The Enhancement in Mastery Abilities of Geometric Transformation Formulas Through Play Lucky Card Technique on The Students of Class VIII-2 at SMP Negeri 3 Barru, Indonesia

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Abstract

The method used in this study was a classroom-based action research that aimed to improve students' mastery of the geometric transformation formulas through the Play Lucky Card technique. This study was conducted in class VIII-2 of SMP Negeri 3 Barru with 23 students. The results achieved after the study was carried out for two cycles were as follows: In the cycle I, there were 40.63% of students who had the ability to master the geometric transformation formulas in the sufficient category. Whereas in the classical results, it was found that the students' average score was 68.06 in the 54.6-64.5 interval or in the sufficient category. In the cycle II, there were 56.25% of students who had the ability to master the mathematical formulas in the high category, 28.13% of students had the ability to master the mathematical formulas in the very high category. From the results of the final evaluation of the cycle II, it was classically found that the students' average score was 76.75 in the 64.6-84.6 interval or in the high category. Based on the results of the final evaluation, the students of class VIII-2 had an absorption amounted to 86.75%, and other data showed that the students of class VIII-2 who scored $\geq$ 65 (84.38%), were in the high and very high category. Thus, it can be concluded that there was an increase in the ability to master the geometric transformation formulas of class VIII-2 students at SMP Negeri 3 Barru after the implementation of Play Lucky Card technique, there was an increase in motivation and activeness as well as the presence of students following the mathematics learning process. This was reflected in the number (quantity) of students who raised their hands to work on the questions on the blackboard which tended to increase from one meeting to the next. Moreover, almost all students submitted every homework according to predetermined deadlines.

Keywords: Play Lucky Card Technique, Mastery of Geometric Transformations Formulas.

1. Introduction

Mathematics is a necessary subject of particular concern for students in formal educational institutions. Mathematics plays an important role in mastering the contents of science and technology. In fact, the students generally have a lower mathematics learning achievement compared to the achievement of other subjects. This is reflected in the students' average score of Ebtanas Murni in each year which is far below other subjects.

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In conformity with the characteristics of the mathematics material as mentioned earlier as well as the facts faced by teachers in schools, it was found that mathematics is a subject that is relatively difficult for students to learn and difficult for teachers to teach. This results in the emergence of an unpleasant students response, which is indicated by the low students motivation and students mathematics achievement. Therefore, teaching mathematics at every level of education requires a professional ability from a teacher, so that the quality of mathematics education can lead to significant improvements.

Referring to the observations and results of limited discussions conducted with mathematics teachers at SMP Negeri 3 Barru, it can be concluded that some of the phenomena faced which were related to the low ability of students to understand mathematical concepts and formulas were: a) most of the students were passive during the teaching and learning process, so that students rely too much on information from the teacher without any effort to learn independently or in other words students had low curiosity to learn, b) the ability of students to understand the mathematical formulas being taught by the teacher was relatively lacking, so they were less able to use these formulas in solving problems, especially questions that cannot be solved directly using the available formulas, c) students were less able to manipulate formulas or derive other formulas from various formulas that had been learned. For example, students already known that the transformation formula: translation, reflection and rotation at a centered point (0,0). However, most of the students cannot derive the transformation formula for a centered point (a, b) because the formula taught directly by the teacher was only the transformation of a centered point (0, 0). In addition, students were less skilled in solving problems that combine several concepts and the solving formulas.

2. Theorytical Framework

2.1. Mastery of Mathematical Formulas

Mastery of mathematical formulas is a mastery of theorems (formulas) as an object in solving various mathematical problems. Bell [1] suggested two kinds of mathematical objects, specifically direct objects and indirect objects. Direct objects consist of four types, namely: (1) facts, (2) concepts, (3) principles and (4) skills, while indirect objects consist of 7 types, namely (1) proof of theorems, (2) problem solving, (3) transfer of learning, (4) intellectual development, (5) individual work, (6) group work, and (7) positive attitude.

