Effectiveness of the implementation of probing-prompting learning model on student learning outcomes in the discussion of static fluid

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Abstract. This study aims to determine the effectiveness of the Probing-Prompting learning model on student learning outcomes. To see student learning outcomes, researchers use a test in the form of multiple-choice questions. This research is to know the effectiveness of the learning model Probing Prompting towards the Learning Outcomes of students in the static fluid material class XI IPA SMAN 1 Sukadana 2018/2019 school year. This research is a quasi-experimental research. This study uses two classes as an experimental class and one class as a control class. The sampling technique used was purposive sampling. The research sample is by choosing a class that is contained in class XI MIA, which has low learning outcomes. Then the researchers gave treatment to class XI MIA 2 as an experimental class by applying the learning model Probing Prompting in learning, and class XI MIA 1 as a control class applied to the learning model in Discovery Learning accordance with the habits of educators. To find out the differences in learning outcomes in the control class and the experimental class a t-test was conducted using the Polled Variance formula. The results of the analysis of learning outcomes show $t_{\text{count}} = 9.51$ while $t_{\text{table}} = 2.01$ so that $t_{\text{count}}>t_{\text{table}}$, and $H_1$ received. The learning model is Probing-Prompting more effective in improving student learning outcomes, and effectiveness can be seen with the effect size test. The results of the test Effect size are, therefore, included in the medium category ($d = 1.021 <0.8$). Based on these results, it can be concluded that the learning model is Probing Prompting effective in improving student learning outcomes.

1. Introduction

The development and progress of information technology science, which is snowballing in the current era of globalization in every country in all corners of the world, have their own ways to deal with the progress of science and technology, especially in the field of education. The technique that occurs as it is now paving the way for educators and educational technology to be able to examine the problems that arise in the field of education in this era [1]. Learning is an activity that cannot be separated from everyday life, and learning is a form of both mental and physical activities to be able to achieve a goal. The learning process and learning are interrelated with each other because, with a good learning process, it will get good learning outcomes for students [2].
To be able to produce good learning outcomes, it cannot be separated from the role of an educator in using and choosing learning models that will be used in the classroom [3]. Based on the results of the pre-research conducted using a questionnaire to students (N = 40), obtained data that 81.48% of students felt that physics was a difficult subject, 40.74% of students preferred to be less active in the classroom, 44.44% of participants choose not to ask again about the material submitted if they still do not understand, 18.90% there are differences of opinion between students when answering questions given by educators, 48.14% students are less happy about the questions are given by educators at the beginning of learning, 14.81% students do not like if they have to think actively in class, 18.51% Students do not like if they are required to think independently, 88.88% of students still do not feel the use of learning media to the maximum, and 14.81% of students do not like learning by using media.

These results reinforce that physics is part of natural science subjects that are still less desirable by students in schools because physics is a lesson in which to be able to train students to be able to develop experimental skills and think scientifically [4]. Seeing from the results of pre-research that has been done, the researchers decided to use a more innovative learning model in the learning process. Researchers used the learning model Probing Prompting. Learning model Prompting probing is a model of learning by using techniques educators asking questions to students as well as explore the knowledge that here there is a process of thinking experienced by learners, by relating his experience with new experience being studied [5].

2. Research Method
Researchers use the method Quasi-Experiment, then the research design in this study uses the Non-Equivalent Control Group Design. In this design, there are two groups of subjects one group received treatment (experimental class) and one group as a control group [6]. This research was conducted at SMA 1 Sukadana, East Lampung, in the odd semester of the 2018/2019 school year. Subjects in the study were students of class XI of SMA N 1 Sukadana, East Lampung. The population in this study were students of class XI in the odd semester of SMA 1 Sukadana, East Lampung, in the odd semester of the 2018/2019 school year. The sample used is class XI MIA 2, with a total of 25 as an experimental class and class XI MIA 3, with a total of 25 as a Control class. The sampling technique in this study is purposive sampling. The scheme in this study is:

\[
O_1 \quad X \quad O_2 \\
O_3 \quad O_4
\]

Where X is the Treatment with learning model Probing Prompting, O₁ is a Pre-test in the experimental class, O₃ is a Pre-test in the control class, O₂ is a Post-test in experimental class, and O₄ is a Post-test in the class control. The steps taken in experimental research are by measuring the feasibility sheet when the learning process is carried out by the observer, carrying out the treatment by providing a learning model Probing Prompting in the experimental class, and learning model cooperative in the control class, giving a pre-test and post-tests value.

