

Effectiveness of Problem-Based Learning and Discovery Learning Models on Learning Outcomes of Social Science Students

Walipah*

Economy Education, PGRI Kanjuruhan University, East Java, Indonesia

Riril Mardiana Firdaus

Economy Education, PGRI Kanjuruhan University, East Java, Indonesia

Farida Chasanah

Economy Education, PGRI Kanjuruhan University, East Java, Indonesia

*Correspondence author: ririlmardiana@unikama.ac.id

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Abstract:

Research will be conducted to determine the description of the problem-based learning and discovery learning models to improve student learning outcomes, the differences in cognitive and affective learning outcomes between experimental and control classes, and the effectiveness of the problem-based learning and discovery learning models in improving student learning outcomes – quantitative research with an experimental nonequivalent control group design. The population is class VII students of SMP (Junior High School) Negeri 1 Bululawang 2023/2024, totaling 52 students. The sampling technique uses saturated sampling. Data collection uses test and observation techniques. Data analysis techniques use the t-test and Manova test. The research results showed that the effectiveness of the experimental class compared to the control class was 0.032, thus stating that H_a was accepted. The implications of this research show that learning Social Sciences, which has been considered rote, can become applied science using the Problem-Based Learning model.

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Introduction

Learning is a process where students can be directed to learn in order to achieve a certain goal. Good learning needs to be trained and built with a quality learning process and is able to provide opportunities for students to be actively involved in training and building the concepts and theories being studied (Utami, et al., 2022). In learning activities, teachers must abandon learning paradigms that tend to be monotonous mechanics, replacing them with more constructivist paradigms. For instance, instead of lecturing, teachers could facilitate group discussions or hands-on activities that allow students to construct their own understanding of the material. Learning is no longer teacher-centered but must be centered on student activities (Aslon, 2021).

A preliminary study of social studies learning activities for class VII students at SMPN 1 Bululawang showed that the learning activities still used the teacher-centered method. This condition makes students experience difficulties in learning if students are immediately given a test with problem questions related to the material being studied. The ability of a student who takes a cross-section of economic interests to observe and understand this material is still not done well, especially when looking for problems and finding solutions to solve these problems, which still tends to be lacking. Apart from that, the explanation of the material only explains the essential points, which the teacher does not explain in detail, so students need help understanding the lesson material.

Syaifi & Murwitaningsih (2022) argue that in Problem-Based Learning, students hone their group abilities to solve problems the teacher assigns. According to him, the Problem-Based Learning model suits 21st-century learning, where students must hone their critical thinking. Students also find it easier to understand learning because they are faced with problems that exist in everyday life.

Teacher's efforts are vital to improving the existing social studies learning process by emphasizing the active role of students in it. In contrast, the teacher's role should be shifted to being a facilitator, motivator, and evaluator only (Pursitasari et al., 2019). Teachers must implement learning models that can teach students to relate concepts to problems in everyday life. One of them is implementing social studies learning through a problem-based learning model (Aslon, 2021; Syarifah & Ritonga, 2020; Kaharuddin, 2018) or discovery learning (Ristanta et al., 2022; Hikmawati et al., 2020; Putriani and Rahayu, 2018). These two learning models emphasize the active role of students in identifying and finding problems in everyday life and then discussing with peers to analyze how to solve the problem (Purwaningsih et al., 2020). The PBL learning model and discovery learning will effectively help increase student learning activities because they require students to participate in the group discussion stage. With this activity, it is hoped that student learning activities will increase, impacting learning outcomes (Fidon and Tuncel, 2019).

Problem-Based Learning, an instructional model, fosters student learning through collaborative problem-solving and reflection on their own experiences. In this model, the teacher is a facilitator, encouraging students to pool their knowledge and work together (Sari et al., 2021; Simanjuntak et al., 2021). PBL is a real-world learning process where students investigate problems in groups and collectively evaluate the solutions (A. et al., 2021).

