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Application of problem based learning (PBL) learning model based on culturally responsive teaching (CRT) to the science learning outcomes of students in grade VII junior high school

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ABSTRACT

This study aims to examine the effectiveness of the application of the CRT-based PBL model on science learning outcomes on ecology and biodiversity material in junior high school grade VII. This study used a quasi-experimental design with the post-test-only control group. Data were obtained through post-test to measure cognitive learning outcomes and observation during the learning process to assess affective learning outcomes. The results in this study indicated that in the experimental class, the average post-test score (79.79) exceeded the average score in the control class (63.88). The t-test analysis revealed a significant difference between the two groups (0.001 < 0.05). In addition, observation of affective aspects indicated that the level of activity and involvement of students in the experimental class was observed to be higher than in the control class. These findings corroborate that the Culturally Responsive Teaching (CRT)-based Problem Based Learning (PBL) method not only improves cognitive understanding but also encourages learners' affective engagement more optimally than conventional learning.

INTRODUCTION

Learning in the field of Natural Sciences (IPA) is considered to have an essential role in constructing students' understanding of scientific principles, as well as honing analytical thinking skills and the ability to formulate solutions to problems systematically. At the junior high school level, science learning often faces challenges due to the abstract nature of the material, so students have difficulty understanding the concepts taught (Buulolo, 2022). In addition, learning approaches that are still oriented toward memorization methods tend to inhibit the active participation of students in the learning process (Sutrisna, 2022). The inadequate application of experiential learning is one of the significant factors that contribute to the low comprehension ability of science materials among students. When experiential learning methods are not optimized, learners lose the opportunity to construct their knowledge through direct experience, experimentation, and scientific inquiry. Learners need a more contextual and applicable approach so that they can more easily understand concepts well and apply them in real life. An approach that can be applied to solve this problem is the implementation of the PBL (Problem-Based Learning) learning model, which focuses on solving real problems in the context of everyday life (Nirwana, 2021). The PBL model has been tested to optimize concept understanding and stimulate students' critical thinking skills (Sari, 2018). This model helps learners to be more proactive in the process of finding solutions to various problems faced while helping them understand the close relationship between theoretical concepts and their practical application. Thus, the PBL approach can be the best solution for improving the quality of science learning, especially for ecology and biodiversity materials.

The main problem in science learning in Indonesia is the low involvement of students in the learning process due to an approach that emphasizes memorization rather than contextual problem solving. Previous studies have proven that learning methodologies based on problem solving such as PBL have the ability to increase the level of conceptual understanding of students in various scientific fields including Natural Sciences (IPA) (Prasetyo, 2022). The implementation of PBL combined with the CRT (Culturally Responsive Teaching) approach has successfully improved learning outcomes by linking subject matter with learners' cultural experiences (Primadani, 2024). CRT allows learners to better understand concepts by connecting them to their local environment and culture, thus increasing relevance and engagement in learning (Khasanah, 2023). In addition, CRT also plays a role in supporting learners to hone critical and reflective thinking skills because they are invited to see the connection between science and daily life, so that learning activities will be more relevant and in-depth and able to build learners' intrinsic motivation. Therefore, integrating PBL with CRT can be an effective alternative in improving science learning outcomes in Indonesia, especially in ecology and biodiversity materials. The application of this strategy can provide a richer learning experience, motivate learners to explore concepts more deeply, and build a more holistic understanding of the relationship between humans and the environment.

Previous studies have shown the success of CRT-based PBL in improving learning outcomes. Study by Girsang et al. (2024) showed that a similar model was effective in learning Mathematics at the elementary school level, with an increase in learning outcomes from 69.55 to 90.88 in two cycles.

However, research on the integration of PBL and CRT is still limited, especially in Science learning at junior high school level. This study applied a quasi-experiment with a posttest-only control group design, so it was stronger in testing the effectiveness of the learning model by comparing learning outcomes between the experimental and control classes. In addition, this study not only analyzes cognitive learning outcomes, but also affective aspects, such as student engagement and participation, which shows that this approach can increase their motivation and activeness in learning.

