

IMPLEMENTATION OF REACT LEARNING MODEL ON SECOND YEAR STUDENTS ACHIEVEMENT LEARNING OF SMPN 3 SINGOSARI IN MATERIAL PRESSURE

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Abstract

This study aims to see the high level of learning achievement of second year students of SMPN 3 Singosari using the REACT learning model compared to the discovery learning model on material pressure and its application in everyday life. The problem experienced by students in understanding material pressure material that is abstract is one of the factors that influence the low learning achievement. Students also have difficulty connecting their concepts with real-world phenomena. Therefore, we need a meaningful learning reform to improve learning achievement. One of the reforms is to choose a contextual learning model REACT to overcome these problems. The quasi-experimental method was used for this study, with the Pretest-Posttest Control Group Design in the experimental class and the control class. The research population is second year students of SMPN 3 Singosari 2018/2019 academic year consisting of 9 classes. The technique for sampling in this study is purposive sampling. The sample chosen to be the subject of the study is SMPN 3 Singosari students in the 2018/2019 academic year class VIII I as an experimental class and class VIII H as a control class, with 31 students per class. Analysis of students' initial abilities through pretest results, while high or not student achievement is seen through posttest. The T test gives the results of $T_{count} > T_{table} = 2.3057 > 1.6706$, which indicates an inequality in learning achievement, between students learning through REACT and conventional learning models. After that, Tukey test was conducted to produce the value of $Q_{count} > Q_{table} = 3.289 > 2.89$, higher learning achievement using the REACT model compared to conventional models. The REACT model is effective as an effort to solve the problem of low learning achievement.

Keywords: REACT, Sciences, Learning Outcomes

Abstrak

Penelitian ini bertujuan untuk melihat tingginya tingkat prestasi belajar siswa kelas VIII SMPN 3 Singosari memakai model pembelajaran REACT dibandingkan dengan model discovery learning pada materi tekanan zat dan penerapannya dalam kehidupan sehari-hari. Problematika yang dialami siswa dalam memahami materi tekanan zat yang bersifat abstrak ialah salah satu faktor yang mempengaruhi rendahnya prestasi belajar. Siswa juga kesulitan dalam menghubungkan konsep yang mereka miliki dengan fenomena di dunia nyata. Oleh karena itu, diperlukan suatu reformasi pembelajaran yang bermakna untuk meningkatkan prestasi belajar. Salah satu reformasi itu ialah memilih model pembelajaran REACT yang berbasis kontekstual untuk mengatasi masalah tersebut. Metode eksperimen kuasi dipakai untuk penelitian ini, dengan desain Pretest- Posttest Control Group Design pada kelas eksperimen dan kelas kontrol. Populasi penelitian yaitu siswa kelas VIII SMPN 3 Singosari tahun pelajaran 2018/2019 yang terdiri dari 9 kelas. Teknik untuk pengambilan sampel pada penelitian ini ialah purposive sampling. Sampel yang terpilih untuk menjadi subjek penelitian yakni siswa SMPN 3 Singosari tahun ajaran 2018/2019 kelas VIII I sebagai kelas eksperimen dan kelas VIII H sebagai kelas kontrol, jumlah siswa setiap kelas 31 siswa. Analisis kemampuan awal siswa melalui hasil pretest, sedangkan hasil tinggi tidaknya prestasi belajar siswa dilihat melalui posttest. Uji T memberikan hasil $T_{hitung} > T_{tabel} = 2.3057 > 1.6706$, yang mengindikasikan adanya ketidaksamaan prestasi belajar, antara siswa yang belajar melalui model pembelajaran REACT dan konvensional. Setelah itu dilakukan uji lanjut Tukey menghasilkan nilai $Q_{hitung} > Q_{tabel} = 3.289 > 2.89$ prestasi belajar lebih tinggi menggunakan model REACT dibandingkan model konvensional. Model REACT efektif untuk dijadikan usaha pemecahan masalah rendahnya prestasi belajar.

Kata kunci: REACT, IPA, Hasil Belajar

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BACKGROUND

Education is one of the means used to build a nation in realizing its ideals, which is to educate all aspects of life that a nation has (Rizka, et.al, 2014). Education can never be separated from the process of learning and learning. Learning is an individual's conscious effort to achieve certain goals or knowledge in order to reap the change for the better. Learning has a real meaning, which is a learning experience as a form

of interaction between the teacher and students (Menteri Pendidikan dan Kebudayaan Republik Indonesia, 2016). Learning and the process of learning are also indicators that cannot be separated between the two.

