

Think Pair Share (TPS) Model to Improve Learning Outcomes Mathematical Concepts of Multiplication for Students with Mentally Retarded

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Abstract—One obstacle to deaf students in mathematics is their understanding of the multiplication concept, so that it has an impact on poor mathematics learning outcomes. Based on these problems in this study applying cooperative learning think pair share (TPS) with the aim of analyzing the effect of cooperative learning think pair share (TPS) type on the learning outcomes of the concept of mathematical multiplication of mentally retarded students before and after treatment. The approach used is quantitative, with the type of pre-experiment and research design of one group pretest-posttest design. Data was collected using test, observation and documentation methods. Subjects numbered 6 people. The data collection technique is in the form of a test with non parametric statistical data analysis techniques with the Wilcoxon match pairs test formula. The results of data analysis using the non-parametric statistical data analysis Wilcoxon match pairs test showed that the use of TPS cooperative learning models had a significant effect on the learning outcomes of the concept of multiplication of children with intellectual disabilities.)

Keywords—*Think Pair Share; Mathematical concept; Mentally Retarded*

I. INTRODUCTION

Mentally retarded children are children who have limitations in terms of their intellectual intellect below the normal average. So that mentally retarded children have difficulties in their academic, communication and social assignments, academic achievement that results in learning outcomes tends to be low, such as in the field of Mathematics study which requires students to have abstract thinking skills. This is an obstacle for mentally retarded children in understanding mathematical concepts. [1] that it *“We conclude that these criticisms are not valid, and that, given the importance of mathematics to academic success in all subjects, all children need and deserve to build a robust knowledge of mathematics in their earliest years and can do so if we use the research knowledge and research-based standards and programs presently available”*

Can be concluded that mathematics is a very important science in shaping students' mindsets, in mathematics students are required to have the ability to think logically, analytically, systematically, critically and creatively. One of the mathematics learning objectives in [2], namely the

2013 curriculum is summarized in 4 (four) Core Competencies, namely spiritual attitude competency, social attitude competence, knowledge competence and skills competency. Spiritual attitude competence This is the understanding of concepts has an important role for students in solving mathematical problems.

Beth & Piaget (1956) in [3] say that what is meant by mathematics is knowledge relating to various abstract elements and inter-structure relationships so that it is well organized. While Kline (1972) in [3] is more likely to say that mathematics is knowledge that does not stand alone, but can help humans to understand and solve social, economic and natural problems. On the other hand, Reys (2002) in [3] says that mathematics is the study of patterns and relationships of ways of thinking with organizational strategies, analysis and synthesis, art, language, and tools to solve abstract and practical problems.

From the explanation it can be concluded that basically mathematics is one of the lessons taught to students that will be very beneficial for everyday life. Mathematics lessons can support other subjects. But in reality in the field shows that mathematics is considered as one of the difficult subjects and often causes significant problems. Mathematics learning applied to mentally retarded children refers to the 2013 curriculum (K13). So that they need special services by adjusting the material according to the ability of mentally retarded children to develop their abilities optimally. Children with mental retardation themselves find it difficult to experience abstract things such as multiplication material.

Regarding the importance of curriculum needs with the characteristics of mentally retarded children, the Indonesian government developed the latest curriculum namely Curriculum 2013. Besides competency-based and character-based, 2013 Curriculum also has several characteristics such as written in Minister of Education and Culture Regulation No. 67 of 2013 [4]. The characteristics of the 2013 curriculum are the curriculum that accommodates a balance between aspects of competency, skills, and knowledge. Competence is developed through integrated thematic learning.

Thematic / integrated learning contained in K13 is also a learning model that combines several learning materials

from various basic competencies and core competencies from one or several subjects especially in mathematics with other lessons for mentally retarded children. One translation of K13 on mathematics subjects is that students can perform mixed counting operations (addition, subtraction, multiplication and division). Mathematics has a broader range of arithmetic. Arithmetic is part of mathematics, numeracy is an important thing and can provide benefits in the lives of all people in the community, including mentally retarded children. Count operations in numbers are the main arithmetic concepts that children should learn. After they carry out addition and subtraction operations then they study multiplication and division operations. The study in this study is multiplication counting operations.

