e-ISSN: 2986-8076
DOI: 10.57254/tess.v2i3.42

International Journal of Geometry and Applied Mathematics
TESSERACT
Vol. 2, No. 3, Nopember 2024 Pp. 268-280
Journal Page is available at http://ekalaya.nindikayla.com/index.php/home

IMPROVEMENT OF LEARNING OUTCOMES OF GRADE VIII STUDENTS OF SMPN 4 SALATIGA THROUGH THE PBL MODEL WITH A CRT APPROACH

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Abstract

This study aims to improve the mathematics learning outcomes of class VIII G students of SMP Negeri 4 Salatiga in the material Surface Area of Flat Sided Buildings through the PBL (Problem Based Learning) model with the CRT (Culturally Responsive Teaching) approach. This research is classroom action research conducted in two cycles using the Kemmis and MC Taggart models with 4 stages namely planning, implementation, observation/observation, and reflection. The subjects of this study were class VIII G students of SMP Negeri 4 Salatiga for the 2022/2023 academic year, consisting of 30 students (15 boys and 15 girls). The technique of collecting data in this research uses observation sheets of the implementation of learning and learning achievement tests. The criteria for the success of learning outcomes in this study were increasing the class average score in each cycle and the class achieving classical mastery (many students who completed individually 85%). The results of this study showed an increase in class average scores from pre-cycle to cycle 1 (from 62.7 to 77.03) and cycle 1 to cycle 2 (from 77.03 to 84.1) and the achievement of classical mastery of 86. 67%. The conclusion obtained in this study is that the application of the PBL model with the CRT approach has succeeded in increasing the mathematics learning outcomes of class VIII G students of SMP Negeri 4 Salatiga on the material surface area of flat side shapes.

Keywords: *Learning Outcomes, PBL (Problem Based Learning), CRT (Culturally Responsive Teaching)*.

INTRODUCTION

Mathematics is a science that requires a mindset, reasoning, and logic in studying it. Mathematics is a subject that must be studied by students at the elementary, secondary education, and higher education levels. However, so far, mathematics has become one of the difficult subjects and is not liked by students because of its abstract material, so it is not new that most students have low learning outcomes in this subject. In line with the problem in class VIII G SMP Negeri 4 Salatiga, namely the low learning outcomes of students in mathematics subjects. (Susanti, 2020)

Learning outcomes are the results of assessments given to students after participating in the learning process, which can be in the form of knowledge values, attitudes, or skills. Learning outcomes are very important to be used to measure the achievement of learning objectives. Learning outcomes are of course inseparable from a learning process. As it is said, the learning process affects student learning outcomes. (Nurrita, 2018) Kaban et al. (2021)

The results of observations in class VIII G SMP Negeri 4 Salatiga show that

students' mathematics learning outcomes are still low. This is shown from the results of the UTS Mathematics Even Semester for the 2022/2023 Academic Year where the average grade score of class VIII G is 48.83 and only 3.33% of students have reached the KKM. Based on the results of the observation of learning for the mathematics teacher in the class, the learning that has been carried out by the teacher has run well and smoothly using the lecture method, giving examples, followed by practice questions in the mathematics companion book. However, this kind of teacher-centered learning does not give students room to explore their own understanding. Students still have difficulty in solving a variety of problems that are different from those exemplified. This means that students have not been able to understand the concept of the material given properly, which causes low student learning outcomes. In line with the expression that unsatisfactory learning outcomes are an indication of students' lack of understanding of the material provided. The learning model can be one of the influences on student learning outcomes. As said, the learning model is one of the factors that can affect student learning outcomes. The application of the right learning model is one way to optimize student learning processes and outcomes. Ulfa (2019) Yanuarti & Sobandi (2016) (Fauzia, 2018)

