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## Implementation of problem based learning model in biological learning in public high school

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### Abstract

Research has been conducted which aims to determine the implementation of the problem based learning model in Biology learning at the public high school SMA Negeri 7 Manado. This research applies the class action research method. The stages of the study consisted of: planning, implementing class actions with problem based learning learning models, observation and reflection. The results showed that the implementation of the problem based learning model in the biology learning process in high school was an interesting, fun and not boring model, so that it could improve student learning outcomes. The problem based learning model implemented in the biology learning process was developed for biology learning in five subjects, very effective and efficient for the achievement of learning goals. However, it must be supported by infrastructure, availability of tutors, availability of learning resources and other supporting factors that are fulfilled.

**Keywords:** model, problem based learning, SMA Negeri 7, Manado

### Introduction

Currently in Indonesia, biology subjects are held in schools ranging from junior high school to high school, almost all of them are still passive and boring because the teacher provides or teaches learning and practical material while students have a passive tendency to accept (theoretical) subject matter, so that provision of minimal analytical skills, individual learning and less in terms of activities that lead to problem solving. Thus many students experience difficulties in learning and boring especially in biology learning material, seemingly only memorizing.

Students can learn actively, if the teacher can create and maintain optimal learning conditions. The lack of attention of students to the material being discussed, can be seen in the activities of students such as playing cellphones, chatting, combing hair / grooming, drinking, not recording material that is being given / explained by the teacher or just reading like the teacher asks the teacher to answer while being followed by students. This if left unchecked will result in learning objectives or standards of competence and basic competencies will not be achieved. This is the result of observations in one of the high schools in Manado and clearly only teachers who master the material, this is evidenced by the results of tests obtained by students with below-standard values, namely 20% above 70, while 80% below 70 (70 is learning completeness).

Based on the results of the author's interview with 6 students from different classes, the situation of learning activities in the classroom is the teacher speaking / lecturing and usually while writing on the board if there is no LCD, while students take notes while listening to lectures / explanations from the teacher passively. The activity takes more than half of the lesson. Very short remaining time is used for question and answer, usually 1 to 3 students. Finally the teacher closes the lesson by giving assignments from the LKS that are in the textbook or contained in the teaching material made by the teacher. The implementation of the assessment tends to be done with multiple choices and assignments. On the other hand is the result of interviews with five biology

teachers, showing the weakness of students in answering essay questions, because students are only able to answer according to the notebook, have not been able to develop complete answers. This is due to the lack of mastery of concepts, developing and applying them in problem solving. The student statement above illustrates that the learning process is still teacher-centered yet student-centered. The teacher has not prepared a conducive learning environment, giving students the opportunity to more actively express opinions, solve their own problems, ask questions, discuss and present. As a result, students find it difficult to understand the concepts of Biology material that the teacher conveyed and even boring, the students' understanding of the concept of biology is at the level of memorizing only. Learning by memorizing has an impact on students' weaknesses in developing and applying biological science concepts in real world life. As the principle of biology is the study of life which talks about the problems around the life of interesting living things to be discussed and applied and practiced. Therefore, innovative approaches and learning methods are needed and provide opportunities for student learning exploration.

Problem-based learning can be an alternative learning method that gives students space to learn effectively and creatively. The essence of this method is a problem that is solved by students. Problem given / presented are problems that have context with the real world. The closer to the real world, the better the effect will be on improving students' skills (Amir; 2009) <sup>[1]</sup>. To optimize the learning process of biology, the involvement of students needs to be emphasized in order to construct knowledge and improve the ability of the learner to be able to solve problems so that the learning paradigm will shift and be student-centered. For this reason, this research was conducted in order to develop, apply PBL learning models in the field of biology in high school.

