**Electronic Journal of Education, Social Economics and Technology**
Vol. 7, No. 1, (2026), e1429
ISSN 2723-6250 (online)
DOI: https://doi.org/10.33122/ejeset.v7i1.1429

SAINTIS publishing

*Research Article*

# The Effect of the Reciprocal Teaching Model on Students' Critical Thinking Skills in Science Education

**Henni Fitriani, Nuraini Fatmi*, Sri Setiawati, Fakhrah, Indah Syahfitri**

Fakultas Keguruan dan Ilmu Pendidikan Universitas Malikussaleh, Aceh, Indonesia
*Corresponding Author: nurainifatmi@unimal.ac.id | Phone Number: +6285260135109

## ABSTRACT

This study aims to determine the effect of the Reciprocal Teaching model on students' critical thinking skills in the subject of Basic Chemistry Laws. The research was conducted at Sawang State High School 2 during the second semester of the 2025/2026 academic year. The research method used was a quasi-experimental study with a pretest-posttest control group design. The study population consisted of 39 10th-grade students. The sample comprised Class 10 Science 2 as the experimental class and Class 10 Science 1 as the control class, selected using purposive sampling. Data collection was conducted through essay tests in the form of pretests and posttests to measure students' critical thinking skills. Data were analyzed using normality tests, homogeneity tests, and independent samples t-tests with the assistance of IBM SPSS Statistics 25. The results showed that the average pretest score for the experimental class was 30.95, increasing to 76.49 on the posttest, while the control class increased from 29.86 to 65.28. The hypothesis test results yielded a Sig. (2-tailed) value of 0.009 < 0.05, indicating that the Reciprocal Teaching learning model has a significant effect on students' critical thinking skills. The application of the Reciprocal Teaching model was able to encourage students to be more active in discussing, analyzing, evaluating, and summarizing concepts, thereby improving students' critical thinking skills regarding the material on the Basic Laws of Chemistry.

**Keywords:** Reciprocal Teaching; Critical Thinking Skills; Chemistry Learning; Learning Model

## 1. INTRODUCTION

Scientific and technological developments in the 21st century has brought major changes to the world of education. This transformation is marked by the introduction of the Merdeka Curriculum, which provides educators with greater freedom to create innovative, flexible, and student-centered learning experiences (Hasriadi, 2022). This curriculum represents an effort to improve educational quality through various programs that support teachers' creativity in the learning process (Ledia & Bustam, 2023). 21st-century learning ultimately places students at the center of the learning process (Nababan, 2024). Therefore, the learning process requires varied methods and models to create an active learning environment, ensuring students do not feel bored and remain engaged throughout the learning process (Dewi et al., 2023).

Engaging and effective learning can be observed through the instructional models used by educators (Kholifah et al., 2024). Teachers play a crucial role in selecting appropriate instructional models so that students can follow lessons effectively and develop their thinking skills (Wilujeng & Sudihartinih, 2021). An appropriate learning model not only provides a comfortable learning environment but also helps develop thinking skills and increases student engagement throughout the learning process (Fitriani, 2021). Chemistry is a branch of natural science that studies the composition, structure, properties, and changes of matter (Khairani et al, 2025). In chemistry education students are encouraged not only to retain concepts in memory but also to understand the relationships between concepts and solve various problems related to daily life (Lestari et al., 2025; Sulistiana et al., 2024). However, in reality, the chemistry learning process in schools often still takes place conventionally, with the teacher as the center of learning (Priliyanti et al., 2021) . Meanwhile, students tend to be passive objects in the learning process, making them less able to develop their potential and thinking skills. This situation causes students to experience difficulties in understanding concepts and solving chemistry problems, particularly those involving calculations.

These issues in the learning process also affect students' learning outcomes and thinking skills in chemistry. Students' learning outcomes remain varied, ranging from high, moderate, to low. Students also struggle to understand chemistry material, particularly in calculation problems and the application of formulas. An unengaging learning process causes students to become passive and easily bored, resulting in their critical thinking skills not developing optimally. This low conceptual understanding leads to poor student learning outcomes. Additionally, the Reciprocal Teaching model has never

been implemented in chemistry instruction at the school.

