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Application of Quantum Learning Models to Increase Student Motivation and Learning Outcomes

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Abstract – The learning atmosphere greatly influences the teaching and learning process in the classroom. therefore, the figure of teacher is needed to transform conventional learning models into more enjoyable learning models. One effective and fun learning model is Quantum Learning. The purpose of this study was to determine the increase in student motivation and learning outcomes with the Quantum Learning model. The location of this research is at SMAN 2 Gunungputri. This study uses a quasi-experimental design. The study sample consisted of two classes with a sample of 60 people. The control class applies the conventional learning model while the experimental class applies the Quantum Learning model. The research instruments were learning outcomes and motivational questionnaires. The results of the study found that student learning outcomes using the Quantum Learning Model increased by 0.49. Modification of the learning technique through various learning methods is needed to explore the potential of students.

Keywords – Quantum Learning model , Learning Motivation, Learning Outcomes.

I. INTRODUCTION

Minister of Education and Culture Regulation No. 22/2016 emphasizes that the learning process in an education unit is carried out interactive, inspirative, fun, challenging and motivating students. Based on these regulations students are expected to actively participate, in initiatives, creativity, and independence in accordance with their talents, interests, and physical and psychological development. To get education as mentioned before, the conditions and situations in the learning process should create a pleasant atmosphere. A pleasant atmosphere can stimulate students to be motivated in learning well in class [1].

One of fun learning model is the Quantum Learning Model. Quantum Learning is tips, instructions, strategies, and the entire learning process that can sharpen understanding and memory, and make learning activities as a fun and useful process [2]. In the steps of learning there is also a celebration that is giving an award (reward) for student learning efforts that aim to increase student confidence and build student motivation. This is in line with the opinion that there are several forms and ways to foster motivation in learning such as giving rewards so students are more enthusiastic in learning, conveying learning outcomes that encourage students to be more active in learning, and giving appropriate praise to foster pleasant atmosphere, heightens the passion for learning and arouses self-esteem [3].

The Quantum Learning learning model for the first time in Supercamp activities in California, United States of America (USA). In Supercamp the teacher combines self-confidence, teaching skills, and communication skills of students in a pleasant environment. Supercamp activities have succeeded in increasing motivation by 68% and increasing learning outcomes by 73% [4].

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Research related to the Quantum Learning Model was proposed by carrying out twice daily tests in class X5 students resulting in an increase in student learning outcomes with an increase in learning outcomes of 2.8% in the cognitive aspects of 77.24% in cycle I to 80.05% in cycle II on a scale of 100%. The Quantum Learning model can also increase learning motivation. This can be proven from research conducted in class X5 students of SMAN 1 Purwoharjo with the ARCS (Attention Relevance Confidence Satisfaction) questionnaire data collection method to find out student motivation which results in increased learning motivation in the attention aspect of 1.19. In the aspect of relevance increased by 0.33, in the aspect of confidence increased by 0.64, and in the aspect of satisfaction increased by 0.95. This means that there is an increase in motivation in applying the Quantum Learning Model in the experimental class [5].

The results of interviews with students in SMA Negeri 2 Gunungputri, students assume that the teaching and learning process in class is not fun. This is due to the teacher teaching in one direction and monotonous so that students are easily bored and sleepy. The learning model used by the teacher also uses conventional methods where the teacher only explains the material in the book and does not provide an opportunity for students to take notes and conduct discussions, both discussions with the teacher and fellow students in class. In addition to students, interviews were conducted with the teacher. Teachers assume that it is very difficult to change the conventional learning model to a more enjoyable learning model.

The results of observations made in class, found that learning outcomes obtained by students are not optimal. This can be seen from the results of daily tests of students on the subject matter of Elasticity and Hooke's Law has an average score of 72.3. For these results, the KKM (Minimum completeness Criteria) did not reach the SMPN 2 Gunungputri for physics subjects. So, it was concluded that the teaching and learning process at SMAN 2 Gunungputri was still too monotonous, students felt unhappy learning physics in class, the teacher also found it difficult to change the conventional learning model. Therefore, we need a fun learning model, so the teaching and learning process in class can run well.

From the results of research conducted by previous researchers, the results of observations, and interviews conducted at SMAN 2 Gunungputri, it is expected that the existence of a Quantum Learning Model implemented at SMAN 2 Gunungputri can increase motivation and student learning outcomes**.**

II. METHODS

This research was conducted at SMAN 2 Gunung Putri, Bogor. This research was conducted in January to July 2018. This study uses class X MIPA 3 and X MIPA 4 to be used as samples. Class X MIPA 3 as a control class totaling 30 students and class X MIPA 4 as an experimental class by implementing a Quantum Learning Model with a total of 30 students.

This study uses a quasi experimental design that is unable to provide full control. The research design was a pretest and a posttest with a control group to see the effect of increased motivation and learning outcomes in both classes [6]. The test of learning outcomes in this study was in the form of 30 multiple choice questions. The learning achievement test is divided into two namely pretest and posttest which consists of five alternative choices on the learning material of momentum and impulse.