Manado Public High School 7 is one of the many high school in Manado which belongs to the category of good quality schools in the field of facilities and infrastructure,

the number of students is also many qualified teachers. Nevertheless observation at school shows biology subjects are still boring subjects. Students are less able to take on the role of students who are actively seeking knowledge resources to think critically in solving problems, so students have not been given space and are challenged to learn. To be able to optimize the learning process, student involvement needs to be optimized in constructing knowledge and increasing students' ability to solve problems. This study aims to determine the implementation of the problem based learning model in Biology learning at Manado 7 Public High School.

## Research Methods

### Research Settings

Grade X students of SMA 7 Manado. The study took place in the even semester.

### Research procedure

This research applies the class action research method. The stages of research are Planning, at this stage the preparation of a learning program plan, preparation of research instruments for teachers and students. Next is the preparation of learning resources in the form of learning materials and student worksheets. At this stage development of learning steps is carried out with the Problem Based Learning learning model. The action, at this stage, carried out the application of class action, based on the implementation plan of learning using the PBL model. Observation, at this stage an assessment of the results of class action is carried out, using the observation sheet given to students. Reflection, at this stage, carried out an evaluation of cycle I actions based on collected data. Furthermore, the discussion of the results of the cycle I learning class action was discussed. If there were still problems, for example there were still many (> 50%) students who did not or did not understand, about the material taught on the subject, then it would continue in the second cycle but if no more problems will stop in the first cycle or complete.

### Data collection technique

The sources of data in this action research are class X students of SMA 7 Manado, researchers, observations (teachers and teams). The type of data in this study is quantitative data in the form of student learning outcomes in working on the questions given, including the initial and final tests after the action.

### Data processing

1. Changes in students during the learning process and after. The analysis used is a description of the results of observations / observations at the end of each cycle by comparing the results achieved previously / in each cycle.
2. Increased learning outcomes used quantitative analysis using the formula:

$$DSI = x / y \times 100\%$$

Ket: DSI = Individual Absorption Power

X = score obtained by students

Y = maximum score

## Results and Discussion

### Results

#### 1. First Cycle Research Results

In this cycle, researchers use student worksheets that are compiled by the researchers themselves as learning media and measure the extent of student activity and creativity in the learning process. In the first cycle, the final implementation of the test was held with a classical percentage of only 52, 94% or around 18 students who completed the study. Individually there were 13 students who had not achieved classical learning completeness, namely 75, 4. Other students did not take the test. Seeing this fact, the researcher continued the action research into cycle two.

#### 2. Second Cycle Research Results

In the implementation of the second cycle, the researcher identified the problem that appeared on the first cycle by referring to the first cycle observation sheet and input from the observer. Furthermore, researchers approached, motivated and facilitated students who experienced learning disabilities such as; not focus or not concentration, lazy, ignorant and others during the learning process takes place. In the implementation of the second cycle of action researchers also use LKS prepared by researchers based on the syntax of the problem based learning or PBL model and guidelines for its implementation as learning media. The results of the learning evaluation analysis carried out in the second cycle obtained 85.76% of students had achieved the value of completeness learning in a classical manner and only four students were left unfinished. Two of the four students did not take the test. Based on the results of the evaluation in the second cycle, the researchers no longer continue the research to the next cycle.

### Discussion

The results of the evaluation analysis in the learning process until the end with the implementation of the PBL model conducted in the first cycle of classical learning percentage only reached 52.95%, meaning that there were only 18 learners who completed. While 14 students who have not reached the grade of classical completeness and 3 students did not take the test. Based on the results of the evaluation in the first cycle that did not reach the standard learning completeness value in a classical manner, the researcher continued the research in the second cycle. In this second cycle researchers identified problems in the first cycle where there were students who lacked concentration in working on student worksheets (LKS), playing, daydreaming, asking for permission to leave the classroom. Through the results of the identification, in the second cycle before learning begins, the researcher gives instructions or directs students to work on the LKS, provides some motivation or encouragement to the learner to concentrate more on being energetic, creative and active in the learning process.