Based on this, this research seeks to fill the gap by applying CRT-based PBL as an innovative strategy in science learning. The application of this learning model aims to create a learning

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environment that has a direct relationship with the daily reality of students, by promoting local wisdom as part of the learning process. Through the combination of PBL and CRT, learners not only understand science concepts more deeply, but also contribute to honing critical thinking, cooperation and problem-solving skills. Learners' motivation and active participation in learning activities are projected to increase through the implementation of this approach. In addition, this strategy also has the potential to produce a more inclusive learning environment by respecting cultural diversity and fostering a sense of belonging to the science they are learning. With the implementation of this model, the connection between theoretical concepts and the reality of everyday life is more easily understood by students, so that the learning process is felt to be more meaningful and relevant to the context of their lives, by respecting cultural diversity and fostering a sense of belonging to the knowledge they learn. This strategy can make the learning environment more inclusive. The CRT approach helps evaluate students' academic and psychosocial abilities to maximize their potential (Diana, 2024). This research will also look at what are the obstacles and opportunities when implementing this learning model, so that it can be a guide for educators in developing PBL and CRT-based teaching methods that are more effective and suitable for the diverse characteristics of students in Indonesia. By understanding the challenges and potentials, educators can adapt their learning approaches to better suit the needs and cultural backgrounds of learners, making learning more meaningful and relevant.

Evaluation of the success of the combination of CRT-based PBL models is the main objective of this study, where the improvement of junior high school students' learning outcomes on ecology and biodiversity material will be measured. Previous studies have shown that the application of CRT-based PBL can improve students' reflective thinking skills in science learning. Mentioned in a study by Kurniasari (2024) found that this learning model significantly improved students' reflective thinking skills on ecology and biodiversity materials. In addition, the implementation of this approach is also expected to increase students' active participation in learning. Research found that the PBL model supports students' active participation in the learning process, which ultimately contributes to improved learning outcomes (Andiniati et al., 2023; Lee, 2024). The results obtained from this study are expected to provide practical guidance for educators in applying more effective learning strategies and become a scientific reference in the development of curriculum design based on real experience. Based on these considerations, the applied learning model or method not only contributes to improving learning outcomes but also strengthens a deeper and more contextual understanding for learners. In addition, this research can serve as a foundation for further studies in designing the development of innovative learning methods that adapt to the character of learners in various educational environments.

METHODS

The quasi-experiment method was used in this study. According to Aditiany (2021), quasi-experiment is a method that includes a control group but has limitations in controlling external variables that could potentially affect the implementation of the experiment. The effect of applying the CRT-based PBL learning model on science learning outcomes on Ecology and Biodiversity material was analyzed through this study. The posttest-only control group design was applied to compare learning outcomes between the experimental group treated with the CRT-based PBL model and the control group included in conventional learning (Muzria, 2020). The posttest-only control group design was used in this study to measure student learning outcomes after treatment was given without considering changes before treatment. This approach was chosen to avoid the influence of pretest that could affect learning outcomes so that the difference between the experimental group (CRT-based PBL) and the control group (conventional learning) reflects the real effect of the applied learning method. The different treatments in the two classes are depicted in **Table 1**.

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Table 1. Post-test only control group design

Group	Treatment	Post-test
Experiment Group	X	O
Control Group	C	O

X = treatment with CRT-based PBL model, C = conventional learning model, O = student learning outcomes.

Students of grade VII in one of the junior high schools located in the Surakarta area were determined as the research sample. There were 2 classes that were utilized as research groups, where class VIIA was designated as the experimental group, while class VIIB functioned as the control group. Each class consisted of 22 students, so the total sample involved in this study amounted to 44 students. The simple random sampling technique was applied in the sample selection, which is a random sampling method without considering specific criteria in the process of selecting students to become research samples. The principle of equal opportunity was applied in the sample selection process, where no preference or bias was used in determining the research sample.

The sample characteristics in this study included students with relatively homogeneous academic backgrounds. Based on preliminary data obtained from the school, students in grades VIIA and VIIB have a balanced distribution of academic scores, with a range of average scores that are not much different. This aims to ensure that differences in research results are more influenced by the treatment given in the study, not by other uncontrolled factors. In this study, the experimental group (class VIIA) will receive treatment in the form of learning methods applied by the researcher, while the control group (class VIIB) will continue to use conventional learning methods commonly used at school. Observations and measurements of student learning outcomes from both groups will be analyzed to determine the effectiveness of the model applied in this study.

