Implementation of Problem-Based Learning Model in Blended Learning and Its Implications on Students Achievement at SMK Negeri 1 Dukuhturi

Mohamad Jamali, Taufiqulloh, Yoga Prihatin
{nilnajamali@gmail.com}

Magister of Pedagogy, Universitas Pancasakti Tegal, Indonesia

Abstract. The Covid-19 pandemic has posed challenges to the education system, leading to social distancing measures and a shift to online learning in Indonesia. This research focuses on the application of the Problem Based Learning (PBL) model and the differences in readiness between face-to-face and online learning. An experimental research design was used, with an experimental group taught using a blended learning approach with PBL, and a control group taught using conventional methods. The sample consisted of 71 class X students from SMKN 1 Dukuhturi, divided into control and experimental groups. Data was collected through pre-test and post-test written exams, and analyzed using parametric statistics including N-Gain Score, f-test, t-test, and univariate test. The findings revealed that there was a significant difference in learning achievements between students using conventional methods and those using PBL in blended learning. The results also showed that the use of PBL in blended learning was effective in improving learning achievements, as evidenced by significant increases in post-test scores. This research highlights the benefits of blended learning with PBL in enhancing student learning achievements, particularly in the context of online learning during the pandemic

Keywords: Problem-based learning, blended learning, conventional learning, student achievement

1. Introduction

Blended learning provides teaching and learning solutions to face the difficulties in the world of education caused by the Covid 19 pandemic outbreak that has hit the world. Because it is through this teaching method that we can combine appropriate teaching techniques for students who are categorized in this Z generation. The combination is face-to-face learning and learning through the internet network. As a start the teaching and learning process is carried out face to face where the teacher conveys the subject matter in front of the class then for reflection and assignment the teacher opens an online class using Google Classroom (GC) where students can interact with the teacher and submit assignments on the GC page.

Advances in IT (Information Technology) greatly provide opportunities for the application of blended learning so that teaching and learning activities will be greatly assisted in conveying the subject matter. Because learning does not only rely on the teacher's activities in class, it can also continue in cyberspace through information technology applications that students have no difficulty accessing and using.

Implementation of learning during the Corona Virus Disease 2019 (COVID-19) pandemic was carried out with limited face-to-face learning while still implementing health protocols, and distance learning. According to the joint decree of 3 ministers Number: 03/KB/2021 concerning guidelines for organizing learning during the 2019 coronavirus disease pandemic. Based on the Government Regulation above, it is appropriate for us as educators to immediately respond to these regulations by changing appropriate learning patterns. originally using online learning to offline learning resulted in matters relating to the teacher's teaching preparation, of course, being prepared again like previous lessons. Therefore, because students are used to online learning, we must maintain an online learning background

Learning should also pay attention to the differences that exist in these students so that learning can be expected that the results can occur and can be measured according to their capacity in our learning activities cannot be separated from various activities that support the achievement of a learning goal. is a positive change in the behavior of students after participating in teaching and learning activities, this is following what was expressed by Sugandi and friends [1] which states that the purpose of learning is to help students gain various experiences and with that experience, the intended behavior includes knowledge, skills and values or norms that function as controllers of attitudes and behavior of students. The role of a teacher in learning activities is very influential for the success of an activity or teaching and learning process. In conventional learning, the teacher teaches several students in a room with a large capacity, and students are assumed to have the same skills.

From the results of observations, the process of learning English carried out at SMK Negeri 1 Dukuhturi was not optimal. The lack of student participation in participating in learning has an impact on student learning outcomes. Researchers looked at the level of student participation with indicators of mastery of the material. Explaining that the activeness of working on the problem is 55% while the activeness of asking is 55%, the activeness of answering this question is obtained by 59% and the activeness of asking questions or submitting these opinions is 50% and the ability to make learning conclusions is only able to obtain 50%.

While the minimum learning completeness criterion or KKM for English lessons at SMK Negeri 1 Dukuhturi is 77, the average student learning outcomes are 38% incomplete. While the average student learning outcomes that have been completed according to KKM or more than 77 as much as 62% are used by the teacher to increase student participation by involving students in class learning by inviting students to come forward to work on the questions provided by the teacher.

Researchers try to apply the problem-based learning method in their learning so that there are new variations for students in receiving English subject matter. At first, they seemed less enthusiastic about participating in learning with the implementation of this new method, but

along with a more serious approach they began to feel the benefits of this learning method. Some students still seem reluctant to accept assignments from the teacher, so we continue to motivate them so they want to carry out learning seriously and interspersed with fun games. Blended learning is a learning method that is carried out by combining online and offline learning so that teachers still use their information technology tools in learning as well as using direct conventional methods in front of their students. Because in learning English subjects, of course, face-to-face is an irreplaceable method where a teacher must directly check students' pronunciation and intonation in expressing their ideas in English.

