Improving activities and learning outcomes of biology education students through learning Problem-Based Learning model of entrepreneurship

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Abstract. This study aims to describe the activities of lecturers, student activities and student learning outcomes on creative thinking material in biology study programs, by applying the Problem-Based Learning (PBL) learning model. This type of research is classroom action research (CAR) with descriptive methods. This research was conducted in 2 cycles, each cycle consisting of 4 stages: planning, implementing, observing and reflecting. Research subjects are lecturers and all semester 5th students of biology study programs. The research variable is the learning model Problem-Based Learning and student learning outcomes. Data collection techniques used are observation and tests. While the research instruments consisted of observation sheets and test sheets. The results of the analysis of lecturer activity data in cycle 1 obtained an average of 33.5 (good) and cycle 2 rose to 35 (good). The results of the analysis of student learning activity data cycle 1 obtained an average score of 29 (good) cycle 2 increased to 34 (good). Student learning outcomes tested by the T-test showed that significantly showed an increase in the value of learning outcomes in cycle 1 (3.02439) and in cycle 2 (7.26829). It was concluded that the Problem-Based Learning (PBL) learning model can improve student learning activities as well as student learning outcomes that take entrepreneurship courses in Biology education courses.

1. Introduction

The Problem Based-Learning (PBL) learning model is one alternative learning that can improve the ability of students' thinking processes and problem-solving through direct experience. Problem-Based Learning (PBL) is a method that challenges students to work cooperatively. This prepares students to think critically. Problem-Based Learning (PBL), is a learning process that confronts students with a problem before starting the learning process [1]. Problem-Based Learning is an innovation in learning, because in PBL students' thinking abilities are truly optimized through systematic team or teamwork processes. Thus students can empower to hone, test and develop thinking skills continuously [2].

Problem-Based Learning has been widely applied in the learning process in schools and universities in Indonesia. Research conducted by Fadly, using Problem-Based Learning, in the material of business opportunities in Ardjuna Vocational High School Malang, states that the application of the Problem-Based Learning model has a significant influence on increasing student learning activities from cycle to cycle, thereby also increasing results study [3]. The same research was also carried out by Indriani,
stating that learning by using Problem-Based Learning on environmental pollution material in SMAN 4 Bengkulu Selatan, teacher, and student activities increased from cycle to next cycle, thereby also increasing student learning outcomes [4].

The Problem-Based Learning Model is chosen by researchers to be applied in the learning process in the hope that students can increase their participation and activeness in the learning process because students are actively involved in the learning process, so students can learn from each other, and can communicate to express opinions of the results of their thinking. So it is expected that student learning outcomes can improve.

Research purposes to describe (1) the activities of lecturers and student activities in the entrepreneurial learning process on creative thinking material by applying the Problem-Based Learning (PBL) learning model and (2) the learning outcomes of students in the entrepreneurship subject of creative thinking after applying the Problem-Based Learning (PBL) learning model.

2. Methods
This research is a Classroom Action Research, which is action research within the scope of education that will be carried out by the teacher, who is also a researcher in his class or together with others (collaboration) by designing, implementing, and reflecting collaborative actions. and participatory which aims to improve or improve the quality of the learning process in its class through a certain treatment in a cycle [5]. In this class action research aimed at 5th-semester biology students who take entrepreneurship courses as an effort to improve student learning outcomes on creative thinking material using the Problem-Based Learning (PBL) learning model.

The research method used is the descriptive method, descriptive research in the field of education and teaching curriculum is quite important, describing the phenomena of educational activities [6]. The descriptive method is used to describe teacher activities, student activities and student learning outcomes in application Problem-Based Learning (PBL) model.

The research procedure used in classroom action research consists of four stages, namely the planning stage, the implementation phase, the observation phase, and the reflection phase [7]. The study was conducted in two cycles, each cycle related to each other, cycle II was an improvement from cycle I.

