

# The Enhancement of Learning Mathematic's Motivation by Using Application of Quantum Learning Model Teaching

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## ABSTRACT

This study aims to describe the effectiveness of Quantum Teaching learning model on mathematics learning in terms of aspects of student learning motivation. The type of experiment in this study was quasi experimental research (quasi alphabets experiment) and experimental design that used up was one-Group Pretest-Posttest. The population in this research was the whole grade VIII of SMP Muhammadiyah 1 Yogyakarta, which was grade VIII-D as sample. The independent variable in this study was a model of Quantum Learning Teaching and the dependent variable in this study was the student motivation mathematic's learning. The instrument used was the student learning motivation questionnaire. To test the effectiveness of Quantum Learning Teaching model, the data were analyzed by using one sample t-test. The results showed that the model of Quantum Learning Teaching effective motivational aspects of learning math.

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## 1. INTRODUCTION.

Learning is the process of the development of human life. Learning is an active process in the construction of knowledge (Fitriana, 2019; Yuliami *et al*, 2019). The statement looked at learning as a process of understanding new information in the form of preparation of knowledge continuously through concrete experiences interpretation by construct based on knowledge before. In learning activities, teacher, student, subject matter, and the learning environment largely determine the success to achieve learning objectives (Rahayu, 2018).

In addition to paying attention to the problems in terms of cognitive, teachers should also pay attention to the problems in terms of psychological or affective in the learning process. In fact, not a few students who have problems in terms of psychological or affective one is the low learning motivation of students. Affective aspects of learning motivation is supporting the success of the process of learning, especially learning mathematics (Pratiwi, 2019; Kurniawan, 2018). Students who have learning motivation will feel happy to learn these subjects so that it can be expected to achieve optimal outcomes. Research conducted by the Syahrir (2011:156) showed that student learning motivation that still need to be improved. According to Sardiman (2012:75) learning's motivation is a non-intellectual psychic factor that has typical to passion increment, good feeling, and passion for learning. A strong motivation in students will increase interest, willingness and passion in learning, because between the motivation and spirit of learning have close links. This is in line with the opinion Begle, E.G.

(1978:88) which states that "more than half the studies relate to mathematics achievement motivation". More than half of many studies linking between achievement motivation of learning mathematics. Sardiman (2012:86) says that the existence of good motivation in learning will show good results too. The intensity of student motivation will determine the level of their learning achievement. In learning activities, motivation will give and assure learning activities, so that the desired goals by the subject of the study it can be achieved. Motivation is very important in learning, students being diligent in the learning process learning outcomes can be realized as well.

Regulation of the Minister of Education and Culture Number 65 of 2013 (replacement for the Regulation of the Minister of National Education Number 41 of 2007) about The Standards of Primary and Secondary Education Process mentions that:

The learning process in educational units is organized by interactive, inspiring, fun, challenging, motivating learners to participate actively, as well as to provide enough space for creative thinking ability, initiative, and independence in accordance with their talents, interests, and physical and psychological development of learners. For this reason, each education unit conducts learning planning, implements the learning process and evaluates the learning process to improve the efficiency and effectiveness of graduate competency achievement.

Referring to the regulation, the teacher as a facilitator should be able to devise active learning, innovative, creative and fun so that it will appear in the motivation of students to be more interested in following the instruction. Not only that, it will also affect the learning achievements of students. One part in designing the learning is through the use of appropriate learning model in the process of teaching and learning. The selected learning models are expected to develop and enhance the achievement of learning and motivation to learn. There are several learning models that are supposed to be used to achieve these goals including the Quantum Teaching model.