The results of previous research conducted by [Permatasari et al. \(2019\)](#) stated that the problem-based learning model significantly affects student learning outcomes in social studies subjects. Likewise, the results of previous research by [Kaharuddin \(2018\)](#) prove that applying the problem-based learning model has a positive and significant effect on student learning outcomes. Meanwhile, the results of previous research by [Putriani and Rahayu \(2018\)](#) stated that the discovery learning model had a significant influence on student learning outcomes. Likewise, the results of previous research by [Burhendi et al. \(2019\)](#) prove that the discovery learning model has a positive and significant effect on student learning outcomes. The Discovery Learning learning model directs students to direct concepts, meanings, and relationships through an intuitive process to conclude ([Ilhan & Ekber Gülersoy, 2019](#)). Discovery Learning is a learning model that encourages students to learn independently through active involvement by discovering concepts and principles ([Sugiarti & Husain, 2021](#)).

Research Methods

This type of research is quantitative, using quasi-experiments. The quasi-experimental design used in this research was a nonequivalent control group design. This research activity was conducted at SMP Negeri 1 Bululawang, Jalan Raya Sempalwadak No. 9, Bululawang Village, Bululawang District, Malang Regency. The population of this study was all students in class VII A and VII B of SMP Negeri 1 Bululawang 2023/2024, totaling 52 students. The sampling technique uses non-probability sampling, a method where the selection of participants is based on the researcher's judgment, while the sampling technique uses saturated samples, a method where all available and eligible participants are included in the study. In carrying out the experiment, class VII A (26 students) was designated as the experimental class, while class VII B (26 students) was designated as the control class, with the consideration that in initial observations it was known that the learning outcomes achieved by class VII A students were lower than class VII B.

Data collection in this research used test and observation techniques. Thus, the data collection instruments used include test sheets and observation sheets. Tests measure student learning outcomes in cognitive aspects, where the test type is multiple choice. Test scoring uses a dichotomous assessment: one if correct and 0 if incorrect. The number of test instrument questions is 18 questions. The test was given twice, namely at the pretest and posttest stages. Observation is used to measure student learning outcomes in the affective aspect. The practical observation sheet is prepared based on Bloom's taxonomy, which consists of five indicators: receiving, responding, valuing, organizing, and internalization. The assessment of this observation instrument is on a scale of 1-4.

This research's main data analysis techniques include the t-test and the Manova test. The t-test is used to test H_1 or to analyze differences in social studies learning outcomes between experimental and control class students, where the hypothesis testing criteria are: (1) If $\text{sig.} > 0.05$, then H_0 is accepted, and H_1 is rejected, (2) If $\text{sig.} \leq 0.05$ then H_0 is rejected and H_1 is accepted. Meanwhile, the Manova test was carried out to test H_2 or analyze the effectiveness of using the PBL model and discovery learning to improve student learning outcomes in social studies subjects, where the hypothesis testing criteria are: (1) If $\text{sig.} > 0.05$, then H_0 is accepted, and H_2 is rejected,

(2) If sig. ≤ 0.05 then H0 is rejected and H2 is accepted. All data processing was carried out via SPSS 16.0 for Windows.

Results and Discussion

After carrying out research activities from the pretest to posttest stages, the researcher can present the learning outcomes of experimental and control class students as listed in Table 1 below.

Table 1. Data Pretest and Posttest

| Description | Eksperiment | | Control | |
|---------------|-------------|----------|---------|----------|
| | Pretest | Posttest | Pretest | Posttest |
| Average score | 37.88 | 96.73 | 42.38 | 88.46 |
| Highest score | 67 | 100 | 67 | 100 |
| Lowest score | 10 | 80 | 20 | 60 |

It is known that the average post-test score for the experimental class is 96.73. Meanwhile, the average posttest score for the control class was 88.46. Based on the posttest data from the two classes above, the learning outcomes of experimental class students are higher than those of control class students.

The t-test results, where data processing was carried out using a computer program (SPSS 16.0), are listed in Table 2 below.

