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Improving Mathematics Learning Activity and Outcomes through the Culturally Responsive Teaching (CRT) Learning Approach for Class VII Middle School Students

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ABSTRACT

The choice of learning approach carried out by the teacher can influence student activity and learning outcomes. This research aims to determine the application of the Culturally Responsive Teaching (CRT) approach in improving the activity and mathematics learning outcomes of class VII junior high school students. The subjects in this research were students in class VII-A of SMP Negeri 3 Sidoarjo for the 2022/2023 academic year, totaling 32 students. This research uses a research method in the form of Classroom Action Research (PTK) with 2 cycles and each cycle consists of 4 stages, namely the planning stage, action implementation, observation/observation, and reflection. Research data collection techniques include observation, tests and documentation. The results of the research showed that student learning activity in the pre-cycle was still in the low activity category, namely with a percentage of 51.95%, then in cycle I it increased to the moderate activity category with a percentage of 67.09%, and in cycle II it again increased to the high activity category. with a percentage of 79.10%. The percentage of students' classical mathematics learning outcomes in the pre-cycle was 43.75% (14 students in the complete category out of a total of 32 students), then in cycle I it increased to 75% (24 students in the complete category out of a total of 32 students), and in cycle II experienced another increase reaching 81.25% (26 students in the complete category out of a total of 32 students). Based on these results, it can be concluded that the application of the Culturally Responsive Teaching (CRT) learning approach can increase the activeness and mathematics learning outcomes of class VII-A students in

the statistical material of presenting data at SMP Negeri 3 Sidoarjo for the 2022/2023 academic year.

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INTRODUCTION

Mathematics plays an important role in the development of knowledge and technology, according to Sari et al. (2016) mathematics is a basic branch of science for technological development, apart from that mathematics also plays an important role in various scientific disciplines and improves human thinking patterns. Mathematics is a science and a very important subject to be taught to students (Shoit, A., Rasiman, Harun, L. & Harianja, M., 2023). Meanwhile Yulia, et al. (2018) stated that mathematics needs to be taught to students because it is always used in all aspects of life. The important role of mathematics in life is not matched by the facts that occur in the field where secondary school students' mathematics learning outcomes are still relatively low (Wali, G. N. K., Winarko, W., Murniasih, T. R., 2020). Learning outcomes are the skills or abilities displayed by students after participating in learning activities which include cognitive, affective and/or motor skills (Turmuzi, 2020).

Some students still consider mathematics to be a difficult and boring lesson because it involves many formulas. This makes it difficult for students to understand and like mathematics correctly and precisely, resulting in low student learning outcomes. In line with this, SMP Negeri 3 Sidoarjo, which is one of the schools in Sidoarjo Regency, is experiencing problems in the mathematics learning process, especially in class VII-A. Based on the results of observations during learning, several problems were found, namely that students did not pay enough attention to the lesson because students thought mathematics was a boring subject and difficult to understand so that students did not understand the material optimally. Observation results also show that student learning outcomes are still below the threshold for the criteria for achieving learning objectives (KKTP).

Another factor that causes low mathematics learning outcomes is that the learning approach used is not appropriate. According to Darkasyi, et al (2014), low mathematics learning outcomes are not only caused by difficult mathematics, but are caused by several factors, namely the students themselves, teachers, learning approaches and the learning environment which are interconnected with each other.

The new learning paradigm guides the learning process to adapt to student needs. The learning process in the classroom must recognize the differences that occur (Turhusna & Solatun, 2020). Teachers must know their students, especially in the society where they live (Shoit, A., Rasiman, Harun, L. & Harianja, M., 2023). This is as a result of students in the class having different backgrounds, characteristics and social backgrounds. The Culturally Responsive Teaching (CRT) learning approach is an approach that can develop the potential for student diversity by exploring students' academic abilities and psychosocial abilities (Gay, 2018). Culturally Responsive Teaching (CRT) is a learning approach that recognizes the importance of students' cultural references in all aspects of learning (Ladson-Billings, 1995). Culturally Responsive Teaching (CRT) can be interpreted as the use of cultural characteristics, experiences and perspectives from various ethnicities of students as a more effective learning medium.

