International Journal of Scientific Engineering and Applied Science (IJSEAS) – Volume-11, Issue-1, January 2025
ISSN: 2395-3470
www.ijseas.com

Implementation of the REACT (Relating -Experiencing-Applying-Cooperating-Transfering) Learning Model in Improving Students' Science Process Skills

Hartoyo Yudhawardana

Physics Study Program, MIPA Department, FKIP, Nusa Cendana University

hyudhawardana@gmail.com

Abstract

This study aims to determine the effect of the Relating-Experiencing-Applying-Cooperating-Transferring (REACT) learning model on students' science process skills in the implementation of the independent curriculum in senior high school education units. The sample of this study was two classes in class X of SMA Negeri 10 Kupang, namely class X_A as a control class taught using conventional learning with 30 students and class X_B as an experimental class with 29 students. Students' science process skills assessed in this study consisted of 8 aspects described in 14 indicators, and variables studied, namely; observation, communication, inference, data interpretation, measurement, conducting experiments, formulating hypotheses, and using numbers. Data on students' science process skills in the study were based on classroom observation instruments and science process skills test questions. The sampling technique in this study was carried out by purposive random sampling, the research design was Posttest Only Control Group. The research data were obtained from written test instruments and observations in both sample classes. The results of data analysis using the two-sample t-test obtained a t count of 3.1005 and a t table of 2.0024 at a significant level of $\alpha = 0.05$, then -t table = -2.0024 <t count = 3.1005> t table = 2.0024, so it can be concluded that there is a difference in science process skills between students taught using the REACT learning model and students taught using the conventional learning model. The results of data analysis in the second hypothesis test using the t-test with a significant level of $\alpha = 0.05$ can be concluded that the science process skills between students taught using the REACT learning model are higher.

Keywords: learning model, Relating-Experiencing-Applying-Cooperating- Transfering, Students, process skills, science

Introduction

Human development in Indonesia continues to progress. Since 2020, Indonesia's human development status has been at the "high" level. During 2020–2023, Indonesia's HDI increased by an average of 0.72 percent per year, from 72.81 in 2020 to 74.39 in 2023. NTT is in the moderate category at 60 ≤HDI ≤70 for the provincial level. (Romzi, 2023). The Education Report Card displays the evaluation results of the education system, including student learning outcomes, learning processes, equal distribution of service quality, quality of school management, and the quality of human resources involved in schools. Literacy skills are important for students in the school environment and society as a basis for knowledge, development of critical and analytical thinking skills, and provisions for competitiveness in globalization and technology. The achievement results based on education level in 2023 showed that 49.26% of students had literacy

competencies above the minimum, down 4.59 from 2021 (53.85%) for high school and equivalent levels. (Technology, 2023). Data from the Program for International Student Assessment (PISA) 2022 research was recently announced on December 5, 2023, and Indonesia was ranked 68th with a score of; mathematics (379), science (398), and reading (371). This study evaluated the achievements of 15-year-old students in mathematics, reading, and science. PISA 2022 participation involved around 690 thousand students from 81 countries, and the survey is conducted every three years. Since 2000, the OECD has consistently conducted this assessment. The PISA 2022 survey was supposed to be conducted in 2021. However, it was postponed due to the Covid-19 pandemic. In PISA 2022, the assessment focused on students' proficiency in mathematics with a greater emphasis placed on mathematical reasoning. The PISA 2022 survey is said to be the first extensive study containing data on how the COVID-19 pandemic has impacted student performance worldwide. (Alam, 2023). However, Indonesia's Pisa score is not yet impressive. This was stated by education observer, Indra Charismiadji, who said that Indonesia's PISA score did not reach the target of the National Medium-Term Development Plan of the Ministry of Education, Culture, Research, and Technology 2020-2024. This happened in every PISA assessment indicator. "Reading literacy dropped 12 points from 371 in 2018 to 359 in 2022. This is an important thing because it has an RPJMN target of 396. This is getting further away from the RPJMN target which should be 396 in 2024, but now it is 359," Indra told Medcom.id, Wednesday, December 6, 2023. (Ariyansah & Nurfathurrahmah, 2022)

