



THE IMPLEMENTATION OF DISCOVERY LEARNING MODEL TO IMPROVE STUDENTS' LEARNING ACTIVITIES AND COGNITIVE ABILITIES OF SMP NEGERI 1 WAKORUMBA UTARA

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Abstract

This study aims to improve student learning activities and cognitive abilities through discovery learning model on the material characteristics and classifications of living creatures in class VII 1 of SMP Negeri 1 Wakorumba Utara. This research was conducted in the 2nd semester of the academic year 2015/2016. This type of research is Classroom Action Research (CAR) with three learning cycles. Each cycle goes through four stages: (1) planning; (2) implementing actions; (3) observation and (4) reflection. The data source of this study was an assessment using observation sheets of student learning activities, evaluation questions as tests of cognitive abilities and observation sheets of teacher activities in cycle I, cycle II and cycle III. The data obtained were analyzed using descriptive analysis. The success of the learning activities of the students in cycle I achieved a mean score of 3.1, cycle II 3.5 and cycle III 3.5. The average achievement of the cognitive abilities of students in the first cycle was 66.36. Cycle II was 79.09 and Cycle III was 78.18. The mean achievement of teacher activity in the first cycle was 3.2, the second cycle was 3.6 and the third cycle was 3.7. Based on the results of the study concluded that the application of discovery learning models can improve learning activities and cognitive abilities of students on the subject matter of the characteristics and classifications of living creatures of class VII1 students of SMP Negeri 1 Wakorumba Utara.

Keywords: Discovery Learning Model, Student Learning Activities, Student Cognitive Abilities

A. Introduction

Students are directed to develop the competencies they have concerning the natural environment in learning biology science. Besides, in learning activities, teachers have challenges when delivering subject matter because they must pay attention to the characteristics of the material and the conditions of students being taught. The solution used to overcome this problem is to make improvements in the teaching and learning process by optimizing the learning model.

Learning that can be developed to overcome this problem is by using the Discovery Learning model. Discovery Learning Method is understanding concepts, meanings, and relationships, through an intuitive process to reach the conclusion (Budiningsih, 2005: 43). The Discovery Learning model can provide opportunities for students to learn actively (Sardiman, 2005: 145). This model was chosen because it emphasizes more learning that makes students

active in finding their own concepts so students think more creatively and have the goal of increasing student involvement in obtaining and processing learning gains.

B. Literature Review

1. The Nature of Learning

Learning is an active process, a function of the whole surrounding environment, when we talk about learning it means talking about how the behavior changes through practice (skill) and experience (Sudjana, 1989: 5). This is as stated by Lester D. Crow & Alice Crow in (Roestiyah, 1982: 10) as follows "Individual changes in habits, knowledge, and attitudes". This definition is said that a person experiences a learning process if there is a change from not knowing to know, in mastering science.

Learning and teaching are two words that are often interpreted the same but actually, they have different meanings. In the context of education, the teacher teaches that students can learn and master the content of the lesson to achieve something determined objectives, which can affect changes in attitudes, and skills of a student.

2. Learning Outcome

The learning outcomes are obtained through the learning process, where the learning process is a reciprocal activity between the teacher and students. According to Mulyasa (2009: 244) learning outcomes are essentially an activity to measure changes in behavior that have occurred in students. In general, learning outcomes will affect two forms: (1) students will have a perspective on their strengths and weaknesses for the desired behavior; (2) they find that the desired behavior has increased in stages or two stages so that the gap between the appearance of the current behavior and the desired behavior arises again.

In connection with this, according to Suprijono (Thobroni & Mustofa, 2013: 23), learning outcomes are patterns of acting values, understandings, attitudes, aspirations and skills. Slameto (2010: 54) suggests the factors that influence learning are generally grouped into internal factors and external factors. Internal factors in question are factors originating from within students which include physical and psychological factors. External factors are factors that originate from outside the students themselves, namely school factors.

3. Learning Activities

According to Arikunto (Iskandar, 2009: 128) student activity is the involvement of students in the form of attitudes, thoughts, attention, and activities in learning activities to support the success of the learning process. Student activity during the teaching and learning process is one indicator of the desire of students to learn.

The types of learning activities are classified by Diedric in Sardiman, (2007: 101) as follows:

- a. Visual activities, for example, reading, paying attention to demonstration pictures, experiments, and other people's work.
- b. Oral activities, stating, formulating, asking, giving advice, issuing opinions, conducting interviews, discussions, and interruptions.
- c. Listening activities listen to conversation, discussion, music, and speeches.
- d. Writing activities, writing stories, essays, reports, questionnaires, and copying.
- e. Drawing activities, drawing, making graphics, maps and diagrams.
- f. Motor activities, which include conducting experiments, making construction, repairing models, playing and gardening.
- g. Mental activities, responding, remembering, solving problems, analyzing, seeing relationships and making decisions.
- h. Emotional activities, paying interest, feeling bored, excited, excited, passionate, brave, calm and nervous.