Science is a study that trains students to solve problems in learning, then linked to the knowledge they have (Puspita, et.al., 2017). Science learning provides independence to students to learn about the natural surroundings as well as further development and application in daily life. The learning process at Science emphasizes direct and independent learning to develop knowledge and understand the natural environment.

Natural science learning achievement at the Middle School (SMP) level is still relatively low. This can be seen through the results of the initial ability test, especially the learning achievement of Natural Sciences (Physics) grade VIII of SMPN 3 Singosari which still shows grades below the minimum graduation criteria (MGC). In science learning, students are still many who have difficulty in relating and understanding material, especially those related to equations in physics (Fakhruriza & Kartika, 2015). Physics is a branch of Natural Sciences (IPA) that deals with systematically finding out the natural surroundings, in the form of discoveries, facts, concepts and further development in the application of knowledge (Presiden Republik Indonesia, 2003). Science learning, especially in second year class of SMPN 3 Singosari, has not yet triggered student activity. When the learning process students only accept concepts without finding it themselves. In addition, the formulas are accepted by students without the process of finding out and solving problems. This is very influential on student achievement.

In order to realize the high achievement of science learning in schools, teachers must be able to understand the nature of science in learning science. In addition, teachers must be able to provide meaningful learning in students. Based on the above problems, it is necessary to have effective problem solving for the achievement of educational goals by selecting relevant learning models to overcome the problem of low learning achievement. The ideal learning model for solving these problems is the REACT model (Relating, Experiencing, Applying, Cooperating, Transferring) with a contextual approach.

The application of this model will train students to facilitate learning by linking student knowledge in real life (Fakhruriza & Kartika, 2015). Based on that, the researchers took the initiative to conduct a research that is the effect of the REACT learning model on the learning achievement of second year students of SMPN 3 Singosari.

METHOD

Quasi-experimental method of pretest-posttest control group design. The research subjects of second year class VIII H and VIII I of SMPN 3 Singosari in the 2018/2019 academic year, each of which amounted to 31 students. The experimental class uses the REACT model and the control class uses the discovery learning (DL) model. The subject matter of Basic Competencies 3.8 material is the pressure of substances and their application in everyday life. The research instruments were Lesson Plan, Student Worksheet, and Syllabus which are classified as treatment instruments. The measurement instrument uses a learning achievement test item with 15 items and a sheet of implementation of the learning process. Techniques for data analysis were performed prerequisite tests including normality tests using the Liliefors test and homogeneity using the Bartlett test on the results of the pretest and posttest scores. The pretest value was then analyzed to determine the initial ability and the posttest value was used to test the hypothesis after both classes were treated using t-test.

RESULTS AND DISCUSSION

The treatment instrument consisting of lesson plans, syllabus, and learning implementation sheet was tested for validity by UM Physics expert lecturers. The results of the validity test of the instrument are 100% so that the treatment instruments can be categorized as very suitable for use in research. Learning achievement test instruments are empirically tested to find out valid and reliable questions. The results of empirical tests made 15 valid items were obtained with a reliability level of 0.6285 (very reliable). After that, an analysis is carried out to find out the level of difficulty and the difference in the power of the items. Difficulty and differentiation test results show that there are 7 easy questions, 7 moderate questions, and 1 difficult question. Then, the results of the different test items are 3 items not good, 5 items are good enough, and 7 items are good. After conducting research, the results obtained consisting of the initial similarity of students in both classes VIII H and VIII I, the influence of the model used on student achievement, so that it can be explained as follows.

Table 1. Results Percentage of Implementation of Student Learning Process Activities

Meeting	Percentage of Implementation	
	REACT	Discovery Learning
I	99.11	97.83
II	99.10	95.65
III	97.20	95.65
IV	96.43	93.48
V	97.32	93.48
Average	97.86	95.22

Table 1 shows the implementation of the learning activities of the two classes with an average of 97.86% for the class using the REACT model and 95.22% for the class using the DL. From these data, the implementation of the learning process and learning activities of students is very carried out so that it is considered that there will be no effect of the implementation of the learning activities of student activities on student learning outcomes in the control and experimental class.

