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Best Practice Efforts to improve student learning outcomes through the application of the discovery learning model with Phet media in dynamic fluid material for class XI MIPA-3 Al Qona'ah Baleendah High School

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Abstract

Best Practice Efforts to improve student learning outcomes through the application of the discovery learning model with Phet media in class XI MIPA-3 SMA Al Qona'ah Baleendah fluid dynamic material. The purpose of writing this best practice is to describe and explain the author's Best Practice, an effort to improve student learning outcomes through the application of the discovery learning model with Phet media in a dynamic fluid material. The targets for this Best Practice are students in class In implementing this activity there are 4 stages including planning, implementation, observation, and reflection. From the Best Practice results, it was found that the learning process using the Discovery Learning learning model with Phet simulation learning media can improve students' abilities in transferring knowledge, developing scientific literacy and numerical literacy in understanding Fluid Dynamics material, by thinking critically, creatively, communicatively, and collaboratively. The results obtained after learning using the Discovery Learning model with Phet simulation learning media, resulted in a significant increase in results. The percentage of student completion increased from 59.4% to 90.6%. There was an increase in the completion of conventional learning outcomes with the Discovery Learning model learning outcomes of 31.2%.

Keywords: *best practice, learning outcomes, fluid, discovery learning*

INTRODUCTION

Learning is the process of interaction between students and educators and learning resources in a learning environment (Law No. 20 of 2003). In the learning process in the classroom, students should be placed as subjects and no longer as objects, therefore the true learning process is the student's learning activities in achieving learning goals. Student-centered learning aims to ensure that students have high motivation and the ability to learn independently and are responsible for developing knowledge, skills, and attitudes.

In the world of education, physics is a branch of science that requires students to be active and directly involved in the learning process. According to Ningsih et al (2019), physics learning is better if its implementation uses models and methods that allow students to be more active and include students right during learning, therefore the material presented is easier to understand.

However, in reality, students are still not able to master the expected competencies. This is evident from the students' physics learning outcomes which are still low. Based on the results of the pre-test on students' knowledge and skills competencies with KKM 70, of the 32 people, only 19 people (59.4%) had completed it and 13 people (40.6%) had not completed the knowledge aspect. Meanwhile, in the skills aspect, only 16 people (50.0%) have completed it, so there are still 16 people (50.0%) who have not completed it.

This low learning outcome is caused by several things such as; 1) students are still not used to learning independently, 2) students think Physics is difficult, so students are reluctant to learn, 3) teachers have not used learning media that can help instill students' concepts, and 4) teachers have not implemented learning models that can guide students in find out for yourself. best practice, learning outcomes, fluid, discovery learning.

To overcome the problems above, one solution that can be done is to apply the Discovery Learning learning model. Discovery Learning is a learning model that directs students to understand concepts, meanings, and relationships through an intuitive process until finally students can conclude (Ariyana, et al., 2019). Through Discovery students can use their mental processes to discover several concepts and principles. Discovery is carried out through observation, classification, measurement, prediction, determination, and inference (conclusion).

Learning using the Discovery Learning model is intended to encourage students to be active in discovering concepts (Rosdiana et Al, 2017). The Discovery Learning model is a HOTS-oriented learning model. Apart from learning models that can improve the quality of learning, learning assessments also function to develop students' high-level thinking abilities. Learning assessment can be carried out through various instruments in the form of questions or non-test instruments in the form of observation sheet questionnaires (Nabila, 2021).

Problems that often arise and are encountered by students in learning are misunderstandings when studying physics material. The reason is that teachers only teach abstract physics through classroom learning, are not equipped with experimental processes in the laboratory, and utilize the help of technology-based learning media.

The use of PhET simulations can help students when carrying out practicums or activities in the laboratory will still be carried out well because in schools there are still many laboratories that lack materials and equipment, making the practical process hampered, so with this PhET simulation can make students carry out practicums efficiently. Well, it makes the learning process more fun and motivates students to learn so that students become more active during the learning process.

