Improving Students' Physics Activities and Learning Outcomes Using Advance Organizer Learning Models

by

Rita Destini
Universitas Muslim Nusantara Al-Washliyah Medan
North Sumatra, Indonesia
Email: ritadestini@umnaw.ac.id

Abstract

This study aims to determine whether there is an increase in students' physics activity and learning outcomes by using the advanced organizer learning model. Subjects in this study were 30 students in class XI, SMA Sumatra Tanjung Morawa. The objects of this research are the activities and the results of students' physics learning on Fluid Mechanics using the advance organizer learning model. The research instruments used were observation and tests. This type of research is Classroom Action Research (PTK). Research observation is in the form of activities to observe student activities. And for the multiple choice test, 23 questions were compiled in cycle I. In the second cycle, the test was in the form of multiple choices which consisted of 24 questions. Students' physics learning activity at the first meeting reached 44.6% and at the second meeting reached 53.74% with the percentage of students' classical physics learning activity in the first cycle of 49.8%. Meanwhile, the students' physics learning activity at the fourth meeting was 76.68% and at the fifth meeting it was 87.52% with the percentage of students' classical physics learning activity in the second cycle was 82.1%. The completeness of the students' physics learning outcomes in the first cycle classically reached 50%. The completeness of students' physics learning outcomes in the second cycle classically increased by 33%. In addition, the percentage of student learning outcomes in the second cycle of physics completeness reached 83%. The results showed that the use of an advance organizer learning model can improve the activity and learning outcomes of students in Physics in class IX SMA Sumatra Tanjung Morawa in the 2016/2017 academic year.

Keywords: Activities, Learning Models, Advance Organizer, Learning Outcomes

Introduction and Background of the Problem:

The fundamental element to student success in learning physics can be perceived from the ability of students to understand three main things, namely concepts (understanding), laws (principles) and theories. Improving the achievement of optimum student learning outcomes is an indicator of the student's ability to understand the three points of physics. Physics prioritizes the development of a scientific attitude such as curiosity; the habit of looking for evidence before receiving a statement (veneration for evidence), a flexible and open attitude with scientific ideas (flexibility), the habit of asking critically (critical reflection) and sensitive attitudes to living things and the environment (sensitivity to living things and environment). In the physics learning strategy, it is necessary to have learning that uses a scientific approach. Therefore, the teacher's responsibility is to create a classroom atmosphere so that learning interactions occur and eventually motivate students to study well and more seriously (Huda, 2014).

To meet the above demands, the teacher must always innovate using an attractive learning model so that it can help convey the knowledge they have (Ngalimun, 2014). Deciding on various methods, models, strategies, approaches and learning techniques is the main mechanism. One alternative that can be used is the advanced organizer learning model proposed by Ausubel (1978). With this model it is hoped that it can improve students' understanding of physics concepts in high school. The advance organizer learning model is a learning model used to see the meaning of the concepts to be studied and to relate them to existing concepts and to make students more active in the learning process. The advantage of this model is that it can link old material with later material by using an Ausubel organizer (general framework) (Joyce, 2016). In addition, the advance organizer learning model can increase student creativity and activity in the learning process, and the occurrence of meaningful learning.

The Nature of Learning:

Anthony Robins in Trianto (2016) says that "Learning is the process of creating a relationship between something (knowledge) that is already understood and something (knowledge) that is new." Gagne in Dahar (2011, p. 2) argues that "learning can be defined as a process in which an organization changes its behavior as a result of experience." Slameto in Hamdani (1988, p. 20) states "that learning is an attempt by a person to obtain a whole new change in behavior, as a result of one's own experiences in interaction with the environment". Meanwhile, Hamalik (2013, p. 36) states "that learning is a process of an activity and not an outcome and goal. Learning is not only remembering but it is broader than that, namely experiencing."

The learning process occurs in many ways, whether intentional or unintentional and lasts all the time and leads to a change in the learner. The change in question is a change in behavior in the form of knowledge, understanding and habits that have just been acquired by individuals. Experience is an interaction between individuals and the environment as a source of learning (Sardiman, 2011). From the above explanation, it can be concluded that learning is a process of gaining knowledge and experience in the form of behavior change which tends to continue to influence the behavior model in an increase due to the interaction with the environment.

