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Improving Character Development and Learning Achievement of SMPN 3 Cibarusah Students Using PjBL Learning Models On Biotechnology Materials

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Received December 2, 2022; accepted December 30, 2022; online December 31, 2022

Abstract: Learning Project Based Learning (PjBL) models provide opportunities for teachers to improve nationalist character, mutual cooperation and independent students in learning. The PjBL model gives students the opportunity to experiment with producing work according to related materials. This will make students better understand the learning material and can improve learning achievement. The purpose of the research is to increase the character building and learning achievement by implementing Project Based Learning (PjBL) learning models in biotechnology topics. The research population was students of grade IX-A SMPN 3 Cibarusah academic year 2022/2023 It belonged to class action research. It consists of two cycles. The results of this research showed that the implementation of PjBL was able to increase character building from 68.97% to 89.

Keywords: Project Based Learning, Character, Learning Achievement, Biotechnology.

Introduction

Learning is one way to build civilization (Fatonah & Prasetyo, 2014). One aspect of learning that needs to be taught to students is science. The essence of science is a way of thinking, a way of investigating, and a body of knowledge (Collette and Chiappetta, 1994). In learning science at school, activities are needed that are able to build knowledge in the minds of students (Fatonah & Prasetyo, 2014). A learning can achieve maximum results if it pays attention to several factors which are the basis of teaching, one of which is by mastering several teaching methods and techniques.

Teachers should be able to choose learning methods that are appropriate to the material to be delivered. The teacher determines the use of certain methods according to the nature and conditions of the material being taught and the level of development (child maturity). For example, materials for science lessons require different methods from language lessons. One thing that needs to be considered in the use of teaching methods is that they must always be varied, not monotonous, so that learning in the

classroom becomes effective, successful, and satisfying for both students and teachers. Teaching is not just transferring knowledge from the teacher's brain to the student's brain, but teaching is leading, guiding, and directing students to gain the truth (knowledge) as well as forming good study and work attitudes and habits so that they can study independently without assistance. So teaching is formed according to the nature of the child and the child's environment.

This IX-A SMPN 3 Cibarusah students have an average ability, this can be seen from the achievement of students who achieve the KKM in each Basic Competency which is around 65%, this shows that learning achievement is still low. Based on the results of observations during the learning process, the character of students shows that students like to work in groups but are unable to be independent and respect the differences in the abilities of their friends. This can be observed when students work in groups. Students are active in activities and tend to be crowded so it is considered important to activate students. The crucial factor in active learning is to make

students engage mentally and physically and build information processing networks (Harahap, 2016: 8)

This condition of students encourages teachers to improve the learning process to optimize students' abilities to produce contextual work, both individually and in groups, so it is highly recommended to use a learning approach that produces work based on problem solving (problem based and project based learning) (Widodo et al. , 2016: 3). Based on these characteristics and objectives, learning biology on the topic of biotechnology students are directed to find out and conduct experiments through project based learning (PjBL). PjBL is learning with a student centered approach where students collaborate to complete the final project (Mills, 2009:607).

In learning using the PjBL learning model, each group is given the opportunity to apply simple biotechnology, namely making tape or tempeh with basic ingredients according to the wishes of students at school. Furthermore, students report the results so that students are directly involved in observing objects and making works according to what students think. The expected learning outcomes are that students' learning achievements can reach 85% and achieve the Minimum Completeness Criteria (KKM). Learning is defined as a process of changing behavior in individuals due to the interaction between individuals and their environment.

Suciati et al. (2014: 12) states that the objectives of PjBL are: (1) to acquire new knowledge and skills in learning, (2) to improve students' abilities in solving project problems, (3) to make students more active in solving complex project problems with results tangible products in the form of goods or services, (4) develop and improve students' skills in managing resources/materials/tools to complete assignments/projects, and (5) increase student collaboration, especially in PjBL which is a group. Thus, PjBL is suitable for use for the

purposes of this research, namely to improve the character building and learning achievement of class IX-A students of SMPN 3 Cibarusah for the 2022/2023 school year in studying biotechnology.

