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Implementation Of Quantum Teaching Learning Viewed From Multiple Intelligences in Mathematics Learning

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Abstract

The purpose of this study is to know which gives better performance between using QTL and conventional models. The type of research used is quasi experimental research, where the respondents are grouped into two groups namely QTL and conventional groups. The population in this study is all students of class III SDN Pojoksari District Sukomoro Magetan. The sampling technique was done by stratified cluster random sampling. The independent variables in this study is the learning model and multiple intelligences, while the dependent variable is the achievement of learning mathematics. Data collection method used in this research is the method of documentation and test. Data analysis technique in this research are: 1) balance test: using t-test with normality test test with Lilliefors method and homogeneity test with Bartllet test, 2) hypothesis test: using t-test. All analyzes of this study used a significance level of 5%.
Keywords : QTL, Multiple Intelligence, Mathematics Education.

INTRODUCTION

Education is an attempt to develop the ability of individuals in anticipating the possibilities that are or will happen. Education is done in a planned, programmed, directed and sustainable as an effort to improve human resources in supporting the achievement of national development goals. Therefore, education must be able to maintain the culture and identity of the nation in the midst of incessant onslaught of diverse cultures. Because Indonesia is a country rich in culture and natural resources, Indonesia must be able to become an independent nation that can meet the needs of society in accordance with the goals and ideals of the nation.

The quality of national education is considered not to have adequate quality compared with the quality of education in other countries. This can be seen in the rank of Human Development Index (HDI) Indonesia ranked 111 out of 117 countries in 2004 and ranked 110 in 2005. Similarly, the International Educational Achievment (IEA) report shows that the reading ability of Primary School students, Indonesia is at Ranking 38 of 39 countries surveyed. While in the World Competitiveness Year Book report of 2000, Indonesia's human resources rank 46 out of 47 countries surveyed.

The government in this case the Ministry of National Education is always trying so that our education can develop in accordance with the demands of the times, while the community and family is a factor supporting the success or failure of the nation's next generation to advance the country. Judging from the explanation, the role of education is very important in determining the future of the nation. Education is a conscious effort to improve human resources.

In basic education, both Primary School / Madrasah Ibtidaiyah, education is done to provide the provision of science and skills to develop ways of thinking. One tool to develop students' thinking is through math. Because in learning mathematics students are required to develop the potential of thinking logically. Therefore, mathematics is necessary both in everyday life and in the face of the progress of the era. So that math needs to be provided to the students since elementary school, even since kindergarten.

But in reality mathematics learning achievement in Indonesia is still low. This can be seen in the survey through the 2003 International Forensic Student Assessment (PISA) program showing that from 41 countries surveyed for Indonesian mathematics field ranked 39th. The low mathematics learning achievement in Indonesia is also experienced by elementary school students in Magetan Regency. This can be seen from the results of interviews with one of the principals at SDN Pojoksari Kabupten Magetan which shows that during the learning process of mathematics students tend to crowded themselves, do not pay attention to teachers in front, until the effectiveness does not appear in the learning process. In addition to the problems that come from the students was also there are problems of educators, it is seen that at the time of learning process less effective teachers in using the model of learning, so less attention to students in following the lesson. The lessons that teachers use are only classical with lecture methods. Students can only listen and record material submitted by teachers without involving students directly, so students feel bored and tired in following the learning. This will reduce the level of students' understanding of the material being taught, thus affecting student achievement.

One of the causes of such problems is the inappropriateness of the learning models used during mathematics learning. Learning model used by teachers is very important in improving student achievement. In this case the presence of teachers in learning activities play an important role. Teachers should be able to develop the knowledge, understanding, and skills of students to be a provision in the face of all inequities that occur in society.

In addition, teachers should be able to choose a learning model that is fun in the learning process, because the model of learning the right and interesting to make the teaching and learning atmosphere to be comfortable, allowing each student to easily receive and absorb the subject matter correctly. Selected learning model is expected to develop and improve student achievement. There are several models of learning that can be used to improve student achievement in mathematics subjects. Such learning model is Quantum Teaching Learning model.

Learning model Quantum Teaching Learning is a fun learning model and includes all the dynamics that support the success of learning itself and all the interconnections, differences in interaction and aspects that can maximize the momentum to learn. The learning model of Quantum Teaching Learning can be viewed as an ideal learning model, because it emphasizes the cooperation between learners and teachers to achieve

common goals. Bobby Deporter, developed a learning strategy.