The same thing was experienced by SMKN 1 Dukuhturi where the process of transition from the pandemic to the post-pandemic period made all elements of education, both teachers and students, experience influences that made learning achievement less effective, teachers were required to understand and act quickly in responding to the situation by always update every technological development to respond to students who are increasingly thirsty for knowledge because the technological era requires them to immediately have sufficient skills to be accepted in the world of work. one of the activities to prepare students to enter the world of work.

Based on the identification of the problem which is then described in the Boundaries of the problem, the problem is formulated as follows: (1). How can the implementation of the problem-based learning model in blended learning affect students' English learning achievement? (2). Is learning English using the problem-based learning method in blended learning effective? (3). Is there a change in student achievement after applying the problem-based learning model in blended learning?

2. **Methods**

This type of research based on what has been carried out in this activity is a type of experimental research, where the effectiveness and changes in the application of a learning model will be sought for student achievement in a school so that basic answers will be determined about causes and consequences, of course by analyzing the factors that influence student achievement. Experimental research methods are generally used in laboratory research. However, that does not mean that this approach cannot be used in social research, including educational research. So, in experimental research based on the positivistic paradigm, initially, the first problem was related to the internal validity of a research result, while the problems related to the second question concerned the external validity of a research result. Experimental research generally places more emphasis on fulfilling internal validity, namely by controlling/controlling/eliminating the influence of external factors being experimented on which can affect experimental results.

Experimental research is the most reliable scientific research (the most valid) because it is carried out with strict control over the interfering variables outside of those being experimented on. Experimental research is a special form of investigation that is used to determine what variables are and how the relationship forms between one another. According to the classical concept, experimentation is research to determine the effect of the treatment variable (independent variable) on the impact variable (the dependent variable).

There will be issues regarding study subjects when using experimental research methodologies in social and educational research. Given that the subject being studied involves interactions between or between persons, using this experimental method will be exceedingly challenging in this situation. Additionally, it is challenging to locate individuals willing to actively participate as research subjects ("guinea pigs").

The Experimental Research Procedures can be explained as follows: a. Selecting and formulating the problem, including testing what treatment, and what effect you want to see. b. Selecting subjects who will be subject to treatment and subjects who are not subject to treatment. c. Choosing an experimental research design. d. Develop measurement instruments (instruments for collecting data). e. Carry out research procedures and data collection. f. Analyze data. g. Formulation of conclusions.

3. Result and Discussion

1. Data Analysis of Experimental Class Learning Outcomes

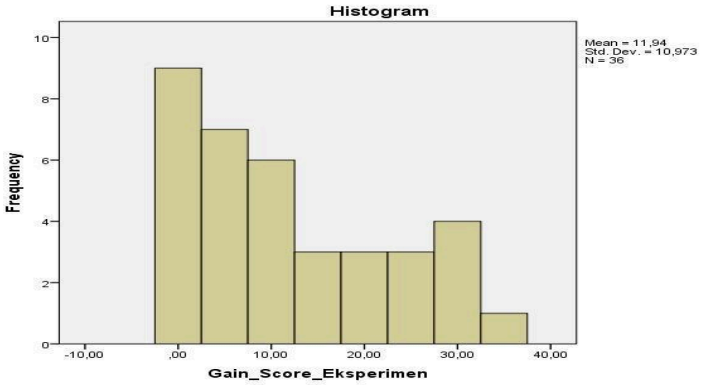
Table: 8

Experiment Class N-Gain Score Results

Statistics

Gain_Score_Eksperimen		
N	Valid	36
	Missing	0
Mean		11,9444
Std. Error of Mean		1,82876
Median		10,0000
Mode		,00
Std. Deviation		10,97255
Variance		120,397
Range		35,00
Minimum		,00
Maximum		35,00

Based on the results of calculating the N-Gain Score using SPSS 22 in the experimental class, the number of valid samples was 36, with mean score = 11.9444, median value = 10,000 standard deviation = 10.973, minimum value = .00 and maximum value = 35. Then the N-Gain Score frequency distribution table for the experimental class can be illustrated in the histogram below:

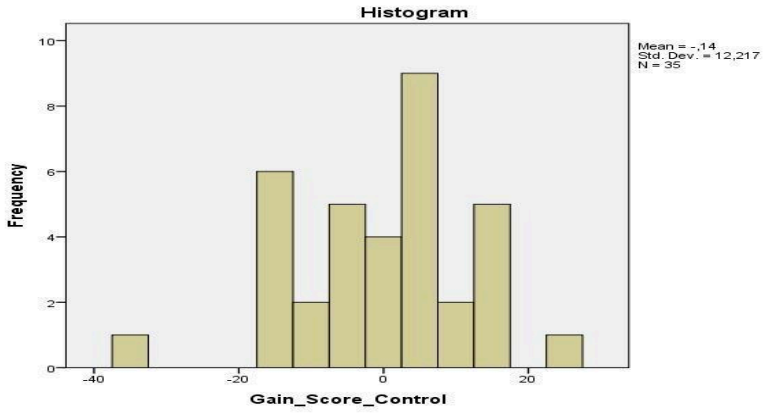


Picture 4
Frequency distribution of N-Gain Score experimental class

Shown in the table and histogram above, the frequency data for the experimental class are mostly located in the interval -2.5 – 2.5 of 9 students (25.0%).

Based on calculations using the SPSS 22 N-Gain Score in the control class, the number of valid samples = 35, mean score = -0.14, median value = .00 standard deviation = 12.217 minimum value = -35 and maximum value = 25.

Based on the N-Gain Score frequency distribution table for the control class, it can be described in the histogram below:



Picture 5.
N-Gain Score frequency distribution for Control class

As can be seen in the table and histogram above, the frequency of the majority control class lies in the 2.5 -7.5 interval of 9 students (25.7%). Furthermore, the activity carried out is to analyze the test of the average difference in the N-Gain Score of the Experiment Class and the N-Gain Score of the Control class. The things we will calculate include:

a) Question Item Validity=According to Pearson's correlation calculations, there are 42 valid questions.
b) Difficulty level = Based on the calculation of the difficulty level of the 42 valid questions, there are 23 questions in the easy category, 7 questions in the difficult category and 12 questions in the medium category.
c) Discriminating Power= Based on the calculation of the test results, among the valid questions there are questions with 25 questions with pretty good categories and 17 questions with good categories.
d). Question Reliability= From the results of calculating the reliability of the questions, with SPSS 22, the r value was 0.725, it can be concluded that the test instrument for learning outcomes is reliable with very high criteria. The following is a table of Cronbach's Alpha values from the SPSS 22 output results.

Based on the calculations of Validity, Reliability, Difficulty Level and Question Discrimination, the questions that will be used for the pretest and posttest are 20 pretest questions and 20 posttest questions.

a. Testing Prerequisites Analysis

Testing of the prerequisites for analysis was done prior to data analysis. The normalcy test and homogeneity test were prerequisites employed in this investigation. The following is a presentation of the analysis prerequisite test results.:

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Score_Control	,149	35	,058	,951	35	,122

Based on the table above, it can be seen that the N-Gain Score data for good learning outcomes in the control class has a sig value > 0.05, so it can be concluded that the data group is normally distributed.

Table 17

SPSS Output Calculation of Normality Test Gain score of Experimental class

Explore

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
Gain_Score_Eksperimen	36	100,0%	0	0,0%	36	100,0%

Descriptives

			Statistic	Std. Error
Gain_Score_Eksperimen	Mean		11,9444	1,82876
	95% Confidence Interval for Mean	Lower Bound	8,2319	
		Upper Bound	15,6570	
	5% Trimmed Mean		11,4506	
	Median		10,0000	
	Variance		120,397	
	Std. Deviation		10,97255	
	Minimum		,00	
	Maximum		35,00	
	Range		35,00	
	Interquartile Range		18,75	
	Skewness		,605	,393
	Kurtosis		-,918	,768

Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Gain_Score_Eksperimen	,181	36	,074	,883	36	,101

a. Lilliefors Significance Correction

Based on the table above, it can be seen that the N-Gain Score data for good learning outcomes in the Experiment class has a sig value > 0.05, so it can be concluded that the data group is normally distributed.

2. Homogenity Test

The homogeneity test is conducted after determining the degree of normalcy of the data. The level of similarity in variance between the experimental group and the control group is assessed using the homogeneity test. by comparing the sig price on Levene's statistic with 0.05 (sig > 0.05), one can decide whether to accept or reject the hypothesis. According to the findings of the homogeneity test, the statistical value for the research variables according to Levene is 0.032, with a significance level of 0.858. The data in this study have an uniform variance, according to the results of calculating a significant price more than 0.858 (sig > 0.05)..

