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Implementation of Problem Based Learning (PBL) Learning Model Integrated with Culturally Responsive Teaching (CRT) to Increase Motivation to Learn Mathematics

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ABSTRACT

This study was conducted to improve the quality of learning in the classroom, low motivation in Mathematics subjects in class X DKV 1 SMK Negeri 10 Medan. Through observation that students have low learning motivation. Learning that is carried out continuously without innovation makes the level of student motivation low, with this study the researcher combines the Problem Based Learning (PBL) learning model with the Culturally Responsive Teaching (CRT) approach. This type of research is classroom action research which is carried out in 2 cycles. The subjects of the study were 33 students. The data taken were in the form of observations and questionnaires. The results of the study showed that there was an increase in student learning motivation of 19% which was obtained through a motivation questionnaire based on student learning motivation indicators. Significant results can be seen from the percentage obtained during cycle I which was only 61%, while in cycle II it was 80%. This shows that the implementation of the Problem Based Learning (PBL) model integrated with Culturally Responsive Teaching (CRT) can increase students' motivation to learn mathematics so that learning becomes more innovative and enjoyable.

Keywords: ***Learning Model, PBL, CRT, Motivation, Mathematics***

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1. INTRODUCTION

The main text format Education creates superior human resources that can improve the quality of the nation. One aspect that can be assessed by other countries, therefore the government always tries to create a curriculum that follows the changing times. Where the independent curriculum is designed to side with students. Teachers serve as facilitators who guide the natural strength of students and the nature of the times so that students can achieve safety and happiness as human beings. Although students are the center of learning, they are encouraged to be actively involved in learning activities. Good and quality human data sources can be realized through an effective education system. Through education, a person can also experience a transformation from ignorance to having knowledge, thus becoming a better individual. (Putri N. S, dkk, 2018:258).

A title of One of the obstacles or problems of the learning process is low learning motivation. One thing that can improve learning achievement is learning motivation. The higher the motivation of students in learning, the better the results they will get. Learning motivation will facilitate the learning process. Therefore, providing the right motivation is needed for success in learning. Teachers must design learning models and approaches that can increase student motivation.

Student learning motivation is very influential in the learning process, because it can change student behavior in learning. Students can develop themselves well if they have a desire to achieve success. Motivation will encourage students to be active in learning. Conversely, if students do not have the enthusiasm to learn, it will cause various other problems, such as students being lazy to follow learning, students having difficulty understanding learning, and being unable to do assignments. Student learning

outcomes will be of higher quality if they have high motivation. Student motivation is closely related to the role of the subject teacher himself. The design of an appropriate and interesting learning model, which includes approaches, strategies, methods, and techniques will encourage student motivation to be enthusiastic in following learning. Teachers can create good classroom conditions in order to create effective learning, and in line with the individual needs of students (Ayu, dkk., 2023: 435).

The learning method that can be used to meet students' needs is Problem Based Learning. PBL is a learning model that can make students actively involved and think critically in understanding lesson concepts. This is done by presenting situations and problems from the beginning of learning, with the intention of being a learning material for students in solving problems through a problem-solving approach. (Utomo dkk, 2014:6).

The Culturally Responsive Teaching approach is a culture-based approach that looks at the cultural background of students in its application. In this learning, teachers integrate cultural content into learning materials. The CRT approach will make students close to their culture, appreciate cultural diversity, and can make students enthusiastic to participate because the learning material is relevant to their daily lives. The application of learning with the CRT approach has the potential to increase student interest and motivation. Hernandez (in Larasati Anggi, 2023: 84) that learning that is linked to the culture and daily experiences of students will make it easier for students to understand the concepts of science.

So it can be concluded that learning with the CRT approach is important to train students to understand learning materials, and to increase students' motivation to learn mathematics, teachers must meet students' learning needs through learning models. One of the learning models applied in class X DKV 1 is the PBL learning model to increase student motivation, so that the quality of learning becomes better.

Through observations at SMK Negeri 10 Medan, it was found that students were less motivated in learning, many students were still afraid to give arguments, lacked self-confidence, and lacked curiosity in learning. It can be concluded that students cannot be said to be active in learning. Learning that is less interesting and still conventional makes students not focus on following the learning. In addition, learning is less related to the background of student participants, such as social conditions, environment, and culture of students.

2. RESEARCH METHOD

This type of research is Classroom Action Research. (*Clasroom Action Reseacrh* (CAR)). This research follows the flow *planning-acting-observing-reflecting*.