Quantum through the term TANDUR, namely Grow, Natural, Named, Demonstrate, Repeat and Celebrate. By using the right model of learning, it is expected to improve student achievement in mathematics subjects. In addition to learning in the classroom, it needs to be reviewed also on the multiple intelligences of students. The intelligence of each student also has an effect on student achievement in school. Intelligence can be interpreted as the overall ability of the individual to acquire knowledge, master it, and practice it in a problem. Gardner identified nine kinds of intelligences called multiple intelligences including linguistic intelligence, logical mathematical intelligence, musical intelligence, kinesthetic intelligence, spatial intelligence, interpersonal intelligence, intrapersonal intelligence, naturalistic intelligence and intelligence of existence.

In this study, among the nine multiple intelligences researchers take only three criteria of students' intelligence, namely linguistic intelligence, logical mathematical intelligence and spatial intelligence. Linguistic intelligence is a person's ability to use language both orally and in writing. While logical mathematical intelligence is the ability of students in processing a number. Furthermore, spatial intelligence is the ability of a person to visualize an image. Because in this study the authors take the subjects of mathematics on the material wake flat, the authors only take three types of intelligence students tailored to the material to be delivered.

METHODS

This research uses quasi experiment (quasi experiment). In this research design, the researcher uses factorial design design 2 x 3. The population in this research is all students of third grade SDN Pojoksari Sukomoro District Magetan. The sample used in this research is students of third grade SDN Pojoksari Sukomoro District Magetan with the number of 2 classes of class III SDN Pojoksari 1 with the number of 20 students and class III SDN Pojoksari 2 with the number of 17 students, the total sample of 37 students. The sampling technique in this research is cluster random sampling. The independent variable in this study is the learning model and multiple intelligences. The dependent variable in this research is students' achievement in Mathematics subject. Data collection techniques used in this research are: 1) documentation method, in the form of UAS 3rd grade odd semester of academic year 2015/2016, 2) test, in the form of 25 items of multiple choice on flat wake material, 3) questionnaire, 45 The questionnaire to find out the multiple intelligences in each student.

Data analysis technique in this research are: 1) balance test: using t test with prerequisite test of normality test with Liliefors method and homogeneity test with Barllet test, 2) hypothesis test: using anova two unequal cell path, 3) double comparison test with Using the Scheffe method. All analyzes in this study used a significance level of 5%.

RESULT

The prerequisite test performed by normality test and homogeneity test

shows that each treatment group comes from a population that is normally distributed and has the same variance. While t test conducted showed that both treatment groups have the same ability.

Furthermore, the hypothesis test of the research conducted by using anova of two different cell roads that previously conducted prerequisite test showed that the samples were from normal distributed population and had the same variance.

Table 1. Summary of Anava Two Cell Paths Not Equal

Source	JK	dk	RK	F_{obs}	F_α	Decision
Learning Model (A)	155,3	1	155,3	5,1	4,16	Ho rejected
Multiple Intelligence (B)	386,6	2	193,3	6,3	3,30	Ho rejected
Interaction (AB)	308,4	2	154,2	5,1	3,30	Ho rejected
Galat	949,1	31	30,6	-	-	-
Total	1799,4	36	-	-	-	-

From table 1, it can be concluded that: (1) $F_a = 5,0713 > F_\alpha = 4,16$, then H_{0A} rejected means learning model have an effect on student achievement, (2) $F_b = 6,3139 > F_\beta = 3,30$, Then H_{0B} rejected means that multiple intelligences affect student achievement, (3) $F_{ab} = 5,0372 > F_{\alpha\beta} = 3.30$, then H_{0AB} rejected means there is interaction between learning models and intelligence on student learning achievement.

Table 2. Summary of Advanced Interagree Test

H_0	F_{obs}	DK	P
$\mu_{1.} = \mu_{2.}$	4,6273	4,12	< 0,05

From table 2, it can be concluded that $F_{1-2} = 4.6273 > F_\alpha = 4.12$, then $\mu_1 = \mu_2$, means that the QTL learning model is better than the conventional learning model.