The data in this study were analyzed using the Miles & Huberman (1992) method, which consists of three main stages: data reduction, data presentation, and conclusion drawing and reflection. Data regarding students' cognitive learning outcomes were obtained from test scores conducted after each learning cycle (post-test). This research refers to a model previously developed by Girsang (2014), which consists of several stages, namely: (1) Planning at this stage, an initial analysis is carried out to understand the conditions and situation of learning in the classroom. Activities carried out include preparing PBL and CRT-based learning scenarios, making teaching modules, Learner Worksheets (LKPD), and assessment sheets. (2) Implementation of this stage is the application of the learning scenario that has been designed. During this process, efforts are also made to improve the effectiveness of learning. (3) Observation at this stage, observation of student activities during the learning process takes place. (4) Reflection at the final stage, analysis of student answer sheets and assignments is carried out. The results of this analysis are used as reflection material for improvement in the next cycle. The success of this study was measured based on the improvement of student learning outcomes after following the learning process, problem-based learning (PBL) is a method that emphasizes student involvement in solving real problems as part of the learning process. The syntax of the PBL model in the CRT approach is visualized in the following picture (Figure 1).

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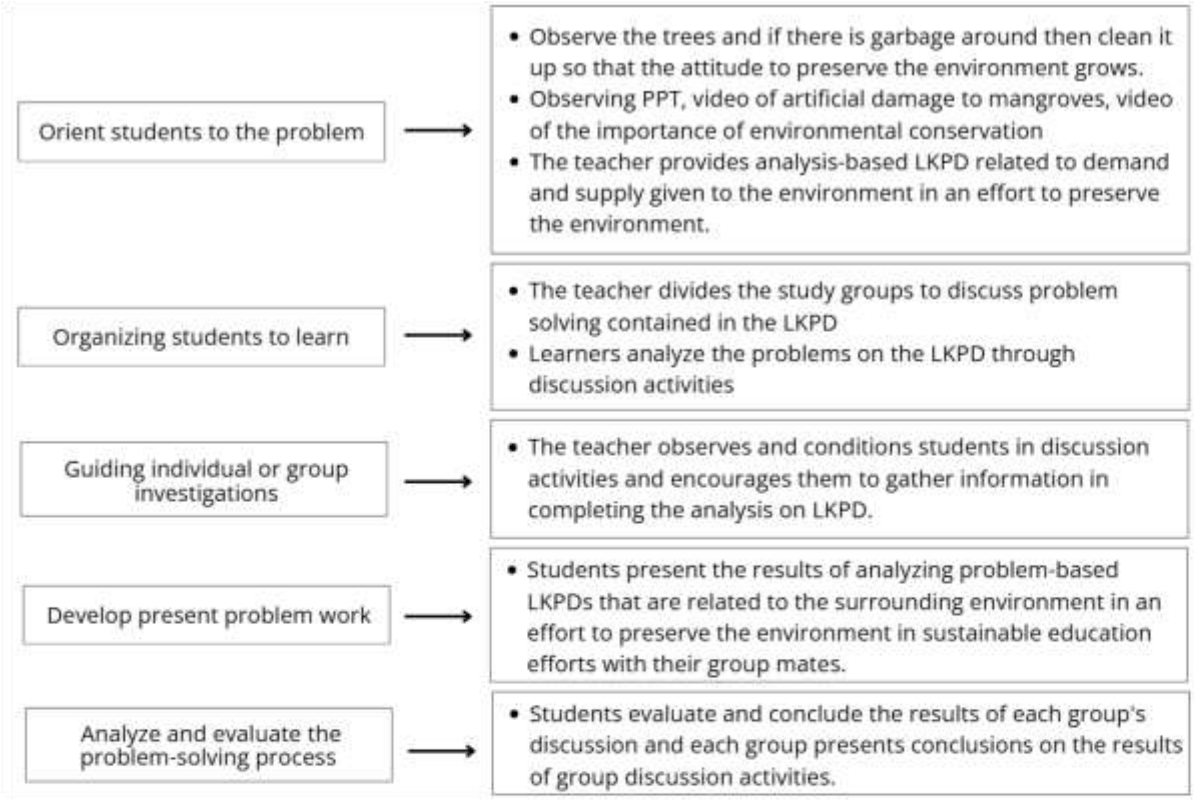

