

Problem Based Learning Model Combination of Peer Tutor Improves Student Learning Outcomes

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ABSTRAK

Permasalahan pembelajaran yang terjadi saat ini yaitu kegiatan pembelajaran belum maksimal. Kurangnya kebiasaan membaca dan perhatian siswa terhadap materi pelajaran yang diajarkan menyebabkan tingkat hasil belajar siswa masih rendah. Berdasarkan hal tersebut, maka tujuan penelitian ini yaitu untuk menganalisis pengaruh model pembelajaran problem-based learning dan metode pembelajaran peer tutor terhadap hasil belajar siswa SMA pada mata pelajaran Ekonomi. Jenis penelitian yang digunakan dalam penelitian ini adalah penelitian eksperimen semu. Populasi berjumlah 6 kelas di pilih secara acak menggunakan cluster random sampling yang berjumlah 216 siswa. Metode yang digunakan untuk mengumpulkan data yaitu observasi, kuesioner, dokumentasi, dan tes. Instrumen yang digunakan untuk mengumpulkan data yaitu lembar kuesioner dan soal tes. Teknik yang digunakan untuk menganalisis data yaitu analisis statistik deskriptif dan analisis statistik inferensial. Hasil penelitian yaitu penggunaan model pembelajaran Problem Based Learning kombinasi Peer Tutor berpengaruh signifikan terhadap hasil belajar siswa pada mata pelajaran ekonomi. Metode pembelajaran PBL berpengaruh signifikan terhadap hasil belajar, dimana metode kombinasi peer tutor dapat memberikan hasil belajar yang lebih baik dibandingkan metode konvensional. Disimpulkan bahwa model pembelajaran Problem Based Learning kombinasi Peer Tutor dapat meningkatkan hasil belajar siswa secara signifikan.

ABSTRACT

The current learning problem is that learning activities could be more optimal. Lack of reading habits and students' attention to the subject matter being taught causes low student learning outcomes. Based on this, this research aims to analyze the influence of problem-based learning models and peer tutor learning methods on high school students' learning outcomes in Economics subjects. The type of research used in this research is quasi-experimental research. The population of 6 classes was selected randomly using cluster random sampling, totalling 216 students. The methods used to collect data are observation, questionnaires, documentation and tests. The instruments used to collect data were questionnaire sheets and test questions. The techniques used to analyze data are descriptive statistical analysis and inferential statistical analysis. The research results show that using the problem-based learning model combined with peer tutoring significantly affects student learning outcomes in economics subjects. The PBL learning method significantly affects learning outcomes, whereas the peer-tutor combination method can provide better learning outcomes than conventional methods. The problem-based learning model combined with peer tutors could significantly improve student learning outcomes.

1. INTRODUCTION

The Industrial Revolution, 4.0 in the 21st century, is marked by the widespread use of information and communication technology in all aspects of life, including education so people need good adaptability (Lase, 2019; Reflianto & Syamsuar, 2019). Increasing quality learning standards will help students develop critical thinking skills (Tang et al., 2020; Toheri et al., 2020; Turan & Koç, 2018). Therefore, having various skills is essential for learning in this century. Developing talents and critical thinking skills enable students to make decisions and draw conclusions, thereby forming individuals who are strong, sensible, rational, critical, careful and efficient (Darmayanti et al., 2022; Liu & Pásztor, 2022;

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Rambe et al., 2020). Good learning in the 21st century includes a combination of literacy skills, knowledge, skills, behaviour and mastery of technology (Rahayu et al., 2022; Septikasari & Frasandy, 2018). Several characteristics of 21st-century learning include involving 21st-century skills in solving problems, collaborating in learning and working with various individuals, and integrating technology in learning (Muhali, 2019; Redhana, 2019). This causes teachers to design learning activities that can significantly improve student learning outcomes. However, the current problem is that many students still need higher learning scores. This is reinforced by previous research findings, which state that students have difficulty learning in class, resulting in low learning outcomes (Nurwidayanti & Mukminan, 2018; Yuniawardani & Mawardi, 2018). Other research also confirms that low student learning outcomes are caused by students feeling bored or lacking supporting learning media (Budiariawan, 2019; Mustaqim & Kurniawan, 2017; Okta Nurfiyanti et al., 2019). Other research also confirms that less varied learning models influence low student learning outcomes (Alfi et al., 2016; Lubis et al., 2019; Saprina et al., 2022). Low learning outcomes for students impact poor critical thinking skills, so learning objectives are not achieved optimally (Mukhara et al., 2022; Okta Nurfiyanti et al., 2019). The results of observations carried out at State Senior High Schools in Blora Regency also found several things that could be improved. The problem that occurs is that the learning process could be more optimal. Lack of reading habits and students' attention to the subject matter being taught causes low student learning outcomes. The results of the students' mid-semester assessments showed the average score of class X students in economics is still below the minimum criteria. Based on these observations, it can be classified that students' absorption capacity is still low. It can be seen from the mid-semester assessment data that students have low learning outcomes. In improving learning outcomes, teachers must use innovative learning models that can improve learning outcomes by current developments.

