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The Effect of the Quantum Teaching Model on Student Learning Outcomes in IPAS Subjects in Grade IV of SDN 155712 Tumba Jae 2

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ABSTRACT

The research aims to analyze the effect of the Quantum Teaching model. The results show that the average learning outcome of IPAS in grade IV is 82.13, which is categorized as good. Of the 30 students studied, 24 students (84%) met the Minimum Passing Criteria (KKTP), while 4 students (16%) did not meet the KKTP. This study is a quantitative study that aims to determine the effect of the Quantum Teaching model on student learning outcomes in IPAS in grade IV at SD Negeri 155712 Tumba Jae 2. The population was all 30 students in grade IV. The sample was taken based on the total sampling technique, namely 30 students. Student learning outcomes showed that the average pre-test score for fourth-grade students was 54.8, while the post-test score was 82.13. The results of this study indicate that the learning outcomes of IPAS students using the Quantum Teaching learning model are in the strong category with a correlation coefficient of 0.902, which means that rcount 0,902 ≥ rtable 0.36), so Ha is accepted. Furthermore, hypothesis testing shows that tcount is 11.077, while ttable is 2.048, proving that the hypothesis is greater than ttable, so Ho is rejected and Ha is accepted. Thus, it can be concluded that the Quantum Teaching model (X) has a positive and significant effect on learning outcomes (Y). This indicates that the Quantum Teaching learning model has an effect on students' IPAS learning outcomes. Thus, all questionnaire instruments in this study are declared reliable and trustworthy, as they have met the minimum requirements specified.

Keywords*: *quantum teaching, learning outcomes

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INTRODUCTION

The ever-advancing and evolving times have brought about many changes in human life. One of these changes has had a major impact on education. Education has become one of the determining factors in creating quality human resources. The function of education is to develop abilities and shape the character and dignity of the nation in order to enlighten the life of the nation. Education also aims to develop the potential of students to become people who believe in and fear God Almighty, have noble character, are healthy, capable, knowledgeable, creative, independent, and become democratic and responsible citizens. This is evident in the IPAS subject, where students still receive unsatisfactory scores below average due to 1) the lack of student involvement in the learning process, which causes students to often feel bored in the learning process 2) The methods often used in teaching are lectures, assignments, and student-centered question and answer sessions. 3) Students are not involved enough in the learning process, which often leads to boredom.

The learning provided is not varied, so there is no innovation to support learning activities. For example, in learning, no learning media or games are used in learning. Students are immediately given

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practice questions, even though they do not yet understand how to solve these questions with their knowledge of science. Sobandi (2019: 14) states that the Quantum Teaching Learning Model is a learning process that provides background and strategies to improve learning and make the process more enjoyable. This procedure provides a teaching style that empowers students to achieve more. It also helps teachers improve their teaching skills and motivate students to study harder, so that teachers ultimately derive greater satisfaction from their work.

To improve the effectiveness of the TGT model implementation, learning media that is appropriate for children is needed. Learning media that involves play, such as using magic bags, is one example. These games are not only visually appealing, but they can also foster a fun learning atmosphere and encourage active student participation. Furthermore, according to Istirani and Intan Pulungan (2023:271), a learning model is: a plan or pattern that we can use to design face-to-face classroom activities or additional learning outside the classroom and to compile learning materials and create a conducive classroom situation and atmosphere so as to motivate students and make it easier for them to understand the material being taught. Based on this description, this study aims to examine the effect of the Quantum Teaching model on student learning outcomes in IPAS in grade IV at SD Negeri 155712 Tumba Jae 2. It is hoped that the results of this study can contribute theoretically and practically to efforts to improve the quality of IPAS learning at the elementary school level through the application of active, collaborative, and enjoyable learning strategies.

METHOD

This study used a quantitative approach with an experimental method and a One Group Pretest-Posttest Design to determine the effect of the Quantum Teaching model on student learning outcomes in IPAS subjects in Grade IV of SD Negeri 155712 Tumba Jae 2 with a sample of 30 Grade IV students. The research instruments consisted of learning outcome tests in the form of pre-tests and post-tests to measure students' understanding improvement, questionnaires to determine students' responses to learning, observation sheets to record activities during the learning process, and documentation as supporting data. All instruments underwent validity and reliability tests before use. The data were analyzed quantitatively by calculating the average score and the percentage of mastery, followed by a normality test using the Liliefors test. A sample t-test was used to test the hypothesis to determine whether there was a significant difference in learning outcomes before and after the treatment. The mastery criteria in this study were determined based on the KKTP score.