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Hernandez et al (2013) stated that a design for developing a Culturally Responsive Teaching (CRT) learning approach adapted to mathematics and natural science learning has five main categories, including (1) Cultural integration in material content (Content Integration), namely integrating culture in learning, building good relationships between teachers and students and providing appreciation for student achievements, (2) Facilitating Knowledge Construction, namely the teacher acts as a facilitator for students in constructing knowledge based on the students' prior knowledge, (3) Not being prejudiced by differences. (Prejudice Reduction), namely the teacher uses a contextual approach to create a class that is free to learn without paying attention to differences in race/ethnicity and social class/language, (4) Social Justice, namely students dare to ask questions without paying attention to differences in their cultural background and the teacher plays a role encourage students to dare to express opinions and dare to show their cultural background, (5) Academic development, namely teachers assist students in developing their academics by carrying out the learning process with a variety of learning strategies according to the students' backgrounds, learning styles and characters. At this stage students are required to be active in learning according to one of the characteristics of CRT, namely student-centered.

Culturally Responsive Teaching(CRT) makes learning meaningful and connected to students' lives (Villegas & Lucas, 2007). Learning materials that are real to students' lives where students have seen, heard and observed can increase student learning activity (Gaol, R. L. & Simarmata, E. J., 2019). Increasing student activity in learning can have an impact on increasing student learning outcomes (Subandono, 2020). The importance of student activity in mathematics learning needs to be increased. This explanation refers to one alternative in increasing student activity and learning outcomes, namely through the Culturally Responsive Teaching (CRT) learning approach. This research aims to determine the effectiveness of implementing the Culturally Responsive Teaching (CRT) learning approach in increasing the activeness and mathematics learning outcomes of class VII middle school students.

METHOD

Types of research

This type of research uses a research method in the form of Classroom Action Research (PTK), namely research that describes the reasons and impacts of a treatment, what happens if the treatment is implemented, as well as all procedures from start to finish (Arikunto, 2021). This research aims to increase activeness and mathematics learning outcomes after implementing the Culturally Responsive Teaching learning approach. An approach to learning that recognizes the importance of students' cultural references in all aspects of learning (Ladson-Billings, 1995). The research design uses the Kemmis and Taggart model which consists of planning, implementing actions, observing and reflecting in each cycle (Kemmis, 1992). These four stages are repeated each cycle until the researcher obtains the desired results. At the planning stage, researchers plan learning models, learning approaches, create learning tools and prepare the necessary instruments.

During the action implementation phase, the researcher implemented the learning plan that had been created previously. In the observation stage, the researcher observed, recorded students' active learning during the learning activities and recorded deficiencies and changes that occurred during the research on the observation sheet. The researcher's reflection stage analyzes the success of using the Culturally Responsive Teaching learning approach in each cycle. If the indicators of success have not been achieved, the research will continue to the next cycle by correcting the deficiencies in the previous cycle.

Subject, Time, and Place of Research

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The research subjects were class VII-A of SMP Negeri 3 Sidoarjo in the 2022/2023 academic year, totaling 32 people consisting of 21 girls and 11 boys. The implementation time will be in the second semester of the 2022/2023 academic year during May 2023 in class VII-A of SMP Negeri 3 Sidoarjo for the subject of statistical data presentation.

Data Collection and Analysis Techniques

1. Student Learning Activeness

The data collection technique is in the form of observation during learning activities in each cycle. The instrument used to measure student learning activity is an indicator of student learning activity according to Sudjana (2010:16)

Table 1. Indicators of student activity

No	Indicator
1	Students participate in carrying out their learning tasks
2	Students are involved in problem solving in learning activities
3	Students ask friends or the teacher if they do not understand the material or encounter difficulties
4	Students try to find information that is needed to solve the problems they are facing
5	Students carry out group discussions according to the teacher's instructions
6	Students are able to assess their abilities and the results they obtain
7	Students practice solving questions or problems
8	Students have the opportunity to use or apply what they have obtained in completing the tasks or problems they face

Each indicator is assessed using four Likert scales, namely score 4 (always), score 3 (often), score 2 (sometimes), and score 1 (never) (Sugiyono 2019). Next, the observation data was analyzed using the following formula by Kunandar (2015):

$$Presentase = \frac{skor\ perolehan}{skor\ maksimal} \times 100\% \quad (1)$$

The classification criteria for the percentage of student learning activity according to Nurhayati (2020) is shown in Table 2. As follows:

Table 2. Classificationpercentagestudent learning activeness

Percentage	Category
$P > 84\%$	Very high
$68\% < P \leq 84\%$	Tall
$52\% < P \leq 68\%$	Enough
$36\% < P \leq 52\%$	Low
$P \leq 36\%$	Very low

Student learning activity is said to have increased, the cycle does not continue and classroom action research is declared successful if the average percentage of student learning activity reaches a minimum of 70%.