The government has tried to improve the education system, including by issuing Law Number 22 and 25 of 1999 concerning Regional Autonomy. From the improvement of this policy, it is expected that the teaching process at the education unit level will be adjusted to the needs and potential of the region. An education system at the education unit level will be of high quality in terms of the learning process and outcomes, where the teaching and learning process takes place effectively and students experience a meaningful learning process. Research results show that changes in learning strategies and methods can change or improve student learning outcomes. The learning process in the modern era focuses on students so formal education greatly affects the quality of student outcomes. Students who receive good learning at school will have an impact on students' good knowledge and vice versa. Rationale for Natural and Social Sciences (IPAS) Subjects Science is defined as a combination of various knowledge that is arranged logically and systematically by taking into account cause and effect (KBBI). This knowledge includes natural knowledge and social knowledge. Natural and Social Sciences abbreviated as IPAS is a science that studies living things and non-living things in the universe and studies human life as individuals as well as social beings who interact with their environment. As a country rich in culture and local wisdom, through IPAS, students are expected to explore the wealth of local wisdom related to IPAS including its use in solving problems. IPAS education has a role in realizing the Pancasila Student Profile as an ideal picture of the profile of Indonesian students. The basic principles of scientific methodology in IPAS learning will train scientific attitudes (high curiosity, critical thinking skills, analytical skills, and the ability to draw the right conclusions) which give birth to wisdom in students. (Aditomo, 2022) The characteristics of Natural Sciences (IPA) are a way of finding out about nature systematically to master a collection of knowledge in the form of facts, concepts, principles, and discovery processes and have a scientific attitude. In this scientific process, science process skills are needed. Toharudin, Hendrawati, and Rustaman (2014) science skills are skills that can be used to understand any phenomena that occur. Rustaman (2005:95) defines science process skills as skills needed to acquire, develop, and apply scientific concepts, principles, laws, and theories, both in the form of mental skills, physical skills (manual), and social

skills. Samatowa (2006:137) states that science process skills are intellectual skills possessed and used by scientists in researching natural phenomena. Dimyati and Mudjiono (2002:140) explain that various skills in process skills consist of basic skills and integrated skills. (Lepiyanto, 2014) According to Rahmah et al., (2019), science process skills are students' abilities in applying scientific methods in understanding, developing science, and discovering knowledge. Science process skills are very important for every student as a provision for using scientific methods in developing science to obtain new knowledge or develop existing knowledge. Research results and analysis used to assess science process skills in the material of the Diversity of Living Things system, Science Process Skills that often appear or are often implemented by students are aspects of communication, observing (Experiment), Defining Operationally, Observing, Predicting, and Predicting. While the lowest aspect is identifying and classifying. (Ariyansah & Nurfathurrahmah, 2022).

To improve the learning process in the classroom, it is necessary to apply a learning model that prioritizes the activities and involvement of participants in the learning process. One of the learning models that involves the activities and involvement of participants in the learning process is the REACT learning model. Learning that emphasizes student activity is the REACT learning model, namely, Relating (connecting), Experiencing (experiencing), Applying (applying), Cooperating (working together), and Transferring (transferring). (Hakim, 2017). According to Anas et al. (2018), this model has a basic principle of constructivism which is considered capable and suitable for developing learning process skills. Students will be able to understand the relationship between abstract concepts and real-world applications by using the REACT learning approach. Concepts can be integrated by students through exploration, reinforcement, and connectivity. This instructional strategy requires teamwork and improves student achievement (Emy Junaidah, 2022). REACT is a contextual learning model that includes the strategies of relating, experiencing, applying, cooperating, and transferring which link problems with problems encountered in everyday life. Learning activities using the REACT model are expected to provide students with the opportunity to understand, plan, implement solutions, and re-check the results of their work. During the learning process using the REACT model, learning emphasizes more on finding concepts or solving a problem. This is done by building students' thinking frameworks from previous experiences. Crawford (2001) stated several stages in the REACT learning model, including: 1) Relating, which is learning based on knowledge or experience that has been obtained previously, 2) Experiencing, which is learning that is carried out through research activities, experiments, or observations, 3) Applying, which is the application of concepts found in a problem, 4) Cooperating, which is learning by carrying out collaborative activities, exchanging opinions, and communicating with other learners and 5) Transferring, which is connecting what has been learned in context, or in other words learning in a new context that has been obtained in previous observations (Feby, 2019). The implementation of the REACT strategy in mathematics learning on the subject of flat shapes can improve the mathematical connection skills of class VII-2 students of State Junior High School 47 Jakarta. Learning using the REACT strategy has advantages compared to learning that is usually done by teachers. Through activities in the REACT strategy, students are allowed to explore their knowledge and understand the usefulness of mathematics. Students can use their previous knowledge and experiences in everyday life to understand a new concept that is given. Then students can apply the new knowledge they have in various fields so that students understand the relevance of mathematics in life. (Firda Nurul Aini, 2017)

