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Research Article

The Quantum Learning Model, Using Miniature Terrarium Media, Improves Science Learning Outcomes on Ecosystem Material in Grade V Students

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Abstract: This study aims to analyze the effect of the *Quantum Learning model* using miniature terrarium media to improve science learning outcomes in grade V of SD Negeri 104202 Bandar Setia. The type of research used is a pre-experimental method with a *One Group Pretest-Posttest design*. The subjects in this study were 21 students in class VC who were determined through non-probability sampling techniques. The test instrument was in the form of 20 multiple-choice questions that had been analyzed through validity and reliability tests. The data results were analyzed using normality, homogeneity, linearity, simple linear regression, and *paired sample t-test tests*. The results showed that the average pre-test score was 68.57, increasing to 87.14 in the post-test. The *paired sample t-test* produced a Sig. value. 0.000 < 0.05 so that H0 is rejected and H1 is accepted, while the regression test obtained an R (R Square) of 0.691, which means that the *Quantum Learning model* with miniature terrarium media has an effect of 69.1% on improving student learning outcomes. This finding confirms that the *Quantum Learning model* using terrarium media has an effect on improving student learning outcomes.

Keywords: Learning Outcomes; Miniature Terrarium; Post-Test; *Quantum Learning;* Science.

1. BACKGROUND

Education is an investment for the future and a key step in preserving and passing on culture from generation to generation. Education plays a crucial role in enhancing and developing the quality of human resources, enabling them to face challenges and obstacles in their careers and social lives. Every child has the right to an education, as stipulated in Article 31, paragraph 1 of the 1945 Constitution. Education is expected to produce qualified individuals who will support national development. Education serves to guide each child in achieving optimal learning experiences. This aligns with Syafrilianto's opinion, which states that education prioritizes three aspects: attitude, knowledge, and skills (Syafrilianto *et al.,* 2023).

In education, teachers play a crucial role in learning activities to improve the quality of student learning outcomes. Motivation is crucial because it fosters student interest in learning and helps them understand the direction of learning objectives. To achieve this, teachers are required to play an active role in managing a conducive learning process, as well as being able to develop teaching materials and determine appropriate learning models.

In general, Joyce and Weil (in Tabrani *et al.,* 2024) state that a learning model is a representation of the educational environment, encompassing curriculum planning, learning unit design, teaching materials, educational management, and the provision of professional development services. Learning models play a crucial role, both as a reference for research and as a model for students to follow in their teaching practices.

Based on the researcher's observations on the results of the odd-year science exam in grade V of SD Negeri 104202 Bandar Setia, there are still problems related to student learning outcomes. These problems are evident from the average class scores, which are mostly below the Minimum Completion Criteria (KKM) set by the school. This finding

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prompted the researcher to raise this issue as a focus in compiling this research. Based on observations during the learning process, one of the factors in the low achievement of student learning outcomes is due to the implementation of a learning model that is still conventional, resulting in a monotonous learning process and a lack of active student involvement.

One interesting alternative to overcome problems in the learning process of students in grade V of SD Negeri 04202 Bandar Setia, especially in science subjects, is by applying a learning model that is adapted to the characteristics of students, one of the appropriate models is the *Quantum Learning learning model* . In applying this model, teachers need to first recognize the needs and desires of students in the learning process, after which the teacher conveys the contents of the lesson material to students.

Learning using the *Quantum Learning model* aims to optimize all components involved in the learning process, including the potential and abilities of students. The *Quantum Learning model* is a development of humanistic learning theory, enabling the effective optimization of rational and emotional potential, thereby improving achievement and learning outcomes. The basic concept of *Quantum Learning* is to create a fun, engaging, and joyful learning process (Warman *et al.,* 2023).

To encourage the implementation of the *Quantum Learning model* , researchers used miniature terrariums as a concrete learning medium. This medium was chosen because it can provide students with a concrete picture of the concept of ecosystems.

2. THEORETICAL STUDY

According to Bobbi Deporter and Mike Hernacki (in Kaifa, 2010), the *Quantum Learning model* is a series of methods and learning philosophies that have proven effective in both educational and business contexts. This approach can be used by various types of individuals and age groups because it can adapt to the characteristics and learning needs of each individual. This learning model was first implemented in the Supercam program, a learning institution located in Krikwords, California, United States. *Quantum Learning* was developed by integrating self-confidence, learning skills, and communication skills in a fun learning environment. Deporter has systematically tested and developed various *Quantum Learning learning ideas* for teenagers participating in Supercam since the early 1980s.