These conditions emphasize the importance of implementing a learning model that can enhance student engagement in the learning process while simultaneously fostering critical thinking skills. One instructional approach that can be applied to promote students' critical thinking abilities is the Reciprocal Teaching model. This model is a student-centered active learning approach that helps students understand the material through reading, discussion, and explaining the material to their peers (Mellyzar, et al 2020; Antara, 2022). The use of an appropriate learning model is expected to help students think more actively, develop their knowledge, and provide opportunities for them to express their ideas during the learning process (Imanda et al., 2024; Qiara, 2024; Ramadhan, 2023). The Reciprocal Teaching model is structured around four main strategies: summarizing, generating questions, explaining, and predicting (Purba & Firdausi, 2024). These four strategies can help students understand the material more deeply and develop critical thinking skills. This model also aligns with the objectives of the Merdeka Curriculum, which emphasizes the importance of developing students' critical thinking skills (Nurropidah et al., 2024). Through the application of the Reciprocal Teaching model, students are expected to be able to play an active role in learning, understand concepts well, and improve their ability to analyze and solve problems (Azizah & Patonah, 2024). Therefore, this study was conducted to determine the effect of the Reciprocal Teaching model on students' critical thinking skills in science learning.

## 2. RESEARCH METHOD

This study was conducted at SMAN 2 Sawang, located in Babah Buloh Village, Sawang, North Aceh Regency, Aceh. The population of this study consisted of all 39 students in the 10th grade at SMAN 2 Sawang. The research sample consisted of two classes: Class X IPA 2, with 21 students, serving as the experimental class, and Class X IPA 1, with 18 students, serving as the control class. The sampling technique employed in this study was purposive sampling, which involves selecting samples based on specific criteria (Sugiyono, 2016). The variables examined in this study consisted of independent, dependent, and control variables. The independent variable was the Reciprocal Teaching model, whereas the dependent variable was students' critical thinking skills. These critical thinking skills include students' abilities to analyze, evaluate, and draw conclusions from problems related to the learning material. The control variable in this study is the material taught by the researcher. All students in the experimental and control classes received the same material, namely the basic laws of chemistry, so that differences in research results were more influenced by the application of the learning model used. Data collection was conducted by administering pretests and posttests to the students using an instrument consisting of critical thinking skill test questions on the subject of Basic Chemistry Laws. The collected data were subsequently analyzed using normality, homogeneity, and hypothesis testing procedures.

## 3. RESULTS AND DISCUSSION

### 3.1 Data Description

This study was carried out at SMAN 2 Sawang with 10th-grade students. The study employed two classes, consisting of an experimental class and a control class. The Reciprocal Teaching model was implemented in the experimental class, while the interactive discussion model was used in the control class. Research data were collected through essay-based test instruments in the form of pretests and posttests were conducted to measure the level of students' critical thinking skil regarding the material on the fundamental laws of chemistry. All research data were analyzed using IBM SPSS Statistics 25.