According to Deporter, Readon, &Nouri (2001:5), Quantum means the interactions that change the energy into light. On the model of Quantum, teaching geared to the learning process of teachers in the classroom, confront the students learning, plan, and evaluate. The pattern of Teaching embodied in the concept of TANDUR,i.e.Tanamkan (Conduct), Alami (Sense), Namai (Givingname), Demonstrasikan (Demonstrated), Ulangi (Repeat), and Rayakan (Celebrate). While learning is the concept for the learner to be able to absorb the facts, concepts, procedures, and principles of a science with a quick, fun, and memorable.Learning pattern embodied in the concept of AMBAK i.e. ApaManfaatnyaBagiku (What does usefulness for me?). Thus Quantum Teaching is learning that transforms diverse interactions that exist in and around the moment of learning. These interactions include elements for effective learning that affects the success of students. And also, interactions has changing the natural skills and talents students become the light that will be beneficial to themselves and to others.

DePorter (2009:12) suggests that quantum learning with students could change all the chance to become a process of learning and make it a successful experience of passing students simply think about it, get ready for it, and responsible. The concept of Quantum Teaching success is applied at the Super Camp, the courses that built by de Porter. Doing a research for doctoral dissertation in 1991, involving approximately 6,042 respondents.From that research, Super Camp succeeded in boosting students' psychic potential. Among others, increased motivation 80%, learning value 73%, increased self-esteem 84% and continued use of skills 98% (Deporter, 2001:4).

Through Quantum Teaching model,students will be invited to study in a more comfortable and pleasant, so that students will be more free to find a variety of new experiences in education (DePoter, 2001:7). This is supported by research Kusno & Joko (2011:3) who suggested that model quantum teaching learning effectively in terms of achievement and learning motivation of students.

## 2. RESEARCH METHOD

Research methods that used in this research is an experimental method. Experimental methods is used to test the effectiveness of a model, approach, technique, or medium of instruction so that it can be used as a reference for applied or whether the models, approaches, techniques, or the learning media in the activities of the actual teaching and learning. Type of experiment in this study was quasi experimental research (*quasi alphabets experiment*). Quasi experiment was chosen because not all variables that appear and experimental conditions can be arranged and are strictly controlled (full randomize) by researchers. While the experimental design used up one-Group Pretest-Posttest-. In this test did not use a control group. This design was done by comparing the results of a pretest and posttest on groups tested. In a schematic, design

research used in this study are expressed in the diagram in Figure 3 as follows:



Description:

- O1 : pretest (in the form of the initial question form)
- X : Treatment (Quantum Learning Teaching)
- O2 : posttest (in the form of the now late)

The population of the research was the whole grade VIII Muhammadiyah 1 Yogyakarta Junior High School, which consists of 7 classes. By selecting from the entire seventh grade studentsrandomly, students from two classes that became a research sample. For the sample of this research is grade VIIIIdby usingquantum learning model of teaching. There are two kinds ofvariables, model of Quantum Learning Teaching as independent variables and the motivation of learning mathematics students as dependent variables.

The instrument used was non-test instruments, namely motivation to learnquestionnaire. This questionnaire wasused to measure studentslearning motivation towards learning math. The learning motivation form was checklist-shaped and includes statements of studentsmotivationmathematics's learning. Learning motivation scale model used in this study was the Lichert scale that consists of 4 value: strongly agree, agree, disagree, and strongly disagree. Scoring values for positive items namely score four for strongly agree, score three to score two to agree, disagree, and score one for the strongly disagree. Scoring for a negative item for strongly agree, score two to agree, score three to disagree, and score four to strongly disagree. Now the motivation of learning students are given before and after the treatment. As for the question form latticelearning motivation of students in table 1.

