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EFFORTS TO IMPROVE THE ABILITY OF MATHEMATICAL CONNECTION OF CLASS VIII A MTs AL-HIKMAH 02 TALEGONG STUDENTS ON CIRCLE MATERIALS THROUGH PROBLEM-BASED LEARNING APPROACH Abstract This article was made to describe the results of research in MTS AL-Hikmah II Talegong, Garut Regency with 25 students with the aim of improving the indicator of mathematical connection ability, which is reviewed from each cycle, whether from each cycle there is an increase or decrease, on the indicator which students feel difficulties what kind of student performance can lead to low connections in the field. The method used in this study is a descriptive method with a qualitative approach.

The research phase consists of planning, implementing class actions, observation and evaluation, and reflection. The results of the study were obtained: 1) in the first cycle the achievement of students' mathematical connection skills was only 16.88%, 2) in the second cycle the achievement of mathematical connection skills increased to 54%, 3) while in the third cycle the average mathematical connection ability increased to 69.75%. Based on the results of the study it can be concluded that class action research to measure indicators of mathematical connection ability has improved better and achieved completeness in cycle three. Keywords: Mathematical connection, Problem Based Learning.

Abstrak Artikel ini dibuat untuk mendeskrifsikan hasil penelitian di MTS AL-Hikmah II Talegong Kabupaten Garut sebanyak 25 siswa dengan tujuan meningkatkan indikator kemampuan koneksi matematik, yang ditinjau dari setiap siklus, apakah dari setiap siklus tersebut mengalami peningkatan atau penurunan, pada soal indikator manakah siswa merasa kesulitan, kinerja siswa yang seperti apakah yang dapat meyebabkan rendahnya kemampuan koneksi dilapangan. Metode yang digunakan dalam penelitian ini yaitu

metode deskriptif dengan pendekatan kualiatif. Tahap penelitian yang dilakukan terdiri dari: perencanaan,pelaksanaan tindakan kelas, obsevasi dan evaluasi, serta refleksi.

Hasil penelitian yang dilakukan diperoleh: 1) pada siklus satu pencapaian kemampuan koneksi matematik siswa hanya 16,88%, 2) pada siklus dua pencapaian kemampuan koneksi matematik meningkat menjadi 54%, 3) sedangkan pada siklus tiga rata-rata kemampuan koneksi matematik meningkat menjadi 69,75%. Berdasarkan hasil penelitian dapat disimpulkan bahwa penelitian tindakan kelas untuk mengukur indikator kemampuan koneksi matematik mengalami peningkatan yang lebih baik dan mencapai ketuntasan pada siklus tiga. Kata Kunci: Koneksi matematik, Problem Based Learning Garut-1, Hadin, Irvan setyadi Suparman -2. (2019).

Efforts to Improve the Mathematical Connection Ability of Grade VIII Students of Al-Hikmah 02 Talegong on Circle Materials through Problem Based Learning Approaches. JIML, X (X), XX-XX. _ _ INTRODUCTION The lack of mathematical connection ability has been felt by students including students who do not understand the relationship between topics in mathematics, the relationship between mathematics and other sciences as well as the relationship of mathematics in everyday life, due to the results of low student achievement Sulistyaningsih (Hadin, Helmy Muhammad, 2018) revealed, in general, the ability of students in mathematical connections is still low.

The low mathematical connection ability of students will affect the quality of learning which has an impact on the low level of learning of certain students at school. one of the schools that felt this was MTs Al-Hikmah 02 Talegong students. The appropriate alternative step was to overcome the problem of students' low mathematical abilities in MTs by developing mathematical skills such as making mathematical concepts using the Problem Based Learning Approach. Why is that? Because students in mastering a material concept through Problem based learning provide permanent knowledge with a scientific approach that produces skills Karaduman (Fadilah, U., Usodo, B.,

& Subanti, 2015) in his research stated that "the implementation of the Problem-based learning model has influenced students' academic performance and their attitudes positively towards science. Students are seen actively in the process of linking new knowledge with the positive structure that they already have and can describe their own abilities " According to Sumarmo (Astuti, 2014) explained the concepts of several mathematical connection indicators that can be used, namely: 1). looking for relationships of various representations of concepts and procedures; 2). understanding the relationships between mathematical topics; 3). applying mathematics in other fields or in everyday life; 4).

