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Testing the Effectiveness of the Discovery Learning Model Based on Educational Tourism on Students' Critical and Creative Thinking Abilities

Didi Wahyudin[1*], Retna Ayu Rachmawati[2], Muhammad Thoriq Bin Ziyad[3], Ni Wayan Asri Udayani[4], Baiq Chunafa Diza Farhana[5], Edy Herianto[6]
[123456]Prodi Magister Pendidikan Dasar, Jurusan Ilmu Pendidikan FKIP Universitas Mataram, Indonesia
[6]Prodi PPKn Jurusan PIPS FKIP Universitas Mataram, Indonesia

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Abstract

The global transformation in the Industrial Revolution 4.0 era demands students to master 21st-century skills, particularly critical and creative thinking. The low achievement of these skills at the elementary level highlights the need for innovative learning models. This study aims to examine the effectiveness of the edutourism-based Discovery Learning *model in enhancing students' critical and creative thinking skills. A quantitative approach with a one-group pretest-posttest design was employed involving 48 fourth-grade students from SDN 1 Terong Tawah. Data were collected through tests and observation sheets, then analyzed using normality tests,* Paired Samples T-test, *and* Effect Size *with SPSS 25.0. The results revealed a significant improvement between pretest and posttest scores (sig. 0.037 < 0.05). Although the effect size was small (Cohen's d = 0.310), these findings confirm that the edutourism-based* Discovery Learning *model effectively enhances students' critical and creative thinking skills.*

Corresponding Author:
Didi Wahyudin
Universitas Mataram

1. INTRODUCTION

The 21st century is marked by massive transformations in various aspects of human life due to the Industrial Revolution 4.0, which has given rise to global challenges such as information transparency, technological disruption, and social complexity (Hanafi et al., 2025; Nuraeni et al., 2019). These changes require mastery of various 21st-century skills, one of which is critical and creative thinking skills, which are core competencies for students. These two abilities are part of life skills that are very important to face the dynamics of changing times, global challenges, and increasingly complex daily life problems (Novianti, 2020). In this context, the ability to make creative and critical decisions in solving problems is an essential skill that every student needs to have (Mahombar et al., 2023). Therefore, strengthening critical and creative thinking skills in the learning process is key to preparing students to face the challenges of the 21st century.

Conceptually, critical thinking refers to the ability to analyze information, evaluate arguments, and make decisions logically and evidence-based (Manurung et al., 2023). In the context of learning, critical thinking encompasses analysis, evaluation, and the interrelationships between concepts to effectively solve problems (Fauzi & Iskandar, 2023; Nurhadi, 2022). Conversely, creative thinking is the ability to generate new, original ideas and innovative solutions through flexible thinking and imagination (Suardipa, 2020; Putri & Santoso, 2024; Rahman, 2021). These two skills need to be developed from elementary school because they form the foundation for long-term reflective and

innovative thinking. Herianto (2025a) emphasized that innovative learning should be designed to foster reflective and solution-oriented thinking, rather than simply memorizing content.

However, the reality on the ground shows that the critical and creative thinking skills of students in Indonesia are still relatively low. This is reflected in the results of the Program for International Student Assessment (PISA), which showed that Indonesia only scored 359 for reading, 366 for mathematics, and 383 for science—all below the international average (Hanafi et al., 2025; Susilowati et al., 2017). At the micro level, pretest results in fourth-grade students at SDN 1 Terong Tawah showed that most students still experience difficulties in constructing logical arguments, analyzing situations, and generating creative ideas independently. This fact indicates that current learning is not optimal in developing higher-order thinking skills sustainably. The research gap that emerged is the lack of research that simultaneously integrates the Discovery Learning model and the educational tourism approach to develop these two thinking skills at once, especially at the elementary school level.

