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IMPLEMENTATION OF THE PROJECT-BASED LEARNING MODEL TO IMPROVE SEFL EFFICACY AND STUDENT LEARNING OUTCOMES

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Abstract: This study aimed to determine the application of the project-based learning model to self-efficacy and student learning outcomes in the botany Phanerogamae course. The research method used in this study is the PTK method or Classroom Action Research. The subjects in this study are students of the Biology Education study program STKIP Al Amin Dompu, even in the semester 2022/2023. The instruments used in this study are lumbar instruments of student self-efficacy and instruments of student learning outcomes. The analysis used in this study is qualitative descriptive analysis. The results showed that applying the project-based learning model can improve student learning outcomes and self-efficacy. The self-efficacy of students in the botany Phanerogamae course in the pre-cycle was 49.12%; in the first cycle, it was 78.95%, and in the second cycle, it was 91.23%. Meanwhile, student learning outcomes have also improved. In the pre-cycle, it was 47.37%, cycle I was 78.95%, and cycle II was 89.47%.

Keywords: *Project Based Learning, Self Efficacy, Learning Outcomes.*

INTRODUCTION

Botany Phanerogamae is one of the compulsory courses in the Biology Education Study Program curriculum of STKIP Al Amin Dompu. Botany Phanerogamae is one of the botany courses that studies seed or flowering plants. "Phanerogamae" is often a synonym for seed or flowering plants. Phanerogamae includes a group of plants that have seeds, which means they have a process of sexual reproduction that involves the formation of seeds. Phanerogamae Botany course discusses various aspects of morphology, anatomy, ecology, classification, and reproduction of seed plants. In addition, the botany Phanerogamae course will also teach about the diversity of seed plants and their importance in the ecosystem.

The learning method of botany Phanerogamae courses is carried out by integrating practicum activities with theoretical studies. Students must carry out practicum before participating in lecture activities, and the reverse order is unjustified. It is based on the assumption that scientific understanding is formed through experience. Truth or error in lecture activities will strengthen the student experience gained through practical activities [1].

Learning in the Botany Phanerogamae course has been different from what I expected from the lecturer. The problem is that most students have not been active during the learning process, and learning outcomes in this course still need to be higher. It was evidenced by the Midterm Exam scores from Biology Education students who took botany Phanerogamae courses in the 2022/2023 academic year; the even semester still needs to be improved. The minimum completeness criteria determined in the botany Phanerogamae course is 70. The evaluation results of 19 students, students who met the minimum completeness amounted to 9 people (47.37%), and the number of incomplete students amounted to 10 (52.63%). It shows that student learning outcomes in the botany Phanerogamae course in the midterm of the 2022/2023 academic year are still categorized as low.

Another thing that can also affect a person's success is self-efficacy. Someone who believes that they can do something that has the potential to change events that occur in their environment will be more likely to act and more likely to be successful than those who have low self-efficacy[2]. The results of a survey from PISA by the OECD [3] show that the average self-efficacy index of Indonesian students is below the average OECD index of -0.51 out of 0.04.

Based on the results of observations and reflections carried out by self-efficacy and learning outcomes of biology education students of STKIP Al Amin Dompu are still relatively low; these problems are influenced by several things, such as lecturers only relying on PowerPoint media and not using other media, the use of inappropriate learning methods for teaching materials in the botany Phanerogamae course, lack of interaction between fellow students and lecturers and quite many students who Do not dare to express opinions or ideas conveyed either to colleagues or with lecturers during the learning process. In the botany Phanerogamae course, students also need help remembering many Latin names of plants that lecturers often discuss and identifying plants; students find it difficult to reveal the characteristics of very diverse plants. From this, there is a need for innovation using a fun learning model that can encourage students to improve their learning outcomes. One of the learning models that is suitable to be applied to botany Phanerogamae courses is Project Based Learning[4].

The Project-based learning model is one of the learning models that can stimulate students to be actively involved in the learning process [5]. Project-based learning is a systematic learning model involving learners in learning knowledge and skills through a

long and structured process of inquiry with authentic and complex questions and carefully designed product tasks [6][7]. Project-based learning has tremendous potential to make learning experiences more engaging and meaningful for learners. The model has been proven to positively impact students, such as increasing student achievement, mastery of student concepts, student attitudes towards science, student activeness following learning, and student learning ability [8-13]. In addition, project-based learning can produce professional teachers [14-16].

Project-based learning has also begun to be developed, not just ordinary project learning. Still, it has begun to be integrated with technology such as computers [17-18], and the results are better than project-based learning that does not use technology. In addition, the results of projects made by learners can also serve as learner assessments [19]. Based on the overall description above, the researcher is interested in conducting research entitled "Application of the Project-Based Learning Model in the Botany Phanerogamae Course to Improve Self-efficacy and Student Learning Outcomes at STKIP Al Amin Dompu."