understanding representation is equivalent to a concept; 5). looking for the relationship of one procedure with another procedure in equivalent representation; 6). apply relationships between mathematical topics and between mathematical topics and topics outside mathematics. As the reality in the field as tangible evidence of previous research that students' mathematical connection ability is still low Sugiman (Sri Sugiarti Basuki, 2014) in his research entitled "Mathematical Connections in Mathematics Learning in Junior High Schools" in Yogyakarta, it was concluded that the level of mathematical connection ability of new students reached an average of 53.8%, in addition other studies found that it was in accordance with the level of basic mathematical abilities, namely for students in the group for high student connection ability (86%), students who are in the middle group the ability to connect students is classified as moderate (74%), and students who are in the lower group mathematical connection ability is classified as very low (32%) (Nurfitria, Bambang Hudiono, 2013) Likewise the ability of mathematical connections will help students in compiling mathematical models that also illustrate the relationship between concepts and data or a problem or situation given, based on an analysis of several writings Sumarmo (Hendriana, Rohaeti, & Sumarmo, 2017) summarizes the activities involved in the task of connection, namely, understanding representations equivalent to a concept, process, procedure, relationship between mathematical topics, and the relationship of a procedure to other procedures in representation that are equivalent.

As for the solution so that learning mathematical connection skills can be helped better by using the Problem Based Learning approach, because it is a learning approach trying to apply what happens in the real world as a context for students in practicing how mathematical connections get problem-solving skills, and unforgettable to get knowledge as well as important concepts from the teaching material discussed. According to Forgatry (Pansa, 2013) problem-based learning has the following characteristics: (1) learning begins with a problem; (2) ensure that the problems given relate to the real world of students; (3) organizing lessons around problems, not around scientific disciplines; (4) giving great responsibility to students in forming and running their own learning process directly; (5) use small groups and (6) require students to demonstrate what they have learned in the form of a product or performance.

The steps of the problem based learning approach model that adopts Arends (Sujadi, 2016) are as follows: orient students to problems, organize students to learn, guide independent and group experiences, develop and present their work and evaluate problem-solving processes. METHOD The research method in this study is a classroom action research with a qualitative approach, this study describes classroom action research from cycle one to cycle three in improving indicators of mathematical connection ability quantitative methods concentrate on what is available, or because the

method only offers limited assistance when looking at Easterby Smith (Susila, 2015) Therefore, qualitative methods are more likely to contribute to the evolution of new theories through understanding the processes of behavior and individual experiences.

The research was conducted from April 4, 2019, to April 26, 2019, at MTs AL Hikmah 02 Talegong, Garut Regency with the subject of the research being VIII A class students with 25 students consisting of 11 women and 14 male students. The instruments in this study are the researchers themselves, where the researcher as a planner, executor, data collector, analyzer and periapsis data. Besides the other instruments are a number of test questions each cycle of mathematical connection abilities. This classroom action research is planned to consist of 3 (three) cycles based on the teaching syllabus of mathematics teacher VIII-A.

Each cycle is carried out according to the changes desired. Before the action is carried out, the initial test is given first with the intention of knowing the students' initial abilities and related to the topic to be taught, namely circles. Each cycle in this study includes the following procedures: (1) planning; (2) implementation of actions; (3) Observation and evaluation; and (4) Reflection. RESULTS AND DISCUSSION Results Presentation of Mathematical Connection Ability Indicator Test Results for Each Cycle The results of the average percentage increase in indicators of mathematical connection ability from cyclic one to cycle three.

Table 1. One to Three Cycle Mathematical Connection Ability Indicator Test Results CYCLE _Mathematical Connection Ability Indicator Test _ _ _ _1 _2 _3 _ _Cycle 1 _ _20% _17% _13% _ _Cycle 2 _ _69,33% _52% _56% _ _Cycle 3 _ _76,67% _64,67% _67% _ _ _ _ _ _ _ _ _ In the first cycle, it appears that on the indicators of mathematical connection ability, the relationship between topics in mathematics for question number 1, the student's presentation value is only 20%, on the indicators of the relationship between mathematics and other sciences students get 17% and on other mathematical indicators with a 13% presentation, the ability of students is still quite low because the overall average yield reaches only 16%.

From the observations made by the researchers, the results of the research in the second cycle of the implementation of the learning scenario by the teacher have reached indicators of mathematical connection ability and the scenario of mathematical connection ability has reached 54% with acquisition values ??below 60%, it can be concluded that this study has not been achieved. In the second cycle it appears that on the indicators of the topic's ability to correlate with mathematics in question number 1 the student's presentation value reaches 69.33% in other words that the indicator of connection ability in the relationship between topics in mathematics has reached an

increase above the KKM, on indicators of mathematical relationships with Other sciences students get 52%, this shows that in this indicator it still needs to be increased to learn in the next cycle and on mathematical indicators with other sciences get 56% presentation so the ability of students begins to increase even though the increase in the two indicators has not reached above the KKM. In the third cycle of learning carried out for 2 times after completing the second meeting in the third cycle, the third Cycle test was held, to determine whether the three improvement cycles were better than the second cycle or vice versa.