Method

This study uses a descriptive research method with a quantitative approach. The type of approach used in this study is a quantitative approach, which is an approach that produces data in the form of numbers from test results (Sugiyono, 2019). Quasi-experiment with the type of Pre Test-Post Test Control Group Design is the type of research chosen by researchers to use in this study. (Apriani, Suryawati, & Annisa, 2023) This design can be described as follows:

Table 3.1 Research design

Sample	Pre-test	Treatment	Post Test
Experimental Class	T1	X_1	T_2
Control Class	T1	X_2	T_2

Description:
T_1 : Initial test
T_2 : Final test
X_1 : Learning using the REACT (Relating-Experiencing-Applying-Cooperating-Transferring) learning model
X_2 : Learning using the conventional learning model.

This research was conducted at State Senior High School 10 Kupang City. Academic year 2022/2023. The population of this study were all students of State Senior High School 10 Kupang City in the academic year 2022/2023. With the purposive random sampling technique for this study, class XB students were the experimental class, and class XA students were the control class. The instruments in this study were learning devices which included the syllabus, lesson plans, student discussion sheets, science process skills instruments, which consisted of observation sheets, and science process skills test questions. The pretest and posttest data that had been collected would then be analyzed, the data analysis process carried out through the following stages:

1. Making a distribution table of students' pretest and posttest scores
2. Normality testing this test uses the chi-square test statistic,
3. Homogeneity Test of Variance
4. Test of Equality of Two Averages and Hypothesis Test

Results and Discussion

Based on the calculation results of the initial abilities of students in the control class, it was obtained $\chi^2_{counts} = 4.7210 < \chi^2_{tabel} = 7.8147$ and in the experimental class, the results were obtained $\chi^2_{counts} = 1.2290 < \chi^2_{table} = 7.8147$, it can be concluded that the initial ability data of the control class and the experimental class are normally distributed. For the homogeneity test of the initial ability score data of students, it was obtained $\chi^2_{table} = 3.8410 > \chi^2_{counts} = 0.2444$. This means that both groups have homogeneous variances. Furthermore, based on the calculation results of students' science process skills in the control class, it was obtained $\chi^2_{counts} = 2.0 < \chi^2_{table} = 7.8147$, it can be concluded that the science process skill score data of students in the control class is normally distributed. Likewise, the data on the science process skills of students in the experimental class obtained the results $\chi^2_{counts} = 3.0 < \chi^2_{table} = 7.8147$, so it can be concluded