The Nature of Learning Outcomes:

Purwanto (2000, p. 54) says "learning outcomes are changes in behavior that occur after following the learning process in accordance with educational goals. Learning to seek behavioral changes in these domains so that learning outcomes are behavioral changes in the cognitive, effective and psychomotor domains." On the other hand, Istarani (2015, p. 18) says learning outcomes can be classified into three, namely: (1) effectiveness, (2) Efficiency, (3) Attractiveness (appeal).

Learning effectiveness can usually be measured by the level of achievement of the learning and learning efficiency is usually measured by the ratio between effectiveness and the amount of time that will be used or the amount of learning costs used, while the attractiveness of learning is usually measured by observing the tendency of students to keep learning. The attractiveness of learning is closely related to the attractiveness of the field of study, where the quality of learning will affect both. Thus the learning outcomes can help in designing a learning system.

Learning Activity:

Majid (2013, p. 31) states that learning activities are the process of changing experiences into understanding; understanding into wisdom, and wisdom into action. Modern education focuses on genuine activities, where students learn while working. Activities are principles that are very important in learning interactions. In principle, learning is doing. It is to change behavior into doing activities. There is no learning if there is no activity. In connection with this, today's learning systems emphasize the utilization of the principle of activities in the learning and learning process to achieve predetermined goals.

Advance Organizer Learning Model:

David Ausubel developed the Advance Organizer learning model which discusses verbal learning in relation to three things: (1) how knowledge is managed, (2) how the mind works in processing new information, and (3) how teachers can apply these ideas to the curriculum and learning when they present new material to students (teaching / instructional) (Joyce, et al, 2016, p. 280). At the heart of Ausubel's theory, learning is meaningful process. In order for meaningful learning to occur, new concepts or new information must be linked to existing concepts in students' cognitive structures.

Based on Ausubel's theory, in helping students impart new knowledge from a material, it is necessary to have initial concepts that students already have related to the concepts to be studied. If it is associated with a problem-based learning model, students are able to work on authentic problems. Ausubel believes that students should be active knowledge constructors, only that they need to be directed to have meta levels of discipline and metagonism to respond to teaching productively rather than initiating teaching with their world of perceptions and guiding them to induce structures. The advance organizer model is designed to strengthen students' cognitive structure, their knowledge of certain subjects and how to properly manage, clarify and maintain that knowledge. In other words, the cognitive structure must match what kind of knowledge we have in mind, how much knowledge is and how it is managed.

Research Design:

The research model applied was classroom action research (PTK). The model describes four steps (and repetitions) (Kunandar, 2008). According to Arikunto (2010, p. 137) the procedure for implementing classroom action research is carried out in the form of a cycle. Each cycle performs these following steps, namely, 1) Planning; 2) Implementation; 3) Observation; 4) Reflection. After implementing the learning process by following steps 1 to 3, step 4 of reflection is carried out to see whether the implementation of the learning process has been successful or not (Tampubolon, 2014). If the learning process has not achieved the results according to the learning objectives, cycle II is carried out with the implementation of learning following steps 1 to 4.

Research Subjects and Objects:

The subjects of this study were all students of class XI IPA at the Sumatra Private High School Tanjung Morawa, TP 2019/2020 and the objects in this action research were actions as an effort to increase student activity and learning outcomes using the advanced organizer learning model.

Results:

After carrying out the learning process, at the 3rd meeting, a test was conducted to determine the research results.

Results of Observation of Student Activities in Cycle I:

There are 30 students who were the objects of this study. The results of observations of student learning activities were obtained in the following table:

Table 1 Students' physics learning activities I and II meetings II Cycle I

Meeting I (%)	Meeting II (%)	Average (%)
44.6	53.74	49.8

From table 1 we can see that student learning activities in cycle I are still low.

Results of Students' Physics Learning Evaluation in Cycle I:

There were 30 students who took the test with static fluid material. There were 15 (50%) students who achieved the learning completeness requirements, namely achieving a value greater than or equal to 65, while 15 students (50%) did not achieve complete learning. The results of this evaluation are presented in Table-2.

