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The Effect of The Quantum Learning Model on Student Learning Outcomes

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Abstract

This research aims to analyze the effect of the Quantum Learning model on student learning outcomes in economics subjects. This research was motivated by the many students in class XI IPS at SMA Negeri 3 Purwokerto who obtained daily test scores below the Minimum Completeness Criteria (KKM) in economics subjects. The research method used is a Quasi-Experimental Design that uses an experimental and control class. This study's population was all class XI IPS students at SMA Negeri 3 Purwokerto. The number of samples in this study was 71 respondents who were students of class XI IPS 3 and 4. The sampling technique used was the purposive sampling technique. Based on the data analysis that has been done, the Quantum Learning Model has a positive effect on student learning outcomes in economics class XI IPS at SMA Negeri 3 Purwokerto. The implication of the conclusions above is that teachers and schools are advised to optimize learning by creating comfort, fun, and opportunities for students to be active in learning. The efforts that can be made are applying the Quantum Learning model because the Quantum Learning model has been proven to be able to improve student learning outcomes.

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INTRODUCTION

Education is a human need to expand knowledge in forming values, attitudes, and behavior. Education is also a means to increase and maximize the potential of the younger generation so that they have intelligence, the ability to control themselves, and the skills needed as provisions for living the life of the nation and state. Sultan and Hajerina (2020) argue that education plays an essential role in the progress of a nation by improving the quality of human resources. Without education, human life will not develop and will be backward. Therefore, education is a necessity as long as humans live.

Education is closely related to the learning process, teaching, and learning activities. Law Number 20 of 2003 concerning the National Education System states that learning is an interactive process between students and educators and learning resources from a learning environment. As an interaction, of course, a good learning process occurs in two directions so that it is not only dominated by the teacher. Still, it accompanies students' activeness in discovering and managing their knowledge (Wote et al., 2020).

One indicator that can be used to measure the effectiveness and success of learning is learning outcomes. Learning outcomes are abilities that students acquire after receiving their learning experiences. Sufianti (2022), in her research, suggested that learning outcomes can be used to determine the extent to which students can understand the material taught by the teacher. Furthermore, Suliyanah (2021) means that learning outcomes can be used to see student success in the learning process. However, the problem that is often encountered in learning is the low learning outcomes of students, which can be seen both from the results of daily tests, midterm tests, and final semester tests.

Nurlina (2021) suggests that learning outcomes are strongly influenced by various factors, both within the students and outside. Internal factors or those that come from students can include physical conditions, intelligence, interest factors, or motivation. At the same time, external factors or factors that come from the outside environment can consist of curriculum, subjects, teachers, media, methods, or learning models. So, it can be concluded that the factors that influence learning outcomes are not only internal factors but also external factors that play a role in influencing student learning outcomes. Thus, the ability of a teacher to manage learning appropriately has an essential role in obtaining maximum learning outcomes for students (Rustam et al., 2022).

The effort required by the teacher to improve student learning outcomes is to apply a learning model. The learning model is a structured framework that can be used as a guide to support the learning process (Berlian et al., 2022). According to Anggara and Rakimahwati (2021), the learning model is a whole series of material presentations carried out by educators and includes all aspects of learning and all facilities, whether used directly or indirectly in the learning process. Selection of a suitable learning model can create a fun learning atmosphere and increase students' creativity. In addition, a pleasant learning atmosphere can increase learning motivation and discipline. It can encourage students to achieve the best learning results (Ningsih et al., 2021). Mahendra (2022), in his research, explained that improving the quality of education can start with choosing a suitable learning model. Conversely, inaccuracies in the selection of learning models can result in low motivation and student learning outcomes.