This research was conducted in September 2019 to November 2019 in the Biology Education Study Program FKIP UNIB, semester 5 which took entrepreneurship courses in 2019. The research site was at the University of Bengkulu GKB3 building.

The data collected in the study are the activities of lecturers, students and learning outcomes in the entrepreneurial learning process of creative thinking material. The technique used to collect data on the activities of lecturers and students is an observation sheet. Observation sheet: to obtain data on the activities of lecturers and students in the entrepreneurial learning process of creative thinking material. Meanwhile, to measure learning outcomes using a test sheet. The test sheet is to obtain data about the completeness of student learning outcomes after the learning process takes place.

Data analysis was carried out descriptively on the learning process carried out in the subject of entrepreneurial creative thinking material and student learning outcomes. This technique is used to describe the data obtained, the data analysis function used to obtain a picture of the teacher's activities, student activities, and student learning outcomes [6]. Data analysis of teaching and teaching activities of students and student learning activities analyzed using the average score on the category of observation scores. The formula for determining the average score of PBL learning models is:

$$\text{Average score} = \frac{\sum X}{N}$$  \hspace{1cm} (1)

$X$ : Total score of learning activities in the learning cycle model 5E
$N$ : Total observed

For PBL model learning activities the highest score per observation item = 3 while the number of observation items is 12, the highest score is 36. The range of values for each observation criterion is:
Table 1. Category of PBL model learning activities score.

| Score Range | Category |
|-------------|----------|
| 12 – 19     | Less     |
| 20 – 27     | Enough   |
| 28 - 36     | Well     |

3. Results and discussion

The results of research conducted using the PBM model, through entrepreneurship learning in Biology Study Program 5th semester, on creative thinking material. The results of observations of lecturer and student activities are presented in the table below.

Table 2. Results of analysis of lecturer and student activities in Cycle I and II.

| Observer | Cycle I | Cycle II |
|----------|---------|----------|
|          | Lecturer activities | Students activities | Lecturer activities | Students activities |
| I        | Score | Category | Score | Category | Score | Category | Score | Category |
|          | 33    | Good     | 29    | Good     | 35    | Good     | 34    | Good     |
| II       | 34    | Good     | 29    | Good     | 35    | Good     | 34    | Good     |
| Average  | 33.5/ Good | 29/ Good   | 35/ Good | 34/ Good |

Based on the table above, PBL learning model learning conducted by lecturers can increase lecturer activities (cycles 1, 33.5, cycles II, 35) and student activities (in cycles 1, 29, cycles II, 34) with good criteria. Increasing cycle 1 to cycle II, there was an improvement in cycle II, where the aspect of the lecturer wrote and explained the learning objectives, in this aspect the lecturer did not just explain, but also display or write the learning objectives. Thus students can note and pay attention to the learning objectives described by the lecturer. This is in accordance with the statement of the, that learning objectives are the expectations of students and teachers implementing the learning process in accordance with the objectives and also so that students and teachers know what will be achieved in the learning process. The activity of the lecturer is considered to be the aspect of the lecturer directing the entire group to divide the tasks among all group members. In this aspect, not all groups share their tasks with members. This has not been implemented well, due to limited time. In this case, this section should be done in conjunction with the division of groups. At the stage the lecturer proposes a phenomenon in life-related to marketing and creativity, in cycle 1, the lecturer shows the phenomenon of marketing with similar products, why there aren't as many consumers coming. In cycle II, the lecturer gives a group assignment to make a creative product, which is different from the others. In this aspect, it is considered good, because the lecturer has shown the phenomenon of problems that occur around students, which in accordance with the topic of learning materials develop creativity. According to Ayuningrum, the PBL model uses a problem as a basis for finding concepts [8].