From the observations made by the researchers, the results of the two cycles of research can be from two aspects, namely: the implementation of the learning scenario by the teacher has reached indicators of mathematical connection ability and the scenario of mathematical connection ability has reached completeness with acquisition values above 60%. Presentation of Difficulty Test Results Indicator of Mathematical Connection Capabilities for Each Cycle The results of the average percentage of student errors in solving the problem of the indicator of connection ability in each cycle. Table 2.

Error Test about the Indicator of Mathematical Connection Ability for Each Cycle CYCLE _Mathematical Connection Ability Indicator Test _ _ _ _1 _2 _3 _ _Cycle 1 _ _80% _83% _87% _ _Cycle 2 _ _30,67% _48% _44% _ _Cycle 3 _ _23,3% _35,33% _33% _ _ _ _ _ _ _ _In the first cycle the majority of students get a smaller value because at the initial meeting the learning teacher has not been optimal both in terms of learning, the approach after learning methods applied so that students have not been able to adapt to learning which is faced with indicators of the ability of topics or topics in mathematics for number one the value of presentation of student errors reaches 80%, on the indicator of the relationship between mathematics and other sciences students get an error of 83% and on other indicators of mathematics with science get a presentation. 87%, there are some students who have not been able to answer questions that are imperfect or worth zero, so the ability of students is still quite low.

The samples of students' answers in cycle 1 on the indicator with the lowest error are as follows. / Figure.1 Error on problem indicator number three In the picture it appears that students' abilities in indicators of the relationship between mathematics and other sciences students do not understand the formula of speed in science, so students find it difficult at cycle one because they are too foreign when mathematics is associated with other sciences even though this material is easy because the material in the school had previously been learned by one of them in elementary school.

In the second cycle there were errors of students or felt difficulties by obtaining the average score obtained on the indicator of the ability of the relationship between topics

in mathematics for the number one problem the presentation value of students' errors was 30.67% in other words that the indicator of connection ability in the indicator of the relationship between topics in mathematics has achieved an increase above the KKM, in the indicators of the relationship between mathematics and other sciences students get a 48% error, this shows that this indicator still needs to be improved for learning in the next cycle and on mathematical indicators with other sciences 44%.

Thus the ability of students begins to experience an increase even though the increase in the two indicators has not reached above the KKM. difficulty in question number 3 on the indicator of the relationship between mathematics and other sciences outside mathematics, there is a sample answer from one of the students about the difficulty in the answer to the sub-material of the circle of the arc length of a circle: / Figure 2.

Error on indicator number two In question number three for the second cycle with indicators of the relationship between mathematics and other sciences students cannot calculate the length of a circular arc so students feel difficulty in determining the next step until completing a simple problem with what is asked in the question to answer perfectly. In the cycle of three students felt the difficulty in seeing the final test results can be seen in the indicators of the topic's ability to relate to mathematics in the number one presentation value of student error 23.33%, on indicators of mathematical relations with other sciences students got 35.33% errors and on indicators of mathematical ability with other sciences received a 33% presentation. Thus the ability of students has experienced a better improvement.

Because overall it is good enough to exceed the KKM limit, the research is sufficient in cycle three. / Figure 3. Student Difficulties in cycle three As for one sample of the results of the workmanship, students feel the difficulties appear in question number 2 on the indicator of the relationship between mathematics and other sciences or beyond mathematics. In question number two with indicators of the relationship between mathematics and other sciences or beyond mathematics students lack perfect answers in completing mathematics with other sciences but for achievement of indicators has increased even though the increase is only a few percents of KKM that have been determined with an increase of above 60%. in cycle 3 it can be categorized better.

Student Performance in Each Cycle Meanwhile, the observation of students in cycle one shows the following: Students look familiar with the PBL approach that is applied in the classroom, Not all students pay attention to the teacher in delivering the material, Some students are less active in responding to apperception activities, Students are not maximal in concluding teaching materials about the material that has been taught, not all students respond when making questions with the time provided and students are

still less courageous in asking questions about questions that have not been clearly explained. / Figure 4.

Student performance in Cycle one The results of observations of students in the second cycle showed the following: Students began to be able to adapt to the learning approach applied because the approach began to be applied in learning. Some students pay attention to the teacher's disguise and are really happy about learning. Students begin to actively respond to learning apperception. ./ Figure 5. Student performance in Cycle two While the results of student observations in the third cycle show the following: Students have attended the study with enthusiasm and order, Students are good enough in deducing teaching materials, Students like to study in groups because of togetherness and have been able to adapt to the approach put forward. ./

Figure 6 Student performance in Cycle three Discussion This research was conducted in one of the schools of MTS AL-Hikmah 02 Talegong, Garut Regency with the aim of improving the indicators of mathematical connection abilities, which were reviewed from each cycle, whether from each cycle there was an increase or decrease using the problem-based learning approach, looking at the problem with indicators where do students feel the difficulties and performance of students who like what can affect the decline in student achievement and the low mathematical connection skills in the field. After reviewing in the field that the connection ability has improved better.