Figure 1. Syntax of the PBL model in the CRT approach

Test and observation methods were chosen to collect data, where a written test in the form of a post-test consisting of 15 multiple-choice questions was developed based on the topics of ecology and biodiversity. This research instrument was developed independently by the researcher by referring to the recommended cognitive competency assessment standards in science learning. The questions in the evaluation instrument were designed to measure the level of conceptual understanding and applicative ability possessed by the research subjects after the learning intervention was applied. In this study, observations were made during learning activities to see students' affective learning outcomes on indicators of activeness in responding and attendance, respecting friends' opinions, and cooperation in groups. The grid for post-test questions on the Ecology and Biodiversity material is shown in Table 2.

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Table 2. Grid of post-test questions on ecology and biodiversity material

Indicators	Cognitive Level	Number of Question
Analyze the impact of human activities on hornbill populations and forest ecosystems.	C4	1
Identify biotic and abiotic components in ecosystems.	C2	2
Assess recovery measures for river ecosystems due to sewage pollution.	C4	3
Identify the impact of land use change on local biodiversity.	C2	4
Identify solutions that can help maintain the balance between culture and biodiversity conservation.	C2	5
Analyze the relationship between local culture and solutions to preserve marine ecosystems and biodiversity.	C4	6
Analyze the impact of human activities on ecosystem balance.	C4	7
Identify the impact of human activities on biodiversity.	C2	8
Evaluate the relationship between human activities and biodiversity in the context of ecosystem sustainability.	C5	9
Analyze the impact of waste management on biodiversity in an ecosystem.	C4	10
Analyze the relationship between deforestation, environmental degradation, and ecological impacts on biodiversity and agricultural productivity.	C4	11
Analyze the role of biodiversity in supporting people's lives based on specific ecosystem conditions.	C4	12
Identify appropriate efforts to protect rare plants in conservation areas from illegal poachers.	C2	13
Analyze the causes and solutions to address the environmental impacts of deforestation, particularly related to landslides.	C4	14
Identify types of interactions between two living things in an ecosystem.	C2	15

Data analysis used the SPSS IBM Statistics 23 program which included normality, homogeneity, and T tests. The normality test used the IBM SPSS Statistics 23 program and used the Kolmogorov-Smirnov and Shapiro-Wilk approaches to ensure the distribution of normally distributed data. This test is considered normally distributed if the significance value listed is more than 0.05 (sig. > 0.05) (Haryono, 2023). The homogeneity test is used to determine differences in parametric statistical tests by evaluating the uniformity of data distribution through variance comparison. If the data groups have two or more equal variances, then the homogeneity test is not required. If the data is normally distributed, the homogeneity test can be performed (Usmadi,

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2020). Meanwhile, the effect of a learning model on learning outcomes is measured using the T test. In the next stage, observation data analysis is used to determine the affective value can be used to calculate the achievement score obtained using the following formula:

$$\text{Achievement score} = \frac{Acquisition\ score}{Maximum\ score}\ x\ 100\%$$

Table 3. Affective test instrument validity criteria

Intervals	Qualifications
85 - 100	Excellent
77 - 84	Good
70 - 76	Fair
50 - 69	Poor
≤ 49	Failed

Source: Jacob (2019)

RESULTS AND DISCUSSION

This study applies a post-test only control group design, which focuses on measuring the results after the treatment is given without a prior pretest. The post-test was conducted after the learning was completed as the final test. This post-test is presented to students after control and experimental class learning activities with the aim of knowing the learning outcomes of students on the topic of ecology and biodiversity after implementation. The affective assessment is carried out during learning, while taking place in class. The results of CRT-based PBL tests in class VIIA (control) and VIIB (experimental) SMP on ecology and biodiversity material in general can be seen in Table 3 below:

Table 4. CTR-based PBL cognitive learning outcomes

Treatment/Grade	Maximum	Minimum	Average	Category
Control/VII A	100	46	63,88	Fair
Experiment/VII B	100	45	79,79	High