Table 3. Summary of Inter-Column Advanced Test

H_0	F_{obs}	DK	P
$\mu_{1.} = \mu_{2.}$	2,7394	6,60	> 0,05
$\mu_{1.} = \mu_{3.}$	8,2676	6,60	< 0,05
$\mu_{2.} = \mu_{3.}$	2,3279	6,60	> 0,05

From table 3, it can be concluded that: (1) $F_{1-2} = 2,7394 < F_\alpha = 6.60$, then $\mu_1 = \mu_2$, meaning that students who have logical mathematical intelligence have the same achievement with students who have linguistic intelligence, (2) $F_{1-3} = 8.2676 > F_\alpha = 6.60$, then $\mu_1 = \mu_2$, meaning that students who have logical mathematical intelligence have higher achievement than student achievement having spatial intelligence, (3) $F_{2-3} = 2,3279 < F_\alpha = 6.60$, then $\mu_1 = \mu_2$, meaning that students who have linguistic intelligence have the same achievement with the achievement of students who have spatial intelligence

Table 4. Summary of Advanced Intercellular Test on the Same Line

H_0	F_{obs}	DK	P
$\mu_{11.} = \mu_{12.}$	14,1148	12,6	< 0,05
$\mu_{11.} = \mu_{13.}$	8,3069	12,6	> 0,05
$\mu_{12.} = \mu_{13.}$	0,0663	12,6	> 0,05
$\mu_{21.} = \mu_{22.}$	2,0414	12,6	> 0,05
$\mu_{21.} = \mu_{23.}$	3,7116	12,6	> 0,05
$\mu_{22.} = \mu_{23.}$	7,6552	12,6	> 0,05

From table 4, it can be concluded that: (1) $F_{11-12} = 14,1148 > F_\alpha = 12.6$, then $\mu_{11} = \mu_{12}$, meaning that students who have logical mathematical intelligence and learn to use QTL learning models have better learning achievement than Students who have linguistic intelligence, (2) $F_{11-13} = 8.3069 < F_\alpha = 12.6$, then $\mu_{11} = \mu_{13}$, meaning that students who have spatial intelligence and learn to use QTL learning models have better learning achievement than students who have Logical mathematical intelligence, (3) $F_{12-13} = 0.0663 < F_\alpha = 12.6$, then $\mu_{12} = \mu_{13}$, meaning that students with spatial intelligence and learning using QTL learning models have better learning achievement than students with linguistic intelligence , (4) $F_{21-22} = 2.0414 < F_\alpha = 12.6$, then $\mu_{21} = \mu_{22}$, meaning that

students who have linguistic intelligence and learning using conventional learning models have better learning achievement than students who Has a logical mathematical intelligence, (5) F_{21-23} = 3.7116 <F_α = 12.6, then $\mu_{21} = \mu_{23}$, meaning that students who have spatial intelligence and learn to use conventional learning models have better learning achievement than students who have intelligence Logical mathematics, (6) F_{22-23} = 7,6552 <F_α = 12.6, then $\mu_{22} = \mu_{23}$, meaning that students who have spatial intelligence and learn to use conventional learning models have better learning achievement than students who have linguistic intelligence.

Table 5. Summary of Advanced Intercellular Test in the Same Column

H_0	F_{obs}	DK	P
$\mu_{11.} = \mu_{21.}$	14,6980	12,6	< 0,05
$\mu_{12.} = \mu_{22.}$	2,2747	12,6	> 0,05
$\mu_{13.} = \mu_{23.}$	3,3343	12,6	> 0,05

From table 4, it can be concluded that: (1) F_{11-21} = 14,6980> F_α = 12,6, then $\mu_{11} = \mu_{21}$ means students who have logical mathematical intelligence and learning with learning QTL learning model better than students Learning with conventional learning model, (2) F_{12-22} = 2,2747 <F_α = 12,6, then $\mu_{12} = \mu_{22}$, meaning that students who have linguistic intelligence and learning with conventional learning model of learning outcomes is better than the students who studied with (3) F_{13-23} = 3.3343 <F_α = 12.6, then $\mu_{13} = \mu_{23}$, meaning that students have spatial intelligence and learning with conventional learning model better learning outcomes than students who learn with QTL learning model.