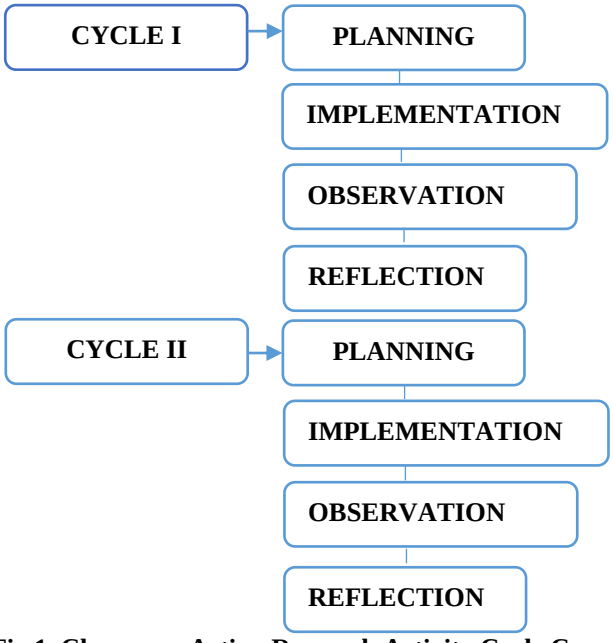

Fig 1. Classroom Action Research Activity Cycle Concept Map

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The subjects of this study were students of class X DKV 1 at SMKN 10 Medan with a total of 33 students, of which there were 16 male students and 17 female students. The school was chosen because it has characteristics that are suitable for testing the relationship between motivation to learn mathematics. The study will be conducted in 2 cycles. Cycle I and Cycle II are given 2 face-to-face meetings.

In this study, two techniques were used to collect data: observation and questionnaire. Observation was carried out by directly observing activities in the field and conducting interviews with teachers and students. Meanwhile, the questionnaire was compiled in the form of statements made through Google Form and given to respondents to be filled in. To assess learning motivation, a questionnaire was distributed covering 20 statements, of which 10 were positive and the others were negative. The results of measuring students' mathematics learning motivation were then processed with a Likert-based scoring system with four answer choices, and analyzed using student motivation indicators. The measurement of student motivation questionnaires was carried out using the indicators contained in the following table.

Table 1. Aspects of Learning Motivation

Number of Item	**Aspects of Learning Motivation**
1	Seriousness in completing tasks
2	Strong motivation and drive to achieve success.
3	Interesting and stimulating learning activities
4	Enjoyment in finding and solving problems.
5	A supportive and comfortable learning environment.

3. RESULTS AND DISCUSSION

Before the research was conducted, an observation of the Mathematics learning process in class X DKV 1 SMK Negeri 10 Medan had been conducted. This observation aims to evaluate the problems faced by students during the learning process.

Classroom action research is carried out in two cycles, namely cycle I and cycle II. The data presented are the results of observations obtained through student questionnaires. The following is a schedule of classroom action research activities related to efforts to improve students' motivation to learn mathematics in each cycle. Classroom Action Research Activity Schedule Table.

Cycle	**Date**	**Students Who Attend**
Cycle I	02 August 2024	33 Students
Cycle II	30 August 2024	33 Students

The findings during the implementation along with their discussion are:

a. Cycle I

In the planning stage, the first step taken is to prepare a learning module for the Mathematics subject. Using the PBL learning model with the CRT approach. In addition, the teacher also prepares learning resources, student worksheet, assessment rubrics, learning tools and media. At this planning stage, the things that need to be prepared are research instruments as data collectors on observation sheets and research questionnaires. In cycle I learning activities carried out on Friday, August 2, 2024 with a time of 4JP. In this learning, students are given a CRT approach with the PBL learning model. The media used are interactive display materials, flipbooks, google classrooms, learning videos, claw machines, and curipods that are integrated with student culture, for example Malay culture, North Sumatra.

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Fig 2. Cycle I

Based on the observation results of the learning motivation of class X DKV 1 students of SMKN 10 Medan in cycle I, the average value of student learning motivation is 61%. This shows that the learning motivation of class X DKV 1 students has not reached the expected success indicators. The results of the observation cycle I show that the average value of student motivation in the questionnaire is 61%. The following are the results of the analysis of student learning motivation in cycle I of class X DKV 1 at SMKN 10 Medan:

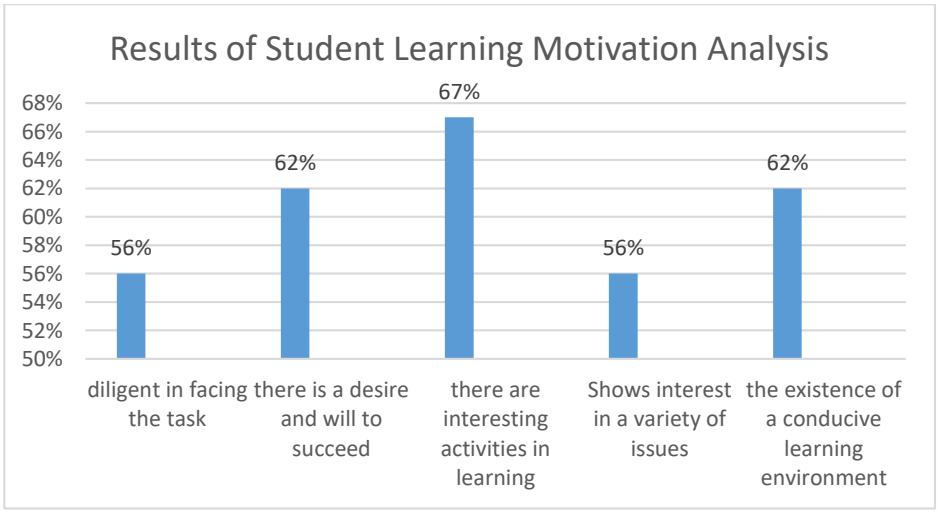

Fig. 3 Results of Student Learning Motivation Analysis

The results of students' mathematics learning motivation after implementing the CRT approach can be seen in the table above. The percentage obtained from each indicator is: indicator 1 is 56.37%, indicator 2 reaches 61.87%, indicator 3 is 67.05%, indicator 4 is 56.21%, and indicator 5 reaches 61.87%. From these data, it can be concluded that the implementation of CRT increases students' learning motivation. However, there are still some students with low motivation, so a further cycle is needed, namely cycle II, to further increase students' learning motivation.

Based on the data of cycle I actions, observation and questionnaire data have not reached the success indicators. So that several shortcomings can be obtained that can be used as reflection materials.

1. In solving HOTS problems, there are still students who are less confident in the material of arithmetic and geometric sequences related to culture
2. The CRT approach is not widely applied in cycle 1, in the next cycle examples of North Sumatra culture will be added to inspire students.
3. In the next cycle, add cultural elements to LKPD and learning resources so that students become more interested and enthusiastic.

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b. Cycle II

The initial step in the planning stage is to prepare a learning module for Mathematics subjects using the PBL model and the CRT approach. In addition, teachers also prepare various learning resources, Student Worksheets, assessment rubrics, and the necessary learning tools and media. At this stage, research instruments must also be prepared to collect data through observation sheets and questionnaires. Learning in cycle II is scheduled to take place on Friday, August 30, 2024, with a time allocation of 4JP. In this learning, students are given a CRT approach with the PBL learning model. The media used are interactive display materials, flipbooks, google classrooms, learning videos, claw machines, and curipods that are integrated with the culture of students of X DKV 1 SMKN 10 Medan, for example Malay culture, North Sumatra.

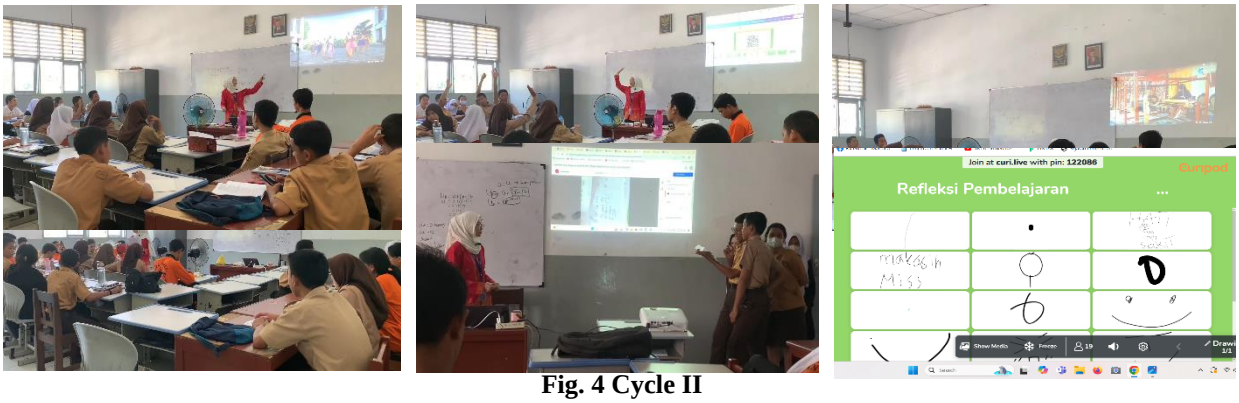

Fig. 4 Cycle II

According to the results of observations on the learning motivation of class X DKV 1 students at SMKN 10 Medan in cycle II, the average score was 80%. This figure shows that the learning motivation of class X DKV 1 students has met the requirements for the agreed level of success. The results of observations from cycle II indicate that the average value of student motivation in the questionnaire is 80%. Below is an analysis of student learning motivation in cycle II in class X DKV 1 SMKN 10 Medan:

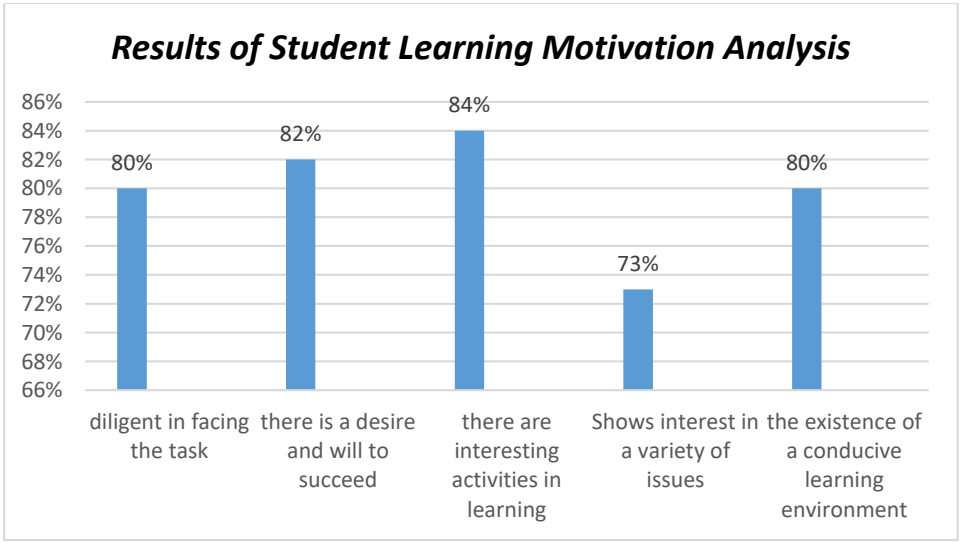

Fig. 5 Results of Student Learning Motivation Analysis

The results of the study on students' mathematics learning motivation after the implementation of the Culturally Responsive Teaching (CRT) approach can be seen in the attached table. The percentage value of motivation per indicator is as follows: indicator 1 recorded 80.30%, indicator 2 reached 82.33%, indicator

3 was 83.90%, indicator 4 was 73.03%, and indicator 5 was also 80.30%. Based on these data, it can be concluded that the implementation of the CRT approach in cycle II was effective in significantly increasing students' learning motivation. Therefore, the researcher believes that there is no need to continue to the next cycle because the research objectives have been achieved.

Research on students of class X DKV 1 on the material "Arithmetic and Geometric Sequences" revealed that the application of the PBL model with the CRT approach succeeded in fostering students' learning motivation. Student motivation increased by 19% from cycle I to cycle II, from 61% to 80%. The percentage of student learning motivation can be seen in the diagram below. Data obtained from cycle II showed that the motivation indicator had reached an optimal level. This shows that learning using the PBL model and the CRT approach is effective in increasing the motivation to learn mathematics for students of class X DKV 1 at SMKN 10 Medan.

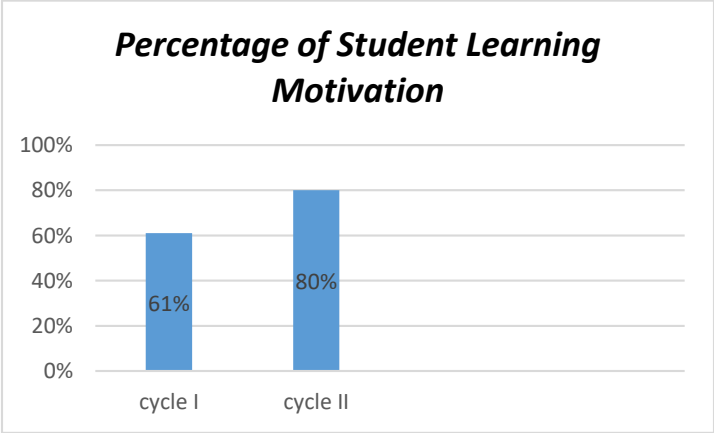

Fig. 6 Percentage of Student Learning Motivation

4. CONCLUSION

A study conducted on students of class X DKV 1 at SMKN 10 Medan discussing the material "Arithmetic and Geometric Sequences" indicated that in learning using the PBL model and the CRT approach, it can effectively foster student motivation. Learning motivation increased by 19% from cycle I to cycle II, namely from 61% to 80%. The increase can be seen from the score of the mathematics learning motivation questionnaire where each cycle experienced an increase. After undergoing learning with the CRT approach, students showed increased motivation, greater enthusiasm, and perseverance in understanding mathematics material. Therefore, students have achieved the established success indicators, so there is no need to continue this research to the next cycle.

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