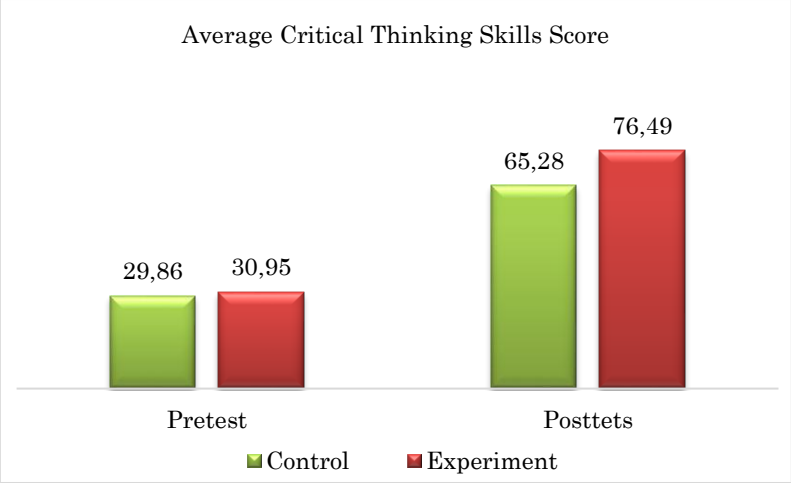


**Figure 1**. Average Pretest and Posttest Scores

Based on **Figure 1**, the research results indicate that students' critical thinking skills improved following the Teaching and learning activities were carried out in both the experimental and control groups. However, the improvement in learning outcomes observed in the experimental class was greater than that in the control class. In the experimental class, the mean pretest score rose from 30.95 to 76.49 on the posttest. In contrast, the control class showed an increase from an average pretest score of 29.86 to 65.28 on the posttest. The increase in scores in both classes indicates that the learning process conducted helped students understand the material better. However, the larger difference in improvement in the experimental class suggests that the application of the Reciprocal Teaching model is more effective in enhancing critical thinking skills compared to the interactive discussion model used in the control class. The Reciprocal Teaching model provides students with the opportunity to be more active in the learning process through activities such as asking questions, explaining, predicting, and summarizing the material. These activities encourage students to think more deeply, express their opinions, and analyze the problems presented. Through a student-centered learning process, they not only receive information from the teacher but are also directly involved in understanding and constructing learning concepts both independently and in groups.

During the question-generation stage, students are trained to identify key information and formulate questions based on the material studied. This activity aligns with indicators of critical thinking skills, specifically the ability to provide simple explanations and focus questions on a specific problem. Students become more active in seeking information and grasping the core of the material, ensuring the learning process goes beyond mere memorization of concepts. The ability to formulate questions also helps students enhance their analytical skills regarding the fundamental principles of chemistry in science learning, which requires conceptual understanding and calculations. The stage of explaining the material to group peers provides students with the opportunity to develop the ability to offer further explanations and present arguments logically. At this stage, students strive to explain concepts using their own words, thereby strengthening their conceptual understanding. Additionally, group discussions in Reciprocal Teaching help students practice evaluating opinions, providing sound reasoning, and proposing solutions to the problems under discussion. These activities facilitate the enhancement of critical thinking skills, particularly in the aspects of analysis and evaluation.

The prediction phase likewise contributes significantly to the improvement of students' critical thinking skills. Through predictive reasoning, students are encouraged to estimate possible answers or outcomes based on the concepts they have learned. This activity relates to the indicators of the ability to draw conclusions and determine problem-solving strategies. Students learn to connect chemistry concepts with the problems presented so that they are able to make decisions logically and systematically. Additionally, summarizing the material helps students understand the core of the lesson in a more structured way. Students are trained to identify key information, reorganize main concepts, and summarize the material using simpler language. This activity supports the critical thinking skill indicator in the aspect of making inferences or conclusions based on information obtained during the learning process.

The implementation of the Reciprocal Teaching model also creates a more interactive and less monotonous learning environment, thereby encouraging students to participate more actively in the learning process. Students' active participation during discussions and problem-solving demonstrates that this model effectively helps them develop critical thinking skills more optimally. Thus, each stage in the Reciprocal Teaching model has a strong connection to critical thinking skill indicators because it trains students' ability to analyze, explain, evaluate, and draw conclusions in the chemistry learning process. This enables students to become more proficient in using critical thinking skills throughout the learning process. Meanwhile, in the control class, students still experienced an improvement in their abilities, however, the improvement was not as substantial as that in the experimental class because the learning process did not fully involve students actively in building their own understanding.