Another opinion also states that *Quantum Learning* is a learning model that fosters enjoyable learning. According to Huda (in Fachrurrozy, 2022), the *Quantum Learning model* is a perfectly balanced combination of work and play, internal and external stimulation, and time spent in a comfort zone, while stepping out of old habits.

Quantum Learning model can be applied well in the learning process if it is implemented according to the design framework or syntax known as TANDUR (grow, experience, name, demonstrate, repeat, celebrate). The TANDUR method can increase student creativity by combining elements of motivation, real practice, conceptual understanding, repetition and appreciation, critical thinking skills, self-confidence, increasing interest in learning and mastery of the material (Insyiroh *et al.,* 2025).

In Natural Science (IPA) learning, the learning process often relies on conventional methods, resulting in less than optimal student active involvement in learning activities. Science learning is a systematic way of exploring nature to master knowledge, facts, concepts, principles, discovery processes, and develop a scientific attitude. In line with Sirajuddin's opinion (in Ansya *et al.,* 2024), he argues that in the world of technology, the role of science is very clear. All the technology we use, from smartphones and computers to the internet, was developed thanks to a deep understanding of physics, mathematics, and computer science. With knowledge of ecology, we can maintain the balance of ecosystems and manage natural resources sustainably.

To promote the implementation of the *Quantum Learning model* , researchers used miniature terrariums, a unique and engaging art form where plants (biotic and abiotic components) are planted in transparent containers to create an artificial ecosystem. Terrariums not only serve as interior decorations but can also serve as mini biology laboratories, displaying miniature terrarium ecosystems in transparent containers.

According to Nathiel Ward (in Djeppu *et al.* , 2023) stated that terrarium is an innovative way to grow ornamental plants efficiently in transparent glass containers that can be arranged to resemble miniature plants. Ward accidentally discovered the concept of terrarium in 1892, when he observed a glass jar containing a giant moth that later evolved into a butterfly. In Indonesia, this concept was known around 1945 as a bottle garden , which involves the use of large and unique glass bottles as plant containers.

In this study, researchers used materials to create a unique aesthetic and atmosphere within an ecosystem terrarium. The materials (decorations) not only add visual beauty but also explain the terrarium's function in understanding ecosystem materials, the relationships between living things, living things and their food chains, and so on. Here are the steps for creating a miniature terrarium:

Table 1. Making Miniature Terrarium Media.

Tools and materials	Receptacle
	
	Sand and soil
	
	rocks
	
	Miniature decorations
	
	Moss, talus moss and snails

	
Steps in making miniature terrarium media	1. Clean the terrarium container with tissue/cotton. 2. Add sand and soil and compact to suit the container and material components. 3. Arranging miniature plants to decorate a terrarium. 4. Include biotic and abiotic components. Add a container cover and make holes to maintain humidity and allow air to enter the terrarium container.

Miniature terrariums offer a variety of benefits, including serving as a medium for studying ecosystem functions, as a research tool, and as a tangible or concrete medium. This allows students to more easily understand ecosystems and directly observe how ecosystem processes occur. Yuliana (in Misykah and Panggabean, 2022) states that concrete media in the learning process can stimulate students' thoughts, feelings, attention, and willingness, thus encouraging their learning process.

According to Purwanto (in Depari, 2025), learning outcomes are behavioral changes that occur after a person participates in the teaching and learning process in accordance with educational objectives. Each individual possesses psychological potential that can be developed and directed, resulting in behavioral changes. These changes encompass the cognitive, affective, and psychomotor domains, which develop along with the student's learning experiences.

Expert findings also indicate that direct involvement and active participation in student learning contribute to learning experiences and behavioral changes. Learning that encourages imagination, active thinking, and creativity can help students understand material more deeply and improve their academic achievement. Therefore, to improve understanding, the quality of the learning process, and outcomes, learning methods that emphasize student activity are needed.