The data in this study are learning outcomes for learners. The data was collected using techniques pre-test and post-tests. The instrument in this study was a multiple-choice test. The test is used to measure learning outcomes in the form of multiple-choice questions.

The hypotheses in this study are:
H₀: probing prompting learning model does not affect student learning outcomes
H₁: probing-prompting learning model affects student learning outcomes

The hypothesis was tested using the t-test.

3. Result and discussion
Before conducting the analysis, the prerequisite tests of data analysis are carried out, namely tests of normality and homogeneity to determine whether the data is normally distributed or not and has a
homogeneous variance or not. The results obtained in the prerequisite testing data analysis are as follows:

| Table 1. Normality Test Results. |
|----------------------------------|
| **Statistic** | **Experiment class** | **Control class** |
| | pre-test | post-tests | pre-test | post-tests |
| L count | 0,1488 | 0,1691 | 0,1455 | 0,1461 |
| L table | 0,1755 | 0,1755 | 0,1755 | 0,1755 |
| Sig | 0,05 | 0,05 | 0,05 | 0,05 |
| Lillifors Tests | Lₕ < Lₜ | Lₕ < Lₜ | Lₕ < Lₜ | Lₕ < Lₜ |

Based on table 1, it can be concluded that both the pre-test and post-tests data samples of the Experiment class and the control class are normally distributed, it can be seen from \(L_{\text{count}} < L_{\text{table}}\) which is a condition of normally distributed data.

| Table 2. Homogeneity Test Results. |
|-----------------------------------|
| **Statistic** | **Pre-test** | **Post-tests** |
| | Experiment | control | Experiment | Control |
| SD² | 3,16 | 2,15 | 3,37 | 0,60 |
| Sig | 0,05 | 0,05 | 0,05 | 0,05 |
| F count | 0,68 | 0,18 |
| F table | 1,96 | 1,96 |
| conclusion | Homogenous | Homogenous |

Based on table 2, the homogeneity test results for the data of the pre-test and post-tests. Both samples have homogeneous variants. It can be seen from the \(F_{\text{count}} < F_{\text{table}}\) above, which is 0.68 <1.96 at pre-test and 0.18 <1.96 at the post-tests. The data used the Fisher test with a significant level of \(\alpha = 0.05\) to find out homogeneity in this study. After conducting the prerequisite test for normality test and homogeneity test and normal and homogeneous distributed data, then the hypothesis test will be carried out by t-test. Following are the results of the experimental class t-test:

| Table 3. Hypothesis Test Results. |
|-----------------------------------|
| **class** | **T-Test Results** | **Results** | **Test Decision** |
| | \(t_{\text{count}}\) | \(t_{\text{table}}\) | \(t_{\text{count}} > t_{\text{table}}\) | \(H_1\) Received |
| Experiment | 9,51 | 2,01 |

From table 3, it can be seen the results of the t-test show that \(t_{\text{count}} > t_{\text{table}}, 9,51 > 2,01\). In this case it is in accordance with the hypothesis test criteria that is if \(t_{\text{count}} > t_{\text{table}}\), then \(H_1\) is accepted. So, it can be concluded that the use of learning model Probing Prompting has a good influence on student learning outcomes in SMA N 1 Sukadana.

This research is an attempt to find the effectiveness of the application of the learning model type Probing Prompting to learning outcomes. Researchers used 2 samples in research this namely class XI MIA 2 (experimental class) and XI MIA 3 (control class) by using a sampling technique that is purposive sampling. This study begins by conducting a pre-test in advance with the aim of knowing the level of knowledge of students in the material provided before starting the core of the material to
be studied. Researchers here give several questions pre-test as many as 10 questions, with a multiple-choice question model. The results of the pre-test obtained are the average value of the experimental class 3.12% and the average value of the control class 2.64%, it can be seen that the readiness of students' knowledge is very lacking in the initial learning process. However, the researcher states that the score is greater pre-test in class XI MIA 2 than the score in pre-test class XI MIA 3.