Table 2 Percentage of Completeness Learning Results in Cycle Physics I

Mark	Criteria	Frequency	Percentage
$0 \leq$ Mark ≤ 64	Not completed	15	50%
$65 \geq$ Mark $\geq$ 100	Completed	15	50%

Based on the research data, the students' learning outcomes of physics in cycle I showed that the level of student mastery of the Static Fluid material was in the category that had not yet reached the completeness of learning, namely 50%. The results of the learning test in the first cycle were not optimal. This can be seen from the results of observations of students' physics learning activities which reached 49.8%. And the results of students' physics learning test only reached 50%.

Results of Observation of Student Activities in Cycle II:

From the results of cycle I, it is known that the learning carried out has not been able to increase learning activities and the learning outcomes are still low, so the research continues to cycle II. The learning material was continued with Dynamic Fluid material. The results of the research from cycle II are seen in the following table,

Table 3 Students' Physics Learning Activities I and II Meetings II Cycle II

Meeting III (%)	Meeting IV (%)	Average (%)
76.68	87.52	82.1

From Table-3, it can be seen that there is an increase in student learning activities from cycle I to cycle II. There is an increase in students' physics learning activity from cycle I of 49.8% to cycle II of 82.1%, so that there is an increase in classical activity of 32.3%.

Results of Student Physics Learning Evaluation Cycle II:

From the results of the tests given in Cycle II, it was found that the classical completeness of the physics learning outcomes of students was 83% with the number of students who scored ≥ 65 as many as 25 students, this can be seen in the table below:

Table 4 Percentage of Completeness of Studying Physics Results Cycle II

Mark	Criteria	Frequency	Percentage
0 ≤ Mark ≤ 64	Not completed	5	16.7%
65 ≥ Mark ≥ 100	Completed	25	83.3%

There are 30 students who took the test, there were 25 (83.3%) students who reached the learning completeness requirements, namely achieving a value greater than or equal to 65 while 5 students or 16.7% did not achieve learning completeness. It can be seen that there is an increase in student learning outcomes from cycle I to cycle II by 33.3%.

Discussion:

Based on the research results, after being given the action in cycle I to cycle II through the advance organizer learning model, there was an increase in student activity in each cycle. It was found that the increase in students' physics learning activity in cycle I and cycle II was 32.3% (cycle I = 49.8%; cycle II = 82.1%). The increase in learning activities can be seen in Figure-1 below:

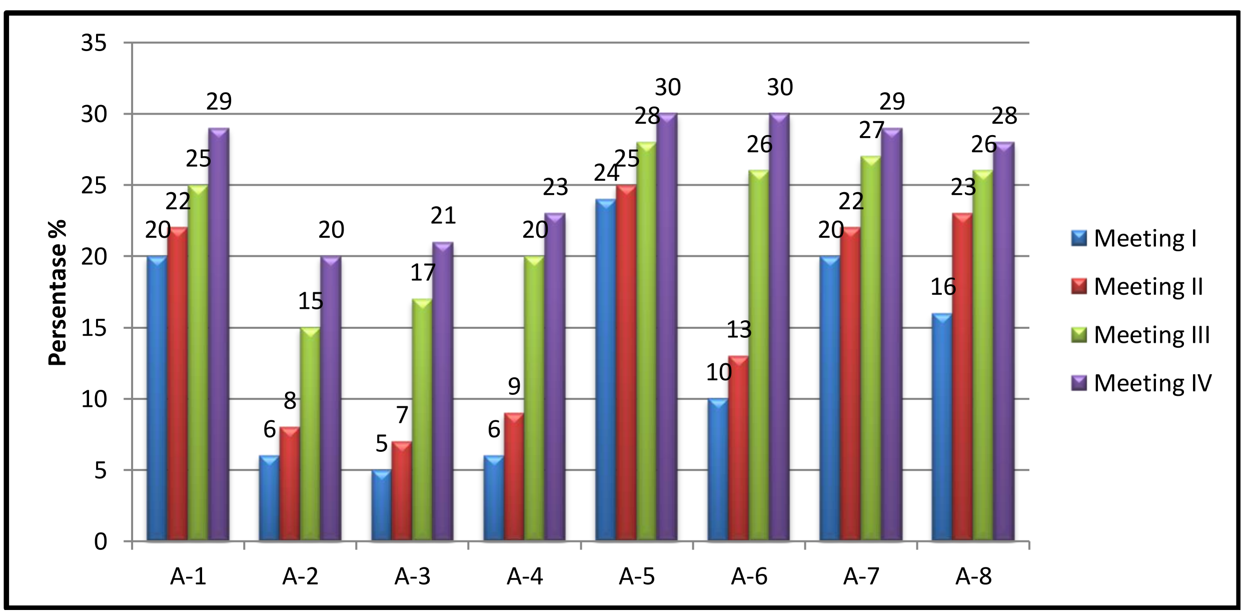

Figure 1 Bar Diagram for the Improvement of Students' Physics Learning Activities

