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# THE EFFECT OF SCAFFOLDING STRATEGY WITH WORKSHEET ON STUDENT SCIENCE PROSCCESS SKILLS

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## Abstrak

Strategi scaffolding adalah strategi yang membuat siswa lebih aktif dalam pembelajaran dengan memberikan bantuan langkah-demi-langkah dari guru dan tutor sebaya sehingga dapat mempengaruhi keterampilan proses sains siswa. Strategi scaffolding juga membuat pembelajaran di kelas menjadi lebih aktif karena siswa lebih percaya diri dalam menyampaikan pendapat mereka. Implementasi strategi scaffolding dilakukan dengan memberikan bantuan pada tahap pembelajaran siswa, sehingga dapat mempengaruhi keterampilan proses sains siswa.

Metode yang akan digunakan dalam penelitian lembar kerja siswa yang dibantu dengan scaffolding adalah metode eksperimen semu dengan desain pretest-posttest kelompok kontrol yang tidak setara, yang membagi sampel penelitian menjadi kelompok eksperimen dan kelompok kontrol. Data dalam penelitian ini diperoleh berdasarkan hasil sebelum tes, hasil setelah tes, lembar observasi tentang pelaksanaan pembelajaran, dan dokumentasi.

**Kata-kata kunci:** Pendidikan Fisika, Scaffolding, Keterampilan Proses Sains

## Abstract

The scaffolding strategy is a strategy that makes students more active in learning by providing step-by-step assistance from teachers and peer tutors so that it can influence student's science process skills. The scaffolding strategy also makes learning in class more active because students are more confident in voicing their opinions. Implementation of the scaffolding strategy by providing assistance at the student learning stage, so that students can influence students' science process skills.

The method that will be used in researching student workseet assisted scaffolding is a quasi-experimental method with a non-equivalent control group pretest-posttest design, which divides the research sample into an experimental group and a control group. The data in this study was obtained based on the results before the test, results after the test, observation sheets on learning implementation, and documentation.

**Keywords:** Physics Education, Scaffolding, Science Process Skills

## INTRODUCTION

The scaffolding strategy in learning involves a thinking process where students are given real world tasks and the teacher guides students to complete these tasks. The research results show that

scaffolding learning strategies that involve student activity increase problem-solving abilities, which is one of the higher-level thinking patterns (Doering & Valentianos, 2007).

Based on research that has been conducted, it can be seen that implementing scaffolding strategies in the learning process can help students increase their knowledge (Badriyah et al., 2017). Scaffolding strategies can be defined as "processes that enable a child or beginner to solve a problem, carry out a task, or achieve a goal that goes beyond his or her own efforts" (Arthur Bakker, et al, 2015). Furthermore, learning using scaffolding strategies can increase learning achievement to a greater extent (Rahmatiah, 2016). The application of scaffolding strategies can also encourage learning activities and motivation so that it can increase students' understanding of concepts (Qamar & Riyadi, 2016).

Based on the background description above, the author is interested in conducting research with the title: " THE EFFECT OF SCAFFOLDING STRATEGY WITH WORKSHEET ON STUDENT SCIENCE PROSCCESS SKILLS"

## METHOD

Operationally, this research aims to determine the effect of the scaffolding strategy assisted by worksheet on the science process skills of class IX students on work and energy and whether there are differences between the group of students who apply the scaffolding strategy assisted by worksheet and the group of students who apply inquiry learning to process skills. science students.

This type of research is quantitative research and the method used in this research is a quasi experimental method with the research design being Pretest Posttest Non Equivalent Control Group Design. In quasi-experimental research, randomization is not carried out to enter subjects into the experimental group and control group, but instead uses a pre-existing group of subjects. The research design used was Pretest Posttest Non Equivalent Control Group Design. The design is to divide the research sample into an experimental group and a control group. The experimental group and control group were selected in a non-random manner. The intervention carried out in the experimental group was a different treatment from the control group, where the experimental group would use a scaffolding strategy assisted by worksheet, while the control group would use inquiry learning.

**TABLE 1.** Scaffolding treatment plan.

Teacher	Student
The teacher gives pretest questions to students	Students work on pretest questions given by the teacher
The teacher explains the material using assisted scaffolding worksheet	Students pay attention to the teacher's explanation
The teacher gives students the opportunity to ask questions related to the material that has been presented	Students ask questions related to things they do not understand
The teacher provides worksheet to support scaffolding	Students work on worksheet in groups
The teacher gives interactive tasks to students	Students carry out assignments given by the teacher
The teacher gives a posttest to students	Students work on posttest questions given by the teacher
The teacher gives a questionnaire to the students	Students complete the questionnaire given by the teacher

**Result and Discussion**

This research was carried out at Madrasah Aliyah Negeri in Jakarta in class X B and in the group of students who were taught using the scaffolding strategy assisted by worksheet as the experimental class and the inquiry model in the control class, the physics material taught in this research was Work and Energy. Previously, the instruments for the pre-test and post-test had been tested for validity and reliability on class XI B students who had studied work and Energy.