One of the main causes is the dominance of conventional teacher-centered learning models, which emphasize memorization and minimal exploration. However, students need an approach that connects subject matter to real-world contexts and encourages their active involvement in the thinking process (Yusuf, 2024). In this context, the Discovery Learning model is considered relevant because it positions students as active subjects who learn through exploration, observation, and independent discovery of concepts (Eriansyah & Baadilla, 2023). This model has been proven to improve creative thinking skills and active student engagement in learning (Patandung, 2017). Herianto (2025a) emphasized that discovery-based learning, if designed reflectively and contextually, can be a means of developing reasoning skills and critical thinking skills sustainably.

To make the learning process more contextual, Discovery Learning can be combined with an educational tourism approach, namely direct, experiential learning outside the classroom. Educational tourism provides opportunities for students to learn from real objects in the surrounding environment, thereby strengthening the link between theory and practice (Astuti et al., 2021). Educational tourism also opens up space for students to think analytically and creatively naturally based on their direct observations and experiences. Herianto (2013) emphasized that environmental and experiential learning has strategic value in developing students' critical awareness of the socio-cultural context they encounter. From this perspective, educational tourism is not merely recreational but pedagogically transformative.

The novelty of this research lies in the simultaneous integration of the Discovery Learning model and the educational tourism approach to simultaneously enhance elementary school students' critical and creative thinking skills. Most previous studies have only examined one thinking skill in isolation or used innovative learning models without a direct, local-culture-based context. Therefore, this research offers conceptual and practical contributions to the development of contextual learning models that are adaptive to the challenges of 21st-century learning. Herianto (2022) also demonstrated that portfolio-based and hands-on learning approaches have positive effects on character formation and learning outcomes, supporting the importance of integrating authentic experiences and cognitive strategies within a single learning process.

According to Ramdani & Handayani (2024), educational tourism combined with technology can be a more interesting and enjoyable learning tool while also training students' analytical skills during the tourism activity. In developing creative thinking, educational tourism encourages students to generate new ideas and innovative solutions based on their direct experiences. Andriana et al. (2024) in their research at SDN Krenceng I found that the application of the field trip method can improve students' creative thinking skills in science learning. Meanwhile, in the context of developing critical thinking, educational tourism provides opportunities for students to directly observe phenomena, analyze information, and evaluate various perspectives. Research by Dahniar (2018)

shows that learning science through the karst ecosystem-based educational tourism method can improve students' critical thinking skills at SMPN 4 Bantimurung.

Although educational tourism has great potential as a contextual learning method, its application at the elementary school level is still very limited. Generally, educational tourism is more often used in empirical subjects such as Natural Sciences (IPA) and Social Sciences (IPS). Meanwhile, Pancasila and Citizenship Education (PPKn), which is more related to the values of life, nationality, and social context, rarely receives an experiential learning approach (eduwisata). Yet, topics in PPKn such as diversity, tolerance, and Pancasila values are highly relevant for linking with out-of-class activities based on local wisdom. If utilized appropriately, culturally-based educational tourism has great potential to strengthen students' understanding and internalize these values in a real-life context.

2. MATERIALS AND METHODS.

This research uses a quantitative approach with the type*Group Pretest-Posttest Design*. The research design used is Pre-Experimental Design, which measures one change in one group before and after receiving the Discovery Learning model treatment based on eduwisata. In this study, three problem formulations were used: 1) The effect of the discovery learning model based on eduwisata on students' creative thinking skills, 2) The effect of the discovery learning model based on eduwisata on students' critical thinking skills, 3) The effect of the discovery learning model based on eduwisata on students' creative and critical thinking skills.

This study measures the extent to which the educational tourism-based discovery learning model influences students' creative and critical thinking skills, which can be understood in Figure 1 as follows.

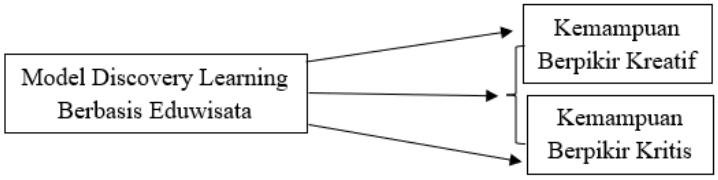

Figure 1 Research Design

The population in this study was all 48 students of grade 4 of SDN 1 Terong Tawah. The sample in this study was48students. The sampling technique used was purposive sampling.The independent variable in this study is the Discovery Learning model based on educational tourism. The dependent variable is students' creative and critical thinking skills. Data collection techniques used in this study were tests and non-tests. The tests used were a pretest and a posttest at the end of the learning process, using instruments that refer to indicators of creative and critical thinking. The non-test method in this study used an observation sheet instrument. The observation sheet was used to determine the implementation of the Discovery Learning model based on educational tourism.