The researcher will present previous research studies or relevant studies that are related to this research. The first research was conducted by Hijratul Hikmah with the title " *The Effect of Quantum Learning Model on Civics Learning Outcomes of Elementary School Students of Bontomaero II, Bajeng District, Gowa Regency* " the results of the research findings obtained an average pre-test score of 53.3, increasing after the application of the *Quantum Learning learning model* with an average score of 88.5. It can be concluded that *Quantum Learning* has a significant effect on Civics learning outcomes of Elementary School Students of Bontomaero II, Bajeng District, Gowa Regency (Hikmah, 2019).

The second study was conducted by Suardi *et al.,* 2023 with the title " *The Effect of the Application of the Quantum Learning Model on Student Learning Outcomes in Thematic Learning for Class V at SDN 39 Cakke, Enrekang Regency* ". The results of this study indicate that the average pre-test scores of the two classes do not have a significant difference where the average in the experimental class is 42.9739 while in the control class it is 43.3300. Based on the N-Gain test, it can be seen that the increase in learning outcomes in the experimental class is 61.6839 which is in the quite effective category while in the control class there is an increase in learning outcomes of 23.9214 which is in the ineffective category. Based on the results of the hypothesis test, it is known that the probability value obtained is smaller than 0.05. so that Ha can be accepted and H0 can be rejected. Based on the T-count value and the df value, the t-table value is 2.03452. then the calculated t-value has a value greater than the t-table (8.965 > 2.03452). If the calculated t-value > t-table, it can be concluded that there is an effect of the application of the *Quantum Learning*

learning model on student learning outcomes in thematic learning for grade V at SDN 39 Cakke, Enrekang Regency. (Suardi R. *et al* , 2023)

The hypothesis in this study is H0 (There is no influence of the *Quantum Learning learning model* using miniature terrarium media to improve science learning outcomes on ecosystem material in class V of SD Negeri 104202 Bandar Setia). While H1 (There is an influence of the *Quantum Learning learning model* using miniature terrarium media to improve science learning outcomes on ecosystem material in class V of SD Negeri 104202 Bandar Setia).

3. RESEARCH METHODS

The approach used in this study is a quantitative method with a pre-experimental research type. The design applied is *a One-Group Pretest-Postest Design*, a simple experimental design that uses only an experimental group without a control group. This design is shown in Table 2 as follows:

Table 2. One-Group Pretest-Posttest Design Research Design.

Pretest	Treatment	Posttest
O1	X	O2

Information

O1 : Initial test (*pre-test* t)

X: Treatment using the *Quantum Learning model*

O2 : Final test (*post-test*)

In this design, students are given an initial test (pre-test) to measure their initial abilities, then given treatment in the form of a *Quantum Learning learning model* and ending with a post-test (final test) to determine changes in student learning outcomes (Hidayat *et al.,* 2024).

The population in this study was all students of class VC at SD Negeri 104202 Bandar Setia. The research sample was determined using a non-probability sampling technique using the purposive sampling method (Sugiyono, 2017). Class VC was chosen because it has a variety of academic abilities, some students have average scores that have reached the Minimum Ability Criteria (KKM).

The data collection techniques in this study used observation, learning outcome tests, and documentation. The test instrument consisted of 20 questions that had been tested for validity and reliability. The validity test used the *Pearson correlation coefficient* (α) method with a value $r_{tabel}$of 0.381. significance level of 5% and reliability test using the *Cronbach's Alpha method* (α) to ensure consistency or consistency when used in similar circumstances (Hidayat *et al.,* 2024).

Data collection analysis techniques in this study include normality tests, homogeneity tests, data linearity, hypothesis testing with simple linear regression and *paired sample t-test.*

4. RESULTS AND DISCUSSION

Analysis

This research was conducted at SD Negeri 104202 Bandar Setia, located in Bandar Setia village, Jl. Terusan Dusun V in Percut Sei Tuan sub-district with postal code 20371, North Sumatra province. This school has an A accreditation status and has implemented the independent curriculum. The principal during the research was Mr. Herdi, S.Pd. and the research was conducted from July 31 to August 25, 2025. During this period, the researcher carried out all stages of the research, from preparation and implementation to evaluation.

Pre-test Score Results

Before being given any action or treatment in the form of an independent variable, students first took a pre-test to determine their initial abilities. This test consisted of 20 multiple-choice questions on the ecosystems science subject in class VC. The results of the students' pre-test scores are presented in Table 3 as follows:

Table 3. Pre-test Score Results.