The data was continued with statistical analysis using the IBM SPSS Statistics 23 program, starting with the normality and homogeneity test through the Shapiro-Wilk approach which obtained results in the form of a significance value> 0.05 so that the data was considered normally distributed and the variance in each group was the same (homogeneous), then the analysis continued with the T test. The results of the T test of Problem-Based Learning (PBL) based on Culturally Responsive Teaching (CRT) class VIIA (control) and VIIB (Experiment) SMP on ecology and biodiversity material in general can be seen in Table 4 as follows:

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Table 5. T-Test results

Treatment/Grade	Mean	N	Std. Deviation	Sig.	Description
Control/VII A	63,88	17	14,083	0,001	H0 is Rejected
Experiment/VII B	79,79	19	9,635		

Description: If Sig value <0.05 then H0 is rejected, if Sig value >0.05 then H0 is accepted. (Asy'ari, 2023).

Based on the data presented in Table 5, it was found that the average post-test score obtained by students in the experimental class intervened with the Culturally Responsive Teaching (CRT)-based Problem Based Learning (PBL) model reached a higher number (79.79) when compared to the score achievement in the control class subjected to conventional learning (63.88). This difference proved to be statistically significant based on the t-test results (0.001 < 0.05) as listed in Table 5. This finding indicates that the application of CRT-based PBL model provides a positive influence on students' cognitive learning outcomes.

This explanation is in line with previous studies conducted by who said that the CRT-based PBL learning model can increase student learning activities. Learning that is more active makes students more excited and enthusiastic. Problem-based education and culturally responsible education increase student participation in learning because they incorporate local cultural values into the subject matter. As learners have the opportunity to take on roles and explore knowledge, PBL models can create more interesting and lively learning. Problem-based learning (PBL) encourages learners' active involvement in the learning process through solving real problems. By presenting a problem at the beginning of the lesson, this model encourages learners to be curious, discover and solve problems, and increases their motivation to learn (Umayrah, 2025). The Culturally Responsive Teaching (CRT) approach helps develop critical thinking skills by respecting learners' cultural diversity and backgrounds. This method allows them to understand the material through hands-on experience, thus improving active participation and learning outcomes (Hidayah et al., 2024). Learning approaches that introduce problems at the beginning of the session, such as Problem-Based Learning (PBL), have been shown to increase students' learning motivation. By presenting real problems as a starting point for learning, PBL stimulates students' active involvement, encourages critical thinking, and hones problem-solving skills (Darojat, 2024). By connecting learning with real experiences that students have experienced, Culturally Responsive Teaching (CRT) makes the learning process more interesting and meaningful. This approach not only increases student engagement but also contributes to improving their learning outcomes (Sya'bana, 2024). The results of this study are also in line with research that cultural integration in problem-based learning can improve student understanding, encourage active involvement, and create a more contextual and meaningful learning experience (Hariyanti et al., 2024; Rochaminah et al., 2024; Surayya et al., 2024)

Data regarding learning outcomes in the affective aspect is obtained through observation instruments of students' involvement in various activities during the learning process. The results of the affective assessment can be seen as follows:

Table 6. Percentage result of affective assessment

Indicators	Control Assessment (%)	Category	Experiment Assessment (%)	Category
Enthusiastic in doing the task	71,5%	Fair	79,8%	Good
Cooperate with the group	73,5%	Fair	77,1%	Good
Express Opinions Ability	73,5%	Fair	77,1%	Good
Participate in discussions	72,5%	Fair	82,4%	Good

Description: 85%-100% = Excellent, 77%-84% = Good, 70%-76% = Fair, 50%-69% = Poor, ≤ 49 = Fail (Jacob, 2019)