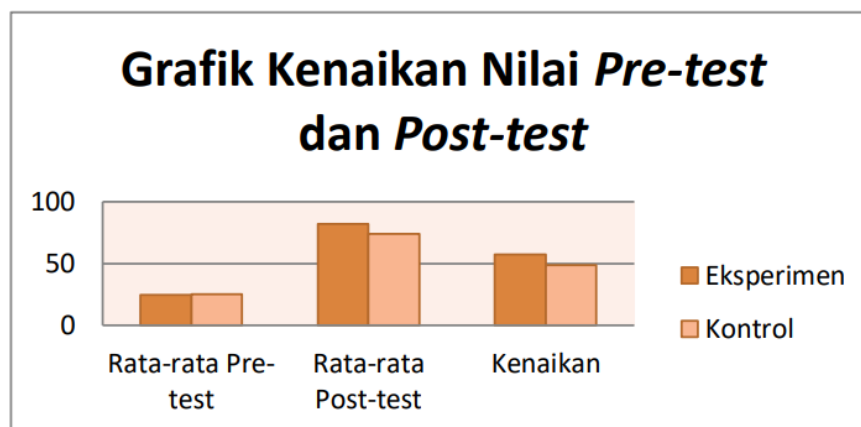
After all the work and energy has been taught to students, at the end of the lesson students are given a posttest to determine the level of students' science process skills. The data obtained from this research is data on the percentage of success in students' science process skills in physics learning on Business and Energy material obtained from 72 students. A total of 36 X E students were the experimental class, namely the class that applied the scaffolding strategy and 36 X B students were the control class that applied inquiry learning.

**TABLE 2.** Deskriptif Data Control and Experiment Class

	<b>Pre-test Control</b>	<b>Experiment</b>	<b>Post-test Control</b>	<b>Experiment</b>
Number of Student	36		36	
Lowest Score	12	11	61	70
Highest Score	48	39	87	97
Range	36	28	26	27
Average	25,14	24,86	74,08	82,31

From the data above, the pretest results for the experimental class got the lowest score of 11 and the control class got the lowest score of 12. Meanwhile, the highest score in the experimental class got the highest score of 39 and the control class got the highest score of 48. Meanwhile, the posttest score for the experimental class got the lowest score of 70 and the control class got the lowest score of 61. Meanwhile, the highest score in the experimental class got the highest score of 97 and the control class got the highest score of 87. In the pretest results, the average scores of the experimental class and the control class were not too different, which means that both classes had relatively similar initial capabilities. After implementing learning with the scaffolding strategy, there was an increase in the average score of 57.45.

**PICTURE 1.** Increase in Pretest Posttest

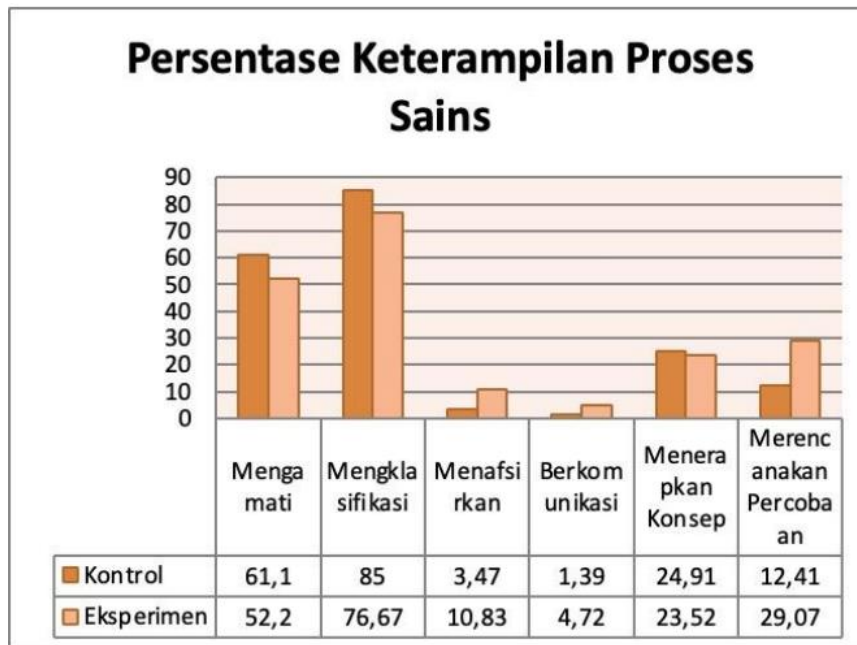


From the research results, it can be seen that in the comparison diagram, the average post-test score for the experimental class is higher. It can be seen from the diagram above, the experimental class obtained an average score of 24.86 for the pre-test and 82.31 for the post-test score. Meanwhile,