No	Information	Pre-Test Score
1	Lowest Value	40
2	The highest score	90
Average		68.57

Table 3 shows that the lowest pre-test score was 40, while the highest score was 90, with an average of 68.57. Ten students met the Minimum Completion Criteria (KKM), while 11 students did not meet the school's Minimum Completion Criteria (KKM).

Post-test Results

After obtaining data on students' initial abilities through a pre-test, the researcher then provided treatment in the form of an independent variable (X), namely the *Quantum Learning learning model* using miniature terrarium media. The learning process was carried out in accordance with the Learning Implementation Plan (RPP) prepared by the teacher or researcher. After completing the learning activities using the *Quantum Learning learning model* , students were given a final test (post-test) with the same questions as the pre-test (initial test) to measure their learning outcomes on the ecosystem material. The results of the students' post-test scores are presented in table 4 as follows:

Table 4. Post-Test Score Results.

No	Information	Post-Test Score
1	Lowest Value	70
2	The highest score	100
Average		87.14

Table 4 shows that the lowest score was 70 and the highest score was 100, with an average score of 87.14. Twenty students met the Minimum Completion Criteria (KKM) and one student did not meet the criteria.

Quantum Learning model successfully increased the average class grade by 87.14 and effectively helped more students achieve learning completion. This demonstrates that the *Quantum Learning model* combined with miniature terrarium media is highly effective in improving student understanding and learning outcomes in ecosystems.

Validity Test

Validity testing is used to determine and ensure that each question item is truly capable of measuring the competency being assessed. In this study, validity testing was conducted using the *Pearson correlation coefficient formula.* r through the help of SPSS version 25 application. A total of 25 questions were tested first on class VA students of SD Negeri 104202 Bandar Setia before being used in the experimental class (class VC). The questions were declared valid if r_{hitung}> r_{tabel}, otherwise if r_{hitung}< r_{tabel}then the questions were declared invalid. In this study, the researcher used 21 students as respondents with r_{tabel}a value of 0.381.

Table 5. Question Validity Results.

No Question	r_{hitung}	Intervention
1	0.503	Valid
2	0.544	Valid
3	0.596	Valid
4	0.560	Valid
5	0.471	Valid
6	0.444	Valid
7	0.575	Valid
8	0.317	Invalid
9	0.634	Valid
10	0.362	Not Vlid
11	0.680	Valid
12	0.534	Valid
13	0.693	Valid
14	0.498	Valid
15	0.534	Valid
16	0.483	Valid
17	0.513	Valid
18	0.303	Invalid
19	0.633	Valid
20	0.471	Valid
21	0.629	Valid
22	0.494	Valid
23	0.435	Valid
24	0.518	Valid
25	0.471	Valid

Source: Processed with SPSS version 25

The validity data analysis results showed that 22 items met the validity criteria, and 3 items were declared invalid. Of the 22 valid items, the researcher only used the 20 most appropriate items for use in the study. The invalid items, along with two valid items that were not selected, were not used in the study to ensure the research instrument remained high-quality and focused on the learning indicators being measured.

Reliability Test

A test instrument is said to have high reliability (a level of trustworthiness) if the results obtained are consistent or consistent when used under similar conditions. In this study, reliability testing was conducted using the *Cronbach's Alpha formula.* with the help of the SPSS version 25 application. (α)*The Cronbach's Alpha* value was used to assess the extent to which the test items in the instrument had good internal consistency. The results of the reliability test of the test instrument were presented in Table 6 as follows:

Table 6. Statistical Reliability Results

Reliability Statistics	
Cronbach's Alpha	N of Items
.885	25

Source: Processed with SPSS version 25

The reliability test results using the *Cronbach's Alpha formula* conducted by the researcher can be declared reliable because as seen in Table 6 there is *a Cronbach's Alpha value* of 0.885, greater than the minimum limit of reliability set at (α> 0.60). Thus, the test items in the instrument have very high internal consistency and can be said to be reliable.

Normality Test Results

In this study, normality testing was conducted using SPSS version 25 using the Shapiro-Wilk method, as this method is more appropriate for the researcher's sample size of 21 respondents (less than 50). The decision-making process was as follows:

a. If the sig value > 0.05, then the data is declared to be normally distributed.
b. If the sig value < 0.05, then the data is declared not normally distributed.

Table 7. Normality Test Results.