that the data on the science process skills scores of students in the experimental class are also normally distributed. For the homogeneity test of the data on the science process skills scores of students, χ^2_{table}= 3.8410> χ 2 counts = 0.0479 was obtained. This means that both research samples have homogeneous variances of students' science process skills. Based on the results of the analysis of the initial ability values of the experimental class, the average value $\overline{x_1}$ = 78.3448 was obtained. This value is in the interval 76-78 and 79-81 with the variance of the experimental class ($S_1{}^2$) of 18.3768. While for the control class, the average value $\overline{x_2}$ = 78.2 was obtained. This value is in the interval 76-78 and 79-81 with a control class variance ($S_2{}^2$) of 15.2689. Based on the results of the analysis using the t-test, it was obtained - table = - 2.0024 < counts = 0.1357 < table = 2.0024. The statistical equation used to test the first hypothesis is a two-tailed t-test. From the calculation results obtained – t table = -2.0024 < t count = 3.1005 > t table = 2.0024 so that the null hypothesis (H_o) is rejected and hypothesis 1 (H_1) is accepted. Meanwhile, the statistical equation used to test the second hypothesis is the right-tailed t-test. From the results of the analysis, the calculation obtained t counts = 3.1005 > t table = 1.6720 so that the null hypothesis (H_o) is rejected and hypothesis 1 (H_1) is accepted.

This research was conducted during 4 meetings and learning was limited to dynamic electricity material. For the experimental class in the Relating phase, students focused their attention on what was conveyed by the teacher. The teacher displayed a picture of a flashlight that was on as a phenomenon related to the phenomenon of electric current, asking students to relate the phenomenon by asking questions related to the material to be studied. The teacher accommodated all opinions of students. In the Experiencing phase, the teacher guided students in forming groups. Each group consisted of 5-6 people heterogeneously, then asked students questions that were by the indicators in each group. And continued by distributing Student Worksheets (LKPD) to each group. Students work together in groups to carry out experimental activities on the LKPD, the teacher controls and provides direction regarding the activities on the LKPD. In the treatment of both experimental class students and control class students in the implementation process, students' science process skills will be seen. In the treatment of both experimental class students and control class students in the implementation process, students' science process skills will be seen. Meanwhile, students' science process skills assessed in this study consist of 8 aspects described in 14 indicators. The aspects of science process skills studied are; observation, communication, inference, data interpretation, measurement, conducting experiments, formulating hypotheses, and using numbers. Students' science process skills measured in this study used instruments in the form of observation sheets and science process skills test questions in the form of descriptions. The initial ability score data of the experimental class and control class were obtained from the daily test scores on the previous material. Meanwhile, the science process skills data were obtained from the observation sheet score data in the learning process during four meetings that had been averaged, and the students' science process skills test score data obtained from the post-test scores, which were given at the end of the meeting after being treated through the results of the average post-test scores of the experimental class and the control class at the end of learning as cognitive values, while psychomotor values were obtained from the average value of science process skills, and affective values were obtained from observations during learning. Indicators on the cognitive aspect were made according to Bloom's taxonomy. The indicators used range from C1 to C6. The post-test questions consisted of 10 essay questions. The test given was a descriptive test. The data on the average score of the observation sheet during four meetings and the written test score data of science process skills in the control class are presented in Table 1.

Table 1. Results of Science Process Skills Observation Scores for Students in the Experimental Class

Science process skills indicators	Meeting			
	first	second	third	fourth
1. Observation	4,21	4,21	4,48	4,69
2. Presenting ideas/concepts/opinions	3,9	4	4	4,1
3. Presenting discussion results	3,93	3,93	3,9	4
4. Using measuring instruments to obtain data	4,97	5	5	5
5. Finding the size of an object	4,4	4,9	4,5	4,8
6. Relating observations to previous experiences/knowledge	4	4,1	4,2	4,6
7. Proposing explanations for observations	4	3,9	3,9	4
8. Recognizing patterns/relationships	4,2	4	4,1	4,3
9. Formulating inferences/conclusions using data	3,72	4,48	4	4,24
10. Proposing and testing hypotheses	4,8	5	4,9	5
11. Formulating temporary hypotheses /assumptions in one's language	3,59	4,28	3,03	3,31
12. Designing ways to test hypotheses	4,9	4,9	4,9	5