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Based on the results listed in Table 6, the affective assessment results obtained by comparing the control class and the experimental class based on indicators such as enthusiasm in completing tasks, cooperation in groups, ability to express opinions, and participation in discussions, it can be seen that higher scores on all indicators are shown by the experimental class than the control class. For example, on the indicator of enthusiasm in completing tasks, the control class scored 71.5% (fair), while the experimental class scored 79.8% (good). This shows that the learning approach implemented in the experimental class has higher effectiveness in stimulating the development of students' affective aspects. Similar results were also seen in the indicators of cooperation with the group, ability to express opinions, and participation in discussions, that the experimental class achieved better scores when compared to the control class. These results show a strong correlation with previous findings in the same field, that in general, the experimental class assessment category is at a good level, while the control class only reaches the sufficient category (Sari, 2021). Learning will be more meaningful if it uses a culturally responsive approach, known as Culturally Responsive Teaching (CRT), The main purpose of this method is to ensure the effectiveness of learning by respecting the cultural diversity of students, thus creating a more inclusive and meaningful learning environment (Husin, 2018). In line with the opinion of Mawadah (2025). This states that learning that relates to the experiences and culture that students have experienced can help them understand concepts more easily. The success of this research shows that the approach used succeeds in creating a meaningful connection between the lesson and the learners' cultural experience, so that they are more emotionally connected to the learning process. In line with the opinion of Scager (2016). stated that learning that involves discussion and cooperation in groups is proven to be able to improve social skills and active participation of learners in learning. Thus, the application of interactive learning methods is highly recommended to improve affective assessment in the educational process.

CONCLUSION

Results showed that the experimental group had a mean score of (79.79) which was far superior to the control group with a mean score of (63.88). When evaluated using t-testing, the PBL method combined with CRT yielded a significance figure of 0.001. This figure is lower than 0.05, so the null hypothesis (H0) is rejected. This finding proves that there is a meaningful difference in learning outcomes between learners in the experimental and control groups. Based on these results, it can be concluded that the application of the PBL learning method integrated with the CRT approach produces a significant effect on the learning outcomes of students in classes VII A and VII B.

REFERENCES

Aditiany, V., & Pratiwi, R. T. (2021). Pengaruh media pembelajaran Macromedia Flash terhadap hasil belajar siswa (Studi quasi eksperimen pada mata pelajaran IPS kelas VIII di SMP Negeri 3 Kuningan). *Equilibrium: Jurnal Penelitian Pendidikan dan Ekonomi, 18*(2), 13–20. https://doi.org/10.25134/equi.v18i2.4420

Andiniati, M. R., Tahir, M., & Rahmatih, A. N. (2023). Pengaruh model pembelajaran Problem Based Learning (PBL) terhadap hasil belajar IPA siswa kelas IV SDN 45 Mataram. *Jurnal Ilmiah Profesi Pendidikan, 8*(3), 1639-1647. https://doi.org/10.29303/jipp.v8i3.1515

Asy'ari, & Rahimah, N. (2023). Efektivitas model pembelajaran kooperatif tipe Two Stay Two Stray terhadap hasil belajar siswa kelas XII IPA SMA Negeri 3 Banjarmasin. *Jurnal Ilmiah Kependidikan, 18*(2), 54–62. https://doi.org/10.33654/jpl.v18i2.2679

Buulolo, S. (2022). Pengaruh metode Gallery Walk terhadap minat belajar siswa pada pembelajaran IPA terpadu di kelas VII SMP Negeri 1 Lahusa tahun pembelajaran 2021/2022.

DOI: https://doi.org/10.17509/aijbe.v7i2.69055
e-ISSN 2621-7260

Faguru: Jurnal Ilmiah Mahasiswa Keguruan, 1(2), 257–266. https://doi.org/10.57094/faguru.v1i2.703

Darojat, L. (2024). Peningkatan motivasi belajar siswa dalam pembelajaran berbasis masalah dengan asesmen team game tournament. *Jurnal Inovasi Pembelajaran Matematika, 3*(2), 263–270. https://doi.org/10.31980/pme.v3i2.1782

Diana, N. P., Hariyono, E., & Maharani, T. D. (2024). Culturally responsive teaching dalam pembelajaran IPA: Analisis soft skills peserta didik SMPN 2 Lamongan. *INKUIRI: Jurnal Pendidikan IPA, 13*(2), 139–150. https://doi.org/10.20961/inkuiri.v13i2.86585

Girsang, B., Maryanti, I., & Nasution, U. (2024). Penerapan model PBL terhadap hasil belajar siswa melalui pendekatan CRT. *JMES: Jurnal Mathematics Education Sigma, 5*(2), 162–169. https://doi.org/10.30596/jmes.v5i2.20786

Hariyanti, S., Hadi, F. R., & Kuswardiyanti, H. (2024). Implementasi model pembelajaran berbasis masalah dengan pendekatan culturally responsive teaching untuk meningkatkan hasil belajar peserta didik pada mata pelajaran Bahasa Indonesia kelas IV sekolah dasar. *Jurnal Pendidikan Dasar, 5*(2), 291–298. https://doi.org/10.56842/pendikdas.v5i2.369

Haryono, E., Slamet, M., & Damar, S. (2023). *Statistika SPSS 28*. Widina Bhakti Persada Bandung.

