



## Improvement of Power Mathematical in Learning Math through Learning Model Combined

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### ABSTRACT

This study aimed to describe the improvement of power of math to students through the implementation of combined model in Madrasah Tsanawiyah, equipped with a description of condition, impact and result of the implementation of learning models combined, direct and indirect. Qualitative research method using a model with classroom action research conducted in two cycles in M.Ts. PUI class IX Kuningan district. the results are described; contained increased the power of math scores and increased categorization qualification in students. Condition learners with learning combined model was found that the direct learning model students can follow but passive, but not directly on student learning model requires an optimal guidance for independent and active. gradual learning model combined can be implemented smoothly, teachers and students responded well, yet still find it difficult students independence, and effect an increase in the average math of students.

**Keywords:** *the power of mathematics, learning models combined, direct and indirect*

### 1. INTRODUCTION

This article as part of the output process of action research on teaching and learning is an integrated activity. Research include the role of teachers, learners, curriculum and teaching-learning strategies. The one that occurred in the teaching and learning of process is the emergence of interaction between learners and teachers. In school mathematics learning aims to have Mathematics of power. Resources include mathematical reasoning ability, connections, problem solving and communication (NTCM, 2000).

Interaction of students and teachers in the learning of mathematics learners performed as a medium for learning explore, investigate conjectures, generalize and use a variety of ways to prove. The activity is an activity to develop reasoning skills.

Besides reasoning capabilities, capabilities that must be developed is the ability of learners expressed a problem with the words themselves, giving reasons for exploration conducted, as well as explaining and making math question. That ability is called mathematical communication skills.

The ability of the above, to be supported also by the ability to relate the topic being studied, linking the concept with other subjects and to relate to the application of the concept of life. This capability is the ability to connect mathematical learners who have developed well in learning.

Another competence is the ability to learn to solve the problems of daily through the help of mathematical concepts, applying various strategies and reflect on the process of problem solving. It's a mathematical problem solving ability.

Studies conducted Sumarmo (1999) on learners in the city, find the low skills of the students in solving mathematical problems. Difficulties experienced by most students is find the right strategy and carry out the calculations re-examine the results of the calculation. Wahyudin (1999) argues that mathematics is a subject that is difficult to understand the distribution of mathematical mastery level of the learners tend to be low.

According Wahyudin (1999) weaknesses in students caused by: (1) lack of a good prerequisite material, (2) lack the ability to understand and identify the basic concepts of mathematics (axioms, definitions, rules, theorems) related to the subject under discussion, (3) lack the ability and accuracy in listening back an answer obtained (whether the answer may or not), (4) lack of logical reasoning abilities in solving problems or mathematical problems.

Report the results of TIMSS (Mullis, 2003) which shows the ability of the students in Indonesia in solving reasoning and problem-solving aspects of the material through the numbers; algebra; geometry, as well as data representation, analysis, and odds are low of ability. It is based on the acquisition value of 8th grade junior high students from Indonesia, which is almost entirely below the international average. For example, when students are asked to find the number of triangles in the n-th image

patterns, learners Indonesia only 7% who answered correctly. While the ability of the international average of 14%. Thus there are differences in the ability of 7%. The ability of learners to apply the reasoning ability, connection, communication and problem solving, one of which tested through a study conducted by the TIMSS (2003). Based on studies conducted by the TIMSS (2003) suggests that learners-learners in the Hong Kong, Korea and Japan achieve high performance, because in more emphasis on the learning of mathematics reasoning and problem solving. High performance achieved by these Asian countries, including the highest achievement in comparison in other countries.

Power of mathematics of learners strongly associated with teachers in process learning that implemented in learning activities. Results of analysis of the plans documents and syllabus documents made by 30 teachers in Kuningan regency still very few teachers identified the learning process (analysis of the core activities in the planning / RPP) can improve math learners. These data indicate that there is a presumption if level the power of mathematics of learners in Kuningan district still needs to be improved.