In line with Bell, Beagle [2] also classified direct mathematical objects into four types, namely (1) facts, (2) concepts, (3) principles, and (4) operations. Principles in mathematics are generally known as principles, Beagle [2] argued that principles are mathematical objects that state the relationship of two or more other mathematical objects, such as facts, concepts, operations, or other principles. Principles in mathematics can be in the form of axioms (postulates), properties or propositions (theorems).

The theorem as a form of principle is generally in the form of an implication statement "If .... Then ....", either in a simple form or in a complex form. A theorem can also be formed in long sentences (words), it can also be in *symbolic* form or *formulas*. However, whatever form it takes, a theorem is a statement which can be verified by axiomatic deduction.

2.2. Learning Formulas and Criteria for Understanding the Mathematical Formulas

Slameto [3] suggested the notion of learning as a business process carried out by a person to obtain a whole new change in behavior, as a result of his own experiences in interaction with his environment. Meanwhile, Hudoyo argued that learning was related to knowing and understanding [4].

Based on these two definitions of learning, learning the principles of mathematics is the process of efforts by a person to know and understand mathematical principles as a result of experience and interaction with the environment.

Based on the understanding of mathematical principles stated by Beagle [2], to be able to understand a mathematical principle properly, the ability to identify facts, concepts, operations, and principles is required.

Learning rules (including principles) is learning that allows students to connect two or more concepts, facts, operations or other rules. For example, if real numbers are operated with the operation of "multiplication" then the "commutative" law will apply. This rule can be comprehended if the concepts of real numbers, equality, and multiplication are also comprehended properly.

Meanwhile, Hudoyo [5] explained that a person is considered to have learned rules (including formulas) if that person follows those rules in their behavior. This means that a rule is a learned intellectual skill that allows a person not only to state something but also to do something by using symbols. Whereas, Tambunan et al. argued that a student who are able to mention a formula cannot be said to have mastered the formula, if he/she is not able to use it in solving problems of the question. On the other hand, the students who are able to use the formulas appropriately but are unable to mention them, are often encountered [6].

Regarding to the steps to teach rules (including theorems/formulas), Gagne [7] suggested several instructional sequences as follows: (a) Tell students about the expected form of performance when learning rules have been completed, (b) Ask questions so that students can recite concepts that are previously learned which are related to the rule, (c) Use verbal questions to guide students in organizing the rules together as a chain of concepts, in the right order, (d) With questions, ask students to demonstrate some concrete examples, (e) With the appropriate questions, ask students to make verbal questions from the rules.

As described in the previous section, one of the important steps in understanding a formula in mathematics is to apply it in solving problems. Dahar [8] argued that a student who can state a rule (formula) verbally is not necessarily able to apply the formula to a real problem (solving problems).

With the Play Lucky Card learning method provided to students, it will make them easier to understand the mathematical formulas. The variety of games given to students can be developed based on the level of the cognitive aspect or the complexity of the concepts and formulas used.

Based on the background of the problems that have been raised and the results of discussions conducted with the teachers at SMP Negeri 3 Barru, the problems to be solved through this action research are: 1) whether learning through the Play Lucky Card Technique Approach can improve the mastery of class VIII-2 students at SMP Negeri 3 Barru, Indonesia regarding to the geometric transformation formulas (mentioning, manipulating, and using mathematical formulas), 2) whether Learning through the Play Lucky Card Technique Approach can increase the Learning Motivation of class VIII-2 students at SMP Negeri 3 Barru.

The objectives to be achieved in this study are as follows; a) to increase students' interest and motivation in participating in the learning process, b) to improve students in remembering and mentioning mathematical formulas they have learned, c) to improve students' ability to use mathematical formulas to solve problems, d) to improve students' skills in manipulating the mathematical formulas they have learned to solve various problems.

The benefits expected from the results of this study are as follows; a) with the implementation of this classroom action research, *teachers* are trained to be able to carry out classroom action research in solving their own problems. Specifically, in accordance with the problem of this study, the teachers become skilled in developing various teaching strategies or methods as a tool to strengthen students' understanding of mathematical formulas, b) through this study, *students* can be more active in learning (especially in solving problems). In addition, students can be motivated and increase their understanding of the mastery of the formulas taught by solving various questions as well as preparation for the National Final Examination (UAN).