Based on the explanation above, it can be interpreted that the learning model is essential in helping teachers improve student learning outcomes. One of the learning models that can be chosen is Quantum Learning. Quantum Learning is a learning model implemented in many countries and has received much expert praise. Razali (2021) in his research suggests that Quantum Learning can be interpreted as a learning strategy and process that can sharpen students' understanding and

memory and create a fun and valuable learning process. Hasriyanti dan Kobi (2022) that Quantum Learning significantly contributes to creating an enjoyable learning process. Mahendra (2022) explains that Quantum Learning can make learning fun and help students get maximum results. Furthermore, Masruroh et al. (2022) explain that Quantum Learning is a fun and effective learning process to make it easier for students to understand the material and be active in learning. Thus, students will be interested and motivated to learn from beginning to end (Praheto & Sayekti, 2021). This statement follows the principle of suggestopedia, which explains that suggestions can and certainly affect learning outcomes, and every detail in learning will provide positive or negative directions.

DePorter et al. (2002) argue that Quantum Learning refers to the principle of bringing the world of students to the world of teachers and the world of teachers to the world of students. This principle shows that the Quantum Learning model offers material that students must learn and teaches how to create good emotional relationships in learning. In practice, the teacher must first apply this principle to build an authentic bridge into students' lives by associating the material with something that exists in the students' environment. After this connection is created, the teacher can bring students to enter the world of the teacher and provide the teacher with an understanding of the subject matter (Sholihah, 2021). The principles of Quantum Learning include: (1) Everything Speaks; (2) Everything Has A Purpose; (3) Experience before Giving a Name; (4) Acknowledge Every Effort; and (5) If It Is Worth Learning, It Is Worth Celebrating. The five have influential roles in all aspects of Quantum Learning (DePorter et al., 2002).

In its application, the Quantum Learning model has six learning steps which are reflected in the term TANDUR, namely T (Grow), A (Experience), N (Name), D (Demonstrate), U (Repeat), and R (Celebrate) (DePorter et al., 2002). To encourage student activity and understanding in learning, the application of TANDUR in Quantum Learning needs to pay attention to several things, namely: (a) AMBAK's strengths (what are the benefits for me); (b) Structuring the Learning Environment; (c) Cultivating a Champion Attitude; (d) Freeing Student Learning Styles; (e) Getting used to taking notes; (f) Getting used to Reading; (g) Making Children More Creative; and (h) Training Children's Memory Power (DePorter & Hernacki, 2015). In addition, background music is also needed to create a learning environment that supports and can affect the physiological conditions of students because musical accompaniment can help students to be calmer and concentrate on learning. It can make it easier for students to receive subject matter (Sholihah, 2021). The various things above show that everything attempted in the process aims to create positive suggestions that can encourage brain power in achieving success in learning. Fadhilah (2022) argues that Quantum Learning does not only offer material to students; more than that, students are taught how to create positive emotional relationships while learning. Thus, Quantum Learning is a set of learning philosophies that combines positive guidance and the interaction of students with their environment to create fun learning, so this model focuses not only on what material will be taught but also on why and how to learn.

Based on the preliminary study's initial data, many students in class XI IPS at SMA Negeri 3 Purwokerto obtain daily test scores for economics subjects under the Minimum Completeness Criteria (KKM), which are below 70 (seventy) and are declared not complete. As a result, the learning mastery of each class has not been achieved, which is below 85%, which is the classical completeness criterion mentioned by the Ministry of Education and Culture (Trianto, 2011). Table 1 is the data for obtaining daily test scores for the economics subject for Basic Competency (KD) 1 from students of class XI IPS at SMA Negeri 3 Purwokerto.

Table 1. Economics Subject Daily Deuteronomy Values

Class	UH Participants	KKM	Complete		Not Completed	
			Amount	%	Amount	%
XI IPS 1	35	70	28	80	7	20
XI IPS 2	32	70	25	79	7	21
XI IPS 3	33	70	22	67	11	33
XI IPS 4	36	70	25	70	11	30
XI IPS 5	35	70	13	37	22	63
Amount	171		113	66	58	34