A new breakthrough for the development of mathematical learners begins with changing views of teachers in terms of learning. This is in accordance with the opinion Sumarmo (2004) which states that in order to support the ongoing conducive learning atmosphere and in an effort to empower learners needed change view of learning, such changes are: the view class just as a collection of individuals to the class to be a community learning ,from the teacher as instructor in the direction of the teacher as a motivator, facilitator and manager of learning.

Along with the above, Ruseffendi (1998) states that there are two factors that affect the cognitive development of learners, ie, internal and external. Two things include intelligence of learners, gifted learners, learning, learner preferences, the model presentation, material, personal and attitudes of teachers, the learning environment, teacher competence, as well as the condition of the wider community. Thus, the teacher as one of the external factors, should plan, perform and provide the kinds of tasks for learning mathematics, which is a task that can make learners participate actively, encourage intellectual development of learners, to develop understanding and skills of mathematics, can stimulate learners, preparing relationships and using work procedures of idea mathematically, advancing communications mathematics, using mathematical as human activities, and to motivated of students understanding essensi of mathematics. Additionally Lorsch and Tobin (2004) stated that the existing knowledge in a person can not be removed simply from a person's brain into someone else's head. Learners themselves who must interpret what is being taught in to growth of knowledge to their experiences.

A similar sentiment was expressed by Sumarmo (2004) that the mathematics required to implement the learning skills of teachers, among others: 1) selecting mathematical tasks that generate interest and intellectual learners, 2) improving the understanding and application of mathematical learners in depth, with connects concepts will be studied and help learners discover relationships between concepts, 3) set the "discourse" is a description or discussion in depth oral or written, to reveal or express opinions, thoughts or approval or disapproval and the reasons for something that happened during the learning of mathematics takes place, for discover and develop mathematical ideas, which include the application of technology and other tools to obtain mathematical discovery and help learners use it. Furthermore, it can guide the individual assignments, group work or class assignments.

Looking at the above conditions, it is necessary an attempt to improve learner's the power of mathematical . Improvement of mathematics can be done either by choosing the appropriate method in the learning. Selection of a learning method in an effect on learning outcomes of students. Because by setting an appropriate method will improve the quality of learning better.

This study generally aims to obtain objective information on the mathematical learners M.Ts Kuningan district PUI class IX who obtain a combined model of learning through direct-indirect. Detailed research objectives are: 1). Explaining the student learning environment by using an indirect model of Joint Direct to Improve Math Learners Tsanawiyah, 2). Explaining the impact of models implementation of the Joint Direct Indirect Improve Math Learners Tsanawiyah, 3). Explaining the smooth implementation of the study using a combined model of direct-indirect, 4). Explaining the mathematical power of the results of students in terms of achievement category of learners with learning combined direct-Not directly.

Model of Combination Learned (Direct and Indirect) which consists of the combined phases between direct instruction and indirect learning. Phases of the learning gabungan yaitu; 1). Delivering objective and preparation to learners; 2). Demonstrate knowledge and skills; 3). Provide guidance if needed; 4). Checking understanding and provide feedback; 5). Provide practice and application of the concept.

## 2. THE RESEARCH METHOD

Classroom action research are characterized by cycles, while in this study consisted of 2 cycles carried out in M.Ts PUI IX class consists of 34 students in the district of Kuningan. Each cycle consists of planning, implementation, observation and reflection.

This study conducted two cycles, the first cycle and second cycle is carried out through the following activities. First, the planning phase, consists of the following activities: preparation of lesson plan (planing) the concept of row in the first cycle of nth term on cyclical II, the learning scenario and its subsequent of the device preparation . Second, the implementation phase (acting), consisting of activities; implementation of learning programs in accordance with the schedule, the learning process by implementing the Models combined direct-indirect Tsanawiyah on learning mathematics, teacher explains the strategy in the Models combined direct-indirect with to use sheet student work, and then conduct further observations about the learning process, conduct written test, written test and assessment results. Third, the observation phase (observing), which is observing lessons and assess the results of the test so that the results are known. The results of the first cycle is used to plan follow-up on the second cycle. The four stages of reflection (reflecting), which concludes the implementation of the results of the action on cycles I and II.