Based on the results of the research, after being given action in cycles I and II using the advance organizer learning model, it can be seen that an increase in student physics learning outcomes from 50% in cycle I to 83% in cycle II that can be seen in Figure 2 below:

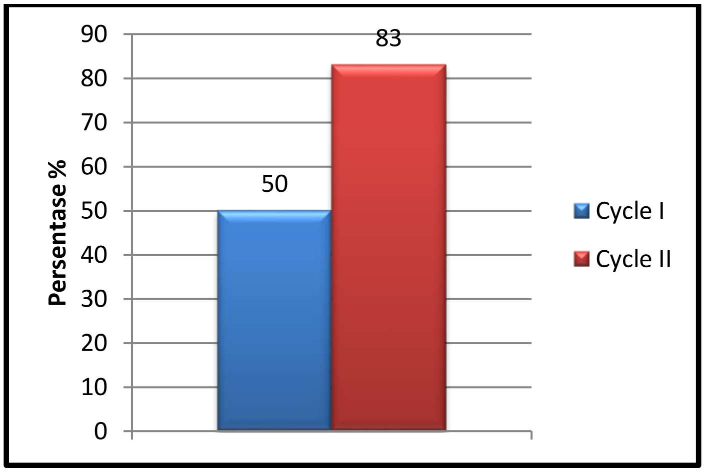

Figure 2 Bar Diagram for the Improvement of Students' Physics Learning Outcomes

From the results of the research in cycle I, it was concluded that the use of the advance organizer learning model that was carried out cannot improve learning outcomes to become better; this may be due to the unfamiliarity of students following the learning process using the advance organizer learning model. The percentage of students 'physics learning activity that runs is only 49.8% and the percentage of students' physics learning outcomes completeness only reaches 50%.

In Cycle II action, it is an improvement in learning carried out in cycle I. And of the 30 students, 25 students have succeeded in solving questions about the Dynamic Fluid material, and 5 students have not succeeded. That is, the completeness of the students 'physics learning outcomes increased by 33.3% with the percentage of students' physics learning outcomes in cycle II of 83%. This is because the advance organizer learning model can make students easily understand physics material. With the advance organizer learning model, physics material which is initially abstract according to students becomes more concrete and existent so that students better understand the material presented. This process has increased interest in learning and arouses students' curiosity.

Based on the results of the research discussion above, it is proven that using an advance organizer as a learning model implemented in physics learning about Fluid Mechanics material can increase the activity and learning outcomes of students in class XI of SMA Sumatra Private High School in Tanjung Morawa in Academic Year of 2019/ 2020.

Conclusion:

Based on the results of data analysis, it can be concluded that:

i. Students' physics learning activity using the advance organizer learning model on the subject matter of Fluid Mechanics at the Sumatra Private High School Tanjung

Morawa has increased significantly from cycle I to cycle II. This shows that the average percentage of student activity increases and is achieved.

ii. Students' physics learning outcomes using the advance organizer learning model on Fluid Mechanics material at the Sumatra Private High School Tanjung Morawa increased significantly from cycle I to cycle II. Based on the defined learning completeness criteria, it can be concluded that the students' completeness in learning physics in the Fluid Mechanics material has been fulfilled or achieved.

iii. Advance organizer learning model can increase student activity and physics learning outcomes in Fluid Mechanics learning at (SMA) Sumatra Private High School Tanjung Morawa

Recommendations:

The recommendations put forward based on the discussion and conclusions of the research results are:

i. It is suggested that students study the subject matter of physics in advance so that they can understand physics concepts more easily.

ii. For teachers, so that they pay more attention to learning models that are in accordance with existing materials in the physics subject.

iii. For schools, the advance organizer can be disseminated learning model to teachers who do not yet know the benefits and how to use the advance organizer learning model

iv. For future researchers who want to research the same problem, they can increase their creativity by using an advance organizer learning model that is more in-depth and interesting.

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