One learning model that can be developed in the 21st century to improve learning outcomes is to use a problem-based learning model. PBL is one of the appropriate learning models for teachers to deliver teaching materials in learning where students work. In teams to find solutions that can improve learning outcomes (Nur et al., 2016; Oktaviani et al., 2020; Ratnawati et al., 2020). The application of the PBL model is practical in developing students' learning outcomes skills (Degeng et al., 2021; Oktaviani et al., 2020; Permana et al., 2017; Primayanti et al., 2019; Ratnawati et al., 2020). PBL is an observation-based learning model where students use learning outcomes to answer problems related to the topics provided (Astraman et al., 2017; Degeng et al., 2021; Hasanah et al., 2019; Primayanti et al., 2019). The PBL learning approach also involves students in a particular problem and asks them to carry out investigations to identify solutions in the real world (Oktaviani et al., 2020; Permana et al., 2017; Wahyuni et al., 2018). Therefore, to succeed academically and gain information that can be applied to real-world situations, students must solve problems and apply what they have learned using this learning model. The PBL model can also be combined with peer tutoring methods to improve student learning outcomes. Learning combinations are anything that helps communicate and disseminate information in a planned manner in order to create a conducive learning environment, and students can carry out the learning process effectively and efficiently (Khasana et al., 2018; Rudland & Rennie, 2014; Saprina et al., 2022; Yael et al., 2022). Combining learning models with appropriate learning methods will produce maximum results (Pristiawati & Saiman, 2021; Romaliyana et al., 2019). The peer tutoring method aims to assist students who have obstacles or difficulties in understanding learning material with other students (Abineno et al., 2019; Munthe & Naibaho, 2019). To maximize learning outcomes, students with high academic abilities will be paired with students with low academic abilities. The peer tutoring method influences cognitive, emotional and psychomotor learning outcomes (Hastari, 2019; Hayati et al., 2018; Nurmala et al., 2016). Based on the description of the peer tutoring method approach and the problem-based learning model, combining them can improve student learning outcomes. Learning outcomes are the results of student evaluation using assessment tools after a well-planned learning process, material and time, as well as desired learning outcomes according to the type and function of assessment or measurement (Nurhasanah Lisa, 2021; Ramda et al., 2022; Wali et al., 2020). Previous research findings also reveal that the PBL model can help students learn in class (Hasanah et al., 2019; Juliawan et al., 2017). Other research also states that the PBL model can increase students' enthusiasm and active learning to improve student learning outcomes (Aryanti et al., 2017; Sudarmin et al., 2019). Other research also states that the peer tutoring learning method is efficacious in improving learning outcomes and helping students who have low academic abilities to achieve maximum or better results (Abineno et al., 2019; Munthe & Naibaho, 2019; Nasihah et al., 2018). The problem-based learning model and peer tutor learning methods can improve student learning outcomes. However, there has yet to be a study regarding problem-based learning models and peer tutor learning methods in improving high school students' learning outcomes in Economics subjects. The novelty of this research is a problem-based learning model combined with peer tutoring. This causes students to be enthusiastic and motivated in learning activities in Economics

subjects. Based on this, this research aims to analyze the influence of problem-based learning models and peer tutor learning methods on high school students' learning outcomes in Economics subjects.