PBL (Problem Based Learning) is one of the learning models where the learning activities are student-centered and able to improve students' understanding of concepts. In line with the results of research that show that PBL is effective in improving students' understanding of concepts and critical thinking. Based on observations when the researcher tried to apply the PBL model to the surface area material of Building a Flat Side Space (BRSD) in class VIII G, students seemed to be easier to understand the concept of the material as seen by being able to answer the questions given by the researcher in learning. Student learning outcomes in the material were better than before where the average grade of the class went from 48.8 to 62.7 and many students achieved KKM from 3.33% to 43.3%. However, this learning outcome is still relatively low, so it is necessary to take class action. If PBL alone is not enough to improve student learning outcomes, then additional treatment is needed. One of the treatments that can be given is by applying a learning approach. (Yulianti & Gunawan, 2019)

The learning approach is a starting point or point of view for the learning process to be able to achieve the learning goals that have been set. Each learning approach has certain characteristics that differ from one to the other according to the function and purpose of each approach. Culturally Responsive Teaching is one of the learning approaches that according to Villegas & Lucas in making learning meaningful and connecting with students' lives. In accordance with the characteristics of grade VIII G students were based on the results of observations they understand better if the mathematics material is related to the real world or daily life. This can be seen when students in grade VIII G can answer the researcher's questions properly and accurately. It will be more meaningful when the material is associated with culture/culture so that in addition to students understanding the material being studied, students can also get to know the culture/culture around them by applying the CRT approach. This argument is supported that CRT empowers students by using meaningful culture to instill knowledge, attitudes, and social skills so that students are creative in achieving learning goals. Cultural integration in mathematics learning can also improve students' mathematics learning outcomes. (Djalal, 2017) (Lutvaidah, 2016) (Gustiwi, 2017) Miskiyyah & Buchori (2023) (Hadijah et al., 2020)

The application of the PBL model is combined with the CRT approach. CRT can be integrated into learning activities and learning materials. What is usually integrated in learning activities are noble cultural values such as faith, mutual cooperation, tolerance, cooperation, diversity, deliberation, manners, never giving up, customs, respect, family, and creativity. Faith is accustomed to students by praying before and after learning. Discussion is one of the learning activities of the PBL model. Discussions can be emphasized more to foster noble cultural values, including working together to solve LKPD problems, deliberating on determining steps/strategies to solve LKPD, being polite by not interrupting friends' opinions, being polite in expressing opinions, and respecting friends' opinions. Bhineka tunggal ika can also be applied by researchers in forming groups. Incidentally, the students of grade VIII G SMP Negeri 4 Salatiga have religious diversity where 18 students are Muslim, 3 are Catholic, and 9 are Christians. Groupings can be made heterogeneously based on cognitive and religious abilities. In addition to being able to tutor peers, students can also work together without discriminating between religions.

What is usually integrated into mathematics material, especially BRSD, is culture that can be seen in its form such as regional specialties, traditional houses, dance properties, and so on in the form of BRSD. The PBL model requires contextual problems to orient students to problems, group discussions, and for formative assessments. The researcher can orient students with pictures of objects in the form of BRSD and problems of BRSD surface area based on the culture of the Salatiga area or other regions. For example, block-shaped food such as gethuk kethek (Salatiga's specialty), tents in the shape of triangular prisms or quadrilateral limas (Mount Merbabu Salatiga is usually a *camping destination*), Tambi traditional houses in the form of triangular prisms (from Central Sulawesi), and others which are then developed in the form of story questions. In addition to attracting students to learn about the surface area of BRSD, indirectly students also do literacy to get to know the regional culture.

Based on the description above, a class action study entitled "Improving the Learning Outcomes of Grade VIII Students of SMPN 4 Salatiga through the PBL Model with a CRT Approach" was carried out on the surface area of the flat side space. The purpose of this Classroom Action Research is that it is hoped that after obtaining mathematics learning through the PBL (*Problem Based Learning*) model with the CRT (*Culturally Responsive Teaching*) approach, the mathematics learning outcomes of grade VIII students of SMP Negeri 4 Salatiga for the 2022/2023 Academic Year on the Flat Side Building Surface material can increase.