3. Methods

This study was conducted in class VIII-2 of SMP Negeri 3 Barru. The number of students in class VIII-2 was amounted to 23 people, consisting of 10 males and 13 females. Meanwhile, this study was conducted in the even semester of the 2013/2014 academic year and lasted about four months, which was divided into two cycles.

The factors that were investigated to answer the problems in this study were: 1) Student factors, namely about the students' abilities and methods in mastering mathematical formulas. In addition, the activeness of students in participating in the teaching and learning process in the classroom, 2) Teacher factors, namely how the teacher's method in assisting students to understand the mathematical transformation formula taught and how the teacher implements the action plan that has been prepared, and, (3) Learning Resources Factors, namely whether the Play Lucky Card package developed is in accordance with the aim of improving students' abilities in understanding geometric transformation formulas.

In general, this study was carried out in 2 (two) cycles, which included the stages: action planning, action implementation, observation, reflection and evaluation.

The four stages of the study activities mentioned above were carried out in cycles, both in one research cycle and in the implementation of research in general. The study activities in each cycle began with planning activities that will be implemented in the action stage. During the implementation of the action, the teacher (researcher) carried out observations to obtain data and information. The data and information collected at this stage will be analyzed as material for reflection. Reflection was basically carried out during the study. Reflection at the end of each meeting was carried out to provide feedback in improving the implementation of the next learning. Meanwhile, reflection at the end of each cycle was carried out to provide an overview of changes and improvements in the implementation of actions in the next cycle.

The results of data analysis and reflection in cycle I were taken into consideration for preparing action plans in cycle II. Meanwhile, the results of data analysis and reflection in cycle II were used as recommendations for partner teachers and school administrators, both for the implementation of future action research and for the implementation of regular mathematics teaching and learning activities.

4. Results

This section discusses the results of the study which consists of three parts: (1) quantitative results, (2) qualitative results and (3) written results of processing student responses. The quantitative result is a description of the level of student mastery through student learning outcomes tests as a reflection of the use of the Play lucky card technique approach in the learning process at the end of the cycle I and the cycle II by class VIII-2 students of SMP Negeri 3 Barru, Barru Regency which is expressed in numbers

4.1. Pre-Test Results

From the pre-test results of class VIII-2 students based on descriptive analysis, it was found that there were 4 people or 17.39% of students who received complete scores or scores more than 65 KKM. This result showed that students who had not given the right answer was amounted to 19 people or 82.61% of students who did not meet the expectation yet, so the teacher (researcher) conducted the remedial for students who did not meet the expectation and carried out the enrichment for students who completed the scores. From each meeting, the teacher (researcher) recorded all events that were considered important regarding to the students activities in following lessons, playing cards or solving process assessment questions

4.2. The Implementation of Cycle I

4.2.1. The Implementation of Action Activities 1

The learning activities in action I were carried out on January 15, 2014. In the learning activities, the teacher conveyed the topics or materials that would be demonstrated by the group of players. In the preliminary stage, students were motivated by the Play Lucky Card technique, but students still had difficulty demonstrating the play lucky card. In the development stage after the action was completed, the students discussed their findings, then there were 12 students who played smoothly, 7 students who did not play smoothly and 4 students who asked for direct guidance by the teacher, moreover, some even asked for a re-explanation. Whereas at the implementation stage, there

were still some students experiencing difficulties and they asked for direct guidance and at the process assessment stage, it was found that of the 21 students who were present, 2 students were sick. Referring to the results, there were 18 students (85.71%) who had reached the maximum score or complete score, after the learning activity was completed, it was continued with the reflection to discuss the results of observations. Regarding to the results, the teacher or the researcher concluded that: (1) at the beginning of learning, the teacher provided motivation and directed students' attention in following the game according to the material studied through the play lucky card technique, (2) the teacher and students drawn conclusions, (3) students were more focused and given the opportunity to develop their thinking insights.