The instrument development carried out by researchers was by using validity and reliability tests with the help of a program of *SPSS version 25.0 for windows*. Validity and reliability tests were conducted by distributing the research scale to 48 respondents in Grade 4 of Terong Tawah Elementary School. Validity test using the correlation formula/product *moment,* with the note that the rtable value has been determined at the 5% level, namely 0.279, then the item is said to be valid if the calculated r is greater than the r table. Meanwhile, the reliability test uses the Cronbach's alpha formula if > 0.6 after conducting a questionnaire trial on 48 respondents, the number of valid and reliable questions is 18 with details of 9 for creative thinking skills and 9 for critical thinking skills so that the research scale can be used for research.

The data analysis technique used in this study is regression analysis. Before calculating the regression analysis, several requirements for data analysis must be met, including the data analysis prerequisite

tests, including normality and linearity tests. The data analysis used regression analysis., *paired sample T-test* (difference between pre-test and post-test) and test *Effect Size* (effect of treatment).

3. RESULTS

a. The Influence of Discovery Learning Model Activities Based on Educational Tourism on the Creative Thinking Skills of Grade 4 Students at SDN 1 Terong Tawah.

Research on the influence Discovery learning model activities based on educational tourism on creative thinking skills class 4 SDN 1 Terong Tawah This hypothesis was obtained, namely that the discovery learning model based on educational tourism has an effect on the creative thinking abilities of 4th grade students at SD Negeri 1 Terong Tawah.

Table 1 Test Results *Normality (Shapiro-Wilk)*

Tests of Normality			
	Shapiro-Wilk		
	Statistic	Df	Say.
Creative Thinking	0.956	48	0.073

Normality test results (*Shapiro-Wilk*) it is known that the results of the calculation of the significance level for the variable of the educational tourism-based discovery learning model on creative thinking ability is 0.073, which means that 0.073 > 0.05, so it can be concluded that the treatment of the educational tourism-based discovery learning model on creative thinking ability is normally distributed.

Table 2 Paired Samples Test Results

Paired Samples Test		
		Significance
		Two-Sided p
Pair 1	Pre-Test - Post-Test	0.042

Test results *Paired Sample S T-test* to see the difference in pre-test and post-test values in the discovery learning model treatment on creative thinking skills, then based on the test results, paired *samples T-test*, obtained sig. value. (2-tailed) of 0.042 <0.05, it is concluded that there is a significant difference between the pre-test and post-test scores. The average post-test (30.48) is higher than the pre-test (26.38) which indicates an increase after treatment. Thus, Ho is rejected and H_1 is accepted, meaning that the treatment of the discovery learning model based on eduwisata on creative thinking skills. It can be seen that the significant value (sig) is 0.042 which is smaller than the alpha value of 0.05 which means that Ho is rejected and H_1 is accepted, from these results it is stated that the discovery learning model based on eduwisata has an effect on the creative thinking skills of 4th grade students of SD Negeri 1 Terong Tawah.

Table 3 Effect Size Test Results

Paired Samples Effect Sizes			
		Point Estimate	Interpretation
Pre-Test - Post-Test	Cohen's d	-0.302	Small

Test Results Effect Size to see how big the influence of the discovery learning model treatment is on creative thinking skills, then based on the test results paired samples T-test, then based on the test results Effect Size obtained value (cohen's d= 0.302) small effect size. So this shows that the discovery learning model treatment on creative thinking skills has a small but significant practical effect.