RESEARCH METHODS

This research is a Collaborative Class Action Research (PTKK) between PPL PPG Pre-service Mathematics Education students, field assistant lecturers, and teachers of grade VIII G SMP Negeri 4 Salatiga in an effort to address the problem of low learning outcomes of grade VIII G students through the PBL model with a CRT approach. This Class Action Research is carried out using the Kemmis and MC Taggart models where there are 4 stages that are passed, namely planning, implementation, observation/observation, and reflection. The individual completeness in this study is that students are said to be complete individually if they obtain a score of ≥75 and incomplete individually if they obtain a score of < 75, in

accordance with the score limit set by SMP Negeri 4 Salatiga. The classical completeness in this study is that the class is said to be classically complete if many students complete individually 85% of the number of students in the class. The criteria for the success of learning outcomes in this study are the increase in the average grade of the class in each cycle and the class achieves classical completeness. (Liando, 2021) ≥ (Ahmad et al., 2020)

This PTKK will be held from March to April 2023. The subject of this PTKK is grade VIII G SMP Negeri 4 Salatiga students with 30 students (15 female students and 15 male students). This research was carried out based on the Independent Curriculum for flat side building surface area material. The data collection techniques in this study include (1) observation is carried out using observation sheet instruments to measure planning readiness, implementation of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach, material mastery, and classroom mastery by teachers; (2) Formative tests are carried out to measure student learning outcomes on the material of the building surface of flat side spaces. The instrument of the observation sheet for the implementation of learning contains preparation, implementation, mastery of the material, and mastery of the classroom by the researcher. The test instrument consists of test questions that measure learning objectives accompanied by scoring guidelines**.**

RESULTS AND DISCUSSION

Pra Siklus PTKK

Observation is the initial stage before PTKK is implemented. The researcher has observed the learning outcomes and learning process in class VIII G SMP Negeri 4 Salatiga. The first observation was made by researchers on March 14-18, 2023, on the learning process by mathematics teachers in the classroom and the learning outcomes. The results of the observation showed that the learning process carried out by the teacher was using the lecture method, giving examples, and practicing questions. The questions given have not been associated with problems in daily life. The learning also does not involve students in exploring their understanding, making students less understanding of the material concepts. This is evidenced by the learning outcomes of grade VIII G students (judging from UTS scores) are still very low where the average grade of grade VIII G is 48.83 and only 3.33% (1 in 30 students) have achieved KKM.

The second observation was carried out by the researcher on March 20, 2023 by carrying out learning using the PBL model in class VIII G on the surface area of cubes and blocks. Students are actively involved in exploring their own understanding and seem to understand concepts more easily when the material is associated with everyday problems. For example, when given a sparker question about a block-shaped swimming pool, students understand that a swimming pool is a block without a roof, so to find the surface area they only need to sum up the area of 5 existing sides. This is shown by the correct answer to the teacher's triggering questions by randomly appointed students. The first and second observation learning outcomes are presented in table 1 below.

Table 1. Pre-Cycle Learning Outcomes

e-ISSN: 2986-8076
DOI: 10.57254/tess.v2i3.42

Phase	***Many Students***		***Class Average***	***Submit Completes***
	Value (complete)≥ 75	*Score <75 (incomplete)*		
First Observation	*1*	*29*	*48,8*	*3.33%*
Second Observation	*13*	*17*	*62,7*	*43.33%*

Table 1 shows an increase in learning outcomes after students are given learning treatment that applies the PBL model. Although it is considered suitable, students' learning outcomes are still relatively low after the application of the PBL model to the surface area of cubes and blocks. This means that additional treatment is needed in addition to the learning model, one of which is the CRT learning approach. The CRT approach can be an alternative to be applied in grade VIII G according to the characteristics of grade VIII G students were based on the results of observation they understand better if the mathematics material is associated with the real world or daily life. It will be more meaningful when the material is associated with culture/culture so that in addition to students understanding the material being studied, students can also get to know the culture/culture around them by applying the CRT approach.

PTKK Cycle

Each cycle is implemented using the 4-stage Kemmis & Mc Taggart model. Learning in each cycle is carried out by applying the PBL model with a CRT approach in grade VIII G SMP Negeri 4 Salatiga.