4.2.2. The Implementation of Action Activities 2

The learning activities in action 2 were carried out on January 19, 2014. In these learning activities, the teacher tried to maximize the game (Play lucky card) in accordance with the material that would be played by each student, and the teacher gave the widest possible opportunity for students to find the most appropriate answers in a game so as to create a fun learning in a conducive class.

In the preliminary stage, students had comprehended the concept of subject matter through the card playing technique, students began to be motivated, creative and enthusiastic in participating in the game. At the discussion stage, there were 8 students who did not play smoothly, 12 students who played smoothly, while the others had comprehended the concept of the material played by their respective groups. This showed that students had been able to understand the topics played by each group. At the process assessment stage, it was found that of the 23 students who were present, there were 20 students (86.96%) who had reached the complete score, after the learning activity was completed, then it was continued by the reflection to discuss the results of the observations. Regarding to the results, the teacher or the researcher concluded that: (1) the teacher needed to provide techniques and procedures in the game, so that students were able to understand the application and use of transformation formulas and then students were able to apply them in real life, (2) students still needed further guidance, so that they could better understand the concept and use of transformation formulas.

4.2.3. The Implementation of Action Activities 3

The learning activities in action 3 were carried out on January 22, 2014, the teacher gave each group the opportunity to display the most appropriate answers in front of their friends and explained systematically according to the learning material, and at the same time the teacher gave directions to students, so that they could follow the flow of learning, and observed as well as recorded the scores obtained by each group to be reported.

Play lucky card technique approach has a very positive effect on students' attention and creativity as well as learning motivation, so that at the game development stage, it was found that no more students experience difficulties in playing the game (play luck cards) according to the subject being studied. This can be seen at the implementation stage, where students had been able to overcome all the various problems that were played together. At the process assessment stage, it was found that of 32 students who were present, they were able to answer all the questions with a complete score (100%), after the learning activity was completed, then it was continued by the reflection to discuss the results of observations, then the teacher or researcher with the students observed the implementation process of the play lucky card technique, and concluded that: (1) before students were invited to play the game (play lucky card) according to the topic given by the teacher, the teacher needed to provide feedback after the learning was complete, (2) students were given the opportunity to do the widest possible criticism of the entire group in order to correct further actions.

4.2.4. The Implementation of Action Activities 4

The learning activities in action 4 were carried out on January 26, 2014, the teacher continued to motivate students to participate in the play lucky card, so that students could play, and provided opportunities to play the game systematically according to the material being studied.

Play lucky card technique approach has a very positive effect on attention and creativity of the students, and this technique was able to eliminate the feeling of boredom of students following the mathematics learning. At the process assessment stage, it was found that of 23 students who were present, they were able to answer all questions with a complete value (100%), after the learning activity was completed, then it was continued with the reflection to discuss

the results of observations made on January 26, 2014, the teacher or researcher together with students observed the implementation process of the Play lucky card technique. Regarding to the results, the researcher concluded that: (1) Before students were invited to play the game (play lucky card) according to the material given to all groups, the teacher directed the students to observe the problems that will be presented through the game (play lucky card), so that students were able to play the game, (2) students were given the widest possible opportunity to solve the problems, and teacher guided the students who experienced any difficulty, so that the students were able to draw the conclusions.

4.2.5. Final Evaluation of Cycle I

As an assessment of mathematics learning outcomes, a test was given at the end of the activity in Cycle I, which was to find out how much the students' mastery of geometric formulas had increased after using the Play lucky card technique which was conducted on February 2, 2014.

Based on the descriptive analysis results of the final evaluation score of the cycle I, it was found that classically, the level of mastery of geometric transformation formulas of class VIII-2 students at SMP Negeri 3 Barru had a level of absorption ability of 68.06%, and individually had a level of absorption ability of 32% increased to 80%.