**Table 1.** Learning Motivation of Students Questionnaire Lattice

No.	Component	Indicator	Number Item		Total
			positive	Negative	
1	Needs	Demonstrate the needs of learning mathematics	12, 13	16	3
		Happy and diligent study, energetically, challenged with tasks that varied.	14, 22	17, 20, 30	5
		Glad to find and resolve the problem.	18, 19	21	3
2	Try	Always tries to make the best possible	7, 25, 27	23, 28	5
		Happy working independently	8, 24	9	3
		The pursuit of long-term goals	26	29	2
3	diligent	Diligent task facing	5	2	2
		The Resilient facing difficulties	3, 4	1, 6	4
		Wishing to deepen their knowledge of the field/materials given.	11, 15	10	3
Total item of statement					30

The data obtained by using instrument that classified in the criteria based on the raw score. Scoring for the question form of motivation studied mathematics in this research have the range from 30 up to 120. To determine the criteria for the measurement results of the classification used is determined by the average ideal (Mi) and the standard deviation is ideal (SDI). As for the calculation of the value of MI and SDI is as follows:

$$Mi = (120 + 30) / 2 = 75$$

$$SDI = (120 - 30) / 6 = 15$$

with the criteria of student learning motivation as in table 2.

**Table 2.** The Criteria of Student Learning Motivation

Interval	Score (X)	Criteria
$Mi + 1,5SDI < X \leq Mi + 3SDI$	$97,5 < X \leq 120$	Very Good
$Mi + 0,5SDI < X \leq Mi + 1,5 SDI$	$82,5 < X \leq 97,5$	Good
$Mi - 0,5 SDI < X \leq Mi + 0,5SDI$	$67,5 < X \leq 82,5$	Good enough
$Mi - 1,5SDI < X \leq Mi - 0,5SDI$	$52,5 < X \leq 67,5$	Less good
$Mi - 3SDI \leq X \leq Mi - 1,5SDI$	$30 \leq X \leq 52,5$	Very unfavourable

(Azwar, 2013: 163).

The effectiveness criteria of the learning model used in this study is an average score of at least 85 students motivation to learn. As for the hypothesis that is used to test the effectiveness of this is as follows

Ho : 84,99 (Quantum Teaching model is ineffective motivational aspects of learning).

Ha : 84,99 (Quantum Teaching model is effective motivational aspects of learning).

After determining by using one sample t-test with SPSS 16 to see the effectiveness of Quantum learning model of Teaching Learning motivation in learning mathematics. The formula as follows:

$$t = \frac{\bar{x} - \mu_0}{\frac{S}{\sqrt{n}}}$$

(Tatsuoka, 1971: 77)

Description:

$\bar{x}$  = the average value obtained

$\mu_0$  = value the hypothesized

$S$  = sample standard deviation are calculated

$n$  = sample size

The criteria is done H0 is rejected if the value smaller than 0.05 significance.

### 3. RESULTS AND DISCUSSION

#### 3.1 Data on Student Learning Motivation

The students learning motivation can be described and drawn conclusions based on the specified category. Learning motivation data aims to find out the influence of the treatment of the learning motivation of students. In summary, the learning motivation in Teaching Quantum groups are presented in table 3.

**Table 3.** The average value, maximum value, minimum value, standard deviation, and variance Learning Motivation of students in Learning QT. (n=34)

Description	The Group QT	
	The beginning	The End
Average	75	93,41
Theoretical maximum score	120	120
Theoretical minimum score	30	30
Maximum score	97	107
Minimum score	56	83
Standard Deviation	8,06	7,00
Variance	64,96	49,00

Categorisation of learning motivation of students in the class of experimental QT before and after carried out research can be seen in table 4

**Table 4.** Categorization of student learning Motivation on the QT Classes

Interval	Category	Pretest		Posttest	
		frequency	%	frequency	%
$97,5 < X \leq 120$	Very high	0	0	11	32,35
$82,5 < X \leq 97,5$	High	6	17,65	23	67,65
$67,5 < X \leq 82,5$	Adequate	23	67,65	0	0
$52,5 < X \leq 67,5$	Poor	5	14,70	0	0
$30 \leq X \leq 52,5$	Very poor	0	0	0	0

Table 4 shows that most students or 67.65% have the motivation of learning by categories adequate, 14.70% of students have low learning motivation category, and 17.65% of students have the high motivation of category. After the research was carried out, the data obtained in experimental classrooms learning motivation QT. These data show that most students or 67.65% had high learning motivation category and 32.35% in very high category. The data also showed there was not student who has the motivation of learning by categories quite, low or very low.