Through react learning, students' science process skills are continuously trained gradually at each phase. REACT learning in the transferring phase provides students with the opportunity to channel the knowledge they have gained through solving problems that contain problems related to the material being studied. And also in the relating phase, students are faced with higher thinking activities, by confronting students with real conditions that are recognized in everyday life, so that this makes it easier for students to construct their knowledge through the experiences they have by linking it to the material to be studied. For the control class, the treatment of students used a conventional learning model with the phase Students focus their attention on what is conveyed by the teacher. Then the teacher asks academic questions related to the material of electric current. The teacher accommodates all answers from students and allows one or several students to formulate answers. The teacher explains by linking the phenomenon to the material to be studied. The teacher provides follow-up questions as focused guidance questions and guides students to perfect their answers. Meanwhile, data on science process skills were obtained from observation sheet score data on the learning process during four meetings which had been averaged, and data on students' science process skills test scores obtained from post-test scores, which were given at the end of the meeting.

Table 2. Results of Observation Scores of Science Process Skills of Control Class Students

Science process skills indicators	Meeting			
	first	second	third	fourth
1. Observation	3,9	4,2	4,03	4,3
2. Presenting ideas/concepts/opinions	3,95	3,9	3,8	3,93
3. Presenting discussion results	3,95	4	4	4
4. Using measuring instruments to obtain data	5	5	4,967	5
5. Finding the size of an object	5	4,8	4,2	4,6
6. Relating observations to previous experiences/knowledge	3,97	3,87	3,83	4,03
7. Proposing explanations for observations	3,9	3,7	3,7	4
8. Recognizing patterns/relationships	4	4	4	4
9. Formulating inferences/conclusions using data	3,9	3,7	4	4,2
10. Proposing and testing hypotheses	4	5	4.93	5
11. Formulating temporary hypotheses /assumptions in one's language	3,3	3,73	3,3	3,2
12. Designing ways to test hypotheses	5	5	5	5

It can be seen that in almost all aspects of science process skills, there are significant differences between learning with the REACT model compared to the conventional model. This is in line with what Fakhruriza stated that one of the reasons the REACT learning model can be used in learning is that students are more active because in the teaching and learning process they not only listen to material from the teacher but also play an active role in the learning process. (Cahyono, Sutarto, & Mahardika, 2017). This is also in line with previous research conducted by K. Selamet, I.W. Sadia, and K. Suma in their research entitled "The Effect of REACT Contextual Learning on the Understanding of physics concepts and Science Process Skills of Grade VIII Junior High School Students", which showed an LSD rejection limit of 0.0184 and an average difference in science process skills $\Delta\mu$ of 0.093 at a significance level of 0.05 with a t_{table} of 2,000. Where this value shows that there is a significant difference in science process skills between students taught using react contextual learning and students taught with conventional learning.

Table 3 Assessment of aspects of science process skills in the experimental class and control class

	Group	Experiment	Control
No	Assessment Aspects	Score	

1	Observation	87,93%	82,17%
2	Communication	77,96%	75,74%
3	Measurement	96,12%	96,50%
4	Inference	83,58%	79,63%
5	Data Interpretation	82,67%	79,75%
6	Conducting Experiments	98,10%	93,33%
7	Hypothesis Formulation	84,74%	81,67%
8	Use of Numbers	75,00%	65,83%

In this study, the differences in aspects of science process skills that stand out are aspects of observation, communication, inference, data interpretation, conducting experiments, formulating hypotheses, and using numbers. The aspect of communication appears in the relating and cooperating phases. In the relating phase, the communication aspect is assessed when students convey their ideas/concepts when the teacher presents phenomena related to the material to be studied. In the related stage, the experimental class score was 77.96. This is influenced by the teacher in implementing the relating stage when students relate new concepts to something that students already know. Relating is a stage of linking what students already know with new information. Through related activities, students' communication skills are assessed by conveying their opinions verbally, where students ask questions or answer questions by providing guesses about the questions. Then, in the aspect of formulating the hypothesis, it can be seen in the relating phase which trains students to ask questions, as well as provide their opinions on a series of questions based on observations of the phenomena presented, so that this hones students' skills in the experiencing phase to formulate hypotheses/temporary assumptions based on their observations in their own language so that it can facilitate in channeling the concepts learned where students themselves will find facts about related materials through practical activities and then relate the existing facts to existing theories through a series of questions presented.

