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APPLICATION OF ARTICULATION LEARNING METHOD IN SCIENCE SUBJECTS

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Abstract

Purpose: This study aims to analyse the impact of the application of Articulation Learning method to the student's learning outcomes in Science subject.

Research Methodology: This study uses Classroom Action Research and Paired t-test by using the pre-test and post-test score.

Results: The application of articulation learning method can increase students' learning outcomes in Science subject.

Limitations: This study analyses the impact of Articulation Learning method in science subject for middle school.

Contribution: The results contribute to the education field in terms of effective learning model to increase students' learning outcomes.

Keywords: *Problem-Posing Method, Classroom Action Research*

1. INTRODUCTION

School is one of the primary learning environments. Students must learn how to learn and develop practical learning skills at school. However, learning these has primarily been an incidental result of academic instruction and needs improvement (Wegner et al., 2021). In education systems, learners are expected to possess increased autonomy and show initiative in learning processes, inspecting learning materials, and understanding contents. Efficient growth of knowledge inside and outside of school is only possible if students have skills that initiate, guide and control the search for information and its processing and storage later on. In learning and teaching research, these techniques are called learning strategies. (Wegner et al., 2021). They are necessary for students to use to foster their application of results in education. The primary purpose of teaching at any level of education is to bring a fundamental change in the learner (Tebabal & Kahssay, 2011).

To facilitate the process of knowledge transmission, teachers should apply appropriate teaching methods that best suit specific objectives and level exit outcomes. For this reason, teachers are expected to have various abilities, both in terms of readiness and mastery of the material to be taught, selection of appropriate learning models, as well as class mastery, and the use of various learning models, which in essence, lead to student learning outcomes.

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In the standard epoch, many teaching practitioners widely applied teacher-centered methods to impart knowledge to learners compared to student-centered methods. Until today, questions about the effectiveness of teaching methods on student learning have consistently raised considerable interest in the thematic field of educational research (Hightower et al., 2011). Moreover, research on teaching and learning constantly examines the extent to which different teaching methods enhance growth in student learning (Ganyaupfu, 2016).

Effective teachers will integrate different teaching models and methods depending on their students and their needs and learning styles. Models of teaching relate to several models that assist teachers in honing their communication skills. The models enable teachers to assist the overall learning curves of students. Various approaches may create a successful course curriculum for long-term and short-term courses. Teaching models instruct instructors and planners while speeding up the educational process. It helps them to assess and improve on their strengths and weaknesses. When developing such models, teachers consider social, personal, information processing, and behavior elements.

The results of the researcher's initial observations obtained from the results of discussions with teachers of the Integrated Science subject at SMP Negeri 4 Ciawi show that the learning process carried out so far is still oriented towards conventional learning model patterns which are more dominated by teachers, where the teacher only explains the material, then provides an example, finally giving exercises or questions to students and concluding learning. The average student learning outcomes do not meet the Minimum Completeness Criteria (KKM), namely 70.00, especially in the material of Addictive and Additive Substances. The conventional learning model is a method that has been criticized the most because it is seen as learning that does not give students the freedom to do activities.

Learning problems often faced by students can be caused by a lack of understanding of the material, a lack of reading skills, or problems with learning methods. To overcome this problem, the teacher can help students by giving them additional assistance and explaining the material in more detail.

Regular poor academic performance by most students is fundamentally linked to the application of ineffective teaching methods by teachers to impact knowledge to learners (Adunola, 2011). Substantial research on the effectiveness of teaching methods indicates that learners' achievements often reflect the quality of teaching. According to Ayeni (2011), teaching is a process that involves bringing about desirable changes in learners to achieve specific outcomes. For the method used for teaching to be effective, Adunola (2011) maintains that teachers need to be conversant with numerous teaching strategies that recognize the magnitude of the complexity of the concepts to be covered.

Teachers can also help students by providing various teaching materials to suit their needs and interests. Students can understand the material better and complete learning tasks more efficiently. The learning process carried out so far only emphasizes achieving curriculum demands rather than developing student learning abilities. Student involvement in learning is not optimal, resulting in the acquisition of student learning outcomes that could be more optimal too. The role of students is no longer as a subject of study but as an object of learning. The learning model that can help students solve problems is the Articulation learning model. (Shoimin, 2014) states, "The Articulation model is a learning model that requires students to be able to act as message recipients as well as message delivery." Learning that has been given by the teacher must be continued by students.

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The Articulation learning model is a learning model that gives students more time to think actively and respond and help each other. Speaking properly and correctly is one way to provide material to students quickly. The articulation model is considered very appropriate when applied to improving students' ability to solve problems. Because with the articulation model, students will be more active in learning. Where students are formed into small groups, and each student in the group has the task of interviewing their group mates about the material just discussed so that it can improve students' abilities in learning mathematics, especially in solving problems (Rahmadani, 2018).