Cycle 1

Planning

Before planning, an analysis of the learning materials and characteristics of students of grade VIII G SMP Negeri 4 Salatiga was first carried out. Based on the results of the analysis, a learning tool was prepared in the form of a teaching module that applied the PBL model with a CRT approach to the prism surface area material. The teaching module is composed of attachments such as diagnostic assessments, culture-responsive LKPDs, formative assessments, and so on. In addition, at this planning stage, the teacher also prepares *a power point* as a learning medium that has been adjusted to the learning activities in the teaching module made. The test instruments are contained in the teaching module in the form of formative assessment attachments where the questions used are also based on cultural responsiveness. An observation sheet instrument has been prepared that contains an assessment of aspects that measure the suitability of planning, the implementation of the PBL model with the CRT approach, material mastery, and class mastery by the researcher.

Cycle 1 is allocated 3 meetings with the aim of using the PBL model with a CRT approach, it is hoped that students can (1) find the concept of prism surface area appropriately; and (2) solve problems related to the surface area of the prism appropriately. The first meeting was designed to complete phase 1 activities, namely strengthening the understanding of prerequisite material, providing triggering

questions that refer to the concept of prism surface area, and orienting students to culturally responsive based problems. The second meeting is designed to complete phase 2 and phase 3 activities, namely organizing students to discuss, work on culturally responsive LKPD, and conduct group investigation guidance. The third meeting is designed to complete phase 4 and phase 5, namely group presentations, class discussions, conclusions, and formative tests (learning outcome tests).

Implementation (acting)

Cycle 1 learning is carried out in accordance with the teaching module that was made, which was carried out for 3 meetings applying the PBL model with the CRT approach. Meeting 1 will be held on April 3, 2023. The learning went quite well where students explored and strengthened their understanding of the prerequisite material. Students can mention the side of the base, the roof side, the upright side, and the height of the prism of the prism built shown in the PPT. Students can answer well the triggering questions given by the teacher that refer to the concept of prism surface area. Students can also identify problems with the surface area of the culture-based prism that is shown on the PPT. Meeting 2 was held on April 6, 2023. Learning went well, students could accept group divisions and then discuss working on culture-responsive LKPD, and students also actively asked questions when the teacher gave group guidance. Meeting 3 will be held on April 10, 2023. Learning went smoothly according to the plan where students had presented the results of their discussions, students and teachers had jointly made conclusions from the results of the discussion, and formative tests (learning outcome tests) had also been carried out to measure student learning outcomes.

Observing

Observation is carried out by mathematics teachers in grade VIII G by filling out an observation sheet on the implementation of learning. Table 1 below is the percentage data of the results of the analysis on the filling in of the observation sheet by the observer.

Table 2. Data Recapitulation of Observation Sheet Cycle 1

No.	***Performance***	***Percentage***
1.	Suitability of PBL Model Planning with the CRT Approach	92,86%
2.	Implementation of PBL Model Planning with CRT Approach	93,75%
3.	Mastery of Material by Researchers	93,75%
4.	Classroom Mastery by Researchers	93,75%

Based on table 2, according to observers, the learning planning made by the researcher is generally in accordance with the independent curriculum and in accordance with the syntax of the PBL model with the CRT approach so that it reaches a percentage of 92.86%. According to the observer, what can still be improved, namely the time allocation can be considered again considering that there is little effective time left and there is still a lot of material. The percentage of

e-ISSN: 2986-8076
DOI: 10.57254/tess.v2i3.42

performance of the implementation of the PBL model planning with the CRT approach reached 93.75%. In general, all learning activities have been carried out well by teachers in accordance with the planning made. The thing that can be improved again is to give the group the opportunity to compare the results of the discussion. The researcher has given the opportunity, but due to limited time and all other groups agree with the results of the group discussion that was presented, the activity becomes less intense.