the control class obtained an average score of 25.14 for the pre-test and 74.08 for the post-test. The average of the pre-test and post-test shows a significant increase.

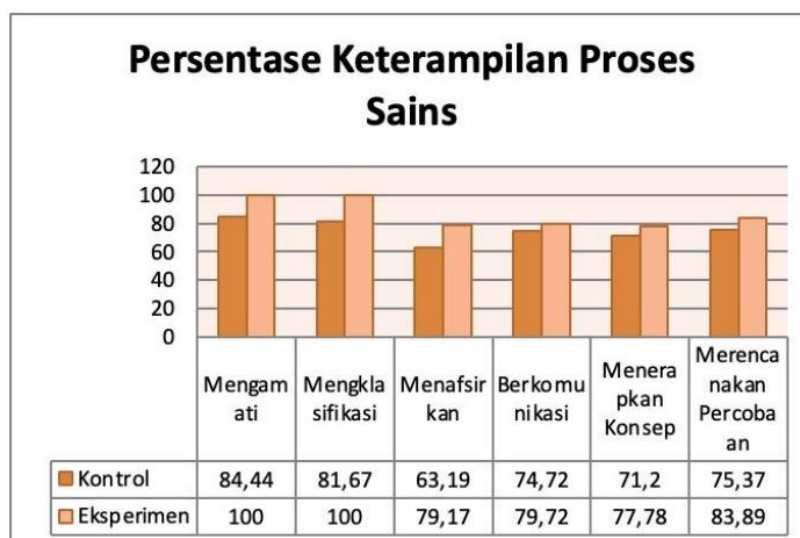
From the research that has been carried out, before implementing the scaffolding strategy, the pre-test results on students' science process skills in the control and experimental classes were very low.

PICTURE 2. Percentage of Science Process Skills Before Treatment



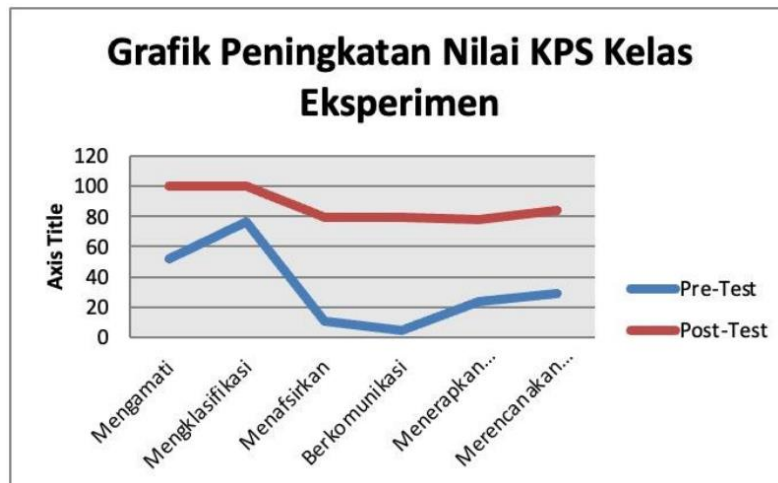
Meanwhile, after implementing the scaffolding strategy assisted by worksheet, the post-test results of students' science process skills increased significantly to very high levels. Can be seen from the diagram.

PICTURE 3. Percentage of Science Process Skills After Treatment



After carrying out calculations using SPSS 27, it showed that the results of students' science process skills had increased significantly in the experimental class compared to the control class.

PICTURE 4. Improving Experimental Class Science Process Skills



The observing aspect for the pre-test showed a result of 52.2 in the medium category, after being taught scaffolding strategy learning assisted by worksheet it rose to 79.72 in the very high category

### CONCLUSION

The application of scaffolding strategies assisted by worksheet is more effective than inquiry learning. This can be proven from the increasing results of students' science process skills in class X E. It is hoped that the scaffolding strategy can be used in other subjects and other subjects.

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