METHODOLOGY

The purpose of writing this Best Practice is to describe and explain the author's Best Practice to improve student learning outcomes through the application of the discovery learning model with Phet media in dynamic fluid material for class XI MIPA-3 SMA Al Qona'ah Baleendah. The targets for this Best Practice are students in class

The method used in implementing this Best Practice is a cooperative learning method through the Discovery Learning learning model and discussion and question and answer methods with the help of Phet simulation media. The activity steps in this Best Practice are:

1. Planning

   In the planning stage, the activities carried out are as follows: a) Creating a Learning Implementation Plan (RPP). b) Prepare teaching materials. c) Make LKPD

2. Implementation

   In the implementation stage of learning activities carried out by the syntax of the Discovery Learning learning model, the steps are as follows:

Work Steps	Teacher Activities	Student Activities
Stimulation	The teacher begins the learning activity with Asking questions, distributing LKPD and teaching materials, showing Phet simulations, and other learning activities that lead to preparation for problem-solving.	➢ Students are faced with something that confuses, then continue not to make generalizations, so that the desire to investigate for themselves arises. ➢ Stimulation in this phase functions to provide learning interaction conditions that can develop and help students
Problem Statement	The teacher allows students to identify as many problem agendas as possible that are relevant to the lesson material, and then one of them is selected and formulated in the form of a temporary answer hypothesis to the problem	The selected problem must then be formulated in the form of a question, or hypothesis, namely a statement as a temporary answer to the question asked.

Work Steps	Teacher Activities	Student Activities
	question).	
Data Collection	When exploration takes place, the teacher also allows students to collect as much relevant information as possible to prove whether the hypothesis is true or not.	This stage functions to answer questions or prove whether the hypothesis is true or not. In this way, students are allowed to collect various relevant information, read literature, observe objects, interview sources, carry out their trials, and so on.
Data Processing	The teacher provides guidance when students process data.	Data processing is the activity of processing data and information either through interviews, observations, etc., then interpreting it. All information resulting from reading, interviews, observations, and so on, is processed, randomized, classified, tabulated, even if necessary, calculated in a certain way, and interpreted at the highest level. certain beliefs.
Verification	Verification aims to ensure that the learning process will run well and creatively if the teacher allows students to discover a concept, theory, rule, or understanding through examples they encounter in their lives.	Students carry out careful examinations to prove whether or not the hypothesis set earlier is true with alternative findings, linked to the results of data processing.
Generalization	The process of drawing a conclusion that can be used as a general principle and applies to all similar events or problems, taking into account the verification results.	Based on the verification results, the principles underlying the generalization are formulated.

3. Observation

   At this stage, the teacher carries out observations of the progress of the Physics learning process using the Discovery Learning learning model to see students' learning activities. Observations were carried out using student observation sheets.

4. Reflection
   The results of observations and attendance lists will be used as reflections at the next meeting

RESULTS AND DISCUSSION

The results that can be reported from this Best Practice are described as follows:

1. This learning process applies the Discovery Learning Learning Model with discussion and question-and-answer methods and is assisted by Phet simulation learning media so that teaching and learning activities in class are enjoyable.
2. Discovery Learning The Learning Model is a learning model that directs students to understand concepts, meanings, and relationships through an intuitive process until finally, students can conclude, it is also a HOTS-oriented learning model.
3. Learning using the Discovery Learning model is proven to be able to improve students' ability to transfer knowledge, and develop scientific literacy and numerical literacy in understanding Fluid Dynamics, by thinking critically, creatively, communicatively, and collaboratively, and the level of student participation increases as seen from the number of responses and questions. When the Phet application is displayed, students can calculate pressure and velocity at different cross-sections directly without calculating using equations, just by fiddling with the Phet application program. In this lesson, students' understanding of the concept of Fluid Dynamics is built by students through observation and discussion which requires students' ability to think critically.