The performance of the mastery of the material by the researcher in general was good so that the percentage of the assessment reached 93.75%. This can be seen from the way the researcher facilitated students to build the concept of prism surface area matter using guided lighter questions that made it easier for students to understand the concept. The researcher has delivered the material in accordance with existing theories/concepts, conveyed the material clearly according to the student's ability, and used the media that has been prepared to the maximum. The performance of class mastery by the researcher was good so that the percentage of assessment reached 93.75%. Researchers have maintained classroom conditions that remain conducive to learning, monitored students to stay focused on learning, invited students to be active in learning, and managed learning implementation time effectively. As for what can still be improved, it is in terms of managing time to be more effective.

The results of mathematics learning in grade VIII G after the learning process of cycle 1 are presented in table 3 below.

Table 3. Recapitulation *of Learning Outcomes of Students of Grade VIII G Pre-Cycle - Cycle 1*

Phase	***Many Students***		***Class Average***	***Submit Completes***
	Value (complete)≥ 75	*Score <75 (incomplete)*		
First Observation	*1*	*29*	*48,8*	*3.33%*
Second Observation	*13*	*17*	*62,7*	*43.33%*
Cycle 1	*19*	*11*	*77.03*	*63.33%*

Table 3 shows an increase in the average grade of the class and the percentage of students who complete. Based on this statement, the model and approach used have a positive influence on the learning outcomes of grade VIII G students of SMP Negeri 4 Salatiga. There were 21 out of 30 students whose grades increased from their pre-cycle grades because they were quite good at understanding concepts; However, there were 7 out of 30 students whose grades dropped mostly due to lack of thoroughness when using the Pythagorean formula in finding the height of the prism base in the shape of a triangle, they thought that the height had been found even though it was still in the form of T2, they forgot that it had to be rooted first to find the height; while the other 2 students have fixed grades from their pre-cycle. Actually, most of the students of grade VIII G have understood how the concept of prism surface area looks when answering the questions I asked, but it is not thorough and some students are still fixated on the formula even though I have reminded several times that "don't get hung up on the formula, use the concept of

finding the surface area, which is to sum the area of the sides in the given flat side space". This is shown by the student's question "Mom, which formula is this? Is this one, right?" but after the teacher gives the trigger question to find the surface area related to the question asked, the student can answer correctly. Researchers need to emphasize to students not to get used to fixating on formulas and remind students to be more thorough by applying the Pythagorean theorem.

Refleksi (reflecting)

Based on the learning process, analysis of observation sheets filled in by observers, and student learning outcomes, some things that can be concluded related to the implementation of the PBL model with the 1st cycle CRT approach are as follows.

1. The learning planning in the form of teaching modules is in accordance with the independent curriculum. The learning activities were also in accordance with the model and approach used, namely the Problem Based Learning model with the Culturally Responsive Teaching approach. This makes learning activities carried out effectively.
2. A review of time allocation is needed so that the implementation of learning runs more efficiently in achieving learning goals.
3. The orientation of problems based on cultural responsiveness helps students more easily understand the concept of prism surface area matter and attracts students' attention in learning it.
4. The habit of students not to be fixated on formulas is necessary to solve mathematical problems so that students are not confused about the variety of questions given.
5. Emphasizing students to be more thorough in applying the Pythagorean theorem is needed to minimize the occurrence of errors in solving problems. For example, to determine the value of t at t^2 , it must first be rooted.

Cycle 2

Planning

Cycle 2 is a continuation cycle of cycle 1. The surface area of the prism has been studied in cycle 1, so the material studied in cycle 2 is the surface area of the prism. Cycle 2 learning planning is designed based on the results of cycle 1 reflection. The researcher has designed a teaching module and also prepared a power point as a learning medium that has been adjusted to the learning activities in the teaching module made. The core activities in each syntax are more or less the same as cycle 1, only it is packaged more neatly in the problem orientation section. Another difference lies in the time allocation, in cycle 2 only 2 meetings were allocated because of the progress of students in cycle 1 who already understood the concept of the surface area of the flat side space better than in the pre-cycle, so the teacher considers that students can understand the concept of the surface area of the square in a shorter time. In addition, the teacher's follow-up to cycle 1 in cycle 2 lies in the teacher's treatment which places more emphasis on more carefully determining the unknown side using the pythagorean formula and accustoming students not to be fixated on the formula. In addition to the teaching modules and

power points, in cycle 2, observation sheet instruments have also been prepared to measure the suitability of planning, the implementation of the Problem Based Learning (PBL) model with the Culturally Responsive Teaching (CRT) approach, material mastery, and classroom mastery by teachers; as well as formative test instruments to measure learning outcomes.