**Table 1**. Results of the Normality Test for Pretest and Posttest Data

| Class | | Shapiro-Wilk | | |
|---|---|---|---|---|
| | | Statistic | df | Sig. |
| Pretest | Control | 0.942 | 18 | 0.308 |
| | Experimental | 0.959 | 21 | 0.491 |
| Posttest | Control | 0.926 | 18 | 0.164 |
| | Experimental | 0.934 | 21 | 0.166 |

Based on **Table 1**, the results of the normality test using the Shapiro–Wilk method revealed that the significance value of the pretest data in the control class was 0.308 with a sample size (df) of 18, while the experimental class obtained a significance value of 0.491 with a sample size (df) of 21. Furthermore, the posttest data showed significance values of 0.164 for the control class and 0.166 for the experimental class. Since all significance values for both pretest and posttest data exceeded 0.05, it can be concluded that the data from both classes were normally distributed and showed no substantial deviations from normality.

**Table 2**. Results of the Homogeneity Test for Pretest and Posttest Data

| | | Levene's Statistics | df1 | df2 | Sig. |
|---|---|---|---|---|---|
| Pretest | Based on Mean | 2.538 | 1 | 37 | 0.12 |
| Posttest | | 0.002 | 1 | 37 | 0.969 |

Based on the **Table 2**, that homogeneity test results using Levene's statistic, the significance value for the pretest was 0.12 and for the posttest was 0.969. Both significance values were greater than 0.05, indicating that the data in the control and experimental classes had homogeneous or relatively similar variances. Variance homogeneity indicates that the level of data dispersion in both classes did not differ significantly. In the pretest data, the homogeneous results indicate that the initial abilities of the students in the control and experimental classes were relatively equivalent before the instructional treatment was administered. Meanwhile, in the posttest data, the homogeneity results indicate that the distribution of learning outcomes after the treatment also remained balanced between the two classes. The fulfillment of this homogeneity requirement indicates that the research data is suitable for further analysis using parametric statistical tests. Thus, hypothesis testing can proceed using the independent samples t-test to determine the effect of the Reciprocal Teaching model on students' critical thinking skills regarding the subject matter of Basic Chemistry Laws.

**Table 3**. Results of the pretest hypothesis test

| Independent Samples Test | *Pretest* |
|---|---|
| Sig. (2-tailed) | 0.748 |
| $\alpha$ | 0.05 |
| Decision | $H_{01}$is accepted |

Based on **Table 3**, the results of the pretest hypothesis testing using the independent samples t-test showed a significance value (Sig. 2-tailed) of 0.748 at a significance level (α) of 0.05. Since the significance value exceeded 0.05 (0.748 > 0.05), $H_{01}$ was accepted. This finding indicates that there was no significant difference in the students' initial abilities between the control class and the experimental class prior to the implementation of the instructional treatment. The test results show that the initial critical thinking skills of students in both classes are in a relatively similar or equivalent condition. Thus, both classes have balanced initial abilities, making them suitable as research samples to compare the effects of the implemented learning models. This equivalence in initial ability also indicates that the differences in results obtained at the final stage of the study were not caused by differences in students' initial ability, but rather by the learning interventions administered during the study.

**Table 4**. Results of the Pretest Hypothesis Testing Using the Independent Samples t-Test

| Independent Samples Test | Pretest |
|---|---|
| Sig. (2-tailed) | 0.009 |
| α | 0.05 |
| Decision | $H_{01}$is rejected |

Based on **Table 4**, the results of the posttest hypothesis testing using the independent samples t-test revealed a significance value (Sig. 2-tailed) of 0.009 at a significance level (α) of 0.05. Since the obtained significance value was lower than 0.05 (0.009 < 0.05), $H_{01}$ was rejected. These findings demonstrate that the Reciprocal Teaching model significantly influenced students' critical thinking skills on the topic of basic chemical laws. The experimental class demonstrated higher posttest scores than the control class that the Reciprocal Teaching model is effective in helping students understand concepts more deeply and actively engage in the learning process. The improvement in students' critical thinking skills is evident in several indicators: interpretation, analysis, evaluation, synthesis, and drawing conclusions. In the interpretation and analysis indicators. The improvement achieved by students in the experimental class was greater than that of the control class. This occurred because in Reciprocal Teaching, students are trained to understand information, analyze concepts, and discuss the material with their group members. The discussion process made students more active in understanding the relationships between concepts in the basic chemistry material (Muttakin, Thalitha Attahara, 2024) .