Learning in 2 sample classes is done with 2 different models, the model in the control class (XI MIA 3) is the Discovery Learning which is a model that is used by educators while in the experimental class the model is applied Probing Prompting. The study was conducted in 4 meetings. The first meeting began with a pre-test and main hydrostatic legal material. The second meeting discussed the material of Pascal's law and Archimedes' law. At the third meeting, discussing the material Meniscus and the Capillary Symptoms and the fourth meeting discussing the material Viscosity and Stokes's Law as well as the post-test.

Post-test was conducted at the fourth meeting where researchers gave multiple choice questions of 10 items, it can be seen that in the post-test this value obtained by students was quite satisfying especially in the experimental class using the learning model Probing Prompting. With the value obtained is the average value of the control class 6.04% and the experimental class gets an average post-test of 8.20%, it can be said that the score or average value of the pre-test in the experimental class is greater than the average value post-test obtained by the control class. Referring to the following results show that the experimental class learning outcomes with the application of the model Probing Prompting are greater than the control class that uses the learning model Discovery Learning.

Calculation of N-Gain in the acquisition of pre-test and post-test obtained the value of N-Gain control class 0.42 that is with moderate criteria, the value of N-Gain in the experimental class got a value of 0.74 with a high category. The results obtained, stated learning outcomes using the learning model Probing Prompting increased greater than the control class with the application of the model Discovery Learning. In accordance with the value data post-test and pre-test and the N-gain values that have been obtained, thus the implementation of the learning model is Probing Prompting able to provide an increase in the learning outcomes of class XI MIA 2 on static fluid material.

This research has succeeded in improving learning outcomes by using the learning model Probing Prompting which has several steps in its use namely, exploration, elaboration, confirmation, with learning activities that encourage students to think actively in the classroom and find out for themselves about the lesson or material to be delivered by educators while in class. Phase Exploration, researchers provide questions related to the material that was previously designed in accordance with the learning objectives to be achieved, then researchers give 1-15 seconds to think about the answers to these questions. Elaboration, the phase in which the researcher randomly appoints students to answer the questions given, if the answers given by students are correct then the same question is posed to other students to ensure that all students are actively involved in the learning process and if the answers from the participants students are wrong, then asked another question that requires students to think in the direction earlier so that students can answer correctly. The last phase is confirmation, the phase where the educator asks other students to give examples or other answers that support the previous answer so that the answers become complex, then students and educators ask questions and answers about material that is not yet understood by students and educators ensure to students that the learning competency has been achieved.

The increase that is influenced by the application of the model is evidenced by the value post-test in the experimental class and the control class which were tested using the t-test and effect size with the results obtained by t count which is higher than t table that is 9.51 > 2.01 and the test effect size shows (d = 1.021 <0.8 then there is an influence and effect in learning outcomes by using the learning model Probing Prompting on static fluid material. The research is a stage in order to find out how effective it is in the use of learning models Probing Prompting learning outcomes for student for the subject of static fluid, the use of this model is carried out by educators holding physics in SMAN 1 Sukadana, with a percentage of the results obtained ie 91.0% with very good category. Therefore, the learning model Probing Prompting can support efforts to improve student learning outcomes.
4. Conclusion

Based on the data description and discussion, the researcher concludes that the use of the learning model is Probing Prompting effective on learning outcomes. This is evidenced by the test effect size. From the effectiveness testing using the effect size obtained the results of the test effect size is 5.08 so that it is included in the moderate category $d = 1.021 < 0.8$. Thus, the researchers concluded that the learning model was Probing Prompting effective in improving concept understanding.

Testing is also carried out to determine the effect of the model on learning outcomes by using a t-test with results $t_{\text{count}}$ is 9.51, and the value of $t_{\text{table}}$ is 2.01 then according to the existing criteria if the value of $T_c > T_t$ then $H_0$ is rejected and $H_1$ is accepted. Researchers concluded from the test that the learning model Probing Prompting Has an effect on student learning outcomes. The effectiveness of the model Probing Prompting to increase student learning outcomes, as evidenced by the average value in the experimental class was better than in the control class. In the control class the average value of student learning outcomes is 3.40%, while in the experimental class it is 5.08%.

5. References

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