The learning objectives of cycle 2, namely through the PBL model with the CRT approach, it is hoped that students can (1) find the concept of the surface area of the pyramid correctly; and (2) solve problems related to the surface area of the pyramids appropriately. The first meeting was designed to complete the learning activities of phases 1 to phase 3, namely providing sparking questions that refer to the concept of prism surface area, orienting students to culturally responsive problems, organizing students to discuss working on culturally responsive LKPD, and conducting group investigation guidance. The second meeting was allocated to complete phase 4 and phase 5 learning activities, namely group presentations, class discussions, conclusions, and formative tests (learning outcome tests).

Implementation (acting)

Cycle 2 learning has been carried out for 2 meetings, in accordance with the teaching module where learning applies the PBL model with a CRT approach. Cycle 2 was carried out during the flash pesantren event at SMP Negeri 4 Salatiga, the researcher asked for special permission for mathematics to continue learning because he remembered that there was still a lot of mathematics material while the effective time was only a little before PAT. Meeting 1 was held on April 13, 2023. Learning runs smoothly until group research guidance. Students can understand well the concept of surface area material of limas. The researcher saw outstanding student enthusiasm and all students were actively involved in learning. Students are able to understand the importance of emphasis and habituation given by teachers as written at the planning stage. Meeting 2 was held on April 17, 2023. Learning went well where students had made presentations, students and teachers had jointly made conclusions from the results of the discussion, and students were able to complete the formative test (learning outcome test) calmly and according to the specified time.

Observing

The data on the percentage of teacher performance in cycle 2 as the success of improving the learning process through the implementation of the PBL model with the CRT approach is listed in table 4 below. This data is recapped based on the results of analysis of the observation sheet by observers (mathematics teachers of grade VIII G).

Table 4. Data Recapitulation of Observation Sheets Cycle 1 & Cycle 2

No.	***Performance***	***Cycle Percentage 1***	***Cycle Percentage 2***
1.	Suitability of PBL Model Planning with the CRT Approach	92,86%	96,43%
2.	Implementation of PBL Model Planning with CRT Approach	93,75%	95,31%
3.	Mastery of Material by Researchers	93,75%	100%

e-ISSN: 2986-8076
DOI: 10.57254/tess.v2i3.42

4.	Classroom Mastery by Researchers	93,75%	93,75%

Based on table 4, the learning planning for cycle 2 made by the researcher, according to observers in general, is very in accordance with the independent curriculum and in accordance with the syntax of the PBL model with the CRT approach. The percentage of learning planning has increased from 93.75% to 96.43%. There is an increase because the time allocation is more effective and has been made based on the results of cycle 1 reflection. The performance of the implementation of learning cycle 2 also increased from 93.75% to 95.31%. More careful planning makes the researcher's performance better in learning. The mastery of the material by the researcher also looks more optimal until the assessment reaches 100% because it is better able to adjust to the students' abilities. However, the percentage of class mastery by the researcher is still the same as cycle 1, which is 93.75%. In cycle 1 that can still be improved, namely in terms of managing time to be more effective, even though in fact in cycle 2 according to time management researchers is better.

The mathematics learning outcomes of class VIII G after the learning process of cycle 2 are presented in the following table 5.