Table 2. T-test Results

| | | Skor posttest | | |
|--|---|------------------------|----------------------------|--------|
| | | Equal variance assumed | Equal variance not assumed | |
| Levene's Test for Equality of Variance | F | 17.571 | | |
| | Sig. | .127 | | |
| t-test for Equality of Means | t | 2.690 | 2.690 | |
| | df | 50 | 34.133 | |
| | Sig. (2-tailed) | .010 | .011 | |
| | Mean difference | 8.269 | 8.269 | |
| | Std. error difference | 3.074 | 3.074 | |
| | 95% Confidence interval of the difference | Lower | 2.095 | 2.023 |
| | | Upper | 14.443 | 14.515 |

It is known that the sig value. (0.010) < 0.05 then H0 is rejected and H1 is accepted. Thus, there are differences in the learning outcomes of class VII students regarding cognitive and affective domains between the experimental and control classes in social studies subjects at SMP Negeri 1 Bululawang.

The results of the Manova test, a rigorous statistical analysis, were obtained using the computer program SPSS 16.0. The detailed findings are presented in Table 3 below, demonstrating the scientific rigor and precision of our research.

Table 3. Results of Manova Test

| Effect | Multivariate Tests ^b | | | | | |
|-----------|---------------------------------|--------|-----------------------|-------|----------|------|
| | | Value | F | df | Error df | Sig. |
| Intercept | Pillai's Trace | .987 | 1904.980 ^a | 2.000 | 49.000 | .000 |
| | Wilks' Lambda | .013 | 1904.980 ^a | 2.000 | 49.000 | .000 |
| | Hotelling's Trace | 77.754 | 1904.980 ^a | 2.000 | 49.000 | .000 |
| | Roy's Largest Root | 77.754 | 1904.980 ^a | 2.000 | 49.000 | .000 |
| Kelas | Pillai's Trace | .139 | 3.945 ^a | 2.000 | 49.000 | .026 |
| | Wilks' Lambda | .861 | 3.945 ^a | 2.000 | 49.000 | .026 |
| | Hotelling's Trace | .161 | 3.945 ^a | 2.000 | 49.000 | .026 |
| | Roy's Largest Root | .161 | 3.945 ^a | 2.000 | 49.000 | .026 |

a. Exact statistic
b. Design: Intercept + Kelas

Based on Table 3 above, the sig value is known. F for Pillai Trace, Wilk Lambda, Hotelling Trace, and Roy's Largest Root (0.026) < 0.05, so H_0 is rejected and H_2 is accepted. Thus, the effectiveness of the Problem-based Learning and discovery learning models in improving the learning outcomes of class VII students in social studies subjects at SMP Negeri 1 Bululawang is high. The relationship between treatment (PBL model and discovery learning) and students' social studies learning outcomes can also be seen based on the test of between-subjects effects. Table 4 below is the SPSS 16.0 for Windows output, which shows the test results for between-subjects effects.

Table 4. Results of Tests of Between-Subjects Effects

| Source | Dependent Variable | Type III Sum of Squares | df | Mean Square | F | Sig. |
|-----------------|---------------------|-------------------------|----|-------------|----------|------|
| Corrected Model | Learning activities | 123.077 ^a | 1 | 123.077 | 1.028 | .032 |
| | Learning outcomes | 888.942 ^b | 1 | 888.942 | 7.237 | .010 |
| Intercept | Learning activities | 307692.308 | 1 | 307692.308 | 2570.694 | .000 |
| | Learning outcomes | 445850.481 | 1 | 445850.481 | 3629.772 | .000 |
| Kelas | Learning activities | 123.077 | 1 | 123.077 | 1.028 | .032 |
| | Learning outcomes | 888.942 | 1 | 888.942 | 7.237 | .010 |
| Error | Learning activities | 5984.615 | 50 | 119.692 | | |
| | Learning outcomes | 6141.577 | 50 | 122.832 | | |
| Total | Learning activities | 313800.000 | 52 | | | |
| | Learning outcomes | 452881.000 | 52 | | | |
| Corrected Total | Learning activities | 6107.692 | 51 | | | |
| | Learning outcomes | 7030.519 | 51 | | | |

a. R Squared = .020 (Adjusted R Squared = .001)
b. R Squared = .126 (Adjusted R Squared = .109)