4. Discovery Learning Model

This learning model emphasizes learning that makes students active in finding their own concepts including discovery methods (Melani, 2012). The Discovery Learning method has several advantages, according to Jerome Bruner (Dahar, 1989: 103):

- a. Has a better transfer effect than other learning outcomes.
- b. Improve student reasoning and the ability to think freely.
- c. Train students' cognitive abilities to find and solve problems without the help of others.

The discovery learning model, students are encouraged to learn independently by themselves, as revealed by (Divine, 2012). Applying Discovery Learning methods repeatedly can improve the ability of self-discovery of the individual concerned. Shah (2004) steps to apply the discovery learning model, namely:

a. *Stimulation (stimulation or stimulation).*

At this stage students are faced with something that raises a question mark, then proceed to not give generalizations, so that the desire arises to investigate on their own. Besides that the teacher can start teaching and learning activities by asking questions, encouraging reading books, and other learning activities that lead to the preparation of problem-solving.

b. *Problem statement (a statement or problem identification)*

After stimulation, the next step is the teacher gives the opportunity for students to identify as many agendas as possible that are relevant to the subject matter, then one of them is chosen and formulated in the form of a hypothesis (temporary answers to problem questions).

c. *Data collection*

When exploration takes place the teacher also provides an opportunity for students to gather as much information as is relevant to prove whether or not the hypothesis. At this stage, the function is to answer the question or prove whether or not the hypothesis. Thus students are given the opportunity to collect a variety of relevant information, read literature, observe objects, interview with speakers, conduct their own trials and so on.

d. *Data processing*

All information from reading, interviewing, observing, etc., are all processed, randomized, classified, tabulated, even if necessary calculated in a certain way and interpreted at a certain level of trust.

e. *Verification*

At this stage, students conduct a careful examination to prove whether or not the hypothesis set earlier with alternative findings, connected with the results of data processing.

f. *Generalization (drawing conclusions or generalizations)*

The generalization stage or drawing conclusions is the process of drawing a conclusion that can be used as a general principle and applies to all events or problems that are the same, taking into account the results of verification

According to Bruner, a person's cognitive development occurs through three stages that are determined by how the environment, namely:

- a. In the practical phase, a person engages in activities to understand the surrounding environment, that is, in understanding the world around him children use motor knowledge, for example through bites, touches, grips, and so on.
- b. In the iconic stage, a person understands his objects or world through pictures and verbal visualization. That is, in understanding the world around them children learn through forms of imagery (appearing) and comparison (comparison).
- c. Symbolic stage, someone has been able to have abstract ideas or ideas that are strongly influenced by his ability in language and logic. In understanding the world around them children learn through language symbols, logic, mathematics, and so on

C. Methods

1. *Research Design*

This study was conducted in the 2015/2016 school year material characteristics and classification of living things with 22 students, consisting of 8 male students and 12 female students. This type of research is a classroom action research (CAR) carried out in three cycles. Each cycle consists of planning, implementing actions, observing and reflecting. In conducting research, researchers are assisted by two observers to observe student activities during the learning process.

2. *Instrument*

The research instrument used 2 types of instruments, namely: Learning outcomes test using 10 numbers multiple-choice questions. Also used observation sheets of student and teacher activities in cycles I, II, and III.

3. *Data Analysis Techniques*

The data analysis technique in this research is descriptive statistics to calculate the average value of students in each cycle using the formula:

- a. Calculates the value of individual learning outcomes.

$$\text{Value} = \frac{B}{N} \times 100$$

Ket. B = Number of scores obtained.

N = Maximum score.

- b. Determine classical learning completeness

$$\% \text{ Complete Classics} = \frac{\sum TBI}{N} \times 100 \%$$

Ket. B = Number of scores obtained.

N = Maximum score.

- c. Determine classical learning completeness

Calculate the average score of teacher activity and student activity

$$\% \text{ the average score} = \frac{\text{total score}}{\text{maximum score}} \times 100\%$$

Success level of action

90% ≤ RS ≤ 100% : Very good

80% ≤ RS < 90% : Good

70% ≤ RS < 80% : Enough

60% ≤ RS < 70% : Less

0% ≤ RS < 60% : Very less (Arikunto, 2009: 35)

D. Findings and Discussion

1. Finding

The results of this study in the form of learning activities and cognitive abilities of students during the learning process take place in class. The data were analyzed using descriptive statistics in the form of determining the average value of learning activities and the cognitive abilities of students in cycle I to cycle III. Aiming to provide an overview of increased student learning activities and cognitive abilities on the subject matter of the characteristics and classifications of living things by using the Discovery Learning learning model.