2. METHOD

The type of research used in this research is quasi-experimental research. This research design uses a 2X2 factorial design, taking class groups randomly. This research was carried out in Blora, located at state high schools in Blora Regency, namely SMA N 1 Blora, SMA Negeri 2 Blora, and SMA Negeri 1 Tunjungan. This research uses two classes, namely the control class and the experimental class. The control class in this research is the class that applies PBL learning, and the experimental class that applies the PBL learning model combined with peer tutoring. The population of this study was all students in class X of SMA Negeri 1 Blora, SMA Negeri 2 Blora, and SMA Negeri 1 Tunjungan class X, totalling 1,080 students. The sample in this study was chosen randomly. The population of 6 classes was selected randomly using cluster random sampling, totalling 216 students. The methods used to collect data are observation, questionnaires, documentation and tests. The observation method is used to observe students' learning processes in class. The questionnaire method is used to determine student learning motivation. The questionnaire in this research uses a checklist form using a Likert scale. The documentation needed to support this research data is in the form of value data obtained from class X Economics teachers at SMA Negeri 1 Blora, SMA Negeri 2 Blora, and SMA Negeri 1 Tunjungan, namely odd semester grades. The value data compares achieving the minimum completion criteria for economics. The test method measures students' knowledge before and after applying the problem-based learning model and peer tutor learning method. The instruments used to collect data were questionnaire sheets and test questions. The instrument grid is presented in [Table 1](#).

Table 1. Research Instrument Grid

No	Material	Indicator	Question
1	Resource Scarcity	Examining natural resource scarcity policies	1,2,3,6,11,12, and 15
2	Human Needs	Determine decisions related to human needs issues	4,9,5, and 10
3	Priority Scale	Determining decisions and the impact of those decisions	7,8,13, and 14

Test the instrument's validity using the product moment formula with the help of SPSS 26 for Windows with a significance level of 5%. The test results show that r_{Table} is 0.329, consisting of 15 questions; there are 13 valid questions and two invalid questions. The reliability test results for student learning outcomes with Cronbach alpha reliability obtained a coefficient value of 0.789, so it is reliable. The techniques used to analyze data are descriptive statistical analysis and inferential statistical analysis. Descriptive statistics in this research provide an overview of the research object through the sample and population as a whole without making general conclusions. The descriptive analysis includes N, median, average, mode, standard deviation, quartile deviation, and data range for economics student learning outcomes. Inferential statistical data analysis uses the independent sample t-test for normally distributed data. If one of the hypothesis conditions is not met, then the test will be carried out using Wilcoxon, Kruskal-Wallis analysis, and the Mann-Whitney test will be carried out with the help of SPSS 26 for Windows.

3. RESULT AND DISCUSSION

Result

The pretest data in this study aims to determine the level of students' knowledge of the material to be presented. The descriptive analysis used includes N, median, average, mode, standard deviation, quartile deviation, and data range for economics student learning outcomes. The results of the descriptive analysis of the learning outcomes of experimental class and control class students showed in [Table 2](#).

Table 2. Results of Descriptive Analysis of Learning Outcomes

Class		N	Min	Max	Rate	Std. Dev
Experiment	<i>Pretest</i>	72	43	78	65.18	9.440
	<i>Posttest</i>	72	76	100	86.74	6.826
Control	<i>Pretest</i>	72	40	78	62.21	8.520
	<i>posttest</i>	72	68	90	81.24	4.310

Based on [Table 2](#), it shows the descriptive statistical values of the learning outcomes of this research with a sample of 144 students consisting of 72 experimental class students and 72 control class students. Learning outcome data is obtained for the minimum value pretest experimental class with a score of 43, maximum score 78, mean 65.18 and Std Deviation 9.440, minimum score posttest experimental class with a score of 76, maximum score of 100, mean 86.74 and Std Deviation 6.826. Based on these data it can be concluded that there is an increase in student learning outcomes in the experimental class. Learning outcome data is obtained for the minimum value pretest control class with a score of 30, maximum score 78, mean 62.21 and Std Deviation 8.520. Minimum value posttest control class with a score of 68, maximum score of 90, mean 81.10 and Std Deviation 4.234. The normality test is used to determine whether the research sample comes from a population with a normal or abnormal distribution. Testing for normality in this study used the Kolmogorov Smirnov test assisted by SPSS 26 for Windows, showed in [Table 3](#).