It is known that the relationship between treatment (problem-based learning and discovery learning models) and student learning activities gives an F value of 1.028 with a significance of (0.032) < 0.05, so H_0 is rejected, and H_2 is accepted. This

shows effectiveness in using the Problem-Based Learning and discovery learning models to increase the learning activities of class VII students in social studies subjects at SMP Negeri 1 Bululawang. On the other hand, the relationship between treatment (PBL model and discovery learning) with students' social studies learning outcomes gives an F value of 7.237 with a significance of 0.010. This shows that there is effectiveness in using the Problem-Based Learning and discovery learning models to improve the learning outcomes of class VII students in social studies subjects at SMP Negeri 1 Bululawang.

The social studies learning process in the experimental and control classes is carried out based on teaching modules that have been previously designed and carried out during one meeting. The social studies learning activities in the experimental and control classes were the same, especially regarding the material presented on preserving natural resources. The difference lies in the experimental class, which was given problem-based learning model treatment, while the control class was taught using the discovery learning model. The series of social studies learning activities through these two models triggers the development of student's critical thinking skills in dealing with problems and searching for various information on solutions to solve them, thus having a positive impact on improving the learning outcomes of experimental class students (Hikmawati et al., 2020). As stated by Setyaningrum et al. (2020), problem-based learning and discovery learning models include active learning models that use real problems that are unstructured and open-ended as a context or means for students to develop problem-solving and critical thinking skills, as well as build new knowledge. This is supported by the opinion of Syarifah and Ritonga (2020) that in contrast to conventional learning models, problem-based learning and discovery learning models present real problems at the beginning of the learning stage as a means for students to continue building their knowledge. Learning through problem-based learning and discovery learning models, students, individually or in groups, solve real problems using the strategies or knowledge they have. By learning to discover for themselves, students can better understand and remember the concepts and knowledge they learn themselves so that student learning outcomes can improve Putriani and Rahayu (2018).

The descriptive analysis revealed that the social studies learning outcomes for the experimental class surpassed those of the control class. This was further confirmed by the t-test, indicating significant differences in the learning outcomes of class VII students in cognitive and affective domains between the two classes. The Manova test also demonstrated the effectiveness of problem-based learning and discovery learning models in enhancing the learning outcomes of class VII students in social studies subjects at SMP Negeri 1 Bululawang.

Learning through problem-based learning and discovery learning models emphasizes the active role of students (students centered) to explore their thinking abilities in order to find problems in material up to the stage of searching for information to solve those problems, thus triggering maximum development of learning outcomes (Komala et al., 2021; Putriani and Rahayu, 2018). In implementing social studies learning through the problem-based learning model, it is evident that the role of the teacher is solely as a facilitator, motivator, and evaluator during the learning activities. Meanwhile, students, individually or in groups, are given the

broadest possible opportunity to interact with various sources, whether interacting with teachers, peers, books, or digital scientific information sources during learning activities in order to solve the problems they find. This is different from control class students who are taught through the discovery learning model, where the student's role is less dominant because control class students do not experience the process of reflecting and evaluating the results of problem-solving, so the knowledge or knowledge they gain still seems abstract (Fidon and Tuncel, 2019).

The findings of this research align with previous studies. Permatasari et al. (2019) found that the problem-based learning model significantly impacts student learning outcomes in social studies subjects. Similarly, Kaharuddin (2018) demonstrated that the application of the problem-based learning model has a positive and significant effect on student learning outcomes. These consistent findings across studies validate the effectiveness of the problem-based learning model in improving student learning outcomes.

Conclusion

After providing the Problem-Based Learning model (experimental class) and discovery learning model (control class), it can be concluded that there has been an increase in social studies learning outcomes for class VII students at SMP Negeri 1 Bululawang. The research results also support this conclusion: there are differences in the learning outcomes of class VII students in terms of cognitive and affective domains between the experimental class (problem-based learning model) and the control class (discovery learning model) in social studies subjects at SMP Negeri 1 Bululawang. This research implies that the Problem-based Learning model can help students learn social sciences so that students do not consider it rote knowledge, and it can be applied as a solution to problems in everyday life.

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