Regarding the evaluation and synthesis indicators, improvement occurs when students are asked to formulate questions and solve problems based on the material studied. Students do not merely memorize concepts but also learn to evaluate answers and connect the information obtained with other concepts. These activities help students develop the ability to think more critically and systematically. Additionally, in the conclusion-drawing indicator, students are trained

to summarize the results of discussions and problem-solving activities they have conducted. This stage helps students grasp the core of the material and comprehensively connect the fundamental concepts of chemistry. Their ability to draw conclusions improves because students are directly involved in the learning process rather than merely receiving information from the teacher.

The Reciprocal Teaching model provides students with the opportunity to be more active in learning activities through group discussions, asking questions, explaining discussion outcomes, and solving problems together (Pradja & Firmansyah, 2020; Sari, 2022). A student-centered learning process makes the learning environment more interactive and helps students develop critical thinking skills optimally (Ilhamsyah, 2021; Permana et al., 2024) . During the group discussion phase, students exchange opinions and discuss the fundamental concepts of chemistry with their group members. This activity helps students understand the material through interaction and collaboration. Next, during the question-formulation stage, students are trained to think more deeply about the material studied, thereby enhancing their analytical and evaluative skills. The presentation stage of discussion results also influences students' critical thinking skills (Masrina et al., 2023; Yuzan & Jahro, 2022)  At this stage, students explain the group discussion results using language that is easy to understand. Students learn to express their opinions, defend their answers, and provide logical reasons for the solutions obtained. This process helps students become more confident in voicing their opinions (Mellyzar, 2020; Rahmi et al., 2022) .

Furthermore, during the stage of classifying problems and solving practice problems, students are trained to analyze problems, determine the appropriate solution, and evaluate the results obtained. This activity helps students understand the basic laws of chemistry more deeply and improves their ability to solve problems requiring reasoning. The final stage, which involves summarizing the material, provides students with the opportunity to summarize the concepts they have learned. The summarization process helps students understand the relationships between concepts and reinforces their understanding of the fundamental laws of chemistry. Thus, all stages of the Reciprocal Teaching model support the development of students' critical thinking skills. The Reciprocal Teaching model is effective in improving students' critical thinking skills. This model fosters more active, interactive, and student-centered learning, enabling students to grasp the material more easily and think critically when addressing learning challenges. Consequently, the Reciprocal Teaching model can serve as an effective alternative instructional approach to enhance students' critical thinking skills in science education.

## 4. CONCLUSION

Based on the findings of this study, it can be concluded that the Reciprocal Teaching model significantly affects students' critical thinking skills in the topic of Basic Laws of Chemistry. The Reciprocal Teaching model is capable of creating a more active and student-centered learning process through activities such as discussion, asking questions, explaining concepts, and summarizing the material together. These activities help students improve their abilities in interpretation, analysis, evaluation, synthesis, and drawing conclusions. Thus, the Reciprocal Teaching model can serve as an effective alternative instructional approach for enhancing students' critical thinking skills in chemistry, particularly regarding the topic of the Fundamental Laws of Chemistry.

## ACKNOWLEDGEMENTS

The author would like to thank Universitas Malikussaleh and SMAN 2 Sawang for providing support and facilities during the research process. The author also extends gratitude to all teachers, students, and all parties who contributed to the completion of this study.