There are problems that are felt in the first cycle of students experiencing problems in learning, because at this stage students are still adapting to learning approaches as well as given mathematical abilities and teachers are still less meaningful in delivering lessons on mathematical connection skills on indicators of the relationship between topics in mathematics, mathematical relationships with other knowledge or outside of mathematics and the relation of mathematics in everyday life desired by a student, the usefulness in the ability to connect mathematics is very important so that the basic thinking of students becomes aware of the problem the solution will be sought.

Studying mathematical connection skills do not only understand the concept or the procedure, but many things can arise from the results of the mathematics learning process. Significance in mathematics learning is characterized by awareness of what is done, what is understood and what is not understood by students about facts, concepts, relationships, and mathematical procedures. According to Afgani (Siti Mawaddah, 2015), meaningfulness in learning mathematics will emerge when the activity developed in learning mathematics contains the standard process of learning mathematics, one of which is mathematical connection skills A student will be able to solve the problem of mathematical connection skills in learning when students understand what is conveyed

by a teacher, what concepts are given by the teacher, what knowledge is given by the teacher, and the concept of how the process of thinking is given by a teacher. Because students will be able to solve the problem of mathematical abilities on the basis of students learning more in detail the basis or relationship in these abilities.

As stated by Weitheimer (Siti Mawaddah, 2015) that learning can occur because of the discovery of various ways to solve a problem. The way to solve the problems obtained by students is the result of the knowledge and experience that students have in relation to the problems the solution wants to find. Therefore the teacher must be able to help students provide meaningful learning in mathematics and build students 'mathematical connection skills to deepen students' understanding of mathematics.

Difficulties experienced by students in cycles two and three students experience difficulties in the indicators of the relationship of mathematics with other sciences or in the real world while mathematical connection ability is an ability that has a relationship with the real world, relationships between concepts in everyday life, this is in accordance with the opinion Dulpaja (Rahardjo, 2016), mathematical connection ability is one's ability to present internal and external relationships in mathematics, which include connections between mathematical topics, connections with other disciplines, and connections in everyday life. the relationship between concepts or principles in mathematics plays a very important role in learning mathematics.

With knowledge, students will understand mathematics more thoroughly and more deeply. In addition, in memorizing, the fewer the consequences of learning mathematics becomes easier if students understand the relationship between concepts and the relevance in mathematics. But the difficulties of students' difficulties in cycle one and cycle three have increased because behind that all are helped by a problem-based learning approach to overcome them.

The low level of connection ability of mathematics with other sciences, compared to the mathematical connection of the relationship between topics in mathematics and connections with the real world or in everyday life, among others because of the many mathematical topics that must be related to problem solving so that they require a high range of thinking with other subjects or the main problem is the difficulty in making mathematical models. In the third cycle, the results of the average assessment of each indicator of the lowest mathematical connection ability on the indicator indicators of relations with other mathematics are shown, because students cannot make mathematical models and do not know which material is connected, this is in accordance with the opinion Kusmayadi (2011) suggests that most students do not know and do not understand which material has to do with the material to be studied.

However, each cycle can be resolved experiencing improvement, by correcting the shortcomings of all aspects of learning that are applied by the teacher in its usefulness as well as assisted by Problem based Learning learning models because problem-based learning is a learning model that begins with giving problems to students. The problems raised are related to students' daily lives as well as relationship issues with other disciplines. So through problem-based learning students can build their own knowledge through the problems given.

And from the results of research conducted by Permana dan Sumarmo (Sri Sugiarti Basuki, 2014) reported that students' mathematical connection skills through problem-based learning are classified as sufficient qualifications. So this learning model can develop mathematical connection skills. CONCLUSION Based on the results of data processing and findings obtained in this study, it can be concluded that: The average value of student presentations from cycle one to cycle three to improve indicators of mathematical connection ability using the problem-based learning model each cycle has improved better.

For students' difficulties in the test, each cycle has difficulties in the indicators of mathematical connection ability between topics related to mathematics or with other disciplines because there are many mathematical topics that must be linked, high range of thinking because there are other subjects and difficulties in making mathematical models. The performance of students for each cycle undergoes gradual adaptation, the better the changes to learning in cycle three. The final average value in cycle three has a change above the school KKM value that has been determined so that classroom action research can be concluded to be successful.

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