data was obtained for each group. The data obtained is in the form of the ability of grade IX students of UPT SMP Negeri 8 Medan for the 2025/2026 Academic Year in writing explanatory texts. The following is the *pretest* and *posttest* data of students from the experimental and control classes based on the explanatory text assessment aspect.

Table 2. SPSS Output Descriptive Analysis

	N	Minimum	Maximum	Mean	Hours of deviation
Pretest Experiments	30	25	75	55.67	12.438
Posttest Experiment	30	60	95	81.17	7.953
Pretest Control	30	40	85	57.5	12.3
Posttest Control	30	50	85	66.67	9.942
Valid N (listwise)	30				

Based on the table above, the results of writing explanatory texts were obtained from the results of *the pretest* and *posttest*. In the experimental class, *the pretest results* obtained the lowest score of 25 and the highest score of 75 with a mean of 55.67. Meanwhile, *the results of the posttest* obtained the lowest score of 60 and the highest score of 95 with a mean of 81.17. These results show that the use of *the Liveworksheet-assisted* Problem-Based Learning *model* in the experimental classroom has a real positive impact on student learning outcomes. Meanwhile, in the control class, *the pretest results* obtained the lowest score of 40 and the highest score of 85 with a mean of 57.50. Meanwhile, *the results of the posttest* obtained the lowest score of 50 and the highest score of 85 with a mean of 66.67. These results showed that the use of *the Liveworksheet* media-assisted expository model also increased, but the experimental group had a much higher final score than the control group.

Before data analysis is carried out, a requirement test is first carried out using the normality test and homogeneity test.

Normality Test

Table 3. SPSS Output Data Normality Test

	Shapiro-Wilk			
	Classes	Statistic	df	*Say.*
Student Learning Outcomes	*Pretest* Experience (PBL)	0.959	30	0.288
	Post-Test Experiment (PBL)	0.936	30	0.069
	Pretest control (expositor)	0.946	30	0.131
	Posttest control (expositor)	0.936	30	0.073

From the table above, it can be seen that the df (degree of freedom) value for *the pretest* and *posttest* is 30. That means that the number of data samples used is less than 50. Then, from the output, it was known that the significance value of the experimental group (PBL) for *the pretest* was 0.288 and *the posttest* was 0.69. Meanwhile, in the control group (expository), the significance value for *the pretest* was 0.131 and for *the posttest* was 0.073. Since the entire significance value (*p-value*) is greater than 0.05 (*sig.*>0.05), it can be concluded that all data are normally distributed, so that the requirements for conducting parametric statistical tests have been met.

Homogeneity Test

Table 4. SPSS Output Homogeneity Test

		Levene Statistic	***df1***	***df2***	***Say.***
Student Learning Outcomes	*Based on Mean*	1.664	1	58	0.202
	Based on Median	1.718	1	58	0.195
	Based on Median and with adjusted df	1.718	1	56.93	0.195
	Based on trimmed mean	1.618	1	58	0.208

From the table of the results of the homogeneity test analysis using *Levene Statistic* on the variables of student teaching results, a significance value (*Sig.)* was obtained. Based on the average (*Based on Mean)* of 0.202. Because the significance value is greater than 0.05 (0.202 > 0.05), it can be concluded that the variance of data in the study group is homogeneous (the same). If this homogeneity assumption is fulfilled, the data on student learning outcomes is worthy of further testing using parametric statistics.

Uji Hypothesis

After the prerequisite assumptions in the form of normality tests and homogeneity tests are met, then hypothesis testing is carried out. The test is carried out in stages, starting with *the Paired Sample T-test,* followed by the *Independent Sample T-Test*, then the final stage will be an *N-Gain test.* The criteria for acceptance or rejection of the hypothesis test are:

If sig. (2-tailed) < 0.05 then Ho was rejected and Ha was accepted.

If the value of sig. (2-tailed) > 0.05 then Ho was accepted and Ha was rejected.