Furthermore, if the scores of the students' mastery of geometric transformation formulas of class VIII-2 are classified into five interval classes, which are based on the categorization method proposed by Nurkancana (2009: 93), then it can be found that based on the results of the final evaluation of cycle I which were carried out on February 2, 2014, the teacher or researcher conducted an analysis of learning outcomes, where in general there was an increase in learning outcomes compared to the pre-test, it was seen that the number of students who completed the scores was amounted to 62.5% which increased to 70.63%, and the average score of 68.06 was in the 64.6-74.5 interval or in the sufficient category, so the results of the final evaluation of cycle I showed an increase in results, however still not significant. Based on the test results, it can be found that there were only 2 indicators for the final evaluation of cycle I that had been completed, namely indicators 3 and 5, indicators that had not been completed were indicators 1, 2, and 4, so that the teacher or researcher conducted a remedial by invloving students to discuss more and guide each other, and the teacher also provided various questions.

4.3. The Implementation of Cycle II

4.3.1. The Implementation of Action Activities 1

The learning activities in action 1 were carried out on February, 12 2014. In these learning activities, the teacher delivered topics or subject matter and distributed game kits (Play Lucky cards) to be played by each group.

In the preliminary stage, students were motivated by the Play lucky card technique, however, the students still had the difficulty in playing cards according to the material being studied, so that the teacher provided direction or assistance required for the students. In the development stage, after the action was completed, the students discussed the results of their games, so there were 4 students who did not play smoothly and 28 students who played smoothly, and even some students who asked for another explanation. Whereas at the implementation stage, there were still some students experiencing difficulties and they asked for direct guidance, at the process assessment stage, it was found that of the 23 students who were present, there were 21 students (91.30%) who had reached the maximum score or complete score, after the learning activity was completed, it was continued with the reflection to discuss the results of observations. Regarding to the results, the teacher or the researcher concluded that: (1) at the beginning of learning, the teacher provided motivation and directed students' attention in following the game according to the material studied through the play lucky card technique, (2) the teacher and students drawn conclusions, (3) students were more focused and given the opportunity to develop their thinking insights.

4.3.2. The Implementation of Action Activities 2

The learning activities in action 2 were carried out on February 16, 2014. In these learning activities, the teacher tried to maximize the game (Play lucky card) in accordance with the material that would be played by each student, and the teacher gave the widest possible opportunity for students to solve the problem given by the teacher.

In the preliminary stage, students had comprehended the concept of subject matter through the Play lucky card technique, students began to be motivated and creative in participating in the game. At the development stage, there

were 2 students who had the difficulty in playing the game, while the others had comprehended the game according to the material studied by the group. This showed that students had been able to understand the topics played by each group. At the process assessment stage, it was found that of 23 students who were present, there were 22 students (95.65%) who had reached the complete score, after the learning activity was completed, it was continued with the reflection to discuss the results of observation which was conducted on February 16, 2014. Regarding to the results, the teacher or the researcher concluded that**:** (1) the teacher needed to provide techniques and procedures in playing the lucky card, so that students were able to understand the concepts and then students were able to apply them in real life, (2) students still needed further guidance, so that they could better understand the mathematical concept in the real life.

4.3.3. The Implementation of Action Activities 3

The learning activities in action 3 were carried out on February 19, 2014. The teacher provided the opportunity for each group to play the game according to the assigned task and at the same time the teacher gave affirmation to students, so that they could follow the flow of the game seriously, and observed as well as recorded all results obtained as material for the process assessment.

Play lucky card technique approach has a very positive effect on students' attention, participation, and learning motivation, so that at the game development stage, it was found that no more students experience difficulties in participating in the Lucky card game. This can be seen at the implementation stage, where students had been able to overcome all the various problems that were studied together. At the process assessment stage, it was found that of 23 students who were present, they were able to answer all the questions with a complete score (100%), after the learning activity was completed, it was continued with a reflection to discuss the results of the observations, then the teacher or researcher concluded that: (1) At the beginning of learning the teacher gave the enthusiasm in developing the creativity of each group, (2) teacher together with students drawn the conclusions that while implementing the game, the teacher needed to provide the guidance for the students who experienced the difficulty.