In this study, researchers used data collection techniques with methods of observation and tests. Data collection techniques to obtain data regarding situation in class and the learning that occurs in the combined model is obtained by using the observation instrument on worksheet. Worksheets to measure learners and mathematics test item for see improved learning outcomes (values) learners. Applied data analysis is to use a simple statistical description.

### 3. RESULT

Research results can be described with respect to the learning atmosphere, the impact is felt, the smooth

implementation and improvement of mathematics learners by using the combined model.

Atmosphere of learners by using Model of Combined to Improve Math Learners Tsanawiyah, identified that the learning atmosphere of silence when learning with the direct method. All students pay attention but the students are not familiar with the indirect method, so that the guidance given should be optimal (extra attention). Learners pay more attention to the direct method and it can be seen that the stimulation provided in the guidance of well-liked teacher learners.

The impact of acts of Model Combined to Improve Achievement Learners Tsanawiyah can show from values pre test and post-test . Achievement test scores of students earned average pretest value of 56.82 and an average posttest value of 72.00.

The smooth implementation of the study using a combined model of direct-indirect on the stages of learning methods combined direct-indirect gradually and smoothly, Learners respond well, and find problem independence as learners in the learning phase of the indirect method.

Description of the results of students in terms achievement category of power mathematical with learning combined direct-Not directly. Power mathematical on aspects of mathematical reasoning and problem-solving aspects seen in values tasks of learners from the given questions.

Scoring power mathematical in this classroom action research can only identify two of the aspects, that are reasoning and problem solving. Scoring is done of teaching materials and student worksheets are provided and graded according to the criteria specified. The criteria for to value reasoning as follows;

Response of students to the Problem to identify the mathematical aspects of reasoning	Score
No answer / answer does not match the question / Nothing is true	0
Only some aspects of questions answered correctly	1
Almost all aspects of the questions answered correctly	2
All aspects of the questions were answered with complete / clear and true	3

Figure 1; Scoring aspect Mathematical Reasoning

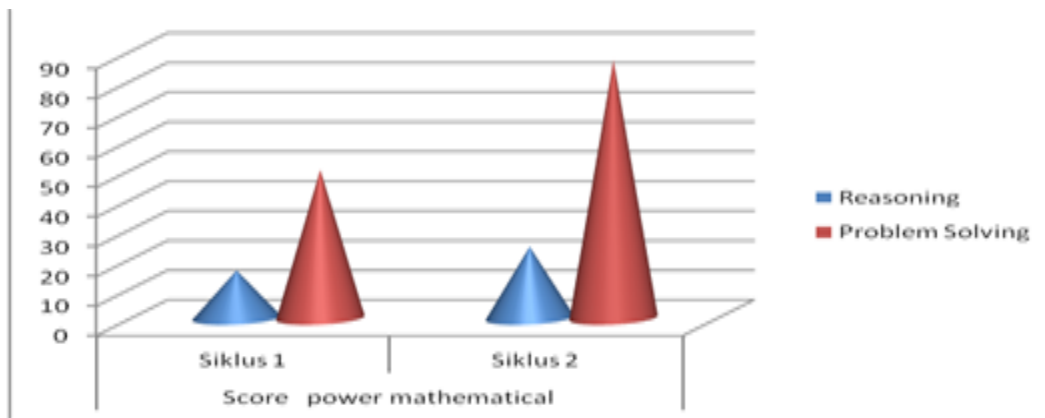
The criteria for score solving problems, the following;

Responses of students from Questions for the identification of mathematics aspects of problem solving	Score
Understanding the problem	
Understanding the problem with completely	2
Understand only part of the problems / interpretation of problem incorrect	1
not understand the problem / wrong interpretation / no answer	0
Choosing the completion strategy	
Correct and complete plan leads kepenyelesaian correct	2
Plan was based on some of the problems correctly interpreted	1
No plan / plan made wrong	0