Table 2. Results Percentage of Implementation of Teacher Learning Process Activities

Meeting	Percentage of Implementation	
	REACT	Discovery Learning
I	99.11	98.91
II	99.11	98.91
III	98.21	98.91
IV	97.32	96.74
V	97.32	97.83
Average	98.21	98.26

Table 2 shows the percentage value of the implementation of teacher activities during the learning process with an average of 98.21% for the REACT model and 98.26% for the DL model. In accordance with the learning process criteria table, it can be said that the learning process is very carried out. After the pretest data is obtained, an analysis of the pretest data can be done to determine the students' initial abilities through the pretest scores. The calculation is done through a prerequisite test that is a test of normality and homogeneity followed by an average similarity test of the two classes.

Table 3. Normality Test (Liliefors Test) of Control Class and Experiment Class Pretest

Sample	Liliefors Test		
	L_0	L_{table}	Conclusion
Control	0.149	0.159	Normal
Experiment	0.122	0.159	Normal

Based on Table 3, the pretest data for both classes is normally distributed using the Lilliefors test. It can be seen from the value of $L_0 < L_{table}$ with a significance level of 0.05. The results show that the control class has a value of $L_0 = 0.149 < L_{table} = 0.159$ so that the data is categorized as normally distributed and the experimental class has a value of $L_0 = 0.122 < L_{table} = 0.159$ so the data is also categorized as normally distributed. After that, a homogeneity test was performed on the pretest data.

Table 4. Homogeneity Test (Bartlett Test) of Control Class and Experiment Class Pretest

Class	Bartlett Test		
	X_{count}^2	X_{table}^2	Conclusion
Control	2.23	3.84	No difference
Experiment			

Table 4 indicates that the homogeneity test that has been carried out using the Bartlett test with the value of $X_{count}^2 = 2.23 < X_{table}^2 = 3.84$ and a significance level of 0.05 indicates homogeneous data (the same) for both classes. After testing the pretest data, the pretest data can be declared normally distributed and variant (homogeneous) both the control class and the experiment so that it meets the requirements to do a test of the average similarity of students to their abilities.

Table 5. Test of Similarity Average Early Ability of Experimental Class and Control Class Students

Class	Bartlett Test		Conclusion
	t_{count}	$t_{table} (df = 60)$	
Control	1.559	0.167	No difference
Experiment			

Table 5 shows the initial abilities of students in both classes at the same level. This was proven by using the Independent Sample t-test which yielded a $t_{count} = 1.559 > t_{table} = 0.167$. According to the results of the Independent Sample t-test, both classes can be declared to have the same initial ability. Data analysis was then carried out to test the research hypotheses with the aim to determine differences in student achievement using the REACT or DL model and to determine the high or not science learning achievement through the two learning models. Before conducting a hypothesis test, a prerequisite test must be performed to determine the type of data.

Table 6. Normality Test (Lilliefors Test) of Control Class and Experiment Class Posttest

Class	Lilliefors Test		Conclusion
	L_0	L_{table}	
Control	0.102	0.159	Normal
Experiment	0.104	0.159	Normal

Table 6 shows the posttest values of the two classes having normal distribution with a value of $L_0 = 0.102 < L_{table} = 0.159$. Based on the Lilliefors testing criteria, if the value of $L_0 < L_{table}$, then the data can be categorized as normally distributed.

Table 7. Homogeneity Test (Bartlett Test) of Control Class and Experiment Class Posttest

Class	Bartlett Test		Conclusion
	x_{count}^2	x_{table}^2	
Control	2.242	3.84	No difference
Experiment			

Table 7 shows that the results of the students' post-test scores had homogeneous data. This is known from the Bartlett test that has been done. If $x_{count}^2 < x_{table}^2$, then the data is homogeneous with a significance of 0.05. Both classes of experiments and controls show normally distributed data and have homogeneous variants that meet the requirements for hypothesis testing.

Table 8. Student Learning Achievement t-Test Results

t-Test		
t_{count}	t_{table}	Conclusion
2.3057	1.6706	No difference

Table 8 presents the results of t-test calculations used to determine differences in science learning achievement. The calculation results show that $t_{count} = 2.3057 > t_{table} = 1,6706$ and this indicates that there are differences in student achievement in the science learning material taught by the REACT model and the DL model. Furthermore, further tests to determine the level of student achievement in natural science subjects, especially material pressure, is carried out. Further tests were carried out with the Tukey test.