4.3.4. The Implementation of Action Activities 4

The learning activities in action 4 were carried out on February 23, 2014. In these learning activities, the teacher delivered the subject matter that would be played by each group so that students no longer had difficulty in playing the game (Play Lucky card).

In the preliminary stage, students were motivated by the Play lucky card technique, and no more students experienced difficulties in participating in learning through the Play cucky card technique. In the development stage, after the action was completed, the students discussed about the results of their games, then there were 7 students who asked to present the results found by them in the game, and the other students showed seriousness in participating in learning through playing techniques. At the process assessment stage, it was found that of 23 students who were present, there were 23 students (100%) who had achieved a complete score, after the learning activity was completed, it was continued with the reflection to discuss the results of observations which was conducted on February 23, 2014. Regarding to the results, the teacher or researcher concluded that: (1) at the beginning of learning, the teacher provided motivation and directed students' attention in following the game according to the material studied through the play lucky card technique, (2) the teacher and students drawn conclusions, (3) students were more focused and given the opportunity to develop their thinking insights in expressing their opinion.

4.3.5. Final Evaluation of Cycle II

As an assessment of mathematics learning outcomes, a test was given at the end of the activity in Cycle II, which was to find out how much the students' mastery of geometric formulas had increased after using the Play lucky card technique which was conducted on March 5, 2014.

Based on the descriptive analysis results of the final evaluation score of the cycle II, it was found that classically, the level of mastery of geometric transformation formulas of class VIII-2 students at SMP Negeri 3 Barru had a level of absorption ability of 86,75%, and individually had a level of absorption ability of 48,00 % increased to 100%.

Furthermore, if the scores of the students' mastery of geometric transformation formulas of class VIII-2 are classified into five interval classes, which are based on the categorization method proposed by Nurkancana (2009: 93), then it can be found that based on the results of the final evaluation of cycle II, specifically at the end of cycle II, there was a complete score of 40.63%, increased to 84.38%, and the average score of the final evaluation results of cycle II (68.06) was in the sufficient category increased to 86.75 at the interval of 74.5 - 84.5 or in the high category, and the results of the final evaluation test of cycle II, showed that learning with the Play lucky card technique approach can improve the mastery of geometric transformation formulas of class VIII-2 students at SMP Negeri 3 Barru. Therefore, it can be concluded that the play lucky card technique approach can improve the ability to master the geometric transformation formulas of Class VIII-2 students at SMP Negeri 3 Barru.

5. Discussions

Based on the results of the analysis above, it can be seen that most of the class VIII-2 students at SMP Negeri 3 Barru (40.63%) had the ability to master the mathematical formulas according to the results of the evaluation at the end of cycle I in the sufficient category, while classically it can be seen that the average score was 68.06 in the interval of 64.6 - 74.5 or in the sufficient category. Moreover, there were 56.25% of students who had the ability to master the mathematical formulas in the high category and 28.38% of students in the very high category. Whereas classically, it can be seen that the average score was 86.75 in the 84.6 - 94.5 interval or in the very high category. Furthermore, the resulst also showed that the "Play Lucky Card Technique Learning" can improve the quality of student learning in class VIII-2 of SMP Negeri 3 Barru. This showed that an increase in the ability to master the geometric transformation formulas can be evidenced with the average score of the evaluation results for each cycle I and II, specifically 68.06 in the cycle I, increased to 86.75 in the cycle II, and it was also concluded that "*Learning Through a Technical Approach Play Lucky Card*" can increase the mastery of the geometric transformation formulas of Class VIII-2 students at SMP Negeri 3 Barru. The results of the study showed an increase in the ability to master the geometric transformation formulas which was evidenced by the average score of the evaluation results at the end of each cycle I and II, specifically the percentage of student learning completeness who obtained score $\geq$ 65 or in the high and very high category data, specifically from the cycle I, there were 13 people (40.63%), increased to 21 people (84.38%) in the cycle II. Referring to this, the increase in student learning completeness who obtained a score $\geq$ 65 was amounted to 43,75%, this indicated a very significant increase.