RESULTS AND DISCUSSION

School Data Description

This study was conducted in grade IV of SD Negeri 155712 Tumba Jae 2. This study was conducted to determine the extent of the influence of the Quantum Teaching model on student learning outcomes in IPAS subjects in grade IV of SD Negeri 155712 Tumba Jae 2, which has facilities that support a fairly complete teaching and learning process. The school has one principal's office, one teacher's room, two school bathrooms consisting of one teacher's bathroom and one student bathroom, six classrooms/student learning rooms, and a library.

This research is an experimental study with a one-group pretest-posttest design involving one class. Data collection was conducted using test questions and questionnaires. Before collecting data on the research sample, the first step taken by the researcher was to conduct a trial test at another school, namely SD Negeri 153042 PO Manduamas, which consisted of 30 students. Of the 40 questions, 25 were declared valid, and of the 40 questionnaires, 20 were valid. After obtaining valid results, the questions were then distributed to respondents at the research school, namely SD Negeri 155712 Tumba Jae 2, grade IV, with 30 students.

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Class IV Post-test Results

In the final stage of the learning process, all material was delivered using the Quantum Teaching learning model. After implementing this model, the researcher conducted a posttest to evaluate the effectiveness of the measures that had been taken. The data from the posttest of fourth-grade students is presented in the following table.

Table 1. Class IV Post-test Results

Number	Name	Score	Description
1	Angeliana putri siregar	96	Highly Developed
2	Ariando jeremia pasaribu	80	Highly Developed
3	Andini maharany ginting	84	Highly Developed
4	Ayu cantika buaton	76	Developing
5	Bintang sihotang	80	Highly Developed
6	Citra lestari sembiring	88	Highly Developed
7	Dhevi yonafa purba	84	Highly Developed
8	Ella leriskisari situmorang	76	Developing
9	Elvindo saputra munte	80	Highly Developed
10	Elden sijabat	84	Highly Developed
11	Fernanda siregar	84	Highly Developed
12	Hotmarito sihotang	92	Highly Developed
13	Hotni sari tumanggor	76	Developing
14	Intisarima sembiring	88	Highly Developed
15	Kesia merlinda manalu	84	Highly Developed
16	Nanda juliper simanullang	88	Highly Developed
17	Natanael febrianto situmorang	84	Highly Developed
18	Nazwa aulia denata sihotang	80	Highly Developed
19	Natalia siregar	72	Developing
20	Olga castelo sihite	68	Developing
21	Olifia simatupang	88	Highly Developed
22	Patrik simatupang	84	Highly Developed
23	Pinka tarigan	80	Highly Developed
24	Randi tumpal hendric purba	76	Developing
25	Saldo ND harahap	80	Highly Developed
26	Sonia angraini simbolon	80	Highly Developed
27	Sari naya hasugian	84	Highly Developed
28	Tirsa intan	80	Highly Developed
29	Wira ancjelit epal ginting	88	Highly Developed
30	Yuliana wulandari barutu	80	Highly Developed
	Total: 2464		
	Average: 82,13		
	Max : 96		
	Min : 68		

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From the table above, it can be seen that the learning outcomes of students in understanding the material on Natural Resources and Conservation show an average post-test score for fourth-grade students of 82.13. Since this score is above the minimum passing score of 80, it can be concluded that 24 students achieved the category of highly developed and 6 students achieved the category of needs improvement. For further clarification, the post-test results of fourth-grade students can be seen in the following summary frequency table:

Table 2. Distribusi Frekuensi Data Post-Test

X	F	FX	$X=X-\bar{X}$	X^2	FX^2
68	1	68	-14,13	199,6569	199,6569
72	1	72	-10,13	102,6169	102,6169
76	4	304	-6,13	37,5769	150,3076
80	9	720	-2,13	4,5369	40,8321
84	8	672	1,87	3,4969	27,9752
88	5	440	5,87	34,4569	172,2845
92	1	92	9,87	97,4169	97,4169
96	1	96	13,87	192,3769	192,3769
Σ	30	2464	-1,04	672,1352	983,467