The results obtained after learning using the Discovery Learning model with discussion and question and answer methods and assisted by Phet simulation learning media, resulted in a significant increase in results. This is evident from the results of the evaluation of students' physics learning in the form of a post-test which was carried out at the end of the lesson. Of the 32 students in class XI MIPA-3, 29 people (90.6%) completed it, and 3 people (9.4%) %) which is still incomplete in the knowledge aspect. Meanwhile, in the skills aspect, 27 people (84.4%) have completed it, so there are still 5 people (15.6%) who have not completed it.

From the Conventional Learning Results (before using the Discovery Learning model) and after using the Discovery Learning model, the following table data is obtained:

Table 1 Student Learning Results before and after using the Discovery Learning model

No	Nama Siswa	L / P	Pembelajaran Konvensional	Pembelajaran Discovery Learning
1	Ai Risma Rusmiati	P	80	100
2	Alvi Fadilah	P	73	93
3	Anisa	P	53	73
4	Arif Fardila	L	73	80
5	Asep Sumarna	L	33	73
6	Difia Suci Hermawati	P	73	80
7	Eka Ramdani	L	60	87
8	Erni Komalasari	P	53	80

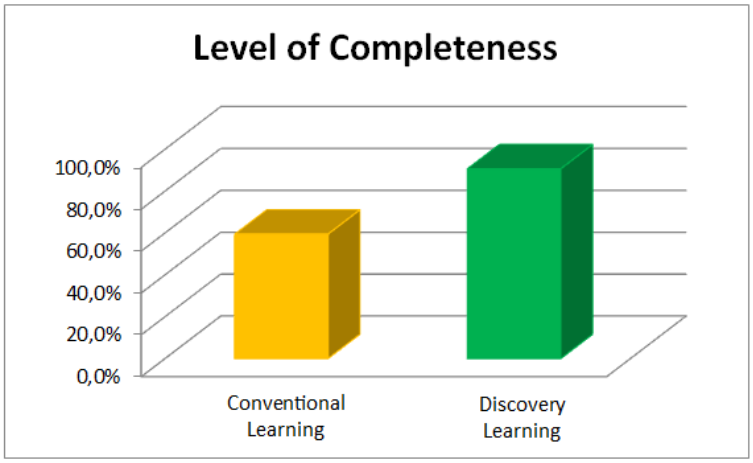
The data in the table above shows the results of conventional learning (before using the Discovery Learning model). We compare it with the learning results after using the Discovery Learning model. There is a significant change in physics learning outcomes towards these learning outcomes. This is illustrated in the table as follows:

Table 2 Level of Learning Completeness

Information	Conventional Learning	Discovery Learning
The highest score	87	100
Lowest Value	20	47
Average value	63,6	81,1
Number of students complete	19	29
Level of Completeness	59,4%	90,6%

Graphically, it can be depicted that the level of learning completeness in conventional learning and the Discovery Learning learning model is as follows:

Graph 1 Level of Learning Completeness



Based on the results of this research, data was obtained that the results of conventional learning carried out on October 3 2022 showed that 32 students in class 63.6 with a reference to Minimum Completion Criteria (KKM) 70. Meanwhile, with the Discovery Learning learning model, the learning outcomes carried out on October 13 2022 in class mean score of 81.1.

The percentage of student completion increased from 59.4% to 90.6%. There was an increase in the completion of conventional learning outcomes with the Discovery Learning model learning outcomes of 31.2%. This shows that the application of the Discovery Learning learning model can improve physics learning outcomes in Fluid Dynamics material in class XI MIPA-3 SMA Al Qona'ah Balendah semester 1 of the 2022/2023 academic year.

CONCLUSIONS

Based on the results of implementing Physics learning on Fluid Dynamics material using the Discovery Learning model with discussion and question and answer methods and assisted by Phet simulation learning media which was carried out on Thursday 13 October 2022 at SMA Al Qona'ah Baleendah, the author found that the learning process and results students improved and were better than learning in other units so that the author concluded it as best practice. This can be seen from the increase in the completeness of student learning outcomes in following the Discovery Learning model. This increased physics learning outcome shows that the Discovery Learning learning model can improve physics learning outcomes, whose completion level was originally 59.4%, increasing by 31.2% to 90.6%.

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