2. Learning outcomes

Learning outcomes are assessed based on observations during the implementation of learning and tests in the form of formative assessments which are carried out at the end of each cycle, then these results are used to provide a score on the criteria for achieving learning objectives (KKTP) based on a predetermined rubric.

Table 3. Criteria for Achieving Learning Goals

	Cycle I	Cycle II
Criteria Based on Learning Objective Indicators	1. Students can explain the meaning of data 2. Students know the types of data based on their nature and how to obtain them 3. Students can explain the concepts of population and sample 4. Students know how to collect data and canpractice it 5. Students can present data in tabular form	1. Students can present data in the form of a bar chart 2. Students can present data in the form of a line diagram 3. Students can present data in the form of a pie chart

Student learning outcomes are declared complete if the percentage of learning achievement criteria (KKTP) is at least 70%. Meanwhile, the completeness of learning outcomes for each cycle can be calculated classically using the following formula:

$$Presentase = \frac{jumlah\ siswa\ tuntas}{jumlah\ siswa\ keseluruhan} \times 100\% \quad (2)$$

Learning outcomes are said to have increased, the cycle does not continue and classroom action research is declared successful if the percentage of classical completion reaches a minimum of 80% with complete information (Maisarah, 2020).

RESULTS AND DISCUSSION

Results

1. Student Learning Activeness

The implementation of the research began by conducting observations to determine the initial state of student activity and student learning outcomes in mathematics subjects before implementing the Culturally Responsive Teaching (CRT) learning approach. The results of observations of student learning activity showed that 0 students or 0% of students were in the very low and very high activity category, 20 students or 62.5% of students were in the low activity category, 8 students or 25% were in the moderate activity category, and 4 students or 12 .5% of students fall into the high activeness category with the average percentage of student activeness being 51.95% which falls into the low activeness category.

The results of observations of student learning activity after implementing the Culturally Responsive Teaching (CRT) learning approach, among others, in cycle I showed that 19 students or 59.375% were in the moderately active category and 13 students or 40.625% of students were in the high activeness category, while those in the very low active category , low and very high are 0 students or 0% students. The average percentage of student activity in cycle I was 67.09%, which was included in the category of sufficient activity, this made the research continue to the next cycle because it had not met the success criteria. In cycle II it was found that 23 students or 71.875% of students were in the high activeness category and 9 students or 28.125% of students were in the very high activeness category, while those in the very low, low and sufficient activeness categories were 0 students or 0% of students. The average percentage of student activity in cycle II was 79.1%, which is included in the high activity category. The results of observations of student learning

activity pre-cycle and after implementing the Culturally Responsive Teaching (CRT) learning approach in cycle I and cycle II are presented in Table 4.

Table 4. Observation Results of Student Learning Activeness

Category	Precycle		Cycle I		Cycle II	
	F	Percentage	F	Percentage	F	Percentage
Very high	0	0%	0	0%	9	28.125%
Tall	4	12.5%	13	40.625%	23	71.875%
Enough	8	25%	19	59.375%	0	0%
Low	20	62.5%	0	0%	0	0%
Very low	0	0%	0	0%	0	0%

The results of observations of student learning activity showed that the average percentage of student learning activity was 51.95% in the pre-cycle, which was included in the low activity category. In cycle I the average percentage of student learning activity was 67.09% which was in the moderate activity category, and in cycle II the average percentage of student learning activity was 79.10% which was in the high activity category. Below is presented the percentage of students' classical learning activity starting from pre-cycle to cycle II in Table 5.

Table 5. Average Student Learning Activity Each Cycle

Student Learning Activeness	Pre cycle (Number of Students)	Cycle I (Number of Students)	Cycle II (Number of Students)
Very high	0	0	9
Tall	4	13	23
Enough	8	19	0
Low	20	0	0
Very low	0	0	0
Average	51.95%	67.09%	79.10%
Category	Low	Enough	Tall

2. Student learning outcomes

Based on the results of observations and formative assessments carried out in the pre-cycle, the average score for the criteria for achieving learning objectives (KKTP) was 64%, as many as 14 out of 32 students or 43.75% of students had achieved the criteria for completion. In the implementation of cycle I of the KKTP the average was 77.85%, as many as 24 students or 75% of students had achieved the criteria for completion. Meanwhile, in the second cycle of KKTP the average was 81.77%, as many as 26 students or 81.25% of students had reached the completion criteria. The following is a recapitulation of students' mathematics learning outcomes which are shown in Table 6.

