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The Effect of Quantum Learning Using Card Media on Physics Learning Outcomes

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ABSTRACT

This study aims to determine and prove that there is an influence of the Quantum Learning learning model using card media on physics learning outcomes. This research was carried out at SMAN 11 Bekasi in class X MIPA students in the odd semester of 2019/2020. In this study, researchers used a quantitative approach with an experimental method. The population used in this study amounted to 34 students. The sampling technique used is purposive sampling. The results of the study were obtained from the results of the pretest and posttest. After the data is normally distributed and homogeneous based on normality and homogeneity tests, it is continued with hypothesis testing using t-test. The calculation results obtained value L_{count} 0,0629, and homogeneity test calculation results $\chi^2_{count} < \chi^2$table (14,56 < 33,70). T-test hypothesis testing was obtained (21.14> 1.69; 21.14> 2.45). This states that H_0 was rejected. Thus, the results of this study concluded that there is an influence of Quantum Learning using card media on physics learning outcomes.

Keywords: Learning Outcomes, Media, Quantum Learning

INTRODUCTION

Education is an important requirement for human life to be able to develop and live life. Therefore education must be truly directed to produce superior people so that the future produced is more directed, quality, and able to compete. To improve the quality of education, it is necessary to increase the learning process. Where the learning process itself is the core of the school education process [1].

The Learning Process Engineering can be designed by the teacher in such away. Ideally, the learning approach for smart students should be different from the activities of moderate or less capable students (although to understand the same material), because students have their uniqueness in learning. This shows that the teacher's understanding of approaches, models, strategies, methods, and learning techniques cannot be ignored [2].

Teachers are required not to force students to follow the teaching style, but vice versa. The teacher can properly use a variety of ways of teaching, so that each student both male and female feels cared for, valued, involved and can be the most important part of the learning process [3].

Based on observations and interviews conducted by researchers that when physics students learn less enthusiastic and uncomfortable in participating in learning, it is impressed that learning is still one-way (passive) which causes boredom and an active atmosphere that does not support in class. So that it affects the learning outcomes produced by students.

To attract the attention of students, teachers should innovate in the learning process so that it attracts attention. Quantum Learning provides the opportunity for students to relate all interactions and differences in maximizing learning moments, thus providing interesting experiences for students. This learning emphasizes students to foster interest in learning, experience first hand the learning provided, name, repeat learning, and celebrate learning outcomes. According to DePorter,

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interpreting Quantum learning is creating lively learning with all its nuances [4].

To create interesting learning, a learning model is needed that can process information and instill an active attitude in learning that aims to improve maximum learning outcomes in each student. With a model that can bring the active involvement of all students in learning which includes verbal, mathematical, graphic, and picture thinking skills as well as arousing curiosity in solving physics problems that are relevant to everyday life without overriding the nature of physics learning [5].

Quantum learning is a new learning method that uses a methodology based on educational theories into a multisensory, multi-intelligence package and is compatible with how the brain works that can increase the ability and speed of learning [6]. This learning model is a strategy, tips, instructions, for the whole learning process that can improve understanding and memory and make learning activities fun and useful [7].

The implementation of quantum learning does not only pay attention to internal factors from within the students but also all external factors of the learning environment that also affect the learning processes and outcomes of students. Quantum Learning also conceptualizes "organizing the stage: the right learning environment". Structuring a pleasant learning environment aimed at students with an effort to maintain a positive attitude [8]. To provide maximum results, the researchers applied this quantum learning model by combining learning media in the form of a card that will be used to train students to be more active, creative, and innovative with their respective learning styles.

Knowing learning styles can help students to prepare and develop a learning environment so that individuals can improve their learning. Because each individual prefers to study, work, or concentrate in different ways, and the ability to absorb information increases when individuals think, work, or concentrate in favorable conditions [9]. The use of media in the learning process is equally important in achieving teaching and learning success. The integration of learning models with a media is nothing but to achieve the successful learning of students in terms of understanding, concepts, and applications [10].

The media is an intermediary for transferring information from the teacher to students in the learning process. Therefore, in this case, the media will not escape the whole learning process. The main role of the media in learning is its ability to create students' interest in reading. The use of media in learning integrated with learning models will make effective learning media. Through the media, knowledge can be conveyed quickly and effectively [11].

The use of instructional media should be one that must be considered by the teacher in every learning process. All activities carried out in the learning process must involve the activeness of all students and students' thinking power to be able to solve problems. Involving students in the learning process helps students understand the material easier.

Card media used in this study is the result of student creativity, where students are the center of learning. Students are given the freedom to vary to make cards in any form such as cards containing questions, main maps, or pictures according to the ability of each student to make it easier to understand learning.

Appropriate and varied media will lead to students' enthusiasm for learning and allow the interaction of students with teachers, so students can maximize learning achievement [12]. Students not only receive material from the teacher, but students also try to explore and develop themselves. Learning outcomes not only produce values but can increase knowledge and concepts of physics [13].

Learning outcomes are abilities possessed by students after he has received his learning

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experience [14]. Children's intellectual intelligence is determined by cognitive development. Cognitive development in question is the ability to regulate cognitive skills in responding to a problem [15].