## REFERENCES

Antara, I. P. P. A. (2022). Problem Based Learning Model to Improve Chemistry Learning Outcomes on the Topic of Thermochemistry. Journal of Education Action Research, 6(1), 15-21. https://doi.org/10.23887/jear.v6i1.44292

Azizah, N. E., & Patonah, R. (2024). The Effect of the Reciprocal Teaching Model on Students' Critical Thinking Skills in Introductory Economics. J-KIP (Journal of Teacher Training and Education), 5(2). 367-373. https://doi.org/10.25157/j-kip.v5i2.12389

Dewi, U. M., Muttakin, Sari, A. M., & Setiawan, T. (2023). Application of the Collaboration of Problem-Based Learning and Inquiry Learning Models with Macromedia Flash on Students' Learning Outcomes and Learning Activities. Co-Catalyst: Journal of Science Education Research and Theories, 1(1), 31-42. https://doi.org/10.33830/cocatalyst.v1i1.5096

Fitriani, H. (2021). The Effectiveness of Problem-Based Learning on Electrolyte and Non-Electrolyte Solutions. Relativitas: Journal of Physics Learning Innovation Research, 4(1), 24. https://doi.org/10.29103/relativitas.v4i1.3890

Hasriadi, H. (2022). Innovative Teaching Methods in the Digital Age. Jurnal Sinestesia, 12 (1), 136-151.

Ilhamsyah, I. (2021). The Application of the Reciprocal Teaching Model on the Creative Mathematical Thinking Skills of 10th Grade Vocational High School Students. Pedagogy: Journal of Mathematics Education, 6 (1), 147-157. https://doi.org/10.30605/pedagogy.v6i1.1426

Imanda, R., Setiawaty, S., & Qausar, H. (2024). Mentoring Elementary School Students Through the Discovery Learning Model Oriented Toward Higher-Order Thinking Skills (HOTS). Journal of Social Service, 1 (4), 205-210. https://doi.org/10.59837/vqcmkj32

Khairani, D., Rahmi, A., & Muliaman, A. (2025). "Implementation of the Culturally Responsive Transformative Teaching (CRTT) Learning Model to Improve Students' Cognitive Outcomes and Learning Interest." Cermin: Jurnal Penelitian 9(1):357-67. https://doi.org/10.36841/cermin_unars.v9i1.6533

Kholifah, S. N., Sasomo, B., & Mashuri, A. (2024). Development of Reciprocal Teaching-Based E-Modules to Improve Students' Critical Thinking Skills in Matrices. Jurnal Jendela Matematika, 2(01), 55-66. https://doi.org/10.57008/jjm.v2i01.577

Ledia, S. L., & Bustam, B. M. R. (2023). Implementation of the Merdeka Curriculum in Improving the Quality of Education. Reslaj: Religion Education Social Laa Roiba Journal, 6(1), 790-816. https://doi.org/10.47467/reslaj.v6i1.2708

Lestari, S., Damanik, M. H., & Manurung, A. A. (2025). Basic Concepts and Teaching Methods for Physics, Biology, Chemistry, Earth and Space Sciences in Elementary School Science. Research and Development Journal of Education, 11 (2), 1431. https://doi.org/10.30998/rdje.v11i2.21140

Masrina, Alvina, S., Fakhrah, & Mellyzar. (2023). Development of an Assessment Instrument for Students' 4C Skills (Critical Thinking, Collaboration, Communication, Creativity) on the Topic of Colligative Properties of Solutions. Jurnal Genta Mulia, 14(2).

Matialo, I., Marianus, & Umboh, S. I. (2023). The Effectiveness of the Reciprocal Learning Model on Students' Critical Thinking Skills and Learning Outcomes in the Topic of Mechanical Energy. Charm Sains: Journal of Physics Education, 4 (2), 84-90. https://doi.org/10.53682/charmsains.v4i2.252

Mellyzar, Muliaman, A. (2020). Improving Learning Outcomes Using the Project-Based Learning Model in Reaction Rate Material. Unnes Journal Chemistry in Education, 9(2), 91-95.