Based on the results of descriptive analysis, it can be concluded that "*Learning Through the Play Lucky Card Technique Approach*" can improve the mastery of geometric transformation formulas of class VIII-2 students at SMP Negeri 3 Barru, this showed that there was an increase in the mastery of geometric transformation formulas for each evaluation at the end of cycle I and cycle II.

The results of qualitative analysis based on observations conducted by the teacher (researcher) and students during the teaching and learning process are as follows: The level of attendance of students in the teaching and learning process of mathematics continued to increase which was indicated by the attendance of students which was almost 100% on average. The students' activeness in participating in the lucky card game was quite enthusiastic. Of the four - eight games, almost no student who could not solve the problems in accordance with the transformation formula within the predetermined time. The average percentage completeness of the process assessment of students who were able to solve problems in accordance with the time in the cycle I was amounted to 95.11% and in the cycle II increased to 99.22%.

In participating in the play lucky card game, students no longer rely on memorization but through understanding and applying transformation formulas. This was indicated by their ability to manipulate and use mathematical formulas to solve problems, both homework questions and problems solved in playing Lucky Cards or in the learning process in class.

The results of the assessment of the 8 games given showed a tendency to increase the average score of the completeness of the overall process assessment achieved by students in 8 games which was amounted to 97.17%.

The results of the final evaluation in the two cycles of the study also showed a significant increase in the average score, from 68.06 in the cycle I to 86.75 in the cycle II.

Based on the results of the study and discussion that has been stated previously, it can be concluded that in general there had been an increase in the mastery of mathematical formulas of class VIII-2 students at SMP Negeri 3 Barru. This increase can be seen from the average score at the end of each cycle, which increased from 68.06 in the cycle I to 86.75 in the cycle II.

Another quite encouraging result was an increase in students motivation and activeness in the teaching and learning process. This was reflected in the number (quantity) of students who raised their hands to work on the questions on the blackboard which tended to increase from one meeting to the next. Moreover, almost all students submitted every homework according to predetermined deadlines with an average of 87.35%.

Moreover, it was found the direct recognition of students by filling out a general response questionnaire that they find it helpful to understand mathematical formulas without relying too much on memorization. This recognition also supports the results of the quantitative analysis which showed that by the implementation of the play lucky card technique, the mastery of the mathematics formula of class VIII-2 students at SMP Negeri 3 Barru can be improved.

In addition to the successes results as described above, this study also has weaknesses, including: (1) The results obtained are less accurate, because there are many other factors that affect the teaching and learning process and are difficult to control, (2) The process of implementing the action is still not optimal, because on the one hand, the implementation of play lucky cards directly in class, requires a lot of time, while on the other hand, the teacher must complete the curriculum targets, (3) It is difficult to guarantee that the homework given is actually done by the students themselves and not cheating from their friends' work, (4) The teacher has difficulty in preparing the Play lucky cards game, because not all the material taught can be made on the play lucky cards game.

6. Conclusion

Referring to the results of the study and discussion that have been previously described, some research conclusions can be drawn as follows:

a. In the first cycle, most of the students of class VIII.$_2$ at SMP Negeri 3 Barru (40.63%) had the ability to master the mathematical formulas in the sufficient category, whereas classically it was seen that the students' average score was 68.06 in the 6.0 - 7.5 interval or was in the Good category.

b. In the second cycle, most of the students of class VIII.$_2$ at SMP Negeri 3 Barru (56.25%) had the ability to master the mathematical formulas in the high category, and 28.13% of the students had the ability to master the mathematical formulas in the very high category. Whereas classically, it can be seen that the average score of students was amounted to 86.75 in the interval of 8.0 - 9.5 or was in the high category. Other data showed that students score ≥ 65 in the evaluation results of cycle I was amounted to 40.63%, increased to 84.38% in the results of the evaluation of cycle II, then the increase in mastery of the transformation formula was amounted to 43.75%.

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