#### 3.2 Effectiveness of The Quantum Teaching (QT) Learning Model

After the calculation is performed using the SPSS 16.0 against QT class learning motivation data, obtained a value of t as in table 5.

**Table 5.** The results of a test of One Sample t-test Class QT

Aspects	t	Sig.
Learning Motivation	7,013	0,000

Based on Table 5 above, obtained that the significance t-value smaller than 0.05. That is, H0 is rejected, or in other words, the model learning QT effective motivational aspects of learning students.

## Analysis

In accordance with the expectations of related government regulations about education, innovation in the field of learning included in the learning of mathematics in secondary schools is indeed urgently needed. Innovation in teaching and learning one is innovation that could be done by the teacher in the implementation of a model of learning. However, the absence of a model of learning that there is no guarantee the success and effective to apply to every subject. Therefore it needs to be done in the form of experimental trials.

Prior to doing experiments using Quantum Teaching learning model, research carried out the validation test instrument, motivation for learning students validated by two college professors who are considered experts in the field. Then conducted tests of the real instruments to see valid and reliability of instruments in the empirical. Learning motivation instruments tested in grade VIII F Muhammadiyah 1 Yogyakarta Junior High School that consist of 74 students.

The learning motivation of class VIII students of Muhammadiyah 1 Yogyakarta Junior High School before learning was conducted using the Quantum Teaching learning model was not maximal. In addition, teachers tend to be more dominating the implementation of learning in the classroom. As a result students become quickly bored, saturated, inactive and not skilled when the learning process takes place. The effects of low student learning motivation causing math student learning achievement is low also.

As already described in the section on testing the hypothesis that the value of information, obtained one sample t-test for the hypothesis of Quantum learning model of Teaching effectiveness in terms of student learning motivation aspects of 7.013 with significance of 0.000. Or in other words, Quantum Teaching effective learning model in terms of student learning motivation aspects. This is in line with the study of the theory of the Quantum learning model reveals that the teaching is expected to effectively review of aspects of the attitude of the students towards the learning of mathematics. This is because the students on learning model of Quantum Teaching, students were given apperception and motivation. Apperception and motivation aim to foster students' interest in taking lessons. Learning with the Quantum Teaching model links subject matter with its use in the real world. So they know what are the benefits of what they are learning. In addition, students are also directly involved, starting from the beginning of learning to the end of learning accompanied by instrumental music so that learning is expected to take place pleasant and not monotonous. At the end of learning, students are invited to celebrate the success of learning by giving praise to the best group and yelling together. This matter hopefully strengthen the success of students and enhance learning motivation of students. This hypothesis test results later in line with research conducted by Kusno & Joko (2011:67) who reveals that effective Teaching Quantum learning model in terms of student learning motivation aspects. With the results of this research are expected to be able to add references research that Quantum learning model of Teaching it is true effective motivational aspects of learning students.

## 4. CONCLUSION

Based on the results of data analysis and discussion, then concluded that:

1. After the process of the research carried out, most of the students or 67.65% have the motivation of learning math with

the categories high, 32.35% have the motivation of learning mathematics by category is very high, and there was not a student have the motivation of learning math with enough categories, low or very low.

2. Quantum Teaching Learning Model giving effective motivational aspects to student for learning math.

## Implications

Based on the above conclusions, the research indicates the following implications:

1. Theoretically quantum teaching learning becomes an alternative learning model that can be used to improve student learning motivation, where the results of this study are in line with the theoretical study, namely quantum teaching is effective in student learning motivation.
2. To achieve the optimal result of the learning motivation of students, can apply the Quantum Learning Teaching.

## Recommendation

1. It is recommended to teachers to use quantum learning model teaching in learning mathematics.
2. It is recommended to other researchers in order to expand the material used in the study, thus allowing broader generalizations.

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