The post-test frequency distribution results above show that the mean value is 82.13, the standard deviation is 9.66, and the standard error is 1.79. The post-test frequency results can be illustrated in the following diagram:

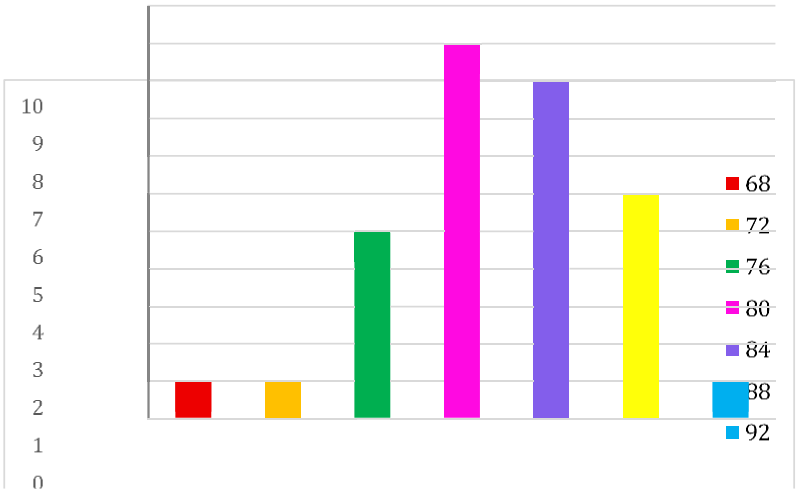

Figure 1. Post-Test Frequency Results

Based on the diagram above, which is a frequency distribution diagram of the post-test scores for grade IV, the highest score was 96 and the lowest score was 68. The post-test results above show that by using the quantum teaching learning model, the students' scores increased. The average score was 82.13, while the average pre-test score was 54.8. The diagram below shows the following.

Correlation Coefficient Test

The correlation coefficient test was conducted to determine whether there was an influence between the independent variable (X) and the dependent variable (Y). The requirement for the correlation coefficient test was to see whether r_count > r_table using the product moment correlation formula. The researcher

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performed the correlation coefficient test manually using Microsoft Excel and SPSS version 26. Table 4 shows the correlation coefficient calculations using Microsoft Excel.

Table 4. Correlation Coefficient Results

Number	X	Y	X^2	Y^2	XY
1	96	94	9216	8836	9024
2	80	68	6400	4624	5440
3	84	80	7056	6400	6720
4	76	66	5776	4356	5016
5	80	73	6400	5329	5840
6	88	82	7744	6724	7216
7	84	79	7056	6241	6636
8	76	69	5776	4761	5244
9	80	71	6400	5041	5680
10	84	84	7056	7056	7056
11	84	75	7056	5625	6300
12	92	90	8464	8100	8280
13	76	67	5776	4489	5092
14	88	87	7744	7569	7656
15	84	70	7056	4900	5880
16	88	86	7744	7396	7568
17	84	77	7056	5929	6468
18	80	76	6400	5776	6080
19	72	64	5184	4096	4608
20	68	65	4624	4225	4420
21	88	81	7744	6561	7128
22	84	82	7056	6724	6888
23	80	76	6400	5776	6080
24	76	69	5776	4761	5244
25	80	78	6400	6084	6240
26	80	74	6400	5476	5920
27	84	83	7056	6889	6972
28	80	79	6400	6241	6320
29	88	85	7744	7225	7480
30	80	72	6400	5184	5760
Σ	2.464	2.302	203.360	178.394	190.256

Next, the correlation coefficient was calculated using SPSS version 26. Based on the results, the correlation coefficient (r_xy) or r_count = 0.902 with a significance level of 5% and a number of respondents (n) = 30 students, resulting in r_table = 0.361. From these calculations, it can be concluded that 0.902 indicates that there is an influence between the Quantum Teaching model and student learning outcomes in IPAS subjects in grade IV at SD Negeri 155712 Tumba Jae 2.

