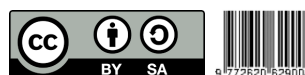# IMPLEMENTATION OF DISCOVERY BASED LEARNING AS AN EFFORT TO IMPROVE STUDENT'S KNOWLEDGE ABOUT MOVEMENT SYSTEM HEALTH IN HUMANS

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Abstract

This research dilators behind the problems that were overcome, among others: (1) Students' understanding of the material being taught; especially on Analyzing motion in living things, the human movement system, is still low; (2) The ability of students to solve problems in science learning is not optimal; And (3) active participation of students in learning is still weak.; According to the problem, the effort to fix it is through: (1) Learning improvement activities with Collaborative Classroom Action Research (PTKK) 2 (two) cycles of science subjects; (2) Implementing innovative, creative, effective, and interesting learning by using the DBL (Discovery Based Learning) learning model; And (3) Carry out learning activities Analyzing motion in living things, the human movement system by applying the expository method; question and answer; work in group; observation; discussion The results of CAR activities in science subjects can be stated to be carried out with procedures and activity steps in 2 (two) cycles properly. This is proven, among others: (1) almost all of the students or 86.49% scored above the KKM (72) with an average score (students' Cognitive Mean) of 82.43; (2) Skill level of students according to KD almost entirely or 96.62% of students are skilled in basic competence Analyzing motion in living things, human movement systems with very good qualifications. And (3) the level of active participation of students in learning reached 88.60% which was declared very high.

Keywords: *Movement in living things, efforts to maintain the health of the movement system, Discovery Based Learning, classroom action research, Natural Science Lessons.*

INTRODUCTION

In science learning, teachers in addition to theoretical skills education, need to train students' abilities about analyzing motion in living things, human movement systems and efforts to maintain the health of the movement system.

In fact, there are still many science teachers who tend to pursue curriculum targets, and do not teach analyzing motion in living things, the human movement system and efforts to maintain the health of the motion system in science learning activities which are considered important in everyday life, especially at the junior high school level. As a result, students lack the ability to analyze motion in living things, the human movement system and efforts to maintain the health of the movement system. To overcome this problem, we will try to research it through classroom action research. From the results of temporary observations, it turns out that the problem of the learning process of the human movement system at SMP Negeri 2 Rancaekek is less satisfying than other classes. This needs to be taken seriously.

Based on the background of the problem above, the problem will be formulated as follows. ; (1) Can the DBL (Discovery Based Learning) learning model improve students' mastery of analyzing motion in living things, the human movement system in class VIII-F of SMP Negeri 2 Rancaekek; (2) Can the DBL (Discovery Based Learning) learning model improve the ability of students in presenting works on various disorders of the human movement system in class VIII-F of SMP Negeri 2 Rancaekek; and (3) Can applying classroom action solve the problem of learning motion systems in humans in science subjects. The purpose of this classroom action research is to apply actions that are predicted to solve learning problems about the human movement system in science subjects.

Theoretical basis

The human movement system is one of the studies of teaching science subjects in class VIII SMP. knowledge of basic competencies 3.4 Analyzing motion in living things, the human movement system and efforts to maintain the health of the movement system; and KD 4.4 Presenting works on various disorders of the human movement system and efforts to maintain the health of the human movement system.

Theoretically Some of the disorders and disorders that often occur in the following motion systems. (1) Rickets occurs due to a lack of vitamin D which helps the absorption of calcium and phosphorus so that the process of bone hardening is disrupted. This disease occurs in children. Rickettsia causes the leg bones to grow bent. (2) Osteoporosis is caused due to lack of calcium. Osteoporosis generally occurs in adults and the elderly. Bones that lack minerals will become brittle and break easily. (3) Arthritis is a disease of the joints. This damage causes the joints to become sore and bent, and unable to move. Rheumatism is a form of arthritis. (4) Fracture (Broken Bone). For example, during an accident or falling from a high place. (5) Kitosis, Lordosis and Scoliosis. (Zubaedah, 2015:59-62)

A joint is a place where two or more bones meet. With the joints, the connection between the bones of the body can be moved. Joints can be grouped according to the amount of movement they allow. Joints that cannot be moved are called synarthrosis, for example, joints found in the skull. Joints that can be movable but limited are called amphiarthrosis, eg joints between the vertebrae. A joint that can move freely is called a diarthrosis. (Zubaidah, 2015: 50).