Lecturers lack motivation in problem-solving. The problem in cycle 1 is related to "similar marketing" activities, and in cycle 2 is related to making "creative products". In this aspect the lecturer has motivated the question "why in a seller's marketing with similar selling materials, but the level of the number of consumers who come is different" and in the second cycle, the lecturer also motivated the way students make creative products, which have very different forms from other products. The lecturer has motivated students to be involved in problem-solving. This is in accordance with Ayuningrum's statement, the learning process must also be in accordance with constructivism learning which emphasizes the development of students' abilities in finding problems and answers related to the problem being studied. In this case the teacher is expected to provide strong motivation to students so that all group members unite to participate in learning and discussion of students do not deviate from the topic of learning [8].
PBL learning model learning conducted by lecturers can increase student activities (in cycles 1, 29, cycle II, 34) with good criteria. PBL learning model learning activities conducted by students in the first cycle and second cycle as a whole are quite good. There has been an improvement from the sufficient criteria to the criteria both on the aspect of students paying attention and recording learning objectives, students have noted and pay attention to the learning objectives explained by the lecturer. In the aspect of students motivated by asking questions/assumptions to be involved in problem-solving. The whole group had a problem-solving discussion. In the aspect of students dividing tasks into each group member, this has been done by the whole group. Not optimally done by students is located in aspects, the results of student discussions about the concept of creativity, not all are associated with daily life and not all members of the student group have discussions in drawing conclusions about thinking creatively. According to Ngalimun, this aspect is included in the exploration phase wherein this activity the teacher gives time for students to think, study literature, look for information and reasoning with good knowledge because reasoning is a high-level thinking ability that requires a lot of practice to master it [9]. In this case, students make predictions before the library study takes place but according to the observer's notes lecturers give less time so that students have the opportunity to think about making predictions of the results of library studies. In cycle II, the stages and aspects which were not optimal in cycle I was improved so that there was an increase in lecturer learning activities in cycle II. However, there are still aspects that are not optimally carried out by lecturers, namely aspects that the improvement is not optimal from the first cycle is the indicator to guide students in generating motivation in creating creativity products. According to one observer, the lecturer was not optimal in emphasizing this aspect so the results were still felt to be unfavorable. In the second cycle, the lecturer has tried to improve aspects that are not optimal in the first cycle, but the evaluation of each observer is different. For example, one observer assesses that lecturer improvement has been optimal, but another observer assesses that improvement is still not optimal. So it can be said, those aspects which are not optimal are not only due to lack of lecturers but also lack of observers who are not careful in assessing lecturer activities.

Learning outcomes data were analyzed by T-test, the value of P-Value was 0.00, this was smaller 0.05, indicating the null hypothesis (H0) was rejected and H1 was accepted. This means that there is a significant difference between cycle 1 and cycle 2. The average value of each cycle is shown in the following figure 1.

Learning outcomes based on the analysis of learning outcomes that have been carried out in the first cycle and second cycle, tested with the T-test, there is a significant increase. The data shows that the average value in cycle 1 (3.02) is smaller and then experiences a significant increase in cycle 2 (7.26). Student activeness during the learning process can affect student learning outcomes. This statement is in accordance with Lestari who revealed that student learning activities in learning affect the learning outcomes obtained by students [10]. Student activity can be realized if in-class students are required to be actively involved directly in the learning process. Another factor that influences student learning outcomes is the classroom atmosphere. Class that is made fun will affect student learning activities in.
class. Kurniawan, states that the application of problem-based learning models can improve student learning outcomes of SMPN 2 Bengkulu City, with classical completeness 77.78% to 86.11% [11].

4. Conclusion
This study concludes that (a) The application of the Problem-Based Learning model of learning in the subject of entrepreneurship creative thinking material can increase the activities of lecturers and student activities and (b) The application of the Problem-Based Learning model with the problem orientation stage, organizing students to learn, guiding individual/group experiences, developing and presenting their work, and analysing and evaluating the problem-solving process, can improve student learning outcomes on creative thinking material.

Acknowledgments
The study was funded by Penelitian Peningkatan Kualitas Pembelajaran (PPKP), contract number 2825/UN30.7/HK/2019, Fakultas Keguruan dan Ilmu Pendidikan, Universitas Bengkulu.

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