Hidayah, K. A., Pratiwi, D. E., & Hastungkoro, H. N. A. (2024). Penerapan model PBL melalui pendekatan CRT untuk meningkatkan hasil belajar matematika kelas 1 di SDN Putat Jaya IV-380 Surabaya. *Jurnal Arjuna: Publikasi Ilmu Pendidikan, Bahasa dan Matematika, 2*(5), 94–102. https://doi.org/10.61132/arjuna.v2i5.1187

Husin, V. E. R., Wiyanto, & Darsono, T. (2018). Integrasi kearifan lokal rumah Umekbubu dalam bahan ajar materi suhu dan kalor untuk meningkatkan motivasi dan hasil belajar siswa SMA. *Physics Communication, 2*(1), 26–35. https://doi.org/10.15294/physcomm.v2i1.11491

Irwan, M., & Dwiastuti, S. (2018). Analisis ketuntasan hasil belajar kognitif peserta didik di SMA Negeri 1 Karas tahun pelajaran 2017/2018 pada mata pelajaran biologi ditinjau dari profil pemenuhan standar nasional pendidikan dan proses pembelajaran. *Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram, 6*(1), 9-17. https://doi.org/10.33394/j-ps.v6i1.959

Jacob, A. R., & Smith, D. A. (2019). Pengaruh model learning cycle terhadap hasil belajar pada materi pencemaran lingkungan siswa kelas VII di SMP Negeri 15 Ambon. *Biopendix: Jurnal Biologi Pendidikan dan Terapan, 5*(2), 89–95. https://doi.org/10.30598/biopendixvol5issue2page89-95

Khasanah, I. M., Nuroso, H., & Pramasdyahsari, A. S. (2023). Efektivitas pendekatan culturally responsive teaching untuk meningkatkan hasil belajar siswa kelas II sekolah dasar. *Edu Society: Jurnal Pendidikan, Ilmu Sosial, dan Pengabdian Kepada Masyarakat, 3*(3), 1121–1127. https://doi.org/10.56832/edu.v3i3.393

Khasanah, K., Subekti, E. E., & Setyaningsih, A. N. (2025). Penerapan culturally responsive teaching sebagai pendekatan untuk mengoptimalkan kemampuan berpikir kritis peserta didik. *Journal on Education, 7*(2), 10154–10167. https://doi.org/10.31004/joe.v7i2.8021

Kurniasari, I., Choyrunisa, R. V., & Sanjaya, I. G. M. (2024). Pengaruh model pembelajaran Problem Based Learning berbasis culturally responsive teaching untuk meningkatkan kemampuan berpikir reflektif peserta didik. *Jurnal Tadris IPA Indonesia, 4*(2), 259–271. https://doi.org/10.21154/jtii.v4i2.3271

Lee, Y. (2024). Changes in Learning Outcomes of Students Participating in Problem-Based Learning for the First Time: A Case Study of a Financial Management Course. *The Asia-Pacific Education Researcher*. https://doi.org/10.1007/s40299-024-00873-y.

Mawadah, L., Zuhri, M. S., & Indraswati, T. (2025). Efektivitas pembelajaran Problem Based Learning (PBL) dengan pendekatan culturally responsive teaching (CRT) terhadap kemampuan pemecahan masalah peserta didik. *Jurnal Pendidikan Matematika, 5*(1), 42–52. https://doi.org/10.46368/kjpm.v5i1.3396

Miles, M. B., & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.