Several studies have shown increased learning outcomes in science subjects with the Articulation method. Research shows that the Articulation learning model provides an increase in student learning outcomes (Purba et al., 2022), (Yastiari, 2019), (Sarumaha et al., 2022), (Sari et al., 2018), (Rahmadani, 2018), (Astrianingsih, D., Prasetyo, 2018), (Kurniawati & Negara, 2017), (Nurnaningsih, 2019), (Yastiari, 2019), (Purba et al., 2022). This study aims to analyze the effect of the Articulation learning model on student learning outcomes in science subjects. This study will analyze the effect of applying the Articulation learning method on student learning outcomes in the integrated science subject at SMPN 4 Ciawigebang.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

Learning can be interpreted as changes in behavior that occur through experience, all changes in behavior, both in the cognitive (knowledge), affective (attitude), and psychomotor (skills) domains that occur due to the experience process, can be categorized as learning behavior (Astrianingsih, D., Prasetyo, 2018).

Generally, the factors that affect learning outcomes are divided into two categories: internal and external (Prasetyo, 2020). Examples of these factors are:

1. Internal factors

Internal factors come from within students and affect their learning abilities. These internal factors include intelligence, interest and concern, learning motivation, perseverance, attitude, study habits, and physical and health conditions.

2. External factors

Family, school, and society are factors originating from outside students that influence learning outcomes. Family circumstances affect student learning outcomes. Unfavorable behavior of parents in everyday life influences student learning outcomes. So, from several theories expressed by Pitajeng, Sundayana, Purwanto, and Ahmad Susanto, using the Articulation learning model can improve science learning outcomes.

A learning model is a plan or pattern that can be used to shape a curriculum (long-term learning plan), design learning materials, and guide learning in class or others (Rahmadani, 2018). The Articulation learning model is learning that trains memory, hearing, precision, or accuracy and trains to express mistakes orally. Thus, students are no longer learning objects but can also act as tutors for their peers, thus making students more motivated because they are encouraged and supported by their peers. The teacher still has a role, namely as a facilitator and motivator. Students are invited to participate in all mental and physical learning so that active learning can be applied. A learning process like this will create an exciting impression because the atmosphere is fun, and students feel they are in the learning process, so their mathematics learning achievement can increase (Kurniawati & Negara, 2017).

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The Articulation learning model is learning with a chain message system. The message that will be brought is the subject matter that is being studied at that time. Technically, each student must pass on and explain the message to other students (group partners) (Astrianingsih, D., Prasetyo, 2018).

Improving student learning outcomes through the Articulation learning model in Science subjects at school based on data findings and the results of the researcher's analysis showed that there was an increase in the learning process using the Articulation learning model in Science subjects at School (Astrianingsih, D., Prasetyo, 2018) (Prasetyo, 2020) (Rahmadani, 2018). Based on previous research, the hypothesis in this study is:

H0: there is no change in the student's score after applying the Articulation learning method

H1: there is a change in the student's score after applying the Articulation learning method

3. RESEARCH METHODOLOGY

This study used a quantitative approach with an experimental method carried out in class VII A SMP Negeri 6 Kuningan, a total of 26 students. This research was conducted in the subject of Mathematics on the subject of Algebraic Forms. The research design used the One-Group Pretest-Posttest Design (Parindra et al., 2021). The first stage is giving a pretest, applying the Problem Posing learning model, and the final stage is giving a posttest (Sugiyono, 2018).

The steps in applying the Problem posing model as in research (Martiani & Rachmiati, 2016), include the following:

1. The teacher explains the subject matter to the students
2. The teacher gives good practice questions.
3. Students are asked to submit 1 or 2 challenging questions, and the student concerned must be able to solve them. This task can also be done in groups.
4. At the next meeting, randomly, the teacher asked the students to present their findings in front of the class.
5. The teacher gives homework individually.

Data analysis

The research was conducted on 32 grade 7 students of SMPN 4 Ciawigebang on the subject matter of Addictive and Additive Substances in the Science subject. The data used are pre-test and post-test data on the material. The learning method used is the Articulation Learning Method with the following steps (Astrianingsih, D., Prasetyo, 2018):

1. The teacher conveys the competencies to be achieved
2. The teacher presents the material as usual
3. The teacher forms a group of two people to find out students' absorption.
4. The teacher assigns one of the students from a pair to listen while making small notes, then both of them change roles and the other groups.
5. The teacher assigns students in turn or randomly to convey the results of their interviews with their partners until some students have submitted the results of their interviews.
6. The teacher repeats/explains the material if the students need help understanding it.