Every time there is always a movement that occurs in our body, the movement occurs because of the work of the muscles. Muscle is a tissue that can be contracted to be shorter. This contraction process causes body parts to move. This contraction requires energy. (Zubaidah, 2015: 54).

The DBL (Discovery Based Learning) learning model according to Takdir (2012: 30) "is a model from Jerome Bruner (1966) which is known as discovery learning. Bruner considers that discovery learning corresponds to the active search for knowledge by humans and by itself gives the best results.

The inquiry learning/discovery learning model was originally more widely used by American teachers, observers of the John Dewey school of thought (1850-1952). The original name of this learning model is inquiry/discovery learning, which more or less means learning to investigate and discover (Syah, 2005:245). Sudjana (2009:154) argues that learning the inquiry/discovery learning

model starts from the view that students as subjects and objects in learning have basic abilities to develop optimally according to their abilities.

The characteristics of the DBL (Discovery Based Learning) learning model stated by Sudjana (2009:155) "This approach is suitable for learning that is skill or skill".

The steps for implementing the DBL (Discovery Based Learning) learning model are stated by Syah (2005: 245) "the six stages of implementing inquiry/discovery learning include: stimulation (stimulation/providing stimulation), problem statements (statements/problem identification), data collection (data collection), data processing (data processing), verification (pentahkikan), generalization (generalization) ".

Classroom Action Research (CAR) is one of the efforts of teachers or practitioners in the form of various activities carried out to improve and or improve the quality of learning in the classroom" (Kasbolah, 2001: 13). Classroom action research is an activity that is directly related to the task of the teacher in the field. In short, classroom action research is practical research that is carried out in the classroom and aims to improve existing learning

Meanwhile, according to Iskandar, (2015: 2). CAR must be carried out by the teacher with the problems encountered in the class where he teaches on a daily basis and of course according to the subject area being taught.

Thus, it can be stated that classroom research or often called CAR is practical research conducted in the classroom as one of the teacher's efforts to improve and or improve the quality of learning which is directly related to the teacher's duties in the field.

CAR as one of the types of scientific writing as a means to develop methods, media, and learning models. Iskandar, (2015: 10) CAR as one of the types of scientific writing has a basic function, namely being a means to develop methods, media, and learning models. The main purpose of CAR is to improve the learning process and learning outcomes. As stated by Arikunto. (2006:21). The purpose of action research is to solve problems through a real action, not just looking at the phenomenon in question. Simply put, in this study, the purpose of CAR refers to the opinion of Kasbolah, (2014:21) which states "The ultimate goal of CAR is to improve (1) the quality of learning practices in schools, (2) the relevance of education; (3) the quality of educational outcomes; (4) education management deficiency.

As for the CAR steps, Kasbolalah put forward (2014: 44). "The flow of the implementation of the class action in question is as follows: (1) planning the action, (2) carrying out the action, (3) carrying out the observation, and (4) reflecting"

From the description above, the authors propose the following hypothesis, "The ability of students to analyze motion in living things, human movement systems and present works on various disorders of the human movement system can increase, if applied with the DBL (Discovery Based Learning) learning model".

METHOD

The procedure for classroom action research on science learning through DBL (Discovery Based Learning) at VIII-F SMP Negeri 2 Rancaekek will be carried out by researchers for up to 2 (two) cycles. In each cycle, two meetings are held. Each cycle has four phases which include (1) planning CAR, (2) implementing CAR, (3) observing, and (4) reflecting. The four phases are planned and implemented to improve student learning outcomes in science learning by using the DBL (Discovery Based Learning) learning model. The data collection techniques used in this CAR are as follows. Documentation study techniques, trial techniques, observation, interviews and test techniques.