Implement the strategy	
Implement procedures properly and correct answers	2
Implement the correct procedures but there are some wrong calculations	1
There is no answer or a wrong answer based on plans that are not appropriate	0
Check the correctness of the results	
Checking the results with the full truth	2
Checking results incorrect and incompletely	1
here is no check on the results and any wrong examination	0

Figure 2: Score aspects Problem Solving of Math

score results power mathematical learners M.Ts PUI obtained as in Figure 3:



Improvement of mathematics students in aspects of reasoning is not too high, increase score only slightly, from a score of 16 in cycle 1 become score 24 in the second cycle. Improved scores on aspects of reasoning is still at the very low category, although there is an increase in the score. As for aspect the problem-solving quite significant improvement, from a score of 50 in cycles 1 become score 87 in cycle 2. Improved scores on the problem-solving aspect, there is also an increase kagorinya, namely the ability of cycle 1 students in aspects of problem solving is in bad category, but in cycles 2 to be sufficient category.

#### 4. DISCUSSION

The selection of a method in teaching should be adapted to the purpose of learning, subjects and conditions learners. These three things are inseparable, interrelated to each other. The link between learning objectives, subjects and conditions learners are being in those aspects of learning which should be planned to be implemented as well as possible, so that learning will improve student achievement.

This combined model is a new breakthrough that begin with the transformation of the teachers' view of mathematics learning in M.Ts PUI Brass. The combined model is combined a model of the direct and indirect. Combined model, in the process, learning more learner-centered, teacher asks questions, does not provide direct

information and the learners are given the opportunity to perform exploration of their ideas and see the connection. Learning with indirect models have quite a big difference compared to the direct model. The differences in terms of competence of learners, teachers, and classroom climate formed.

In the combined model, competencies learners in learning be main goals, the teacher only serves as a mediator, facilitator and motivator in learning, direct explanation of the teacher is given only if needed. Classroom climate that caused the combined model is more alive, because the learners as a center for learning, active learners rather than as a passive waiting for orders from the teacher. Thus skills thinking higher order of students be goals to be formed to support the learning process to form competence of students. In teaching with the combined model showed that certain types of activities that are developed through direct teaching is more suited to improve the low-level thinking skills, while other learning activities developed through more indirect models successfully improve in skills learners in higher order thinking (Suryadi, 2005).

Based on the analysis of data obtained by several findings, including the upgrading of power mathematical , responses learners and teacher to the combined learning model is quite good. Ability of early math learners can be known through observation. worksheet implementation results showed that the mathematical skills of students at

the beginning of cycle 1 is still very minimal, but in the second cycle with intensive mentoring and effective communication from the teachers gained increasing power mathematical at cycle 2.

Increased ability power mathematical to cycle 2 in mathematics learners as a result of the action of this class of teachers say the same, that good teaching method is a method of learning that are tailored to the subject matter. The model used of the teacher in the classroom is of combined model, teachers guide students to be able to complete your task through the use of learning methods.

The ability of teacher in selecting and determining the learning method used is influenced by the ability, knowledge, and experience in teaching long enough. In addition, the educational background of undergraduate mathematics education also support such capabilities.

The magnitude of increase in the ability power mathematics learners show that the teaching given by the teacher to the combined model is quite effective. Thus it can be said that the combined model is quite successful in learning mathematics in this study. Despite this increase in mathematical reasoning ability is not that great. This is because the students are not familiar with the problems of mathematical reasoning, where mathematical reasoning questions require capabilities of a high level.