Tests of Normality						
	Kolmogorov-Smirnov [a]			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Pretest	.184	21	.063	.936	21	.180
Posts	.229	21	.005	.926	21	.113
a. Lilliefors Significance Correction						

Source: Processed with SPSS version 25

Based on the analysis results listed in Table 7, the pre-test value with a significance (sig) of 0.180 and the post-test value with a significance (sig) of 0.113, where the value is greater than 0.05 according to the decision making in the Shapiro-Wilk formula. Thus, it can be stated that the data is normally distributed and is suitable for use in parametric statistical analysis in the next stage.

Homogeneity Test

After the data is declared normally distributed, the next step is to conduct a homogeneity test. This test aims to determine whether the variances between data groups are equal or homogeneous. In this study, the homogeneity test was conducted using the F-test of variance (One-Way ANOVA) using SPSS version 25. The basis for making decisions for the homogeneity test is as follows:

1. If the significance value (sig) > 0.05 then the data distribution is homogeneous
2. If the significance value (sig) < 0.05 then the data distribution is not homogeneous

The results of this test serve as a reference for determining whether further analysis, such as a t-test or ANOVA, can be performed assuming equal variance or whether an approach that does not require homogeneity is necessary.

Table 8. Results of Homogeneity Test.

Test of Homogeneity of Variances					
		Levene Statistics	df1	df2	Sig.
Posts	Based on Mean	.443	3	11	.727
	Based on Median	.122	3	11	.945
	Based on Median and with adjusted df	.122	3	9,000	.945
	Based on trimmed mean	.381	3	11	.769

Source: Processed with SPSS version 25

Based on the analysis results listed in Table 8, the *Pre-test* and *Post-test values* have a Based on Mean value at a significance (sig) of 0.727. This has met the criteria for homogeneity testing. Where the value of 0.727 is greater than 0.05 (0.727 > 0.05), so the research data regarding the *Pre-test* and *Post-test values* can be stated Homogeneous.

Data Linearity Test Results

The linearity test is conducted to determine whether the relationship between the independent and dependent variables is linear, so that the regression analysis used can produce accurate results. Linearity is one of the basic assumptions in regression, because if the relationship between variables is not linear, the simple linear regression model cannot be used appropriately. The decision-making process in the linearity test is as follows:

1. If the significance value (sig) of Linearity > 0.05, then the linearity test is not fulfilled.
2. If the significance value (sig) of Linearity < 0.05, then the linearity test has been fulfilled.

The following are the results of the linear analysis of the data in table 6 as follows:

Table 9. Linearity Test Results.

ANOVA Table							
			Sum of Squares	df	Mean Square	F	Sig.
Posttest * Pretest	Between Groups	(Combined)	941,071	9	104,563	4,843	.008
		Linearity	814,710	1	814,710	37,734	.000
		Deviation from Linearity	126,361	8	15,795	.732	.664
	Within Groups		237,500	11	21,591		
	Total		1178,571	20			

Source: Processed with SPSS version 25

Based on the analysis results listed in Table 9, a significance value (sig) of 0.000 was obtained. Decision making is seen from the linearity column at the sig value and comparing the significance level with 0.05. Because the sig value of 0.000 < 0.005 (smaller), it can be concluded that the relationship between the two variables is linear.

Hypothesis Testing

To analyze the influence of the *Quantum Learning learning model* on the learning outcomes of science on ecosystem material in grade V of SD Negeri 104202 Bandar Setia, researchers tested it using simple linear regression analysis with the help of the SPSS version 25 application. This simple linear regression analysis aims to determine the extent to which the independent variable (X) influences the dependent variable (Y), as well as to predict changes in learning outcomes based on changes in the applied learning model. The decision making in the simple linear regression test is:

a. If the significance value is <0.05, it means that variable X has an effect on variable Y.
b. If the significance value > 0.05, it means that variable X has no effect on variable Y.

The following are the results of the simple linear regression test analysis in table 8 as follows:

Table 10. Results of Simple Linear Regression Analysis.

ANOVA [a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	814,710	1	814,710	42,542	.000 [b]
	Residual	363,861	19	19,151		
	Total	1178,571	20			
a. Dependent Variable: Posttest						
b. Predictors: (Constant), Pretest						

Source: Processed with SPSS version 25

From the analysis of SPSS output data shown in table 10, it is known that the calculated F value is 42.542 with a significance value of 0.000 less than (<) 0.05, so a simple linear regression model can be used to predict the *Quantum Learning learning model variable (X) to improve science learning outcomes on ecosystem material (Y). To find out how strong the influence of the Quantum* Learning learning model is on students' learning outcomes in the science subject on ecosystem material is shown in table 9 as follows:

Table 11. Correlation Coefficient Values.