Muzria, W., & Indrawati, T. (2020). Pengaruh model Project-Based Learning terhadap hasil belajar siswa pada pembelajaran tematik terpadu sekolah dasar. *Jurnal Pendidikan Tambusai, 4*(3), 2232–2238. https://doi.org/10.31004/jptam.v4i3.701

Nisa, A. S., Suharyati, I., & Farhurohman, O. (2025). Efektivitas metode diskusi terhadap hasil belajar siswa dalam pembelajaran IPS SD/MI. *Jurnal Ilmu Pendidikan, Politik, dan Sosial Indonesia, 2*(1), 213–219. https://doi.org/10.62383/aktivisme.v2i1.771

Nirwana, A., & Wilujeng, I. (2021). Pengaruh pembelajaran IPA model Problem-Based Learning berbantuan diagram Vee terhadap kemampuan berpikir kritis peserta didik SMP. *Physics and Science Education Journal (PSEJ), 1*(1), 9–15. https://doi.org/10.30631/psej.v1i1.708

Prasetyo, H. (2022). Model pembelajaran berbasis masalah (PBL) untuk pembelajaran di sekolah dasar. *Kalam Cendekia: Jurnal Ilmiah Kependidikan, 10*(2), 302–305. https://doi.org/10.20961/jkc.v10i2.65634

Primadani, R., Listiani, A., & Hidayat, T. (2024). Penerapan Problem-Based Learning untuk meningkatkan keaktifan belajar melalui pendekatan culturally responsive teaching (CRT). *Jurnal Sindoro Cendekia Pendidikan, 8*(1), 45–58. https://doi.org/10.9644/sindoro.v7i11.6673

Sari, L. (2018). Upaya meningkatkan hasil belajar IPA pada materi klasifikasi makhluk hidup dengan model pembelajaran Problem-Based Learning (PBL) di kelas VII SMP Negeri 1 Stabat. *Jurnal Pelita Pendidikan, 6*(4), 264–268. https://doi.org/10.24114/jpp.v6i4.11693

Scager, K., Boonstra, J., Peeters, T., Vulperhorst, J., & Wiegant, F. (2016). Collaborative learning in higher education: Evoking positive interdependence. *CBE—Life Sciences Education, 15*(4), 1–9. https://doi.org/10.1187/cbe.16-07-0219

Surayya, S., Patonah, S., & Sumiyatun. (2024). Pengaruh pembelajaran berbasis culturally responsive teaching (CRT) terhadap keterampilan berpikir kritis siswa kelas IV sekolah dasar. *Journal of Elementary Education, 7*(2), 214–222. https://doi.org/10.22460.collase.v7i2.22504

Rochaminah, S., Baid, N., & Lantang, N. T. J. (2024). Model pembelajaran Problem-Based Learning dengan pendekatan culturally responsive teaching untuk meningkatkan hasil belajar peserta didik. *Euler: Jurnal Ilmiah Matematika, Sains dan Teknologi, 12*(2), 149–156. https://doi.org/10.37905/euler.v12i2.27409

Sutrisna, N., & Sasmita, P. R. (2022). Model pembelajaran Problem-Based Learning (PBL) terhadap hasil belajar IPA peserta didik kelas VIII SMP. *Science and Physics Education Journal (SPEJ), 5*(2), 34–39. https://doi.org/10.31539/spej.v5i2.3849

Sya'bana, M., Hariyono, E., & Maharani, T. D. (2024). Pengaruh pendekatan culturally responsive teaching terhadap keaktifan dan hasil belajar IPA. *Science: Jurnal Inovasi Pendidikan Matematika dan IPA, 4*(2), 66–73. https://doi.org/10.51878/science.v4i2.2965

Umayrah, Sadri, S., & Azmi, S. (2025). Penerapan model Problem-Based Learning dengan pendekatan culturally responsive teaching (CRT) untuk meningkatkan aktivitas dan hasil belajar peserta didik kelas VII F SMPN 6 Mataram tahun ajaran 2023/2024. *Jurnal Ilmiah Profesi Pendidikan, 10*(1), 73–83. https://doi.org/10.29303/jipp.v10i1.3081

Usmadi. (2020). Pengujian persyaratan analisis (uji homogenitas dan uji normalitas). *Inovasi Pendidikan, 7*(1), 50–62. https://doi.org/10.31869/ip.v7i1.2281

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