The quantitative data analysis technique used in this study was to find the difference in the results of the second cycle of the second meeting minus the results of the first cycle of the first meeting. "The test results of the second cycle of the second meeting are posttest and the results of the first cycle of the first meeting are pretest. The difference between the two is the result of learning." (Arikunto, 2012:84) The criteria for success are increasing mastery of the material, and the ability of students in concepts. The determination of Cognitive criteria uses a reference from Arikunto (2010: 246) with a range of values as follows. Criterion (A) A score of 86 -100 very qualified good; Criterion (B) Score 71 - 85 good qualification Criterion (C) Score 56 - 70 sufficient qualification Criteria (D) Less score 40 - 55 less qualification.

RESULT AND DISCUSSION

1) Quantitative Data on Student Learning Outcomes Cycle I

Based on the results of CAR, quantitative data from the assessment of student learning achievement on analyzing motion in living things, the human movement system in science lessons, can be reflected as follows:

First: The class average (mean) of 70.54 (below PBM 72) is reflected in not achieving minimum completeness in science subjects. However, the grades of VIII-F students who achieved scores above the PBM were 14 students or 37.84%, it was reflected that the learning outcomes had not yet reached the 75% completeness level. Thus, students of class VIII-F of SMP Negeri 2 Rancaekek have not yet achieved complete learning of science subjects about Analyzing motion in living things, the human movement system.

Second: The results of the analysis of the achievement of abilities/skills on each indicator by all groups can be explained that the total average score that has been achieved by all indicators is 76.97. When compared with the PBM score (72), there is an excess of 4.97 scores. Thus, the skills of students in presenting works on various disorders of the human movement system and efforts to maintain the health of the human movement system in Cycle I CAR can be declared to have exceeded the PBM. The explanation shows that there has been success in achieving PBM scores. Qualification skills reach the good category.

Third: The results of observing attitudes in the first cycle based on the attitude qualification mode of students can be explained that the average value (mean) of attitudes in following the learning process is 73.51, and the level of attitude development is 77.61%, so it can be reflected in the attitudes of students in the learning process of the human movement system. declared mostly good.

Based on the description of the data found in the first cycle above, it can be reflected that: understanding and ability of students about the human movement system, there are several indicators that are a problem and the causes and solutions must be sought, including: indicator 2 which is about the practice of analyzing motion joints and muscles; and indicator 3 which is about the practice of Analyzing Disorders and Abnormalities in the Movement System.

For this reason, it is necessary to carry out follow-up actions in cycle II as a solution. Researchers improve the first cycle lesson plan and will use it as the second cycle lesson plan with the emphasis on increasing students' abilities about: Presenting work on various disorders of the human movement system and efforts to maintain the health of the human movement system through the application of DBL (Discovery Based Learning) learning in science subjects.

2) Quantitative Data on Understanding Achievement in Cycle II

Based on quantitative data from the achievement assessment of basic competence in analyzing motion in living things, the human movement system in science lessons can be reflected as follows:

First: The class average (mean) of 80.54 (above PBM 72) is reflected in having achieved minimum completeness in science subjects. Thus, the grades of VIII-F students who achieved scores above the PBM were 30 students or 81.08%, it was reflected in the learning outcomes that had reached the 75% grade level completeness. Thus, students of class VIII-F of SMP Negeri 2 Rancaekek have achieved complete learning of science subjects about basic competencies. Analyzing motion in living things, human movement systems and efforts to maintain healthy movement systems.

Based on the results of the analysis of the achievement of abilities/skills on each indicator by the entire group, it can be explained that the total average score achieved by all indicators is 85.32. When compared with the PBM score (72), there is an excess of 13.32 scores. Thus, the skills of students in presenting works on various disorders of the human movement system and efforts to maintain the health of the human movement system in cycle 2 PTK can be declared to have exceeded the PBM. The explanation shows that there has been success in achieving PBM scores. Qualification skills reach the good category.

The results of the observation of attitudes in the first cycle based on the mode of qualification of the attitudes of students can be explained by the average value (mean) of attitudes in following the learning process of 83.92, and the level of attitude development of 88.60%, it can be reflected in the attitudes of students in the learning process of the motion system. humans are declared almost entirely Very good.