Table 6. Assessment of Mathematics Learning Outcomes Each Cycle

Indicator	Precycle	Cycle I	Cycle II
Total students	32	32	32
Average KKTP	64 %	77.81%	81.77%
Highest KKTP	87.5 %	95%	100%
Lowest KKTP	50 %	60%	66.67%
Students complete	14	24	26
Students do not complete	18	25	6
Complete student percentage	43.75%	75%	81.25%
Student presentations are incomplete	56.25%	25%	18.75%

Discussion

1. **Cycle I**

The stages of implementing cycle I can be described as follows.

Planning: Activities carried out in the planning stage of cycle I include: (a) Identifying the learning style of each student as a guideline for dividing groups based on learning style, (b) designing learning tools using the Problem Based Learning (PBL) learning model with a Culturally Responsive Teaching approach (CRT), especially LKPD which is adapted to learning styles and the application of the CRT approach in the data collection section, namely in the form of problems related to arts, typical food and tourism in Sidoarjo, (c) Developing research instruments and preparing (scoring rubrics) for each instrument to be used.

Implementation of Actions: In cycle I, learning was held in one meeting with a time allocation of 2 x 40 minutes with the subject of getting to know data and collecting data. The learning objectives in cycle I include being able to explain the meaning of data, knowing the types of data based on their nature and how to obtain them, being able to explain the concepts of population and sample, knowing how to collect data and being able to put it into practice, and being able to present data in tabular form. Learning is carried out according to a previously prepared plan.

Observations/Observations: The focus of the observation stage is observing the suitability of the learning steps carried out by the teacher during the lesson, student activities, recording progress and obstacles encountered during the implementation of the action. In cycle I the teacher carried out learning according to the learning steps in the teaching module, namely the PBL learning model with the CRT approach. Students appear more active during learning activities starting from paying attention to instructions given by the teacher, solving problems on the LKPD, asking friends or teachers about problems they don't understand, discussing with group members to solve problems, responding to each other in presentation activities, and looking for other sources. to help find solutions to problems. Even though the learning activities seem more active, there are still one or two students in the group who are still passive in discussion activities and are still hesitant to ask their friends or teacher what they don't understand. After the end of the implementation of cycle I, evaluation activities were carried out on the learning outcomes in cycle I, namely analyzing the results of observations of student activity and mathematics learning outcomes. Data on activity and learning outcomes that have been analyzed have obtained the following results: the average percentage of student activity is 67.09%, which is included in the category of sufficient activity, while the mathematics learning outcomes based on the KKTP are obtained on average at 77.81% with classical completeness at 75%. (24 students completed out of 32 students).

Reflection: Based on the results of data analysis that has been carried out at the observation and evaluation stage, it is then compared with the success criteria. The average student learning activity in cycle I was 67.09% in the moderate activity category, while the average success criteria was 70% in the high activity category. Likewise, for the completeness of classical mathematics learning results, it has only reached 75%, while the success criteria for completeness of mathematics learning results is at least 80%. Thus, classroom action research was continued in cycle II, with several improvements and revisions, including: (a) application of CRT in several learning activities, not only on LKPD, namely in apperception activities and trigger questions, (b) selection of interesting local culture to relate to. with learning to increase student learning motivation, (c) more intensive teacher supervision in the implementation of learning, (c) monitoring in group discussions is more individual, especially giving special attention and encouragement to students whose abilities are less in discussions and presentations to be more active in discussion activities .

2. Cycle II

Cycle II was held in two meetings with the time allocation for each meeting being 2 x 40 minutes. In cycle II, several improvements and revisions were carried out according to those formulated in the cycle I reflection activities. The stages of implementation of cycle II are as follows.

Planning: Improvements made at the planning stage of cycle II were adding the application of CRT to apperception activities and trigger questions. Apart from that, selecting more interesting problems regarding traditions, local products, typical food and tourism in Sidoarjo to be applied to the LKPD. So there are 6 LKPD with different topic choices about the culture in Sidoarjo to attract students' interest in the culture they are interested in. Other preparations are developing teaching modules with the Project Based Learning learning model, preparing observation sheets and other instruments needed for research activities.