Table 3. Results of Normality Test

Class	Treatment	Significance
Experiment	Pretest	0.000
	Posttest	0.000
Control	Pretest	0.000
	Posttest	0.000

Based on [Table 3](#), The results of the normality test of learning outcomes show that the significance value for all group criteria is $.000 < .05$, meaning the data is not normally distributed. The data in this study is declared normal if the significance value is $> .05$. The homogeneity test is used to determine whether there is homogeneous variation between the experimental class and the control class. The homogeneity test in this study used SPSS 26 for windows with a significance level value of $\geq 5\%$ or $.05$. If the Asym Sig (2-tailed) value is greater than 5% or $.05$ then the data is declared homogeneous. The results of the homogeneity test of learning outcomes data with a sample size of 144 students from all experimental classes and control classes shows a significance value of 0.000 . The data in this study is declared homogeneous if the significance value is $> .05$. Based on the homogeneity test results for learning outcome data of less than $.05$, it can be concluded that student learning outcome data is not homogeneous. Therefore, it is necessary to carry out non-parametric tests. The Wilcoxon test was used to prove whether there was a significant difference in the results of conceptual understanding between students in the experimental class and the control class. The Wilcoxon test in this study used SPSS 26 for Windows; H_0 was accepted if the Asymp Sig value was < 0.05 and H_0 was accepted if the Asymp Sig value was > 0.05 . The Wilcoxon test results of learning outcome data are presented in [Table 4](#).

Table 4. Wilcoxon Test Results for Learning Outcomes

	Post Experiment-Pre experiment	Post Control-Pre Control
Z	-9.026b	-9.026b
Asymp. Sig (2-tailed)	0.000	0.000

Based on [Table 4](#), the results of the Wilcoxon test show data on learning outcomes with a sample size of 216 students consisting of 108 experimental class students and 108 control students. The Wilcoxon test results show an Asymp Sig value of 0.000 , meaning that H_0 is accepted or there is an influence of the Peer Tutor combination PBL learning model on student learning outcomes in the experimental class. Hypothesis testing in this study used the Kruskal-Wallis test and the Mann-Whitney test assisted by SPSS 26 for windows, based on the results of the normality test with a normal distribution, for the homogeneity test it was not homogeneous. Therefore, a hypothesis test was carried out using the Kruskal-Wallis test and the Mann-Whitney test. The results of this research hypothesis test are presented in [Table 5](#).

Table 5. Hypothesis test results using the Mann Whitney test for the PBL learning model

Mann-Whyney U	198.000
Wilcoxon W	6084.000
Z	-12.306
Asymp Sig (2-tailed)	0.000

Based on [Table 5](#), the results of the Mann-Whitney test using the PBL model on student learning outcomes show an Asymp Sig (2-Tailed) value of 0.000. The Mann-Whitney Test criteria in this study are accepted if the Asymp. Sig. (2-tailed) < 0.05. The results of the Mann-Whitney test show that the Asymp Sig (2-Tailed) value is 0.000 < 0.05, meaning that there is a significant influence with the PBL learning model on student learning outcomes in the experimental group and the control group. Next, the Kruskal Wallis test will be carried out to determine the effect of the PBL model which is presented in [Table 6](#).

Table 6. Hypothesis test results using the Kruskal Wallis test for the PBL model

Chi-Square	154,428
df	1
Asymp Sig (2-tailed)	0.000

The Kruskal Wallis Test criteria in this study are accepted if the Asymp. Sig. < 0.05. Based on [Table 6](#), the results of the Kruskal Wallis test on student learning outcomes show an Asymp Sig value of 0.000, so H0 is accepted, meaning that there is a significant effect of using the PBL learning model on student learning outcomes in the experimental group and control group. Next, a test was carried out on the influence of the Peer Tutor combination PBL learning model on student learning outcomes. The results of the Mann-Whitney test on student learning outcomes show an Asymp Sig (2-Tailed) value of 0.000. Therefore, it can be concluded that there is a significant influence with the Peer Tutor combination PBL learning model on student learning outcomes in the experimental group and the control group. The PBL learning method has a significant effect on learning outcomes, where the peer tutor combination method can provide better learning outcomes than conventional methods. To determine the effect of the Peer Tutor combination PBL learning model, the Mann-Whitney test will be carried out. The results of data analysis are presented in [Table 7](#).