Source: Processed Data, 2022

In addition, the preliminary study shows a phenomenon that occurs where teachers teach without utilizing a learning model. So learning tends to be carried out conventionally by the lecture method, where the teacher is more dominant in the learning process. Of course, this is not following the Student-Centered Learning (SCL) approach, which positions the teacher as a facilitator in the learning process. As a result, learning economics tends to be boring for students. This problem can be proven from the observational data, which shows that 20% or eight students in the class are sleepy or talking to their friends outside the learning topic. Not only that, but the lack of use of learning models also impacts the low activity of students in the learning process, as evidenced by observational data, which shows that the number of active students is only around 17% or seven people. This phenomenon is in accordance with the opinion of Fadhilah (2022) that learning is carried out using the lecture method, which causes students to feel bored and sleepy quickly. Also, teacher-centered learning can result in students experiencing difficulties understanding the material being studied. Thus, it can be concluded that conventional learning with the teacher's lecture method tends to be boring and does not stimulate students' activeness in the learning process.

Based on the explanation above, teachers' lack of use of learning models is thought to be an aspect that influences the low learning outcomes in the daily tests of economics subjects obtained by students of class XI IPS at SMA Negeri 3 Purwokerto. So, one of the efforts that can be made to overcome this problem is to utilize learning models, especially the Quantum Learning learning model, because the Quantum Learning Model has several aspects that follow the characteristics of economic subjects.

The characteristics of economic subjects are: (1) economic subjects are identical to phenomena or symptoms that occur in everyday life. This statement by the opinion expressed by Prahara et al. (2016) that economic learning is dynamic and related to everyday life. However, the weakness of economics lessons is that they are full of theory, so discussion is needed on economics lessons that are commonly encountered and experienced by students in everyday life. This characteristic is according to the Quantum Learning learning model, which links subject matter to everything that exists in everyday life to build authentic bridges that connect teachers and students; (2) economic subjects are closely related to mathematics or calculations. Perkasa (2020), in his research, explains that economics is a compulsory subject that requires students to have a good mastery of mathematics. Furthermore, in their research, Rahayu et al. (2013) proved that mathematics and economics are interconnected. Nonetheless, previous rese-

arch from Rahmawati et al. (2020) and Syahmawati (2020) shows that students struggle to learn economics, especially in calculations. Syahmawati (2020), in her research, suggests that one of the reasons is that the learning model teachers use is less attractive to students. If this is related to learning mathematics, Siregar et al. (2021), in their research, suggest that a quality mathematics learning process is a learning process that takes place in a fun way, which by the Quantum Learning learning model, which seeks to create fun learning. Thus, the Quantum Learning learning model is expected to be a solution for economics learning at SMA Negeri 3 Purwokerto.

This study differs from previous studies conducted by Surnadi et al. (2019), whose research is a true-experimental design with a pretest-posttest control group design model, while this research is a quasi-experimental design study with a non-equivalent control group design model. The advice for further research is to compare the effectiveness of the Quantum Learning model with other learning models, such as Discovery Learning, Blended Learning, and Problem-Based Learning.

Based on the elaboration in the previous paragraphs, it is necessary to study the effect of the Quantum Learning Model on Student Learning Outcomes in Economics Subject Class XI IPS at SMA Negeri 3 Purwokerto.

METHODS

The type of research used is experimental research. Sugiyono (2018) in his book explains that experimental research is a research method used to find the effect of a treatment on an object under controlled conditions. Experimental research itself has several forms of design that can be used. Sugiyono (2018) in his book states that there are four forms of experimental design. Among them are: Pre-Experimental Design, True Experimental Design, Factorial Design, and Quasi-Experimental Design. In this study, the experimental design chosen by the researchers was Quasi-Experimental Design.

The quasi-experimental design has two forms: Time-Series Design and Non-equivalent Control Group Design. In this study, the design form used is the Non-Equivalent Control Group Design. Sugiyono (2018) explained that the design of this study was almost the same as the Pretest-Posttest Control Group Design. It's just that the sample that will be used as the experimental and control classes is not chosen randomly but according to the characteristics determined by the researcher. The experimental class is the class that will be given treatment. At the same time, the control class is a class that is not given treatment. Before entering the learning stage, both classes will be given a pretest to determine the student's initial abilities. Then, the experimental class will be taught with a predetermined treatment, namely the Quantum Learning learning model. While the control class was not given treatment, namely using conventional learning models. After going through the learning process, both classes will be given a post-test to assess their development before and after going through the learning process.