Paired Samples Test

		Paired Differences							*Significance*	
		Mean	*Std. Deviatio*	*Std. Error*	*95% Confidence* *Lower*	*Upper*	*t*	*df*	*One-Sided p*	*Two-Sided p*
Pair 1	Pre-Test Eksperimen - Post-Test Eksperimen	-25.500	8.237	1.504	-28.576	-22.424	-16.957	29	0.001	0.001
Pair 2	Pre-Test Kontrol - Post-Test Kontrol	-9.167	4.928	0.900	-11.007	-7.327	-10.189	29	0.001	0.001

Figure 1.Output SPSS Paired Sample T-Test

Based on Test results *Paired Sample T-test* above, it is known that the significance value (*Two-Sided p*) for the experimental and control groups was 0.001. Because the significance value is less than 0.05 (0.001 < 0.05), Ho is rejected and Ha is accepted. This shows that there is a significant difference between student learning outcomes in the aat *pretest* and *posttest* in both groups. This means that the treatment provided has a real influence on improving student learning outcomes, both in the experimental class and in the control class.

Independent Samples Test

		t-test for Equality of Means							
				Significance		Mean	Std.	95%	
		t	df	One-Sided p	Two-Sided p	Difference	Error Differen	Lower	Upper
Hasil Belajar Siswa	Equal variances assumed	6.238	58	0.001	0.001	14.500	2.324	9.847	19.153
	Equal variances not assumed	6.238	55.331	0.001	0.001	14.500	2.324	9.842	19.158

Figure 2. Output SPSS Independent Sample T-Test

Based on Figure 2, the results of the *Independent Sample T-Test* in the *Equal variances assumed* section (due to homogeneous data) show a significance value (*Two-Sided p*) < 0.001. Because the p< value is 0.05, Ho is rejected and Ha is accepted. This proves that there is a significant difference between students taught with *the Problem-Based Learning* model assisted by *Liveworksheet* media compared to students in the control class. The *mean difference value* of 14,500 indicates that the average learning outcomes of the experimental class were 14.50 points higher than that of the control class.

Descriptives

	Kelas			Statistic	Std. Error
NGain_Persen	Eksperimen	Mean		58.1798	2.04769
		95% Confidence Interval for Mean	Lower Bound	53.9918	
			Upper Bound	62.3678	
		5% Trimmed Mean		58.1913	
		Median		58.5714	
		Variance		125.791	
		Std. Deviation		11.21564	
		Minimum		37.50	
		Maximum		80.00	
		Range		42.50	
		Interquartile Range		16.67	
		Skewness		-.012	.427
		Kurtosis		-.724	.833
	Kontrol	Mean		20.7642	1.87865
		95% Confidence Interval for Mean	Lower Bound	16.9219	
			Upper Bound	24.6065	
		5% Trimmed Mean		20.9726	
		Median		21.1111	
		Variance		105.880	
		Std. Deviation		10.28978	
		Minimum		.00	
		Maximum		40.00	
		Range		40.00	
		Interquartile Range		13.30	
		Skewness		-.459	.427
		Kurtosis		-.174	.833

Figure 3. *Output SPSS N-Gain Score*

The findings of this study indicate that the treatment implemented in the experimental class was more effective in improving students' learning outcomes compared to the control class. The experimental class achieved an average N-Gain score of 58.18%, which falls into the

"quite effective" category, while the control class only obtained 20.76%, categorized as ineffective. These results suggest that the instructional strategy applied in the experimental class provided a significant contribution to students' conceptual understanding and learning achievement.

The improvement in the experimental class supports Hake's (1999) argument that N-Gain analysis can effectively measure the increase in students' understanding after instructional intervention. The moderate improvement obtained in this study indicates that students experienced meaningful learning progress during the treatment process. In contrast, the low N-Gain score in the control class demonstrates that conventional learning strategies were less capable of facilitating active engagement and knowledge construction.

The effectiveness of the treatment may also be explained through constructivist learning theory, which emphasizes that students learn more effectively when they actively participate in the learning process (Vygotsky, 1978). Through interactive learning activities, students had more opportunities to discuss concepts, solve problems collaboratively, and develop deeper understanding. This finding is consistent with Slavin (2015), who stated that collaborative and student-centered learning strategies significantly improve academic achievement and student motivation. Furthermore, the treatment encouraged active learning, which is considered an important factor in improving learning outcomes. According to Prince (2004), active learning strategies increase students' participation, critical thinking, and retention of knowledge compared to passive instructional approaches. Students who are actively involved in classroom activities tend to develop better conceptual understanding because they directly engage with learning materials and receive immediate feedback during the process.