Based on Table 4.13, the interval value of the correlation "r" (r_xy) 0.902 is in the range of 0.80-1.000, so it can be concluded that there is a very strong relationship between the Quantum Teaching model and student learning outcomes. The calculated learning outcome of 0.902 means that r_ count ≥ r_ table, which

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is 0.902, so the learning model provided by the researcher is very effective to be used in supporting the learning process by 92.7% of 100%, so it can be said that the ineffectiveness of the model used is 7.3% of 100%. Thus, it can be concluded that the relationship between the learning model and student learning outcomes is very significant in the learning process.

Discussion of Research Results

This study was conducted at SD Negeri 155712 Tumba Jae 2. The researchers used tests, questionnaires, and documentation as data collection tools with a sample size of 30 students. The purpose of this study was to determine how the learning process using the Quantum Teaching model in IPAS subjects works, and to determine the extent of the influence of using the Quantum Teaching model on student learning outcomes in IPAS subjects in grade IV at SD Negeri 155712 Tumba Jae 2.

Based on the results of the study, the researchers found the following. In this lesson, educators applied a contextual approach by presenting real-life problems relevant to the daily lives of students. Learning media such as the “magic bag” was used as a tool to facilitate students' understanding of the concept of natural resources and their conservation. Based on the results of the questionnaire that was distributed, the majority of students showed interest in the use of learning media, because it was considered more enjoyable, concrete, and able to improve their understanding of the concepts. Furthermore, a correlation analysis was conducted to determine the relationship between the use of learning media and students' understanding of the material. In the correlation test, the calculated value was 0.902, indicating a very strong correlation. Also, in the t-test, the calculated value was 11.077 > t-table = 2.048, indicating that Ha was accepted (there was a significant effect on the Quantum Teaching model).

The results showed that the use of the Quantum Teaching model was able to significantly improve student learning outcomes. This is in accordance with the opinion of Wena (2018:47) that the Quantum Teaching learning model is as follows: Quantum teaching is a new method that facilitates the learning process, combining elements of art and targeted achievement for all subjects, and is expected to create a pleasant atmosphere that stimulates students in the learning process, especially in social science subjects. Student learning outcomes by applying the Quantum Teaching learning model in social science subjects.

The research design used was a One Group Pretest-Posttest Design. The results of the study showed that on the pretest, the average score was 54.8, with 5 out of 30 students (16.6%) achieving mastery and 25 out of 30 students (83.3%) not yet achieving mastery. The posttest results showed an average score of 80, with 25 out of 28 students (89.29%) achieving learning completeness and 6 students (20%) not yet achieving completeness. The correlation test calculated rhitung = 0.902, indicating a very strong relationship between the learning model and student learning outcomes. In the t-test, the result was tcount 11.077> ttable 2.048, meaning that Ha was accepted, indicating that there was a significant effect of the Quantum Teaching model.

The Quantum Teaching model is a model that involves all students without discrimination and contains elements of play. In this study, the steps of the Quantum Teaching model are as follows. According to Widiasworo (2020:191), Quantum Teaching can be applied through the following steps. (1) Educators must be role models by being honest, good listeners, and always smiling. (2) In addition, educators need to create a pleasant learning atmosphere so that students can absorb the material more easily and do not get sleepy quickly. (3) A comfortable learning environment can be created through creative arrangement of tables and chairs, decorating the classroom, and putting up motivational posters. (4) Educators must also understand and influence students' emotions by conducting stress- relieving activities, strengthening teamwork, and utilizing music or videos in learning. (5) Educators' attitudes towards students include providing guidance on the benefits of the material, appreciating effort, providing motivation, and giving opportunities to observe and record learning outcomes. Reinforced According to Shoimin (2022:142-145), there are several steps in the Quantum teaching model, including the following: (1) Teachers have an important role in creating an effective and enjoyable learning process. They must be good role models for students by demonstrating honesty, listening well, and always being positive. (2) The learning atmosphere must be made enjoyable by fostering

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interest, active involvement, and meaningful understanding. (3) A safe and comfortable learning environment is also important, because students' feelings and attitudes greatly influence the learning process. (4) The use of music, such as classical or instrumental music, can help create a relaxed atmosphere. (5) Teachers also need to provide clear guidance, appreciate students' efforts, celebrate their achievements, and encourage students to use various learning resources. (6) In assessment, teachers must be oriented towards learning completeness by using appropriate methods and variations of assessment.