The hypothesis testing uses Paired Sample t-test. A paired-sample t-test compares the mean of two matched groups of people or cases or the mean of a single group examined at two

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different points in time. If the same group is tested again, on the same measure, the t-test is called a repeated measures t-test (Ross & Wilson, 2017). Paired sample t-test is formulated as follows::

$$t_{test} = \frac{\sum D}{\sqrt{\frac{n.\sum D^2 - (\sum D)^2}{n-1}}}$$

D is the difference per paired value, and n is the number of samples. Before being tested using the Paired Sample T-test, statistical tests were carried out using the normal distribution test.

4. RESULTS AND DISCUSSIONS

Results

Normality test

The normality test aims to determine whether the research data is normally distributed. The normality test uses the Shapiro-Wilk Test of Normality because there are fewer samples than 50 students (Solekhah, 2018, p. 1399). The data is normally distributed if the sig. >0.05. Conversely, if the sig. < 0.05, the research data is not normally distributed. The output test results are obtained as follows based on the normality test:

Table 1 Normality Test

Test of Normality							
	Class	Kolmogorov-Smirnov			Shapiro-Wilk		
		Statistic	Df	Say.	Statistic	Df	Say.
Student learning outcomes	Pretest	.245	21	.200	,867	21	.072
	Post-test	.278	21	.092	,874	21	.064

Based on the Shapiro-Wilk Test of Normality output, the value (Sig.) is 0.072 > 0.05. At the same time, the post-test (Sig.) value is 0.064 > 0.05. So the research data is normally distributed because the value (Sig.) of both is > 0.05.

Hypothesis Testing Based on the results of the prerequisite test, it is known that the data are normally distributed and homogeneous (same); then the hypothesis test can be continued using the parametric test, namely the Paired Sample Test. Test paired sample t-test is used to determine whether the application of articulation learning models can affect student learning outcomes. Decision-making Ha is accepted if the value is sig. (2-tailed) < 0.05, whereas if the sig. (2-tailed) > 0.05, then Ha is rejected, and H0 is accepted.

Table 2 Hypothesis Testing

Paired Samples Test									
		Paired Differences							
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper	t	df	Say. (2-tailed)
Pair 1	Pretest - Posttest	-9.19355	3.67350	.65978	-10.54100	-7.84610	-13.934	30	.000

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Based on the results of the paired sample t-test output, the sig value was obtained. (2-tailed) of 0.000 <0.05. So Ha is accepted and H0 is rejected. This means there is a score change after the Articulation learning method is applied.

Discussion

Based on the results of research conducted at SMPN 4 Ciawigebang, the material for Addictive and Additive Substances in Science subjects was found to have an effect. The Articulation learning model is a learning model that gives students more time to think actively and respond and help each other. Speaking properly and correctly is one way to provide material to students quickly. The articulation model is considered very appropriate when applied to improving students' ability to solve problems. Because with the articulation model, students will be more active in learning when students are divided into small groups where each student in the group has the task of interviewing their group mates about the discussed material so that it can improve students' abilities in learning mathematics, especially in solving problems (Rahmadani, 2018).

The Articulation learning model is learning that trains memory, hearing, precision, or accuracy and trains to express mistakes orally. Thus, students are no longer learning objects but can also act as tutors for their peers, thus making students more motivated because they are encouraged and supported by their peers. The teacher still has a role, namely as a facilitator and motivator. Students are invited to participate in all mental and physical learning so that active learning can be applied. A learning process like this will create an exciting impression because the atmosphere is fun, and students feel they are in the learning process so that their mathematics learning achievement can increase (Kurniawati & Negara, 2017).

These results were in line with the results of previous studies where learning models using articulation could improve student learning outcomes. It was also found that articulation learning can strengthen students' memory and train them to express errors that occur orally.

5. CONCLUSION

This study concluded that the articulation learning model can influence students' learning outcomes in learning the material of Addictive and Additive Substances in science subjects. The application of articulation learning can train memory, hearing, precision, or accuracy and practice expressing mistakes orally. Thus, students are no longer learning objects but can also act as tutors for their peers, thus making students more motivated because they are encouraged and supported by their peers. This study contributes to the education field by providing teaching method alternatives to increase students' learning outcomes.

LIMITATION AND STUDY FORWARD

The results contribute to the education field in terms of effective learning model to increase students' learning outcomes. Based on the results of classroom action research research using the Articulation Learning model, the researchers provide suggestions for teachers to be able to apply this Articulation Learning method to other subjects. Furthermore, teachers can increase their proactive attitude and always create harmonious relationships with students. This will help students grow self-confidence and actively participate in learning..

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