Multiplication is the main basic arithmetic operation that children should learn after they study addition and subtraction operations. Multiplication is repeated sum with the same number. Multiplication operations are found in mathematics lessons given at elementary school level, including exceptional schools for mentally retarded children.

In general, mentally retarded children consider mathematics as a scourge. Mathematical learning basically requires the ability of the power of logic and abstraction, while these abilities for mentally retarded children experience obstacles. Basically for abstract thinking needs good ability in language, students will be able to think coherently and logically and a complicated matter in which the use of difficult and confusing formulas is needed in solving a problem in the form of a process of counting numbers.

Looking at the importance of developing and optimizing the understanding of concepts in mathematics learning, it is necessary to have innovative efforts to solve these problems experienced by mentally retarded children, especially in social interaction and can improve mathematics multiplication learning outcomes so that the effort is to apply cooperative learning models. Because the cooperative learning model emphasizes the process of cooperation and interacting in groups.

[5] *"The cooperative learning model is characterized by cooperative task, goal, and reward structures. Students in cooperative learning situations are encouraged and/or required to work together on a common task, and they must coordinate their efforts to complete the task"*

From the exposure of Arends, it can be interpreted that the cooperative learning model is characterized by cooperative tasks, successes, and *rewards*. students in cooperative learning situations need to work together in completing joint tasks, and they must coordinate their efforts to complete the task. A learning model in which students with different characteristics and abilities and work together to solve a problem or task of learning. In cooperative learning does not distinguish ethnicity, language, and gender, academic abilities, and different tribes. It aims to build an effective learning team.

Based on the results of field observations found in class III mentally retarded children at Singojuruh Banyuwangi Special School there were 6 mentally retarded children who

had difficulty completing the concept of multiplication of math numbers. Besides that the learning process that is often applied in the Extraordinary School is teacher-centered. This can affect the learning achievement of mathematics in mentally retarded children in understanding the concept of multiplication of numbers.

Noting the problems faced by mentally retarded children, the teacher needs to create a learning model that can support teaching and learning activities in the classroom. So that mentally retarded children more easily understand the counting operations of count numbers with results up to 50 which are found in the Basic Competence (KD) class III of the mentally retarded children namely 4.3 calculating the multiplication operation of 2 one-digit numbers with results up to 50 assisted with concrete media. From the explanation it can be concluded that multiplication of numbers with results up to 50 using the cooperative learning model is a learning model in which students with different characteristics and abilities work together to solve learning problems or tasks. One of the learning models that can be applied to mentally retarded children is through the cooperative learning model of the *Think Pair Share* (TPS) type developed by Frank Lyman [6].

The cooperative pair type Think Pair Share model gives students more time to think, respond and work together with friends in their groups. learning model *Think Pair Share* corresponds to the scientific approach as applied to the 2013 curriculum, because the processes in the scientific approach can be implied in the TPS phases [7]. The process of observing in the scientific approach can be applied in the phase *Think* in the TPS model, namely during the demonstration and work on the TPS in an integrated manner. The process of asking, can be applied in the phase *Pair* (paired discussion) and phase *Share* (class discussion). The process of gathering information can be found in the phases *think*, *pair* and *share*. The process of gathering information can be found in all phases of the polling station. The process of communicating in the scientific approach appears in the phase of *pair* and *share*.

[5] states that "... and it has built-in procedures for giving students more time to think and to respond and to help each other". From exposure Arends can be interpreted, namely the procedure used in *Think-Pair-Share* can provide a lot of time for other students to think, respond, and help each other.

Assuming that by applying the cooperative learning model the *Think-Pair-Share* type can provide an experience of interacting and working together between group members in solving a problem from what is learned by mentally retarded students.

There are 3 stages that will be implemented by students in carrying out cooperative learning type *Think Pair Share* [8] which is at the first stage (*Thinking*), students are asked to think answers independently from the Student Worksheet that has been given by the teacher. The second stage (*Pairing*), students are paired with other students to form a small group consisting of two people who then discuss the Student Worksheet. Then stage (*Sharing*), each group presents the results of their discussion in front of the class to share with

other groups. The activity of students in the cooperative learning process can occur when students involve themselves in the learning process. Through this learning experience students are able to embed the concepts that the teacher wants to convey.