RESEARCH METHODS

The approach used in this research is quantitative. The method used is an experimental method to look for the effect of the treatment given by researchers to conditions that are controlled by the form of one group pretest-posttest design. Design this research can be seen in table 1 :

Table 1. *One Group Pretest Posttest Design*

Group	Pretest	Treatment	Posttest
1	O1	X	O2

This study uses 34 sample students from class XI MIPA 5 SMAN 11 Bekasi. Data collection techniques in this study were obtained from tests given to students, the sample of questions given by the teaching material vector during the treatment took place and was held 2 times in the beginning and at the end. The treatment stages are pretest, treatment, and posttest. The instrument test grid is based on cognitive aspects at the C3, C4, and C5 levels.

Testing the validity of the instrument using the Biserial product-moment correlation technique, while testing the reliability of the instrument using alpha crownbach. Tests are made in the form of essays that have been adjusted to the indicator. The sampling technique used in this study was purposive sampling. This research was conducted through the analysis prerequisite test (normality test, homogeneity test) to the final stage, namely the hypothesis test.

RESULT AND DISCUSSION

The results that researchers get from research conducted at SMAN 11 Bekasi in class X MIPA 5 in the form of pretest and posttest results data that has been processed by researchers. And the students' work in making learning card media. From the results of observations made after researchers give treatment, it seems that students are more enthusiastic about the material provided because, in the learning process, participants are given the freedom to choose their learning styles (auditory, visual, kinesthetic). Also, the application of learning using quantum learning methods conducted in groups or individually makes students better understand the material helped by the media they have made.

In addition to improving learning outcomes effectively, cognitive and psychomotor, the application of quantum learning can also improve understanding and memory because in the learning process students are always brought in a happy state with the characteristics of each learning. The success of this study can also be seen from the improvement in student learning outcomes at each meeting.

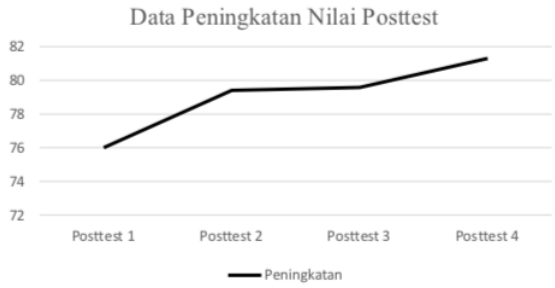

Figure 1. Graphs of data increasing posttest scores after being treated using the Quantum Learning method with card media

From the resulting graph, it can be seen that the value of the per-cycle regression of posttest 1,2,3, and 4 is the causal effect of the variables X and Y, namely the quantum learning method and card media. So it can be concluded that the two variables have a relationship because of an increase in student outcomes even though the value of the increase is not too large.

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Then for the prerequisite test data obtained after processing the normality test from the posttest value using estimated error errors with a significant level $\alpha = 0.05$

Table 2. Normality test results data

A	n	L_{hitung}	L_{tabel}	Criteria
0,05	34	0,0629	0,152	Normal

L_{count} values = 0.0629 and L_{table} = 0.152 with a significant level $\alpha = 0.05$ and the number of samples (n) as many as 34 students. So it can be concluded that the value of L_{count} = 0.0629 < L_{table} = 0.152 which means the data is normally distributed. Homogeneity test uses the Bartlett test with the data in the table below :

Table 3. Data on Homogeneity Test Results

A	n	X^2_h	X^2_t	Criteria
0,05	34	14,56	33,70	Homogen

From the calculations obtained results χ^2_{count} = 14,56 and χ^2_{table} = 33,70. With a significant level of $\alpha = 0.05$ and the number of samples (n) were 34 students. So it can be concluded that χ^2_{count} = 14,56 < χ^2_{table} = 33,70 ; it can be concluded that the data obtained came from a homogeneous population. The last data test performed was the Hypothesis test data with the results of the data in the following table

Table 4. Hypothesis Test Results Data

n	t_{hitung}	t_{tabel}	Keputusan	Kriteria
34	2,29	1,69	Very Significance	H_O rejected
		2,45	Significance	H_O accepted

The results of calculations from the pretest and posttest data obtained t_{count} = 2.29 with the number of respondents 34 students with a significant level $\alpha = 0.05$, t_{table} = 1.69 and a significant level $\alpha = 0.01$, t_{table} = 2.45. So it can be concluded that (2.29> 1.69; 2.29 <2.45), then H_0 is rejected at $\alpha = 0.05$ with a very significant decision stating that there is an influence of the Quantum Learning method using card media on physics learning outcomes.

CONCLUSION

Based on the discussion of the results of research on the effect of Quantum Learning Learning using card media on physics learning outcomes, it can be concluded that in this study, using the Quantum Learning learning model student learning outcomes increase. become more active and creative students in participating in the physics learning process using the media cards used by students.

From the results of the hypothesis test on the calculation results from the pretest and posttest data obtained t_{count} = 2.29 with the number of respondents 34 students with a significant level $\alpha = 0.05$, t_{table} = 1.69, and significant level $\alpha = 0.01$, t_{table} = 2, 45. So it can be concluded that (2.29 > 1.69; 2.29 < 2.45), then H_0 is rejected which states that there is an influence of learning Quantum Learning using card media on the results learn the physics of students. Therefore, learning using Quantum Learning media is successfully implemented well because this method is in accordance with the conditions of students and school conditions.

Based on the information above, we can conclude that the use of media influences students' motivation and interest in learning physics which increases each posttest given by the teacher. The use of media also results

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in a learning environment that is felt to be quite comfortable and enjoyable for students. In addition to an increase in the results of the posttest, the students' skills also increased which resulted in students being more creative, as evidenced by the results of the interesting cards that have been made by students.

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