Based on the description of the data found in cycle 2 above, it can be reflected that: the understanding and ability of students in science learning can be qualified very well, there is an increase in understanding, describing abilities, and developing attitudes in the human movement system. This is evidenced by the aspect of understanding reaching a class completeness level of 81.08%. The skill aspect reaches the class completeness level, which is 85.30%, if qualified, it has exceeded the class completeness. In addition, from the aspect of individual student abilities, it appears that they have achieved an average score of 76.49, or almost entirely (91.22%), which can be reflected in very high qualifications. Likewise, the level of attitude development is 88.60% with a level of qualification almost entirely Very good. So it was agreed that the CAR for science subjects was considered complete until cycle 2 only.

Based on the results of the analysis of all aspects of the implementation of classroom action research on science subjects, it can be concluded as action research in class VIII SMP Negeri 2 Rancaekek which was carried out with 2 cycles of action activities, it can be said to be able to solve problems in science learning, through a learning process using a learning model. DBL (Discovery Based Learning). The learning improvement process can be stated to run well and have a high CBSA level in accordance with innovative, interactive, and creative learning steps in meaningful learning.

This is evidenced by: The procedure for the preparation of classroom action research is in accordance with the plan and stated that 92.5% of the qualifications are very good. The implementation is stated that 95% of the qualifications are very good, and have followed the correct CAR procedures and the steps (Syntax) of the DBL (Discovery Based Learning) learning model that were carried out correctly. Cognitive achievement Learners achieve completeness 81.08%. Skill level reached 85.30% with excellent qualification.

Table 4.1. Obtaining the understanding value of cycles I and II

kelompok	pretes	siklus 1	siklus II	Selisih	peningkatan
I	64	73	83	19	29.4
II	60	66	75	15	25.0
III	59	68	81	23	38.3
IV	65	74	80	15	23.1
V	63	71	85	22	34.9
VI	67	75	83	16	23.9
VII	65	70	78	13	20.0
VIII	59	67	79	20	33.9
Jumlah	501.5	563.3	643.8	142.3	
Rata2 (Mean)	62.7	70.4	80.5	17.8	28.4
Tingkat Ketuntasan	18.9	37.8	81.1		%

Table 4.1 above shows: (1) The difference between the average score of the pretest and the average value of the second cycle of group I is 18.75 or there has been an increase in learning outcomes of 29.41%; (2) The difference in the average score of group II is 15 or there has been an increase in learning outcomes by 25%; (3) The difference in the average score of group III is 22.5 or there has been an increase in learning outcomes of 38.30%; (4) The difference in the average score of group IV is 15 or there has been an increase in learning outcomes of 23.08%; (5) The difference in the average score of group V is 22 or there has been an increase in learning outcomes of 34.92%; (6) The difference in the average score of group VI is 16 or there has been an increase in learning outcomes of 23.88%; (7) The difference in the average score of group VII is 13 or there has been an increase in

learning outcomes by 20%; (8) The difference in the average score of group VIII is 20 or there has been an increase in learning outcomes of 33.90%. The average increase in the understanding of learning outcomes is 80.47 minus 62.68 which is 17.78 or an increase of 28.36%.
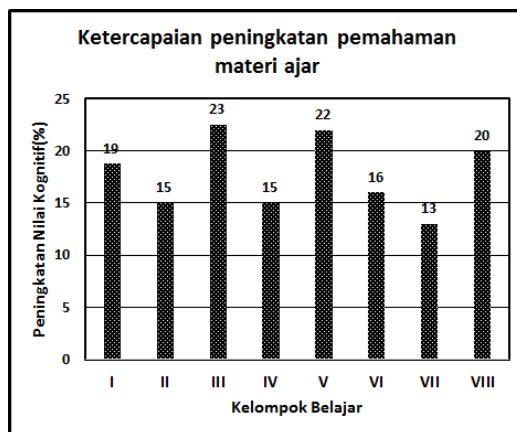
Graph 1 Achievement of increasing understanding of teaching materials

Following are the results of the analysis of the achievement of the ability to present works on various disorders of the movement system in humans and efforts to maintain the health of the human movement system from each group of students in the first cycle of the first meeting and the second cycle of the second meeting in table 2 below.