II. METHOD

The research approach that will be used in this study is a quantitative approach. To test the original data can use the Wilcoxon Matched Pairs Test statistic [9]. In this study the type of research that will be used is quantitative pre-experimental research. The research design or design that will be used is the *One Pretest Group - Posttest Design*

In this study O₁ (pretest) was done first before treatment as much as 1 time, X (treatment) was carried out for 6 times, and finally O₂ was carried out after treatment for 1 time. The Singojuruh Banyuwangi Special School research location consisted of 6 class III mentally retarded students.

Cooperative learning model type *Think Pair Share* (TPS) consists of 3 phases, namely: *thinking* (thinking), *pairing* (pairing), *sharing* (sharing):

Phase 1 (*Thinking*):

- a) The teacher explains the material about multiplication of numbers with results 1-50
- b) The teacher assigns students by giving questions with multiplication multiplication material with results of 1-50

Phase 2 (*Pairing*):

- a) The teacher pairs students and friends to make groups.
- b) Students discuss questions from multiplication numbers with 1-50 results given from each student's answer.

Phase 3 (*Sharing*):

- a) The teacher asks each pair of groups to present the results of the discussion with their friends in front of the class.

The research instrument used in this study consisted of:

1. Learning Implementation Plan
2. Teaching material
3. Work sheet answers
4. Question of the *pretest-posttest*
5. The key answer to the *pretest-posttest*
6. sheet *Pretest-posttest score*
7. Student Learning Activity Sheet

Data collection techniques used are using test methods and observation methods. The data analysis technique used is this technique used to test the comparative hypothesis of two samples that correlate if the data is ordinal in comparing the value of the *pre-test* and *post-test*, whether there is a change or not. Following is the Wilcoxon formula:

$$z = \frac{T - \mu T}{\sigma T}$$

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III. RESULT AND DISCUSSION

The study was conducted at Singojuruh Banyuwangi Special School with the research subjects being 6 grade III

students with the results of learning the concept of low count multiplication. From the results of the study showed that the cooperative learning model of *Think Pair Share* (TPS) had an effect on the learning outcomes of the concept of math count multiplication of students with multiple mental retardation with results up to 50.

TABLE 1. PRETEST AND POSTTEST RESULTS DATA USING TPS LEARNING MODEL

No	Name	Pretest (O1)	Post-test (O2)
1	DRB	40	70
2	ASA	55	100
3	BA	55	100
4	ANK	30	100
5	VAN	50	85
6.	PPM	55	100
	Mean	47,5	92,5

Based on table 1 the average value of children before the cooperative model type *Think Pair Share* (TPS) is applied at 47.5 and after applying the cooperative model the *Think Pair Share* (TPS) type in learning is obtained an average of 92.5.

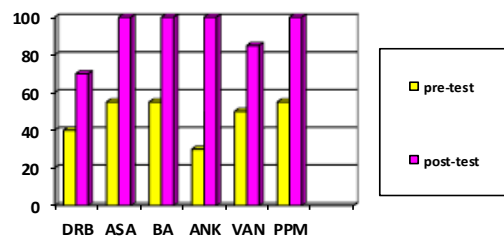


Fig 1 Results Before and After Using Learning Models in Learning *Think Pair Share* Outcomes Concepts of Multiplication of Mathematical Count Numbers for Children with Class III Impairment in Singojuruh Banyuwangi Special School

The mathematics learning outcomes before the treatment obtained the lowest results were 30 and the highest results were 55. After being given treatment using the learning model *think pair share* the results of learning the concept of multiplication of numbers increased very well, this is indicated by the results of reading ability after treatment the lowest result is 70 and the highest result is 100.