This research will be conducted at SMA Negeri 3 Purwokerto in the odd semesters of the 2022/2023 school year. The population in this study were students of class XI IPS at SMA Negeri 3 Purwokerto, which consisted of five classes, along with their presentations.

Table 2. Number of Students

No	Class	Amount
1	XI IPS 1	36
2	XI IPS 2	36
3	XI IPS 3	35
4	XI IPS 4	36
5	XI IPS 5	36
	Total	179

Source: SMA Negeri 3 Purwokerto, 2022

Table 3. Completeness Data for Studying Economics Subject Materials

Class	Average Value	KKM	Number of Students	Mastery Learning (%)
XI IPS 1	80.85	70	36	80
XI IPS 2	81.30	70	36	79
XI IPS 3	77.50	70	35	67
XI IPS 4	75.80	70	36	70
XI IPS 5	62.55	70	36	37

Source: SMA Negeri 3 Purwokerto, 2022

The sampling technique used in this research is purposive sampling. Sugiyono (2018) explains that purposive sampling is a sampling technique carried out by researchers with certain considerations. Besides that, Suliyanto (2018) in his book explains that Purposive Sampling is a sampling technique based on certain criteria. As for the criteria determined by the researcher, namely: (1) Classes that receive economics subjects; (2) Classes with similar majors, namely Social Sciences; (3) Classes with almost the same average scores; (4) Classes with supporting teachers who the same; (5) Classes with almost the same number of students.

Based on the Table 3, the samples selected in this study are class XI IPS 3 and XI IPS 4. The two classes have almost the same average score, which is a difference of 1.7. In addition, the two classes have nearly the same number of students, namely the difference of 1 student. Then, the experimental and control classes will be determined through a lottery where the first class that leaves will be selected as the experimental class, and the next class that goes will be chosen as the control class.

Primary data sources in this study are the pretest and post-test results. At the same time, secondary data sources in this study are official school documents, such as the amount of student data and learning outcomes. Data collection techniques used in this study were (1) multiple choice test questions; (2) documentation; and (3) observation. The data analysis techniques in this study include the Instrument Prerequisite Test consisting of a Content Validity Test, Reliability Test, Difficulty Level, and Discriminating Power. Then, it continued with the Research Data Test, which consists of the Normality Test, Homogeneity Test, and Difference Test.

RESULTS AND DISCUSSION

The Quantum Learning Model positively affects Student Learning Outcomes in Economics Class XI IPS at SMA Negeri 3 Purwokerto

The normality test is needed to determine whether the test score data between the control and experimental classes are normally distributed. The normality test used in this study is the Chi-Square test (X2) with a significance level of 5% or 0.05. Based on the Table 4, it can be seen that the calculated Chi Squared in the experimental class is 10.6 while the Chi-Squared table is 12.6. So that H0 can be accepted because the practical course has a calculated Chi-Square (10.6) ≤ Chi-Square table (12.6). In addition, the table above shows that the calculated Chi-Square in the control class is 9.71 while the Chi-Square table is 12.6. So that H0 can be accepted because the control class has a calculated Chi-Square (9.71) ≤ Chi-Square table (12.6). Based on the results of the normality test that has been carried out, it can be interpreted that the test score data for the experimental and control classes come from customarily distributed samples.

Table 4. Results of Normality Test Analysis

	Experiment Class	Control Class
Chi-Square Cal.	10.5859	9.7099
Chi-Square Table	12.5916	12.5916
Information	H_0 accepted H_1 rejected	H_0 accepted. H_1 rejected

Source: Processed Data, 2022

A homogeneity test is needed to test whether the experimental and control classes' data are homogeneous. The category used in this study is if the significance value is > 0.05, then the data is declared to have the same or homogeneous variance. Based on the Table 5, it can be seen that the Based on Mean significance value is 0.061. Thus, the data is included in the category of homogeneous data due to a significant deal of 0.061 > 0.05.