Table 9. Tukey Test Results of Student Achievement Posttest in Natural Sciences

Tukey Test		
Q_{count}	Q_{table}	Conclusion
3.265	2.89	Greater

Table 9 shows that the further tests that have been carried out produce data $Q_{count} = 3.265 > Q_{table} = 2.89$ which means that the science learning achievement of second year students of SMPN 3 Singosari who learn with the REACT model is higher than those who learn with conventional models. The results above indicate that there is an influence of learning achievement using the REACT model. This was proven after hypothesis testing and further testing with the same initial ability between the two classes. After being given treatment,

there are differences in learning achievement between students who learn to use the REACT model and students who learn to use the DL model (student achievement with a higher REACT model).

The implementation of the REACT learning model and discovery learning showed an average value of 98.21% and 98.26%, respectively, with highly implemented criteria. The REACT model has five stages in the learning process namely Relating, Experiencing, Applying, Cooperating, Transferring. The Relating Phase in this study is the stage of constructivism that can teach students how to link their knowledge to new knowledge (Cahyono, et.al., 2017). During the learning process, the teacher gives a phenomenon that is close to the daily lives of students. This can stimulate the enthusiasm of students to start learning. Students are also given the opportunity to provide questions that will form the basis of inquiry to find solutions. Students are also allowed to give opinions about the phenomena given by the teacher.

In the experiencing phase, the teacher invites students to explore, explore discoveries, and solve problems (Fakhruriza & Kartika, 2015). When conducting experiments, students associate the knowledge they have to find solutions to existing problems. This hands-on activity can build students' knowledge. At the applying stage, the teacher can find out how much students understand in learning the material being taught. Students will answer several questions in groups. The question answered is of course still related to the material discussed earlier. At this stage, the teacher gives students the opportunity to apply the newly acquired knowledge or knowledge, but still in the same context (the same material). With the stages of applying, learning will be meaningful in students and learning will not be easily forgotten and the concepts obtained will be embedded in students.

In the cooperating stage, the teacher invites students to cooperate with each other in completing the questions that exist at the applying stage. Working together will train students how to interact with each other, respect various opinions, and build knowledge of each other for the same purpose. The transferring phase facilitates students to communicate the results of discussions from the previous stage to their peers with the teacher as the verifier. This stage gives students the experience to deepen their knowledge through new contexts, but still in the same subject matter. Students who do not make presentations are asked to give questions and responses to students who are presenting. Conclusions will also be formulated and delivered by students with teacher guidance at this stage. After that, students will be given a challenge that students must complete individually. It aims to find out how much student knowledge is built during the learning process.

The REACT learning model that has been carried out has been proven to be able to improve the science learning achievement, especially the material pressure material, through the stages of this model. This contextual approach model is very suitable for material pressure material because material pressure material is material that cannot be done by memorization without analyzing the application of concepts in daily life. The REACT model is part of constructivism learning that makes learning meaningful (Wildani, 2016). Contextual learning is always looking for meaning and usefulness between the material being taught with daily life that can improve student learning achievement (Junedi & Ayu, 2018).

REACT learning can be applied because it gives students the opportunity to be more active in learning compared to the DL model with a demonstration method that causes the teacher's role to be more dominant (Fakhruriza & Kartika, 2015). The results of the science learning achievement of students learning with the REACT model for the experimental class are higher than the control class using the DL model. This is because the REACT model has a gradual or gradual understanding that can improve student achievement (Durotulaila, et.al., 2014). The basic understanding of students is obtained through the application stage and advanced understanding is obtained by students through the transferring stage. Successive understanding will make student's ability effective so that this model is able to overcome the problem of low learning achievement (Cahyaningrum & Febriana, 2019).

CONCLUSIONS AND RECOMMENDATIONS

1. Conclusion

The REACT learning model is able to improve the learning achievement of science students in class VIII of 3 Junior High School Singosari higher than the learning model of Discovery Learning.

2. Recommendations

The allocation of learning time needs to be rearranged so that the teacher is able to sort and choose phenomena that are closer to students. Further research is needed on the application of the REACT learning model in improving learning achievement for larger samples.

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