In the cooperating phase, the communication aspect is assessed when students present the results of observations and group discussions, and when students present newly learned concepts/principles by providing questions or reciprocal responses orally. And communication is also trained in writing through practice questions given in the context of transferring new knowledge through solving problems in the transferring phase. This model is in accordance with the theory of constructivism, knowledge can only exist in the human mind, and that the theory does not have to match the reality of the real world. Students will continue to try to get their own personal mental model of the real world from their perception of that world. The development of competencies in learning will be created if learners are active agents in the knowledge acquisition process. Teachers cannot simply transmit knowledge to students, but students need to actively build knowledge in their minds. (Sugrah, 2019) So in the concept of contextual learning, the Center for Occupational Research (COR) in America in Muslich (2007, 42) describes it into five subordinate concepts abbreviated as REACT, namely Relating, Experiencing, Applying, Cooperating, and Transfering. Relating is a form of learning in the context of real life or real experience. Learning must be used to connect everyday situations with new information to be understood or with problems to be solved. Experiencing is learning in the context of exploration, discovery, and creation. This means that the knowledge gained by students through learning prioritizes the critical thinking process through the inquiry cycle. Applying is learning in the form of applying learning outcomes to practical use and needs. In practice, students apply concepts and information to imagined future life needs. Cooperating is learning in the form of sharing information and experiences, responding to each other, and communicating with each other. Transferring is a learning activity in the form of utilizing knowledge and experience based on a new context to gain new knowledge and learning experiences.

In the control class that implements conventional learning, the use of separate learning strategies is intended for students to obtain information and ideas contained in each subject taught. Conventional learning methods are traditional learning methods also called lecture methods, because since long ago these methods have been used as a means of oral communication between teachers and students in the learning and teaching process (Hakim, 2017) the process of transferring knowledge is still not optimal, in conventional learning teachers are still dominant so that the meaningful process of "learning by doing" or learning through exploration, discovery, and creation is not optimal. According to Conny Semiawan (1990), the task of education is not only limited to transferring the results of science and technology. In addition, a teacher acts as an educator and is also tasked with instilling new values demanded by the development of science and technology in students within the framework of basic values that have been agreed upon by the Indonesian nation. The teaching and learning process occupies a very important and determining position. However, it should be noted that the teaching and learning process is a human interaction between educators and students that is full of uncertainty (Suparlan, 2019).

Based on the results of data analysis on the second hypothesis, it was obtained that $t_{counts} = 3.1005 > t_{table} = 1.6720$, which means that the science process skills of students taught using the REACT learning model are higher than students taught using the conventional model. This is because learning using the REACT learning model involves students more in the learning process, making students more motivated and active in learning because of the opportunity given to students to express opinions/ideas/concepts at each phase of learning starting from the relating phase to the transferring phase, by conducting direct observation/practice activities, interpreting observation results, answering questions in LKPD helping students practice the necessary process skills. Through REACT learning, students' science process skills continue to be trained gradually at each phase. In REACT learning in the transferring phase, students are allowed to channel the knowledge they have gained through solving problems that contain problems related to the material being studied. Also in the relating phase, students are faced with higher thinking activities, by confronting students with real conditions that are recognized in everyday life, so that this makes it easier for students to construct their knowledge through the experiences they have by linking it to the material they will learn. While in learning using conventional learning models it is generally the same, it's just that in conventional learning in the initial activities students are not faced with real situations in linking the context of knowledge with the experience they have, as in REACT learning which is reflected in the relating phase. And also, after the practicum activities there is no longer a presentation of the concept of the material that has been learned through working on questions together to transfer back the knowledge that has been obtained through previous knowledge/experience. So based on this it will be clear that the science process skills of students taught using the REACT learning model are higher. In this study, it was proven that the average score of students' science process skills in the experimental class was 84.483. While in the control class, the average score of students' science process skills was 81.5.