The statistical test is needed to determine a treatment's effect or prove the proposed hypothesis. The statistical tests in this study used the t-test as an independent sample test. Based on the Table 6, which is the result of the independent sample test, it can be seen that the calculated t value is 2.401 with the df value at 69, so the t table is 1.667. Thus, t count at 2.401 > t table at 1.667 with a significance value of 0.02 <0.05.

After carrying out learning with different models, where the experimental class uses the Quantum Learning learning model and the control class uses the conventional learning model with the lecture method, it can be seen that the post-test results of the two classes have a difference of 8.28 where the experimental class gets a score of 81.31. The control class got a score of 73.03, proving that the abilities possessed by the experimental class are higher when compared to the control class.

Based on the research results that have been obtained, it can be seen that using the Quantum Learning model positively influences student learning outcomes in the experimental class. This result is evident from the value of t count with the number 2.401> t table with the number 1.667 at a significance level of 0.05. In addition, the Quantum Learning influence model is proven by the average value

Table 5. Homogeneity Test Results

Test of Homogeneity of Variance					
		Levene Statistic	df1	df2	Sig.
Learning Outcomes	Based on Mean	3.624	1	69	.061
	Based on Median	2.563	1	69	.114
	Based on the Median and with adjusted df	2.563	1	64.889	.114
	Based on trimmed mean	3.443	1	69	.068

Source: Processed Data, 2022

Table 6. Independent Sample Test Results

Independent Sample Test				
		t	df	Sig.
Learning Outcomes	Equal variances assumed	2.401	69	.019
	Equal variances not assumed	2.410	64.933	.019

Source: Processed Data, 2022

Table 7. Group Statistic

Group Statistics					
	Class	N	Mean	Std. Deviation	Std. Error Mean
Learning Outcomes	Experimental Post-Test	35	81.31	12.333	2.085
	Post-Test Control	36	73.03	16.405	2.734

Source: Processed Data, 2022

of the experimental class, which reaches 81.31 with classical completeness at 88%, which exceeds the exception of classical mastery from the Ministry of Education and Culture.

The application of Quantum Learning to the experimental class according to the steps described by DePorter et al. (2002). These steps are known as TANDUR, which includes Grow, Experience, Name, Show, Repeat, and Celebrate. At the Grow stage, the teacher builds students' curiosity by explaining the benefits students will experience at the end of learning. For example, students will understand why Indonesia does not print money for free and distribute the money to the people for free. Thus, the attention and understanding of students in the experimental class are higher when compared to students in the control class. So, this follows the theory explained by DePorter & Hernacki (2015) that students' curiosity can be built by providing perceptions about the benefits received after participating in the learning process.

Furthermore, in the Experience stage, students are asked to review the reasons for the price increase and discuss articles about the Indonesian government's efforts to overcome COVID-19. This activity aims to strengthen the relationship between the material being studied and the events experienced by students in everyday life. In the process, students fought each other for opportunities when asked questions about price increases and efforts to prevent COVID-19 from being carried out by the Indonesian government. So, this follows the theory described by DePorter et al. (2002) that at the natural stage, a teacher needs to bring in general experiences that students can understand by asking students to observe and analyze a problem.

At the Name stage, the teacher explains monetary and fiscal policy material to students using visual media such as power points and audio-visual media in learning videos. At this stage, the concentration and attention of students in the experimental class are better than in the control class. This situation can occur because the teacher allocates more time in the experimental class to build students' curiosity about the study material. Thus, the process at this stage is assessed according to the theory described by DePorter et al. (2002) that the naming stage is the stage where the teacher begins to provide various keywords, concepts, models, or strategies in concretizing the abstract concepts that have been conveyed in the previous stage.