In the second cycle of the research implementation, referring to the results of the learning evaluation in the first cycle, where there were still a number of problems that emerged in the first cycle, among others, lacked focus in the learning process, but by using LKS that already had instructions the researchers saw improvements final cycle test. However, there are still some students who have not yet completed achieving the minimum completeness score.



Thus, the researcher continued the research into the second cycle. In this second cycle the evaluation results showed an increase and had reached the standard classical completeness value of 85.35%. From a total of 35 students, there were 34 students who took the test and from 34 of them, 29 students achieved classical learning completeness, but individually there were still three students who had not yet achieved the value of classical completeness. While two students did not take the test. Factors that affect the five students who have not reached the classical completeness value, namely lack of focus or lack of concentration in the learning process; thus the researcher no longer continues the research to the next cycle. This is based on the results of the tests reaching the standard grade of classical completeness, which is 85.35%. In addition, researchers also evaluated the learning activities of students through LKS.

LKS has a function as a medium in learning activities. Especially the student worksheet with its usefulness structure in biology learning includes: 1) It is an alternative for teachers to direct learning or introduce an activity such as the introduction of facts, skills, concepts and principles as teaching variations. 2). Speed up the learning process so that it can save learning time. 3). Facilitate the adjustment of individual / group tasks. 4). Ease the work of teachers in giving individual assistance or doing remedial especially management of large classes. 5). Optimizing the use of limited learning media (Paat, 2013). The student activity sheet is one of the learning resources that helps students to develop the knowledge they have in mastering the material, problems, creative and active looking for problem solving / solutions and helps students learn in groups and independently. This is in accordance with the opinion expressed by Jonassen D.H. that "Problem Based Learning is instructional strategy. That is, it is an instruction to students to learn content that is problem solving problems" (Jonanssen, 2011)<sup>[11]</sup>.

The model of problem based learning is a learning strategy that is one learning solution designed to improve learning by bringing, leading to requiring students to learn the content of teaching materials when solving problems (Meike, 2013). When the problem based learning model is implemented in the learning process it turns out that it can make students master the learning material in the fields of cognitive, affective and psychomotor. This can be seen at the end of the cycle where both the first and second cycles of the student learning outcomes were improved and completed, while the five students who did not complete were caused by other factors such as illness and others. Factors that influence learning outcomes according to Munandi include internal factors and external factors as follows: 1. Internal factors: physiological factors, in general physiological conditions such as prime health means not in a state of fatigue and tiredness, and so on. This can affect students in receiving lessons. Psychological factors; each student basically has different psychological aspects this affects learning outcomes. Some psychological factors include; intelligence (IQ), attention interest, talent, motivation, reasoning and others. 2. External factors such as: environmental factors can affect learning outcomes. Natural environment such as temperature, humidity and others. Studying in the middle and in a room that lacks air circulation will be very influential and very different from learning in the morning whose conditions are still fresh and the room for air circulation. Instrumental factors include

curriculum, facilities and teachers who are expected to be able to design to achieve learning objectives (Rustam, 2012).

## 2.2 Conclusion

Based on the results of calculations, analysis and discussion that have been carried out in this study it can be concluded that the implementation of the problem based learning model in the biology learning process in high school is an interesting, fun and not boring model, so it can improve student outcomes and learning interests. The problem based learning model that is implemented in the biology learning process, was developed for biology learning in five subjects. The results are very effective and efficient for the achievement of learning objectives during consideration of infrastructure, availability of tutors, availability of learning resources and other supporting factors are met.

## Recommendation

Based on the conclusions of the above research, there are several suggestions that can be proposed, namely the PBL model can be applied / used as one of the learning models in different material, or in different schools. Teachers must dare to try and implement the PBL model developed for biology learning because it is very effective for achieving learning goals during consideration of infrastructure, tutors' availability, availability of learning resources and other supporting factors are met. Teachers, need to make LKS based on PBL model itself as a medium in the learning process that can make students learn more actively, creatively both in groups and independently.

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