CONCLUSION

Based on the results of data analysis and discussion, it can be concluded that

(1) There is a significant difference in science process skills between students taught using the Relating-Experiencing-Applying-Cooperating-Transferring (REACT) learning model and students taught using the conventional learning model.

(2) The science process skills of students taught using the Relating-Experiencing-Applying-Cooperating-Transferring (REACT) learning model are higher than those of students taught using the conventional

learning model. Based on the conclusions, the suggestions that researchers can recommend are: (1) Further research is needed on the REACT learning model that can be developed by measuring other appropriate aspects of science process skills (2) Research is also needed on other factors that can have a direct impact or influence on students' science process skills such as student learning styles, quality of interpretation and student responses.

References

Aditomo, A. (2022, February 5). MINISTRY OF EDUCATION, CULTURE, RESEARCH, AND TECHNOLOGY. Retrieved from EDUCATION STANDARDS, CURRICULUM, AND ASSESSMENT AGENCY: https://kurikulum.kemdikbud.go.id/wp-content/unduhan/CP_2022.pdf

Alam, S. (2023). PISA 2022 Results, Reflection of National Education Quality 2023. Board of Trustees of Sukma Foundation. Jakarta: Media Indonesia.

Apriani, M., Suryawati, & Annisa, D. (2023, December). REACTION OF LEARNING STRATEGY IMPLEMENTATION TOWARDS STUDENT LEARNING OUTCOMES. Opportunity Journal, 11(2), 52-59.

Ariyansah, & Nurfathurrahmah. (2022, March). Analysis of Science Process Skills Through Problem-Based Methods on Diversity Material. Journal of Education and Social Sciences, 105 -109. Retrieved from https://jurnal.jomparnd.com/index.php/jp

Cahyono, B.A., Sutarto, & Mahardika, I. . (2017). REACT Learning Model (Relating, Experiencing, Applying, Cooperating Transfering) with Video Media of Physics Events on Science Process Skills and Student Learning Outcomes in Physics Learning in High School. JOURNAL OF EDUCATION, IV (3), 20-24.

Emy Junaidah, N.,. (2022). LEARNING REACTION (RELATING, EXPERIENCE, APPLYING, COOPERATION, TRANSFERRING) IN THE 21ST CENTURY EDUCATION ERA. Scaffolding: Journal of Islamic Education and Multiculturalism, 4 (no 3), 372-385.

Feby, AP (2019). Relating, Experiencing, Applying, Cooperating, Transferrin (REACT) Learning Model Based on Ethnomathematics. Proceedings of the National Seminar on Mathematics and Mathematics Education, Sesiomadika 2019 (pp. 938 - 944). Karawang: Mathematics Education Department, Singaperbangsa University.

Firda Nurul Aini, SP (2017). Application Of React Strategy (Relating, Experiencing Applying, Cooperating, Transfering) To Improve Students' Mathematical Connection Ability On The Topic Of Plane Shapes In Class VII-2 SMP Negeri 47 Jakarta. Journal of School Mathematics Learning Research, 67 -75. doi:https://doi.org/10.21009/jrpms.011.08

Hakim, M.L. (2017, February). React Learning Model For Science Subjects. Edudeena, 1(no 1), 53-62.

Lepiyanto, A. (2014). Analysis Of Science Skills Process In Learning Based On Practice. Bioedukasi Journal of Biology Education, 5(no 2), 156-161.

Putra, IP (2023). Indonesia's PISA Score Does Not Reach the 2024 RPJMN Target. Jakarta: Medcom.id.

Romzi, DM (2023). Official Statistics News. Jakarta: Central Statistics Agency.

Sugrah, N. (2019, September). Implementation Of Constructivism Learning Theory In Science Learning. Humanika, Scientific Study of General Courses, 19(2), 121-138.

Suparlan. (2019). Constructivism Theory In Learning. Islamika: Journal of Islam and Educational Sciences, 1(2), 79-88. Retrieved from https://ejournal.stitpn.ac.id/index.php/islamika

Teknologi, KP (2023). Education Report. Jakarta: Ministry of Education, Culture, Research and Technology.