Table 5. Recapitulation *of Learning Outcomes of Students of Class VIII G Pre-Cycle - Cycle 2*

Phase	***Many Students***		***Class Average***	***Submit Completes***
	Value (complete)≥ 75	*Score <75 (incomplete)*		
First Observation	*1*	*29*	*48,8*	*3.33%*
Second Observation	*13*	*17*	*62,7*	*43.33%*
Cycle 1	*19*	*11*	*77.03*	*63.33%*
Cycle 2	*26*	*4*	*84.1*	*86.67%*

Table 5 shows an increase in the average grade of the class in each cycle and in cycle 2 has reached classical completeness of 86.67%. Referring to the success criteria in this study, it can be said that through the PBL model with the CRT approach, it is able to improve the mathematics learning outcomes of students in grade VIII G SMP Negeri 4 Salatiga on the material of building flat side spaces. ≥ 85%

Refleksi (reflecting)

Based on the learning process, analysis of observation sheets filled in by observers, and student learning outcomes, some important things that can be concluded related to the implementation of the PBL model with the CRT approach in cycle 2 are as follows.

1. The study of activity plans and time allocation can help the implementation of learning more effectively in achieving learning objectives.
2. Giving students the habit of not fixating on formulas helps students to focus on the concept of determining the surface area of the flat side space in solving

their problems.

3. Giving emphasis to students to be more thorough in applying the Pythagorean theorem to find unknown sides has helped students minimize errors in solving the problem of the surface area of the flat side space.
4. The application of the PBL model with the CRT approach must be accompanied by the right strategy as in points 1 to 3 so that it is more optimal in improving student learning outcomes.

The results of the study showed that the implementation of the PBL model with the CRT approach for 2 cycles with a total of 5 meetings succeeded in improving the learning outcomes of students in grade VIII G SMP Negeri 4 Salatiga on the material of the surface area of the flat side room. Based on the description at the planning, implementation, observation, and reflection stages, it can be concluded that the application of appropriate learning models, approaches, and strategies can support the achievement of learning goals. Understanding the concept of the material and the accuracy of applying the prerequisite material by students also help determine the success of achieving learning objectives. In addition, time management and classroom management also play an important role in the implementation of optimal learning activities and affect learning success. This can be seen based on the application of the PBL model with the CRT approach in cycle 1 which has not succeeded in achieving the success criteria in this study even though there has been an increase in learning outcomes compared to the pre-cycle. The success criteria in this study were only met in cycle 2, namely after learning improvements were made referring to the results of reflection cycle 1.

There are several previous studies that support the results of this study. concluded that the application of the Problem Based Learning (PBL) model has succeeded in improving the learning process and improving mathematics learning outcomes in grade VIII of junior high school. has also proven that the application of the PBL model is effective in improving understanding of concepts so that it can improve student learning outcomes as in this study. The CRT approach also supports the improvement of student learning outcomes. In line with the results of the study which concluded that cultural integration in mathematics learning can improve students' mathematics learning outcomes. Several previous studies support the results of this study that the application of the PBL model with the CRT approach can improve student learning outcomes. Teachers need to choose the right learning model to achieve learning success. As expressed, that even though the learning objectives have been well formulated and the teaching materials have also been prepared well, if an effective learning model has not been used, it is certain that the success of learning will not be achieved. Rahmawati et al. (2020) Yulianti & Gunawan (2019) Hadijah et al. (2020) Adawiyah (2021)

CONCLUSION

The conclusion of this PTKK is that the application of the PBL model with the CRT approach has succeeded in improving the mathematics learning outcomes of students in grade VIII G SMP Negeri 4 Salatiga on the surface area of the flat side space. This can be seen from the fulfillment of the success criteria in this study, which shows an increase in the average grade of classes starting from pre-cycle to cycle 1 (from 62.7 to 77.03) and cycle 1 to cycle 2 (from 77.03 to 84.1) as well as the achievement of classical completeness by 86.67%.

Suggestions that can be given based on the results of this study are (1) the application of the PBL model with the CRT approach can be an alternative learning to improve student learning outcomes, especially in the material of the building surface of the flat side space; (2) provide reinforcement of the understanding of the prerequisite material to facilitate students' understanding of the new material learned and/or minimize the occurrence of student mistakes in the process of solving problems; and (3) give students the habit not to be fixated on formulas in solving problems, but to use material concepts that students have understood because fixating on formulas can make students confused in solving various problems.

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e-ISSN: 2986-8076
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