DISCUSSION

In this discussion will be discussed about the results of research, research findings based on calculation and data processing. The data taken is the student's post test data. Students who are given a model of learning Quantum Teaching Learning and conventional learning models have different learning achievements. This can be seen from the average value obtained by the students. Students given Quantum Teaching Learning model have an average of 84.75 and Problem Based Learning model has an average of 80.56. From the average value obtained can be seen that the learning achievement of students who are given learning with learning model Quantum Teaching Learning is better than the model of learning Problem Based Learning. This is because the learning of Quantum Teaching Learning students will be easier and more focused attention to the material presented and try to understand it, so that learning goes active and effective. This is reinforced by research journals that have been tested by Trisnawati and Wutsqa (2015: 305) suggests that the learning model of Quantum Teaching is more effective than cooperative Learning type Teams Games Tournament (TGT) in learning mathematics.

There is a significant difference between the type of intelligence possessed by students to the achievement of learning Mathematics students class III SDN Pojoksari Magetan District. This is because students in the process of learning mathematics in flat waking materials are able to take advantage of the intelligence possessed by each student in understanding and answering the given problem. In logical mathematical intelligence, students have the advantage

in solving problems so that no difficulty in doing calculations in the matter. While in spatial intelligence students have the advantage in understanding and solving problems by imagining flat forms of wake and creating images that can help. Furthermore, in linguistic intelligence students are able to convey ideas of ideas related to the problems that are solved. From the data analyzed, it is found that students with logical mathematical intelligence type have the same achievement with students who have linguistic intelligence type. Students with logical mathematical intelligence type have higher achievement than students who have spatial intelligence type. Students with the type of linguistic intelligence have the same achievement with students who have spatial intelligence types. This study is reinforced by research journals that have been tested by Sholikhah (2014: 737) which states that students 'mathematical learning achievement with logical-mathematical intelligence is better than interpersonal and linguistic intelligence, whereas students' mathematics learning achievement with interpersonal intelligence is similar to linguistic intelligence. In the NHT learning model, students' mathematics learning achievement with mathematical-logical, interpersonal, and linguistic intelligence is the same. In the GI learning model, students' learning achievement with logical-mathematical intelligence is similar to interpersonal intelligence and better than linguistic intelligence, on the other hand student achievement with interpersonal intelligence similar to linguistic intelligence

Multiple intelligence gives influence to learning achievement that can be proved from data that have been analyzed. Of each type of intelligence that is owned by students will facilitate students in solving problems or problems given. Because each student has a different type of intelligence. Therefore, through the appropriate learning model will be able to give a positive influence on student learning activeness in achieving the desired learning achievement. Thus, the results of research conducted in accordance with real conditions in place of research, ie multiple intelligences provide a significant effect on student achievement. This study is reinforced by research journals that have been tested by Pradana (2014: 1037) which states that students with language, logical-mathematical, interpersonal, and spatial intelligence types have similar achievements. In each learning model, students' mathematics learning achievement with language, logical-mathematical, interpersonal, and spatial intelligence is equally good.

From some tables described above, it turns out there is an interaction between the learning model and multiple intelligences. Learning model is a means of learning support, and multiple intelligences are factors that affect learning outcomes. In each model of learning used and reviewed from the multiple intelligences of students give effect to the learning achievement obtained. Students with logical mathematical intelligence are able to utilize their intelligence in computing, students with spatial intelligence able to construct images that can help them in solving problems, while students with linguistic intelligence are able to express ideas or ideas both orally and in writing. This is what causes student achievement

is obtained equally well. In addition, the achievement of learning obtained by students is also influenced by the model of learning given to students during learning

CONCLUSIONS

Based on the results of research and analysis of data that has been dadap, it can be concluded that: 1) The use of QTL learning model is better than conventional model of learning achievement Mathematics class III SDN Pojoksari Magetan District, 2) Achievement learning Mathematics class III SDN Pojoksari Magetan with Logical mathematical intelligence type has the same achievement with students who have the type of linguistic intelligence. Students with logical mathematical intelligence type have higher achievement than students who have spatial intelligence type. Students with the type of linguistic intelligence have the same achievement with students who have spatial intelligence type, 3) In the learning model Quantum Teaching Learning (QTL) students with spatial intelligence type better than logical and linguistic mathematics, while students with logical mathematical intelligence type better Rather than linguistics. In the conventional learning model students with spatial intelligence type are better than logical and linguistic mathematical intelligence, while students with linguistic intelligence types are better than logical mathematics, 4) In each multiple intelligence, the conventional learning model is more effective than the QTL learning model of achievement Learning Mathematics students of class III SDN Pojoksari Magetan Regency.

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