Improvement occurring in mathematical reasoning ability learners who learn by observation combined model was supported in learning. In general, the students have a positive attitude towards learning the combined model. Learners benefit from learning math in a new way that the combined model. Learners feel involved actively learning and participating actively thinking. Learners' positive attitude towards learning mathematics. Learners feel that the material of mathematics is interesting material, especially when there are coaching in problem solving. Learners feel that the material is very useful in everyday life, increase knowledge, skills and ways bersikapnya in the face of the existing problems. These findings complement the results of research conducted by Faradhila N, et al (UNS, 2012) concluded that the Missouri Mathematics Project learning model produces better learning achievement than learning model directly on material of the surface area and volume of prisms and pyramid, the results of this study do not comparing two learning models, but combining the two learning models. Research Effendi, LA (UPI, 2012) also conclusion that increase the ability of problem solving math, representation and learning of students who received guided discovery method is better than conventional learning. This study shows that the indirect model of learning (guided discovery) can improve one aspect of students' of power mathematical is the ability to solve problems.

Teacher's response to the combined model of learning mathematics is a positive, he was happy to see new ways of doing mathematics learning. This is due to the task of learning in a combined model of learning is lighter than usual for teachers. Teachers act more as facilitators, rather than conventional learning requires teachers who are more active, especially in speaking. Learning is more concentrated on the activity of the learner rather than the teacher activities, such as expected of curriculum.

The data results of action research classroom indicate that learning model uses a model combined can improve power mathematical of students M.Ts. This is evidenced by the increase in scoring and categories from two aspects, namely the reasoning of mathematical aspects and aspects of problem solving. Results have not been up and likely still will be increased again due to the condition of the students are familiar with direct instructional model where passive condition, because it used usually in teach, teacher as centre. The indirect learning model requires both students find out. The results showed that the increase in scoring and problem solving category adequate to students M.Ts. PUI Kuningan district, but the reasoning aspect was little increase in his score. This is understandable given the characteristics of students in M.Ts. PUI Kuningan district, is still not used actively in learning. Therefore, the need for further research to examine all aspects of the mathematics in-madrasah Madrasah other.

## 5. CONCLUSION

Classroom action research is to determine the improvement of power mathematics students with learning models combined. However, the findings of the research can be explained as a learning environment, the impact of the implementation of learning, learning smoothness of the combined model of direct - indirect.

Atmosphere of learners by using Models Combined direct-indirect to improve the Power mathematical student Tsanawiyah can identified that the atmosphere of silence when learning with the direct method. All students pay attention but the students are not familiar with the indirect method, so that the guidance given should be optimal (extra attention). Learners pay more attention to the direct method and it can be seen that the stimulation provided in the guidance of well-liked teacher learners.

Impact of Combined Model Direct teaching can indirectly increase the value of the average student.

The smooth implementation of the study using a combined model of direct-indirect implemented gradually and smoothly, Learners respond well, and a lot of trouble independence as learners in the learning phase of the indirect method.

Improvement of mathematical reasoning of students in aspects of the increase is only slight and still is at less qualified category. As for the problem-solving aspect of the increase is significant, and there is an increase in its category of less in the first cycle, but the cycle 2 to be enough category.

## SUGGESTION

Based on the results of classroom action research (CAR), there are some suggestions related to classroom action research, among others:

1. Learning mathematics with model of combined is given to students who are capable and high, preferably before the research of conducted, teachers identify the ability of the students, so students that low-ability can be treated specially, so that the learning model's shortcomings can be overcome with intensive coaching as individual, so improvement of mathematics for each student.
2. This study is limited to the concept of row and nth term. Expected on other researchers to develop a learning model combined with materials other subjects.
3. The sample was taken only in the junior secondary school PUI class IX in Kuningan District. Expected to the other researchers in order could use larger sample, with the purpose minimize errors and get a generalization which more accurate.
4. Learning model combined can success caused by teaching materials and worksheets students who stimulate the improvement of power mathematics. Because it's the teachers who will use this model should be able to analyze and prepare teaching materials and worksheets first aimed to improve power mathematical of learners
5. Subsequent researchers can also examine how to find criteria for teaching materials and worksheets that can improve power mathematical of learners

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