Tabel 2. Rata-rata Keterampilan Siklus I & II

Kemampuan	Siklus I	Siklus II	Selisih	Peningkatan (%)
Indikator 1	91	98	6.72	7.36
Indikator 2	71	82	10.25	14.36
Indikator 3	68	78	10.94	16.20
Indikator 4	78	83	5.50	7.07
Rata-rata	77	85	8.35	10.85

The table above shows: (1) The difference between indicator 1 and 6.72 or an increase of 7.36%; (2) The difference between indicator 2 and 10.25 or an increase of 14.36%; (3) The difference between indicators is 5.5 and 7.07 or an increase of 16.20%; . Globally, the difference between the average and the average is 8.35 or an increase of 10.85%.

Furthermore, the researcher will determine the comparison of the achievement of all indicators through the level of achievement as follows. The comparison of the achievement of each indicator between indicator 1: indicator 2: indicator 3: indicator 4 is 6.72:10.25:10.94:5.5 total 33.41. Furthermore, each achievement number for each indicator is divided by 33.41 and then multiplied

by 100. The result of processing these numbers is a comparison of the achievement of indicator number 1: 2: 3: 4 is 20.11% : 30.68% :32.74% : 16.46% Total 100%.
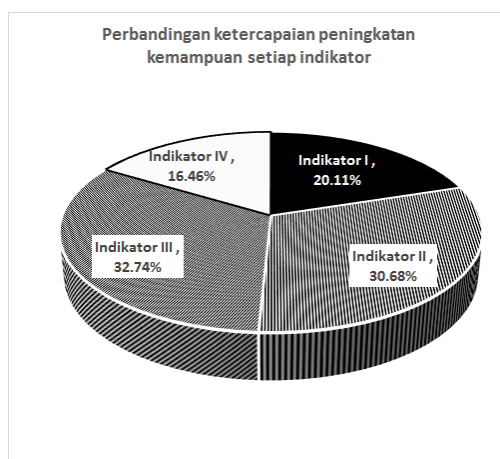
Graph 4.6 Comparison of the achievement of capacity building for each indicator

Based on the discussion of the results of the analysis above, it can be shown that the hypotheses in this classroom action research are: "The ability of students in analyzing motion in living things, human motion systems and presenting work on various disorders of the motion system in humans can increase, if applied to the model. DBL (Discovery Based Learning) learning. "proved to be quite significant".

CONCLUSION

Based on the results of the action research on science subjects that have been carried out, several conclusions and suggestions are made as research inputs to be recommended and followed up. The conclusions and suggestions are as follows:

First, there has been an increase in students' understanding of Analyzing motion in living things, the human movement system. This is evidenced by the CAR results, namely: The average value of understanding in the second cycle is 80.54, and the difference with the pretest score (62.84) is 17.70 or an increase of 28.17% which is a significant increase in learning outcomes.

Second, there has been an average increase in the overall ability of student learning outcomes regarding the skills of presenting works on various disorders of the human movement system and efforts to maintain the health of the human movement system in class VIII-F students of SMP Negeri 2 Rancaekek as evidenced by the average value of ability in the first cycle is 76.97 and the average ability value in the second cycle is 85.32, the difference is 8.35, or the percentage increase of 10.85% is a significant increase in the ability of learning outcomes.

Third, the implementation of classroom action research on science subjects through a learning process using the DBL (Discovery Based Learning) learning model can solve problems in science learning, this is evidenced by: The preparation procedure is stated to be 92.5% with very good qualifications. The implementation is stated to be 95% with very good qualifications. And the level of active participation of students in learning reaches 88.60% which is declared very high.

It is recommended that the DBL (Discovery Based Learning) learning model can be used in contextual teaching materials by using adequate media according to the needs for the development of the potential of students and carried out in an adequate time, accompanied by indicators for measuring the level of success that are more accurate to obtain results. significant research.

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