Model Summary				
Model	R	R Square	Adjusted R Square	Standard Error of the Estimate
1	.831 [a]	.691	.675	4,376
a. Predictors: (Constant), Pretest				

Source: Processed with SPSS version 25

The results of the output analysis of the correlation value of the summary model in table 11 show that the value of the correlation or relationship (R) is 0.831 and from this correlation value, the coefficient of determination (R Square) is 0.691, which means that the influence of the *Quantum Learning learning model* (variable X) on the variable (Y), namely the learning outcomes of Science on Ecosystem Material, is 69.1%.

The final step in the research testing was the *Paired Sample T-Test,* which compares the difference between two means from two paired samples, assuming the data is normally distributed. The paired samples come from the same subject, and each variable is taken under different circumstances. The results of the t-test are shown in Table 10:

Table 12. *Paired Sample T-Test* Results

Paired Samples Test									
		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Standard Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1	Pretest-Posttest	-18,571	8,238	1,798	-22,321	-14,822	-10,331	20	.000

Source: Processed with SPSS version 25

In table 12 there are significant results (2-tailed) which is 0.000 so that it can be decided that the analysis results obtained a p-value = 0.000 smaller than the significance level of 0.05 or (0.000 <0.005) so that H0 is rejected and H1 is accepted. And the interpretation is that the results of the hypothesis testing show that there is an influence of the *Quantum* Learning learning model using miniature terrarium media to improve science learning outcomes on ecosystem material in class V of SD Negeri 104202 Bandar Setia.

Discussion

Based on the research results, before the implementation of the *Quantum Learning learning model* using miniature terrarium media, the average value of science learning outcomes on ecosystem material for class VC students of SD Negeri 104202 Bandar Setia was 68.57. After the implementation of the *Quantum Learning learning model,* it increased to 87.14. This increase shows that the implementation of *Quantum Learning* is effective in improving learning outcomes because students are actively involved, motivated, and gain meaningful learning experiences through interactive activities with miniature terrarium media. These results are in line with Indriyani *et al.,* (2019) who stated that the *Quantum Learning learning model* helps students build knowledge independently and creates a fun and meaningful learning atmosphere, so that understanding of the material becomes deeper and lasts in the long term.

Herlina's (2022) findings also confirmed that the implementation of the *Quantum Learning model* can improve creativity and learning outcomes because it emphasizes active interaction and a fun learning environment. Therefore, it can be concluded that the implementation of the *Quantum Learning model* has a positive effect on improving science learning outcomes on ecosystems in fifth-grade students at SD Negeri 1014202 Bandar Setia.

5. CONCLUSION AND SUGGESTIONS

The findings in this study, it can be concluded that the application of the *Quantum Learning learning model* has a significant effect on improving the learning outcomes of science on ecosystem material in class V of SD Negeri 104202 Bandar Setia. This is shown through the output results of table 12, namely the significant results (2-tailed) of 0.000 so that it can be decided that the results of the analysis obtained a p-value = 0.000 or (0.000 <0.005) so that H0 in this study is rejected and H1 is accepted. The results of the analysis of the correlation value of the summary model in table 11 also show that the magnitude of the correlation or relationship value (R) is 0.831 and from the correlation value, the coefficient of determination (R Square) is 0.691, which means that the influence of the *Quantum Learning learning model* (variable X) on the variable (Y) namely the learning outcomes of science on ecosystem material is 69.1%. Based on the results of research conducted in the VC class of SD Negeri 104202 Bandar Setia, it was found that the application of the *Quantum Learning learning model* with the help of miniature terrarium media had a significant influence on improving science learning outcomes in ecosystem material. With these results, teachers are advised to use interesting and innovative learning models such as *Quantum Learning* , because this model is able to create an active, enjoyable learning atmosphere. Students are also expected to be more enthusiastic in participating in learning activities, improve discipline, and play an active role in creating a conducive learning environment. In addition, for further researchers, it is recommended to pay attention to the limitations in this study so that future research can develop and refine the results that have been obtained.

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