RESEARCH METHODS

The research method used in this study is the PTK method or Classroom Action Research. The design in this study used the PTK research design from Kurt Lewin. Action research is a research activity in the context of a classroom that is carried out to solve learning problems faced by educators to improve the quality and learning outcomes and try new things in learning to improve the quality and learning outcomes [20]. Kela action research here is carried out in as many as two cycles, with each cycle consisting of four stages, namely: (1) planning, (2) implementation, (3) observations, and (4) reflection. The subjects in this study are 19 students in the 2nd semester of Biology Education STKIP Al Amin Dompu for the 2022/2023 academic year. The instruments used are self-efficacy with Likert scales and student learning outcomes instruments totaling 25 questions. The data analysis technique used in this study is using descriptive analysis. To analyze the data obtained in this study, use the following formula:

Students' self-efficacy criteria are said to have good self-efficacy if at least in the medium category [12].

$1 \leq X \leq 2$: Very low
$2 \leq X \leq 3$: Low
$3 \leq X \leq 4$: Medium
$4 \leq X \leq 5$: High
$X = 5$: Very high

The results of the percentage of student self-efficacy in further learning will be adjusted to the criteria achieved in Table 1 [22][23].

Table 1. Classical criteria of student self-efficacy

Grade (%)	Criteria for completeness of self-efficacy
81-100	Very high
61-80	High
41-60	Medium
21-40	Low
0-20	Very low

$$\% \text{ clasical} = \frac{\text{number of students completed}}{\text{a number of all students}} x100\%$$

The criteria for successful actions applied in this study include two things that can be seen in Table 2.

Table 2. Action success criteria

No	Aspects	Action success criteria
1.	Student self-efficacy	Student activeness reached a percentage of ≥ 81%, a very good
3.	Student learning outcomes	The percentage of classical completeness reached ≥ 81% of all students who achieved the KKM of the Botany Phanerogamae plant course, which is 70

RESULTS AND DISCUSSION

The results show that the application of the project-based learning model can improve self-efficacy and learning outcomes of STKIP Al Amin Dompu students in the Botany Phanerogamae course. More details can be seen in the following table:

Table 3. Results of Student Self-Efficacy Percentage Analysis

Self-efficacy	Pre Cycle		Cycle 1		Cycle 2	
	(%)	Criteria	(%)	Criteria	(%)	Criteria
Academic	42.10	Medium	68.42	High	84.21	Very High
Social	52.63	Medium	89.47	Very High	94.74	Very High
Emotional	52.63	Medium	78.95	High	94.74	Very High
Average	49.12	Medium	78.95	High	91.23	Very High

Based on the results of the analysis of the percentage of self-efficacy of biology education students in learning using a project-based learning model, in the pre-cycle, the average self-efficacy of students measured based on three components, namely academic, social, and emotional, is still in the medium category, which is 49.12%. From these results, in the pre-cycle self-efficacy of biology education, students have not met the completeness criteria. In cycle 1, it is known that the average self-efficacy of students in learning is 78.95% with high criteria but has not reached the predetermined criteria, namely with an average percentage of students in learning ≥ 81% with very high criteria, but when viewed from table 3 the self-efficacy of students of STKIP Al Amin Dompu biological education increased and met the criteria for completeness in the social component, Where in the social component, 89.47% of students meet the criteria. In cycle II, it can be known that the average percentage of student self-efficacy in project-based learning is 91.23%, which means that it has met the criteria for an average percentage of ≥ 81% with very high criteria. More details can be seen in the diagram below.