Table 7. Results of hypothesis testing using the Kruskal Wallis test for the PBL learning model combined with Peer Tutor

Chi-Square	45,315
df	1
Asymp Sig (2-tailed)	0.000

Discussion

The data analysis results show that the Peer Tutor combination PBL learning model significantly affects student learning outcomes in the experimental and the control groups. Several factors cause this. First, using the PBL learning model combined with Peer Tutor improves student learning outcomes. Problem-Based Learning is a learning model that uses an authentic problem approach. Students can build what they think with their knowledge to develop skills and increase self-confidence ([Nur et al., 2016](#); [Permana et al., 2017](#); [Ratnawati et al., 2020](#)). Other research findings also reveal that the PBL model can develop problem-solving skills by generating information based on real-life experiences to improve student learning outcomes ([Degeng et al., 2021](#); [Hasanah et al., 2019](#); [Primayanti et al., 2019](#)). Therefore, the PBL model is very effective to apply in the learning process because this learning focuses on students solving real problems so that students get new information to learn. Apart from that, the peer tutoring method provides an opportunity to train oneself to hold responsibility in carrying out a task and practice patience ([Alvyanita & Priatna, 2021](#); [Amir, 2019](#); [Munthe & Naibaho, 2019](#)). Peer tutors can reinforce the learning material being discussed and train tutors to be responsible for all students regarding their respective learning assignments. Second, using the PBL learning model combined with Peer Tutor can increase students' enthusiasm for learning. PBL is a learning model that improves pedagogical outcomes, such as independent learning skills ([Nur et al., 2016](#); [Oktaviani et al., 2020](#); [Ratnawati et al., 2020](#)). Students learn through simplified problem solving and where problems should be complex, unstructured, and accurate. In the PBL model, students are encouraged to analyze a problem and solve problems to become knowledgeable ([Oktaviani et al., 2020](#); [Permana et al., 2017](#); [Wahyuni et al., 2018](#)). Combining learning models with appropriate learning methods will produce more optimal results by combining peer tutoring methods. Peer tutoring is learning that focuses on students as peers to help other students who experience obstacles or difficulties in receiving lesson material ([Abineno et al., 2019](#); [Noryanti et al., 2019](#)). The peer tutor learning method is a learning activity that focuses on and provides opportunities for students who can absorb the material well and have high intellectual intelligence to teach to friends who do not understand the material being taught ([Alvyanita & Priatna, 2021](#); [Munthe & Naibaho, 2019](#)). This has an impact on increasing student enthusiasm for learning.

Third, using the PBL learning model combined with a Peer Tutor creates a pleasant atmosphere. The PBL learning model has a positive impact, including an exciting approach because students have the opportunity to work on problems related to daily life and play an active role in learning (Hasanah et al., 2019; Primayanti et al., 2019; Suwono et al., 2021). This is what makes learning activities enjoyable. With PBL learning, students can develop independent learning and social skills formed when students collaborate to identify these problems (Degeng et al., 2021; Hasanah et al., 2019; Primayanti et al., 2019; Serevina et al., 2018). The PBL learning model encourages students to be able to process actively. Students are required to be creative in solving problems by connecting lesson material. Peer tutor learning requires students to teach other students (Abineno et al., 2019; Noryanti et al., 2019). In other words, students must be more active in discussing with their friends or doing group assignments given by the teacher at school and at home. Previous findings state that PBL can challenge students and provide satisfaction in discovering new knowledge for students (Margarita et al., 2018; Ratnawati et al., 2020). Other research also shows that PBL can increase learning activities and impact student learning outcomes (Aufa et al., 2021; Ismail et al., 2018; Juliawan et al., 2017). Other research also reveals that the Peer Tutor method makes learning more accessible for students, resulting in increased learning outcomes (Abineno et al., 2019; Nurlizawati, 2019). PBL learning combined with Peer Tutors can make learning more accessible for students. Applying the PBL model and Peer Tutor method emphasizes learning groups oriented towards authentic problems. So, in this model, students are taught learning outcomes in analyzing a problem and understanding the concept of the problem. This research implies that applying the PBL learning model combined with Peer Tutor effectively improves learning outcomes and student enthusiasm. It is hoped that teachers will use creative and appropriate learning models so that they can help students learn and have an impact on improving student learning outcomes.

4. CONCLUSION

Based on the results of the discussion that has been described, the conclusions in this research are as follows: The PBL learning model combined with peer tutors has a significant effect on student learning outcomes. This increase shows an increase in learning outcome scores at the pretest and posttest stages. Apart from that, the results of the effect size test for the experimental class had a higher score than the control group. The detailed increase in ability can be seen in the ability to analyze, evaluate and create. So, the peer tutor combination PBL model is more effective in improving student learning outcomes compared to conventional methods.

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