TABLE 2. WILCOXON TEST HELPER TABLES LEARNING OUTCOMES CONCEPTS OF MULTIPLICATION OF COUNTS OF CHILDREN IMPAIRED BEFORE AND AFTER USING TPS MODEL

No	Name	X _A ₁	X _{B1}	Difference X _{A1} -X _{B1}	Mark level		
					level	+	-
1	DRB	40	70	30	1	+2	-
2	ASA	55	100	45	4	+4	-
3	BA	55	100	45	4	+4	-
4	ANK	30	100	70	6	+6	-
5	VAN	50	85	35	2	+1	-
6.	PPM	55	100	45	4	+4	-
Jumlah						T+ = 21	T- = 0

$$Z = \frac{T - \mu_T}{\sigma_T} = \frac{0 - 10,5}{4,77} = -2,20$$

So the calculated Z value is 2.20 value (-) is not calculated because of the absolute price.

TABLE 3. RECAPITULATION OF STUDENT LEARNING ACTIVITY SHEETS APPLICATION OF TPS TYPE COOPERATIVE LEARNING MODELS

No	Meeting	Aspek				
		attention	cooperation	Masterial of material	Activity	responsible
1	Day 1				83%	
2	Day 2					83%
3	Day 3		83%			
4	Day 4	66%				
5	Day 5	83%				
6.	Day 6			66%		

Based on the results of data analysis obtained by Z count 2.20 with a comparison of Z tables at a critical value of 5%, it means that the confidence level of the results of data analysis is 95%. The meaning of the results of the analysis is that the success rate of the type of cooperative model *Think Pair Share* (TPS) on the learning outcomes of the concept of multiplication of mathematical numbers of mentally retarded children, the success rate reaches 95%, while the failure rate is only 5%.

The results of learning the concept of multiplication of children with mental retardation obtained by mentally retarded children by applying the cooperative learning model type *Think Pair Share* (TPS). As stated by [10] that cooperative learning refers to a variety of teaching methods where students work in small groups to help one another in learning subject matter. Whereas *Think Pair Share* (TPS) is an effective way to vary the atmosphere of class discussion patterns, as stated by [5].

Furthermore, in carrying out the treatment or *treatment*. The results obtained were that students experienced a very significant development in the aspect of collaboration in groups, which occurred in the *treatment* 3rd. While the *treatment* 1st of the prominent aspects was activeness, the *treatment* of the two prominent aspects was responsibility, the *treatment* 4th and 5 prominent aspects is attention, the *treatment* of the 6 prominent aspects is mastery of the material. The accumulation of student learning activities obtained results of 92.8 which states that the use of the type cooperative model *Think Pair Share* (TPS) on mathematics subjects in the concept of multiplication of numbers of mentally retarded children is very good.

IV. CONCLUSION

There is a significant influence on the cooperative model of the *think pair share* (TPS) type on the results of learning the concept of multiplication of math numbers of mentally retarded children in class III at Singojuruh Special School Banyuwangi. It is proven by the results of data analysis $Z_{count} = 2.20 < Z_{table} = 1.96$. Supported the value of *pretest* and *posttest*, before *treatment* with the acquisition of an average value of 47.5 and increased after being given *treatment* with an average gain of 92.5.

Based on the data analysis on the learning activity sheet of students carrying out *treatment* using the cooperative learning model *Think Pair Share* (TPS) type is very good from the aspects of attention, cooperation, material mastery, activity, and responsibility with an average percentage of 92.8%.

Suggestions for teachers, so that the implementation of the cooperative learning model *Think Pair Share* (TPS) type can be carried out well, so in its implementation it needs to be considered the characteristics of students. Characteristics of students need to be considered because to maximize the implementation of the cooperative learning model type *Think Pair Share* (TPS). So that efforts are needed to help student learning readiness, including: in group division, group and seating arrangements are intended to facilitate student learning activities while making it easier for students to achieve learning outcomes, because there are positive feedbacks between students who have high cognition and students who have low cognition, and the use of concrete and interesting media can add to the achievement of learning outcomes. The results of this study can be used as an alternative to teach the concept of multiplication of numbers using the TPS learning model, because by using this learning model provides opportunities for students to be more active in the learning process for mentally retarded students.

Suggestions for future researchers, this research can be used as a foothold of thinking to conduct related research and can be used as a reference as material for further research.

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