Muttakin, Thalitha Attahara, U. M. D. (2024). Comparison of the Problem-Based Learning (PBL) Model and the Project-Based Learning (PJBL) Model on Students' Critical Thinking Skills. Lantanida Journal, 12(1), 60-70. https://doi.org/10.22373/lj.v12i1.23223

Nababan, K. (2024). 21st Century Chemistry Learning. Tahta Media Publisher. Tondano

Nurropidah, R., & Kosmajadi, E. (2024). Systematic literature review: The Reciprocal Teaching model on students' critical thinking skills. Jurnal Madinasika Educational Management and Teaching, 5(2), 78-86. https://doi.org/10.31949/madinasika.v5i2.7686

Permana, I., Djuanda, D., & Karlina, D. A. (2024). The Effect of the Reciprocal Teaching Model on the Interest and Reading Comprehension Skills of 5th Grade Students. Onoma Journal: Education, Language, and Literature, 10(3), 3409-3419. https://doi.org/10.30605/onoma.v10i3.3873

Pradja, B. P., & Firmansyah, M. A. (2020). Application of the Reciprocal Teaching Model in. Imajiner: Journal of Mathematics and Mathematics Education, 2 (2), 159-166. https://doi.org/10.26877/imajiner.v2i2.5829

Priliyanti, A., Muderawan, I. W., & Maryam, S. (2021). Analysis of Students' Learning Difficulties in Studying Chemistry in Grade XI. Undiksha Journal of Chemistry Education, 5 (1), 11-18. https://doi.org/10.23887/jjpk.v5i1.32402

Purba, D., & Firdausi, F. U. (2024). Application of the Reciprocal Teaching Model in History Instruction. Proceedings of the National Seminar of Insan Budi Utomo University, 5 (1), 390-399.

Qiara, S. (2024). Analysis of the Application of the Project-Based Learning Model on Students' Creative Thinking Skills in Chemistry. Inkuiri: Journal of Science Education, 13 (1), 64. https://doi.org/10.20961/inkuiri.v13i1.81628

Rahmi, A., Fitriani, H., Mellyzar, & Mauliani, C. N. (2022). A Comparative Study of Guided Inquiry and Discovery Learning on Students' Cognitive Outcomes. Journal of Chemistry, Education, and Science, 6(1), 7-11. https://doi.org/10.30743/cheds.v6i1.5496

Ramadhan Emira Hayatina. (2023). Implementation of Project-Based Learning Model to Help Students Think Creatively. Protasis: Journal of Language, Literature, Culture, and Their Teaching, 2(2), 43-54. https://doi.org/10.55606/protasis.v2i2.98

Sari, F. F. (2022). The Effect of the Reciprocal Teaching Model on Fifth-Grade Mathematics Learning Outcomes at SDN 23 Dompu. DIKSI: Journal of Educational and Social Studies, 3 (2), 61-69. https://doi.org/10.53299/diksi.v3i2.203

Sugiyono, P. D. (2016). Quantitative, Qualitative, and R&D Research Methods. Alfabeta, Bandung.

Sulistiana, D., & Anggraini, D. P. (2024). Development of an electronic chemistry module based on the local potential of Blitar batik on the concept of matter and acids and bases. LENSA (Lentera Sains): Journal of Science Education, 14(2), 84-94. https://doi.org/10.24929/lensa.v14i2.571

Wati, M. (2021). Improving Motivation and Science Learning Outcomes Using the Reciprocal Teaching Model for Elementary School Students. Journal of Educational Innovation and Information Technology (JIPTI), 2 (2), 100-108. https://doi.org/10.52060/pti.v2i02.630

Wilujeng, S., & Sudihartinih, E. (2021). Critical Mathematical Thinking Skills of Junior High School Students Reviewed from Student Learning Styles. JPMI: Indonesian Journal of Mathematics Education, 6(2), 53-63.

Yuzan, I. F., & Jahro, I. S. (2022). Development of Guided Inquiry-Based e-LKPD on Chemical Bonds to Measure Students' Critical Thinking Ability. Saburai Journal of Education and Learning Innovation, 02(01), 54-65. https://doi.org/10.24967/esp.v2i01.1598