The questionnaire used in this study is a closed questionnaire in the form of a rating scale, which is a questionnaire containing statements followed by answers that indicate levels, so students can directly choose one of the available answers**.**

III. RESULTS AND DISCUSSION

The results of the interpretation of the control class motivation criteria are:

Table 1. Interpretation of Control Motivation for Classroom Control

Indicator	Beginning	Category	End	Category
Curiosity	96,2	Enough	94,8	Enough
Confidence in success	93,8	Enough	93,0	Enough
Attitude	89,6	Enough	99,6	Enough
Needs	105,8	Enough	108,6	Enough
Competition	114,2	Enough	108,6	Enough
Teaching method	91,6	Enough	96,3	Enough
Appreciation	121,0	High	121,0	High

Table 2. Interpretation of Control Motivation for Experimental Classroom

Indikator	Beginning	Category	End	Category
Curiosity	94,6	Enough	112,5	Enough
Confidence in success	94,2	Enough	105,8	Enough
Attitude	98,4	Enough	112,0	Enough
Needs	104,8	Enough	117,2	High
Competition	106,2	Enough	112,2	Enough
Teaching method	88,3	Low	109,3	Enough
Appreciation	120,0	High	131	High

In applying the Quantum Learning Model there are celebration steps that signify class success in the teaching and learning process and give awards to the best students. Therefore, if reviewed further, the control class does not have an improvement on this indicator. This means that the conventional model does not affect student motivation. In the other indicators there was no change in the criteria, but when examined deeper, each indicator increased. This might be due to some statements on the questionnaire that are unable to describe the indicator. The results of the study are in line with the research conducted by Arifin, Sudarti and Lesmono [7] and Zeybek [8] which states that the Quantum Learning Model can improve student learning outcomes.

Pretest results are preliminary data obtained by researchers. pretest data obtained class X MIPA 3 as a control class and X MIPA 4 as an experimental class on physics learning material momentum and impulses are:

Table 3. Pretest Result

Description	Control Class	Experimentation Class
Maximum Score	45	45
Minimum Score	15	5
Mean	30,67	24
Median	30	25
Modus	30	20
Standard Deviation	8,68	10,29

Posttest data results obtained, after given a different learning model treatment between the experimental class and the control class are in the following table:

Table 4. Postest Result

Description	Control Class	Experimentation Class
Maximum Score	70	85
Minimum Score	15	40
Mean	54,33	61,67
Median	55	60
Modus	50	50
Standard Deviation	11,87	11,16

From the description of the control and experimental class data, the experimental class has a lower pretest score than the control class. Based on this the initial ability of the experimental class is lower than the control class. Then there was an increase in the control class learning outcomes of 23.66. In the experimental class there was an increase in learning outcomes by 37.67. The experimental class has a greater average increase than the control class, the difference in the increase is 13.01.

From the posttest conducted, it was found that the experimental class had a higher value than the control class. These results are in line with previous studies [9], [10]. Through the information above, the use of the Quantum Learning Model in the momentum and impulse subject matter is correct. The teaching and learning process in the experimental class focuses on learning activities for students with a pleasant atmosphere, so that makes it easier for students to understand and interpret the material presented.

By using Quantum Learning Model, students also directly demonstrate the material being studied, so that students memories of the material can last longer. Besides that, it is accompanied by Mozzart or Baroque music which influences the physiological conditions of students so that students can concentrate fully [11], [12]. Therefore, it can be concluded that the application of the Quantum Learning Model can improve student learning outcomes.

In applying this learning model, the teacher must prepare all the school devices properly. This model requires the teacher to be able to master the school equipment especially the RPP, so that in applying the model a pleasant atmosphere is built, because the teacher is not confused or clumsy which will interfere with the learning process of students. Students are familiar with the conventional learning process so that in applying this model, especially at the stage of applying the demonstration, students will be noisy and hyperactive. Therefore, the teacher must be firm and be able to conducive the class again.

Gain test is used to determine the increase in student motivation. Based on the learning motivation values of the two classes, it can be seen the average value of normalized gain in the following table :

Table 5. Learning Motivation Gain Test Results for the Control Class and Experiment Class

Class	N	Gain	Classification
Control	30	0,05	Low
Experiment	30	0,26	Low

Based on Table 5, it can be seen that the control class with conventional learning models obtained a gain value of 0.05 with low interpretation. While in the experimental class with the Quantum Learning Model, a score of 0.26 was obtained with a low interpretation. The difference in the value of the control class and experimental gain is quite large at 0.21. This proves that the Quantum Learning Model can increase student motivation. This learning model emphasizes that everything that happens in the learning process has a purpose. So, however detailed what happens in applying this model will definitely affect the atmosphere of learning in the classroom. This has led to a pleasant learning atmosphere so that it can increase learning motivation.

The gain value of students' learning motivation in the experimental class is almost close to medium classification. If in school research is able to provide longer time in the learning process in class, the results of student motivation will be higher.

Gain test is used to determine the increase in student learning outcomes. Based on the pretest and posttest values of the two groups, it can be seen the average value of normalized gain in the following table:

Table 6. Learning Motivation Gain Test Results for the Control Class and Experiment Class

Class	N	Gain	Classification
Control	30	0,33	Medium
Experiment	30	0,49	Medium

Based on Table 6 above, the experimental class gain value is 0.49. While the control class obtained a gain value of 0.33. The gain value of these two classes is medium because it ranges between values 0.31 - 0.70. However, when viewed deeper, the experimental class gain value is higher than the control class gain value, this shows that the Quantum Learning Model is more effective in improving student learning outcomes. Quantum Learning Model in the application process there is a demonstration so students actively carry out learning activities. Students read, find out, do work, draw conclusions, and present themselves so that learning material is more useful and students remember it longer. So the student learning outcomes of the experimental class are higher than the control class.

IV. CONCLUSION

Learning model development needs to be done to improve student learning outcomes. There are various learning models that can be applied, one of which is the Quantum Learning Model. Through this research it is known that, Quantum Learning Model can increase student motivation in class X MIPA 4 by 0.26. There is a significant influence of the use of the Quantum Learning Model on student learning outcomes with an increase in learning outcomes in class X MIPA 4 by 0.49. The application of the Quantum Learning model can increase motivation and learning outcomes of students of class X MIPA 4 SMAN 2 Gunungputri for the material of momentum and impulses. Modification of the learning technique through various learning methods is needed to explore the potential of students.

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