Then at the Demonstration stage, the teacher provides opportunities for students and their peers to apply their knowledge to different problem contexts by differentiating and explaining types of monetary and fiscal policies based on a list of problems provided by the teacher. Similar to the natural stage, at this stage, students are fighting for each other's opportunities to answer and provide explanations for each question. Therefore, this stage is carried out following the opinion of Zeybek (2017), who explains that the demonstration stage provides an opportunity for students to receive information, combine it with other information, and apply it in different situations.

At the Repeat stage, the teacher tests and repeats students' knowledge by playing Snowball Throwing on monetary policy material and playing Quizizz on fiscal policy mate-

rial. At this stage, the learning process is active and fun. Even the teacher found it difficult to stop the process of throwing paper balls in the Snowball Throwing game. Therefore, this stage works according to the theory from DePorter et al. (2002), which explains that teachers can invite students to repeat the concept of material that has been taught by using other learning variations so that it can help students to understand the concepts being studied clearly.

Finally, at the Celebrate stage, the teacher and all students applaud the students' success in understanding the material studied. Celebrating by clapping together is a practice that aligns with the opinion of Zeybek (2017), which states that celebrations can be carried out by clapping, singing, or dancing together.

Apart from the TANDUR stages described in the paragraph above, this research also seeks to utilize background music to increase students' comfort and concentration during learning, especially during the discussion process. Sholihah (2021) explained that musical accompaniment can help students concentrate on learning. However, in practice, students are uncomfortable when accompanied by instrumental background music. Students feel more comfortable if the teacher plays music following current trends. However, playing music like that encourages students to go through the learning process while singing, which can distract other students. In the end, after going through various considerations, the Author chooses not to use background music during the learning process for the convenience of students, following the principle of suggestology, which explains that suggestions can and certainly influence student learning outcomes. Every detail in learning will give positive or negative suggestions (DePorter and Hernacki, 2015) (DePorter & Hernacki, 2015). So, students' discomfort when accompanied by background music is a negative suggestion that needs to be removed in the learning process.

Various stages in Quantum Learning significantly provide comfort and opportunities for students to explore knowledge and actively contribute to learning in a fun way. This opinion aligns with Sholihah's (2021) statement in his book, which explains that Quantum Learning is a learning model that provides broad, comfortable, and enjoyable opportunities for students to contribute to the learning process actively. Thus, students will be interested and motivated to learn from the beginning to the end of learning (Praheto & Sayekti, 2021).

The results of this study follow research conducted by Sakdiah & Gultom (2017) that using the Quantum Learning learning model positively affects student learning outcomes at Kemala Bhayangkara 2 Rantauprapat Private High School. In addition, according to research conducted by Rosmini et al. (2018), the study's results stated that the Quantum Learning learning model positively affected the physics learning outcomes of class X students at SMA Negeri 2 Maumere. Thus, the results reject previous research by Ningthias et al. (2018). This rejection is because the results of this study state that the LKS-assisted Quantum Learning model does not significantly affect the learning outcomes of class XI students at SMA Negeri 2 Mataram.

CONCLUSION

Based on the research results and data analysis, it can be concluded that the Quantum Learning model positively affects student learning outcomes in economics class XI IPS at SMA Negeri 3 Purwokerto. This conclusion can be seen from the average grades and classical completeness obtained by the experimental class after receiving learning using the Quantum Learning model.

Based on the research results that have been obtained, the researcher needs to convey the following implications: (1) Teachers are advised to be able to optimize the implementation of learning by creating a comfortable and enjoyable learning atmosphere, as well as providing opportunities for students to contribute to the learning process actively. One

of the efforts that the teacher can make is to apply the Quantum Learning model so that learning can run pleasantly and students can be motivated until the end of learning. (2) The school needs to train teachers regarding using the Quantum Learning model in the learning process because the Quantum Learning model can provide comfort and opportunities for students to explore knowledge and contribute actively to learning in a fun way. In addition, the Quantum Learning model is proven to improve student learning outcomes and the classical mastery of a class compared to conventional learning models.

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