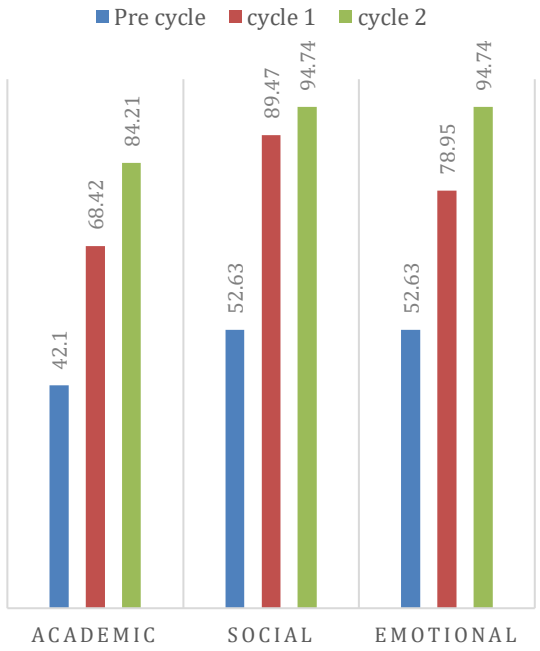

Figure 1. Student self-efficacy diagram

From the picture above, the ability of self-efficacy measured based on three indicators, namely academic, social, and emotional students, before implementing the project-based learning model is still in the medium category. It is due to the ability of students who still need to improve in learning focus and self-motivation, making it more difficult to take tests related to botany Phanerogamae learning material appropriately. In cycle 1, the application of the learning model saw an overall increase in all three indicators, but what was very visible was an increase in social indicators. In cycle 2, the three indicators measured have met classical completeness: academic, social, and emotional indicators have exceeded 81%, with an average of 91.23%. That way, applying the project-based learning model can increase the self-efficacy of STKIP Al Amin Dompu biology education students.

It is because the project-based learning model allows students to build knowledge in a natural context, where the main idea of project-based learning is to provide opportunities for students to investigate problems in the real world that will allow students to gain new knowledge. It is in line with Serin and Safithri, who stated that the project-based learning model provides opportunities for students to explore their abilities in critical thinking, problem-solving, and independent work [24-25]. Then Pajarez & Kranzler stated that self-efficacy provides a basis for motivating, acting well, and achieving in all areas of life [26].

Table 4. Learning Outcomes Test Analysis Results

Learning Outcomes	Pre Cycle	Cycle 1	Cycle 2
High score	84	96	100
Low score	44	64	64
Average	65.42	77.47	82.95
Number of students completed	9	15	17
The number of students is incomplete	10	4	2
% classical	47.37	78.95	89.47

Based on the learning outcomes test in Table 4, the average score of students in the pre-cycle was 65.42, with classical completeness of 47.37%. It proves that classical completeness in the Botany Phanerogamae course must still be added to KKM or in the medium category. After applying the project-based learning model in cycle 1, it can be seen that the highest score achieved by students is 96, The lowest score was 64. The average score from students increased to 77.47, although when viewed from the table of action success criteria, it still did not reach classical completeness, which only reached 78.95%. In cycle two, there was also a significant increase where the percentage of classical completeness reached 89.47%, which means that it has met the classical completeness criteria of ≥ 81%. Thus, it can be stated that applying the project-based learning model can improve student learning outcomes in the botany Phanerogamae course.

The botany Phanerogamae course is a course combined with practicum. Where can students be involved in a project so that it can trigger the development of knowledge they have following what they experience themselves? It is reinforced by the statement of Widiantie, Setiawati, and Junaedi, who suggest that Phanerogamae Botany practicum is synonymous with a free inquiry where students independently determine problem formulations and hypotheses, determine variables to be studied, design

experiments, analyze and interpret experimental data. Students independently conduct investigations based on existing problems following predetermined themes, while lecturers only accompany and facilitate the inquiry-based practicum process [27,35].

It is reinforced by research on the project-based learning model, which suggests that applying it can improve student learning outcomes and learning activities [28-31]. In addition, in project-based learning: 1) students are involved in doing assignments; 2) participate in solving a problem; 3) ask lecturers and other students about problems that have not been understood; 4) participate in seeking information for problem-solving; 5) carry out discussions according to the direction of the lecturer; 6) be an assessment of his abilities; 7) willing to train themselves to solve problems or similar problems; 8) Trying to apply the knowledge gained in the problem-solving process [32].

In learning the project-based learning model, students will solve a hypothetical problem and produce a product as proof so that it can improve student activities and learning outcomes in the Botany Phanerogamae course. It aligns with the research, which states that the project-based learning model can develop problem-solving skills in working on a project that can produce appropriate results and provide broad opportunities for students to choose topics, conduct research, and complete certain projects [33,36]. The result of other studies also stated that the project-based learning model requires skills using the principle of learning by doing or what is called learning by doing. Based on the portfolio, student activities will show what students have learned, how to ask questions, analyze, synthesize, and overcome problems in new ways [34]. In addition, it can also show how students interact intellectually, emotionally, and socially with fellow students and their lecturers.

CONCLUSION

The study's results show that applying the project-based learning learning model can significantly increase self-efficacy. Besides that, the project-based learning model can improve students' learning outcomes of the STKIP Al Amin Dompu biology education study program in the Botany Phanerogamae course. The project-based learning model in this study provides opportunities for students to explore their abilities in critical thinking, problem-solving, and independent work. In addition, the project-based learning learning model is learning that requires skills using the principle of learning while doing or what is called learning by doing. So, it can affect memory, self-efficacy, and student learning outcomes.

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