This study used a One Group Pretest-Posttest design to measure the effect of the Quantum Teaching model on student learning outcomes.

1. Pretest results showed an average score of 54.8, with only 5 out of 30 students achieving mastery (KKTP). The majority of students were in the category needing improvement.
2. Posttest results showed an average score of 82.13, with 25 out of 30 students achieving mastery (KKTP). There was a significant increase from the pretest average score.
3. Statistical Analysis: The correlation coefficient was rhitung: 0.902, indicating a very strong relationship between the influence of the Quantum Teaching model. T-test: thitung = 11.077 > ttabel = 2.048, meaning that there was a significant influence of the Quantum Teaching model on student learning outcomes.

The Quantum Teaching Model According to Putri et al. (2023:9), the Quantum Teaching learning model is as follows: it is lively and enjoyable learning, making students feel happy, active, and interested in learning. Thus, it can be concluded that the quantum education learning model provides a basis for improving the teaching and learning process and making it more interesting. Reinforced by Furthermore, according to Yanuarti and Sobandi (2019:14), the Quantum Teaching learning model is: A learning process that provides background and strategies to improve learning and make the process more enjoyable. This procedure provides a teaching style that empowers students to achieve more. It also helps teachers improve their teaching skills and motivate students to be more active in learning, so that teachers ultimately gain greater satisfaction from their work.

The results of this study indicate that learning with the Quantum Teaching model creates a pleasant learning atmosphere. This study is in line with the findings of Yanuarti and Sobandi (2019:14), who state that the Quantum Teaching Learning Model is: a learning process that provides background information and strategies to improve learning and make the process more enjoyable. This procedure provides a teaching style that empowers students to achieve more. It also helps teachers improve their teaching skills and motivate students to study hard, so that teachers ultimately derive greater satisfaction from their work.

Based on the results of the research and discussion, it can be concluded that the Quantum Teaching model can be effectively applied in IPAS learning in class IV of SDN 155712 Tumba Jae 2, especially in the subject of natural resources and their preservation. The application of this model has a significant effect on improving student learning outcomes, as evidenced by an increase in post- test scores and statistical analysis results. The Quantum Teaching model helps students understand concepts concretely, increases student active involvement, and builds independent and meaningful understanding.

CONCLUSIONS AND RECOMMENDATION

Based on the research discussion, the researchers outlined the conclusions and suggestions that had been compiled based on all research activities regarding the effect of the quantum teaching learning model on the learning outcomes of fourth-grade students at SD Negeri 155712 Tumba Jae 2 as follows:

1. The application of the quantum teaching learning model on the learning outcomes of fourth-grade students at SD Negeri 155712 Tumba Jae 2. The first step taken by the researcher was to give a pretest to fourth-grade students before the treatment, consisting of 20 questions to determine the students' abilities. The average score of the pretest was 54.8, with 5 students showing significant improvement and 25 students showing less improvement based on their KKTP scores. Next, the researcher applied the quantum teaching learning model during teaching, after which the researcher tested the students again with a post-test consisting of 20 questions to assess the results of the treatment that had been given. The post-test results

obtained had an average score of 82.13, with 24 students showing significant improvement and 6 students showing less improvement. After that, the researcher distributed a 20-item questionnaire on the quantum teaching learning model.

2. Before being given treatment by applying the quantum teaching learning model, many students had not yet achieved the predetermined KKTP score. There were 25 students with a percentage of 83.3% and 5 students with a percentage of 16.6% who obtained a passing score, and the average pre-test score was 54.8. By using the quantum teaching learning model, student learning outcomes increased and students became more active in the learning process, with an average post-test score of 82.13. This shows the influence of the model used.
3. There is an effect of the Quantum Teaching learning model on the learning outcomes of fourth- grade students at SD Negeri 155712 Tumba Jae 2, which can be seen from the average pre-test score of 54.8 and the post-test score of 82.13. Based on the hypothesis test tcount ≥ ttable, the result is 11.077 ≥ 2.042, and it can be concluded that the Ha hypothesis is accepted and the Ho hypothesis is rejected.

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