Table 1. Average Data on Student Activity Results in the Cycle I

No	Student Activity	Group				Average
		I	II	III	IV	
1	Identify the topics that have been given	3.5	3	3.5	2.5	3.1
2	Formulate the main problem	3	4	3.5	3	3.3
3	Gather information to get explanations and problem solving	3	3.5	3	3.5	3.2
4	Present the results of the discussion as a final project	3.5	3.5	3	3	3.2
5	Reflecting or evaluating the problem being solved	3.5	3.5	2	3	3
Average						3.1

Based on Table 1. the mean score of student learning activities during the learning process activities in the first cycle was recorded at 3.1

Table 2. Students' Worksheet Assessment Results in Cycle I

No	Learning Outcome	The Number of Students	Percentage
1	Complete	8	36,63%
2	Not complete	14	63,63%
Amount		22	100%
Average		66,36	

Based on Table 2. It shows that the analysis of students' cognitive abilities tests shows that there are 8 complete students with a percentage of 36.36% and 14 students who have incomplete completed with a percentage of 63.63%.

Table 3. Average Student Activity Data on Cycle II

No	Student Activity	Group				Average
		I	II	III	IV	
1	Identify the topics that have been given	3.5	3.5	3.5	3.5	3.5
2	Formulate the main problem	3.5	3.5	4	3	3.5
3	Gather information to get explanations and problem solving	4	4	3.5	3	3.6
4	Present the results of the discussion as a final project	3.5	3.5	3.5	4	3.6
5	Reflecting or evaluating the problem being solved	3.5	3.5	3	4	3.5
Average						3.5

Based on table 3. The average student learning activities during the learning process activities in the second cycle was recorded at 3.5

Table 4. Students' Worksheet Assessment Results in Cycle II

No	Learning Outcome	The Number of Students	Percentage
1	Complete	14	63,63%
2	Not complete	8	36,36%
	Amount	22	100%
	Average	79,09	

Based on the analysis of students' cognitive abilities tests showed that the total students were 14 people with a percentage of 63.63% and 8 students who were incomplete with a percentage of 36.36%.

Table 4. Analysis of Student Learning Activities During Cycles III

No	Student Activity	Kelompok				Rata-rata
		I	II	III	IV	
1	Identify the topics that have been given	3.5	3	3.5	3.5	3.5
2	Formulate the main problem	4	3	3.5	3.5	3.5
3	Gather information to get explanations and problem solving	4	3.5	4	3	3.6
4	Present the results of the discussion as a final project	3	4	3.5	3.5	3.6
5	Reflecting or evaluating the problem being solved	3	4	3.5	4	3.6
Average						3.5

Based on table 4 the mean score of student learning activities during the learning process activities in cycle III was recorded at 3.5.

Table 5. Students' Worksheet Assessment Results in Cycle III

No	Learning Outcome	The number of students	Percentage
1	Complete	18	81.81%
2	Not complete	4	18.18%
	Amount	22	100%
	Average	78,18	

Based on the analysis of students' cognitive abilities tests, it shows that there are 18 complete students with a percentage of 81.81% and 4 incomplete students with a percentage of 18.18%.

2. Discussion

Based on the results of data analysis of student learning activities in the learning process in the first cycle that the mean score of student learning activities is 3.1 with a percentage. This shows that the application of the Discovery Learning model still needs improvement, including the allocation of time used is not by the indicators and learning objectives to be achieved in the learning process. Students are not accustomed to heterogeneous group discussion groups.

Based on the analysis of cognitive abilities test data of students in the first cycle obtained an average of 66.36. This is because students have not been able to detect the characteristics of living things. So the teacher must provide more guidance to students in working on classifying indicators evaluation questions so that improvements can be made and can be improved in the second cycle.

The observations for the second cycle of the average student learning activity of 3.5 showed that the application of discovery learning models had received good and interesting responses from each group. The average analysis of cognitive abilities in cycle II began to increase with a mean of 79.09. In this second cycle, each indicator of students' cognitive abilities has increased significantly because students have begun to work well together even though they must continue to be guided and coordinated to stay focused in accepting learning in class.

The results of the analysis of observations of the third cycle of action are the mean learning activities of students by 3.5. This shows that the discovery learning model is proven to be able to improve student learning activities ranging from cooperation, doing tests, formulating answers, listening to conversations / group discussions, solving problems and making decisions. The results of the analysis of cognitive abilities of students in cycle III decreased slightly in cycle III by 78.18.

Improvement in each cycle shows that the application of the discovery learning model has advantages, as according to Jerome Bruner (Dahar, 1989: 103): (1) The learning outcomes of the discovery have a better transfer effect than other learning outcomes, (2) Overall learning the findings enhance student reasoning and the ability to think freely, (3) Specifically learning discovery trains students' cognitive skills to find and solve problems without the help of others.

Based on the descriptions above it can be concluded that the learning activities and cognitive abilities of students the subject of the characteristics and classification of living things in class VII1 SMP Negeri 1 Wakorumba Utara can be improved through discovery learning learning models.

E. Conclusion

Based on this research, the conclusion is that:

1. The application of discovery learning models can improve student learning activities and cognitive abilities in the material characteristics and classifications of living creatures of class VII1 students of SMP Negeri 1 Wakorumba Utara. This is indicated by the average achievement of the cognitive abilities of students in the first cycle of 66.36 for the second cycle of 79.09 and the third cycle of 78.18.
2. Increased the average student learning activities in the first cycle by 3.1 second cycle 3.5 and third cycle 3.5.

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