Research Methods

This research includes Class Action Research which consists of 2 cycles. Each cycle consists of planning, implementation, observation and reflection stages. CAR is carried out to solve learning problems in specific classes. The spiral cycle of the stages of classroom action research can be seen in Figure 1.

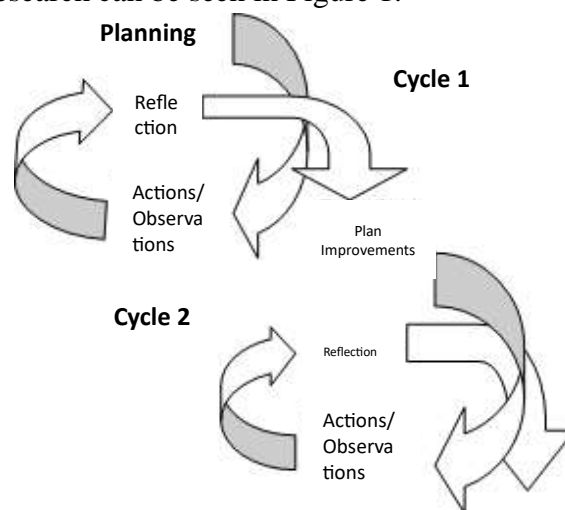


Figure 1 Classroom Action Research Design Flowchart

This study used class IX-A SMPN 3 Cibarusah with a total of 29 students. The learning tools used in this study consisted of syllabus, lesson plans, student project results assessment sheets, observation sheets of teaching and learning activities, and multiple choice written tests. The steps taken in the implementation of PjBL are an indicator of research success is the fulfillment of a minimum KKM of 75 by 85% of students. After that the research data obtained were analyzed descriptively qualitatively. This is because this study describes a learning technique that is applied in class and then explains the results that can be achieved using calculations.

Results and Discussion

Cycle I

a. Action Planning Stage I

Based on the observations made in class IX-A at SMPN 3 Cibarusah, the planned action in cycle I is to apply the PjBL learning model to biotechnology material. In this study, a list of student study groups was prepared, Learning Implementation Plans (RPP), Student Worksheets (LKPD), question papers, question papers, question answer keys and grade scores, score list sheets, observation sheets of student activity during learning process, observation sheets observing students' characters during the learning process, student attendance sheets, learning resources in the form of relevant books, internet and learning media in the form of experimental tools, and Information and Communication Technology (ICT).

b. Implementation and Observation Phase I

The implementation of teaching and learning activities for cycle 1 was carried out on January 23, 2022, and January 25, 2022, in class IX-A with a total of 29 students. In this case the researcher acted as a model teacher. The teaching and learning process refers to the lesson plans that have been prepared. Students are given the opportunity in groups to apply simple biotechnology, namely making tape. The teacher gives the opportunity to design the basic material to be made of tape. As a result, each group chose a different base material.

Table 1. Basic Materials of Tape Loading

GROUP	TAPE BASE MATERIALS
I	Bramo Rice
II	Black sticky rice
III	Cassava
IV	White rice
V	Rice 64
VI	Bengawan Rice
VII	Brown rice

Each group was given the opportunity to present their work and then the students read a summary of the subject matter related to biotechnology in turn. At the end of the implementation of learning, students are given a written test with the aim of knowing the level of success of students in the learning process that has been carried out. Observation (observation) is carried out simultaneously with the implementation of teaching and learning. Observer is a teacher colleague.