3. Hypothesis testing

With the help of this study, it is hoped to identify differences between the Problem-based Learning model's application in blended learning and traditional methods or lectures in terms of what those applications mean for students' achievement in the English language arts class X DKV at SMKN 1 Dukuhturi, Tegal Regency. The results of the author's analysis, which involved a t test conducted with the aid of SPSS for Windows version 22, can be stated in more depth as follows:

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
									95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Gain_score	Equal variances assumed	,032	,858	4,389	69	,000	12,08730	2,75413	6,59296	17,58164
	Equal variances not assumed			4,382	67,758	,000	12,08730	2,75834	6,58276	17,59185

From the data table above, it can be seen that the value of t = 4.389 with a significance of 0.000. Because Sig = 0.00 (<0.05) it can be concluded that there is a difference in the N-Gain Score of the experimental class and the N-Gain Score of the control class.

4. Analysis of Discussion Results

Based on data from the activity of implementing the PBL learning model in blended learning activities for class X DKV students of SMKN 1 Dukuhturi are as follows:

1. According to the calculation results of the t test, it is known that the average N-Gain Score for the experimental class is 11.9444 and the average N-Gain Score for the control class is -0.1429. So that it can be stated that there is a significant increase in the score of student learning outcomes in the experimental group or given the Problem-based learning model in blended learning.
2. Learning English for class X DKV 2 using the conventional learning model or lecture model is Based on the results of the N-Gain Score for the control class of -0.1429, it can be concluded that learning using the lecture method decreased by 0.1429.
3. Results of class X DKV 3 SMK Negeri 1 Dukuhturi students learning English on text process material It can be deduced that the average learning results of the experimental class improved by 11.9444 utilizing the Problem-based Learning Model based on the N-Gainn Score, where it is known that the average experimental class learning result is 11.9444. The t count is 4.389, and the table's significance value is 0.000. The obtained t table of 69 db is 1.667 at a significance level of 5%. Due to this, the t count exceeded the t table (4.389 exceeded 1.667), and the significance level was below 0.05 (p = 0.000 0.05). It may be said that the N-Gain Scores of the students in the experimental class and the control class differ significantly from one another.

Based on the analysis above, it has been proven that there is a significant difference

between the application of the problem-based learning model in blended learning and the conventional method or lecture method in improving student learning outcomes in English learning for class X DKV SMK Negeri 1 Dukuhturi, Tegal Regency.

4. Conclusion

The application of the Problem-based Learning model in blended learning and the traditional approach of teaching English to students at SMK Negeri 1 Dukuhturi have been shown to significantly differ based on the data presented above. Due to the fact that the Problem-based Learning Model is implemented in blended learning, students are more engaged in their education than they would be in a traditional learning environment, which results in greater average scores and improvements. The Problem-based Learning paradigm in blended learning gives students case scenarios where they are trained to look for and find existing problems, even when they are given the same content at the same time. With contrast, in the traditional approach, pupils are less engaged in their learning and are only focused on the teacher's explanation.

References

[1] A. Sugandi, M. B.-J. Analisa, and undefined 2018, "Penerapan pendekatan kontekstual terhadap kemampuan pemahaman dan komunikasi matematis siswa SMP," *journal.uinsgd.ac.id*, vol. 4, no. 1, pp. 16–23, 2018, Accessed: Feb. 11, 2023. [Online]. Available: http://journal.uinsgd.ac.id/index.php/analisa/article/view/2364

[2] S. Susilawati, R. Falefi, and A. Purwoko, "Impact of COVID-19's Pandemic on the Economy of Indonesia," *Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences*, vol. 3, no. 2, pp. 1147–1156, May 2020, doi: 10.33258/BIRCI.V3I2.954.

[3] U. Anis Chaeruman Adress, J. B. Pinus Barat Raya Blok, P. Barat, T. Selatan, U. Anis Chaeruman, and S. Maudiarti, "Quadrant of blended learning: A proposed conceptual model for designing effective blended learning," *journal.unj.ac.id*, 2018, doi: 10.21009/JPI.011.01.

[4] J. Penelitian, P. Ipa, H. Lestari, W. Setiawan, and R. Siskandar, "Science Literacy Ability of Elementary Students Through Nature of Science-based Learning with the Utilization of the Ministry of Education and Culture's" Learning," *jppipa.unram.ac.id*, 2020, doi: 10.29303/jppipa.v6i2.410.