Action Execution: The learning objective in cycle II is to present data in the form of bar charts, line charts and pie charts. Learning is carried out using the Project Based Learning (PjBL) learning model with a CRT approach. At the first meeting, the stages carried out were determining basic questions, project design, preparing a schedule, and monitoring students and project progress. At the first meeting, students looked active and enthusiastic because the group formation was in accordance with their interest in the culture that had been provided. They are also active in completing LKPD and designing projects according to the creativity of each group. At the second meeting, the stages carried out were testing the results and evaluating experiences, each group made a presentation so that the learning activities were more active because students responded to each other during the presentation activities.

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Observations/observations:as in cycle I activities, at this stage the teacher observes the appropriateness of the learning steps, students' active learning, records progress and obstacles encountered during the implementation of the action. Observation activities are focused on improvements and revisions made during the action implementation process. Some of the progress seen in cycle II includes: (a) student learning is more active because the teacher has carried out more intensive supervision in discussion activities, (b) rearranging group members according to cultural interests also has a positive impact on project planning activities , (c) the presentation activity was quite active because all groups were presenting and there were groups that were required to provide responses, (d) student activity also seemed higher because each group presenting presented a different culture. After the end of cycle II, an evaluation was carried out on students' activeness and mathematics learning outcomes. The results of the analysis of activity and mathematics learning outcomes showed that the average percentage of student activity was 79.10%, which was included in the high activity category, while mathematics learning outcomes based on the KKTP were obtained on average at 81.77% with classical completion at 81.25% (26 students completed from 32 students).

Reflection: At the reflection stage, an analysis of the results obtained at the observation stage is carried out with success criteria. It was found that the average student activity was 79.10%, which was included in the high category, which had exceeded the minimum limit set at 70%, while the average mathematics learning outcomes based on the KKTP were 81.77%, which exceeded the minimum limit, namely 70%. Likewise, classical learning completion reached 81.25% (26 students completed out of 32 students) which exceeded the minimum limit of 80%. The results achieved in cycle II have achieved indicators of success, thus the classroom action research was declared successful in 2 cycles.

The use of local culture in learning materials is intended to make students more motivated in understanding a concept because it starts from something that is close to their daily lives. Wahyuni (2013) said that local culture is able to motivate students to carry out better and more meaningful learning. A way to connect mathematical concepts with concepts that are known in the surrounding community, this will build understanding for students to link the knowledge they will learn with the knowledge they already have to help find solutions to problems involving the learning material.

The success of the classroom action research that has been carried out cannot be separated from the application of the Culturally Responsive Teaching (CRT) learning approach. According to Widana (2021), linking local culture with mathematics material can enable students to see, know and do directly things related to local culture. These advantages can foster a sense of love for mathematics lessons which will later have an impact on increasing expected mathematics learning activities.

The Culturally Responsive Teaching (CRT) learning approach makes learning meaningful and connected to students' lives (Villegas & Lucas, 2007). Learning materials that are real to students' lives where students have seen, heard and observed can increase student learning activity (Gaol, R. L. & Simarmata, E. J., 2019). Increasing student activity in learning can have an impact on increasing student learning outcomes (Subandono, 2020).

CONCLUSION

Based on the results of research observations during pre-cycle to cycle II, it can be concluded that by implementing the Culturally Responsive Learning (CRT) learning approach (1) student learning activity in each cycle has increased, initially in the pre-cycle the percentage of classical activity was 51.95% (activity category low) in cycle I increased to 67.09% (fair activity category) and increased again

in cycle II to 79.10% (high activity category). (2) students' mathematics learning outcomes increase every cycle, in the pre-cycle 14 out of 32 students or 43.75% of students have achieved learning completeness, in the first cycle there has been an increase, namely 24 students or 75% of students have achieved learning completeness. This increase continued in cycle II as many as 26 students or 81.25% of students had achieved learning mastery, in this case the specified research success criteria had been achieved.

Some suggestions put forward by researchers based on these conclusions are that the Culturally Responsive Teaching (CRT) learning approach can be applied by teachers in schools on various materials to support new paradigm learning, namely learning that adapts to students' needs and this research can be used by researchers as a reference for conducting further research. on different materials and different levels taking into account the indicators to be studied.

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