The findings are also supported by Meltzer (2002), who explained that higher N-Gain scores generally indicate better conceptual change and stronger learning effectiveness. In this study, the moderate N-Gain score achieved by the experimental class reflects that the treatment successfully facilitated students' cognitive development. In addition, feedback and interaction during the learning process may have strengthened students' self-confidence and motivation, which are essential elements in successful learning (Zimmerman, 2002).

Another possible explanation for the improvement is the existence of formative learning support during the treatment process. Black and Wiliam (1998) argued that effective classroom interaction and continuous feedback positively influence students' academic performance. The treatment implemented in the experimental class likely created a more supportive and interactive learning environment that enabled students to better understand the material. Overall, the findings confirm that the instructional treatment used in the experimental class was effective in enhancing students' learning outcomes. The higher N-Gain score demonstrates that interactive and student-centered learning approaches can provide better learning experiences and significantly improve students' academic achievement compared to conventional teaching methods.

The relatively high mean score in the experimental class suggests that the learning strategy successfully facilitated meaningful learning experiences. According to Hake (1999), N-Gain analysis reflects the degree of conceptual improvement after instructional intervention, and moderate-to-high N-Gain values indicate effective learning processes. The result also aligns with constructivist learning theory, which states that students learn more effectively when actively engaged in constructing knowledge through interaction and collaboration (Vygotsky, 1978).

The descriptive data further show that the experimental class had a standard deviation of 11.21, indicating that most students experienced relatively consistent improvement. In comparison, the control class showed a lower mean score with a standard deviation of 10.28, suggesting that conventional instruction provided limited impact on students' learning progress. The similarity between the mean and median values in the experimental class also indicates that the data distribution was relatively balanced and not strongly influenced by

extreme scores. This interpretation is supported by the skewness value (-0.012), which suggests an approximately normal distribution of students' improvement scores (Field, 2013).

The effectiveness of the treatment can also be associated with active learning principles. Prince (2004) explained that active learning strategies increase students' engagement, participation, and retention of knowledge compared to passive instructional methods. During the treatment process, students were likely encouraged to interact more actively with learning materials, discuss concepts, and receive immediate feedback, which strengthened their understanding. Similarly, Slavin (2015) emphasized that collaborative and student-centered learning environments improve academic achievement because students learn through discussion, peer support, and shared problem-solving activities.

In addition, the improvement in learning outcomes may be influenced by formative feedback during instruction. Black and Wiliam (1998) argued that continuous feedback and classroom interaction significantly support students' cognitive development and academic performance. Students in the experimental class may have benefited from more opportunities to identify misconceptions and improve their understanding during the learning process.

The findings are also consistent with Meltzer (2002), who found that higher N-Gain scores reflect stronger conceptual change and better instructional effectiveness. The moderate effectiveness achieved in the experimental class indicates that the treatment successfully promoted conceptual understanding compared to traditional approaches used in the control class. Furthermore, Zimmerman (2002) noted that supportive learning environments enhance students' motivation, confidence, and self-regulated learning, which may explain why students in the experimental class showed better overall performance. Overall, the findings confirm that the instructional treatment implemented in the experimental class was more effective than conventional instruction in improving students' learning outcomes. The higher N-Gain score demonstrates that interactive and student-centered learning strategies provide more meaningful learning experiences and significantly enhance students' academic achievement.

CONCLUSION

Based on the results of the study, it can be concluded that the ability to write explanatory texts for grade IX students of UPT SMP Negeri 8 Medan before the implementation of *the Problem-Based Learning* (PBL) model assisted by *Liveworksheet media* is still in the low category, with an average pretest score of 55.67 for the experimental class and 57.50 for the control class. After the implementation of the PBL model assisted *by Liveworksheet* media, students' writing skills experienced a significant improvement. This is shown by the average posttest score of the experimental class of 81.17 which is higher than the control class of 66.67. The results of the hypothesis test showed a significance value of 0.001 (< 0.05), which means that there is a significant influence of the application of the model. In addition, the N-Gain value of the experimental class was 58.18% (moderately effective), higher than the control class's 20.76% (ineffective). Thus, it can be concluded that the *Problem-Based Learning model assisted by* Liveworksheet *media* has a positive and significant effect on students' explanatory text writing ability.

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