The research data in cycle I are as follows:

Table 2. Character Assessment Cycle I

No	Character Assessment	> KKM	%
1	Nationalist (no distinguish friends)	23	79,31
2	Mutual cooperation	19	65,52
3	Independent	18	62,21
	AVERAGE	20	68.97

Based on Table 2, it can be seen that the character strengthening of students has only reached 68.97%. This shows that classically character strengthening is still low and has not reached 85%. The test results showed that of the 29 students who achieved the KKM, only 17 students or only 58.62%. Thus, classically mastery learning has not been achieved.

c. Reflection Stage I

Actions that are less supportive of achieving the success of the indicators in cycle I are: (1) students are still happy to work with their chosen friends so when groups are randomly less able to work together, (2) the results of independent work are still low because most students do not write down the results of the experiment and the summary that is made independently is still not perfect, (3) when presenting the results of observations and summaries the students do not

have the awareness to appear first so the teacher must appoint the presentation group, (4) the teacher is still uneven in paying attention to work groups, and (5) teachers give less appreciation to students individually or in groups who have been active in learning. Thus it is necessary to hold cycle 2 to improve student achievement.

Cycle II

a. Action Planning Stage II

Based on the reflection of the results of cycle I, the action planned in cycle II is PjBL on the material of finding new sources of food for humans. In this study, a list of permanent student study groups was prepared so that they could work together more under the same conditions, revised Learning Implementation Plans, Student Worksheets, question grids, question scripts, question answer keys and grade scores, score list sheets, sheet observation of student activity during the learning process, observation sheets of student character observations during the learning process, student attendance sheets, learning resources in the form of relevant books, the Internet and learning media in the form of experimental tools, ICT.

b. Implementation and Observation Phase II

The implementation of teaching and learning activities for cycle 1 was carried out on February 1, 2022, and February 6 2022 in class IX-A with a total of 29 students. In this case the researcher acted as a model teacher. The teaching and learning process refers to the lesson plans that have been prepared. Students are given the opportunity in groups to look for new food sources and practice them. The teacher gives the opportunity to design the basic ingredients and what the food is made of so that students make recipes with the desired basic ingredients. In groups, students practice at home and bring the results to school. The result is that each group chooses different basic ingredients and different types of food.

Table 3. Basic Ingredients and Types of Food Made by Students

GROUP	BASIC MATERIAL	FOOD TYPE
I	Sweet potatoes	Rainbow cakes
II	gembili	Get it Lindri
III	Cassava	Nuggets
IV	Tomato Fruit	For syrup
V	Star fruit	For syrup
VI	Summer squash	Various Snacks
VII	Mustard leaves + Tape	Avocado Essence

Each group is given the opportunity to present their work and then the students read a summary of the subject matter related to Biotechnology in turn.

At the end of the implementation of learning, students are given a written test with the aim of knowing the level of success of students in the learning process that has been carried out. Observation (observation) is carried out simultaneously with the implementation of teaching and learning. Observer is a teacher colleague.

The research data in cycle I are as follows:

Table 4 Character Assessment Cycle II

No	Character Assessment	>KKM	%
1	Nationalist (does not discriminate between friends)	28	96.55
2	Mutual cooperation	26	89.66
3	Independent	24	82.76
AVERAGE		26	89.66

Based on Table 4, it can be seen that the character strengthening of students has reached 89.66%. This shows that classically the character strengthening has succeeded in reaching 85%. The test results showed that of the 29 students who achieved the KKM, 25 students or only 86.21%. Thus, classically complete learning has

been achieved. This shows that the application of the PjBL learning model is able to improve the character building and learning achievement of students. This is in accordance with Made Wena (2014: 147) which reveals that the project-based learning model has advantages, including: increasing motivation, increasing problem solving abilities, increasing collaboration, improving resource management skills, and Increased resource - management skills.

c. Reflection Stage II

In Cycle II there were still actions that were less supportive, namely students were less able to expand their summary by using other sources so that even though they had achieved KKM classically they were still uneven.

Conclusion

Based on the results of the research and discussion previously described, it can be concluded that the application of Project Based Learning in Biotechnology can increase the implementation of character strengthening to 89.66% and increase student achievement to 86.21%. Based on research on the application of Project Based Learning in Biotechnology which shows an increase in the character and learning achievement of students, further research needs to be developed to apply the PjBL learning model to different materials adapted to the characteristics of PjBL.

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