The results of research on the discovery learning model activities based on educational tourism on the creative thinking abilities of grade 4 students at SD Negeri 1 Terong Tawah are in line withSohilait's (2021) findings show that the Discovery Learning model has a significant influence on students' creative thinking skills, as it involves stages that train students to think creatively. A similar finding was also found in research by Setyowati et al. (2025), who concluded that the Discovery Learning model Discovery Learning has a positive impact on students' creative thinking skills in PPKn learning, by providing space for students to be actively involved and discover concepts independently.

Furthermore, the results of this study are also in line with the views For (2017)which emphasizes the importance of environmental role nature supports the development of creativity. A supportive family environment, parental involvement, and freedom to explore are important factors in fostering children's creativity. On the other hand, a school environment that implements an active, creative, collaborative, and innovative learning approach, such as Discovery Learning based on educational tourism, also strengthens the development of students' creative thinking skills.

This is based on the results of the creative thinking ability test questions distributed to 48 students, shown by the results of the average score of the Pre-Test questions of 26.38% after being given treatment with the discovery learning model activity based on educational tourism, the average score experienced an increase in the Post-Test of 30.48%. The difference in increase experienced an increase of 4.1%.

Based on the explanation above, it can be concluded that this research can prove the existing theory. The discovery learning model, based on educational tourism, at Sd Negeri 1 Terong Tawah can have a positive effect on creative thinking skills. Therefore, if the discovery learning model is actively followed and implemented, it is assumed that creative thinking skills will also improve significantly.

b. The Influence of Discovery Learning Model Activities Based on Educational Tourism on the Critical Thinking Skills of Grade 4 Students of SDN 1 Terong Tawah

Research on the influence Discovery learning model activities based on educational tourism towards critical thinking skillsclass 4 SDN 1 Terong Tawah This hypothesis was obtained, namely that the discovery learning model based on educational tourism has an effect on the critical thinking skills of 4th grade students at SD Negeri 1 Terong Tawah.

Table 4 Normality Test Results (*Shapiro-wilk*)

Tests of Normality			
Shapiro-Wilk			
	Statistic	DDf	Say.
Critical thinking	0.955	48	0.061

The results of the data analysis prerequisite test from the regression normality test (*Shapiro-Wilk*) it is known that the results of the calculation of the significance level for the variable of the eduwisata-based discovery learning model on critical thinking skills are 0.061,

which means 0.061 > 0.05, so it can be concluded that the treatment of the eduwisata-based discovery learning model on critical thinking skills is normally distributed.

Table 5 Paired Samples Test Results

Paired Samples Test		
		Significance
		Two-Sided p
Pair 1	Pre-Test - Post-Test	0.034

Test results *Paired Samples T-test* to see the difference in pre-test and post-test values in the discovery learning model treatment on critical thinking skills, then based on the test results, paired *samples T-test*, obtained sig. value. (2-tailed) of 0.034 <0.05, it is concluded that there is a significant difference between the pre-test and post-test scores. The average post-test (30.56) is higher than the pre-test (26.29) which indicates an increase after treatment. Thus, Ho is rejected and H_1 is accepted, meaning that the treatment of the discovery learning model based on eduwisata on critical thinking skills. It can be seen that the significant value (sig) is 0.034 which is smaller than the alpha value of 0.05 which means that Ho is rejected and H_1 is accepted, from these results it is stated that the discovery learning model based on eduwisata has an effect on the critical thinking skills of 4th grade students of SD Negeri 1 Terong Tawah.

Table 6 Effect Size Test Results

Paired Samples Effect Sizes			
		Point Estimate	Interpretation
Pre-Test - Post-Test	Cohen's d	-0.302	Small

Test Results Effect Size to see how much influence the discovery learning model treatment has on critical thinking skills, based on the results of the paired samples T-test, based on the test results Effect Size obtained value (cohen's d = 0.316) small effect size. So this shows that the discovery learning model treatment on critical thinking skills has a small but significant practical effect.

Research results regarding the application of the model Discovery Learning based on educational tourism on the critical thinking skills of fourth grade students at SD Negeri 1 Terong Tawah in line with the research results Hapsari et al., (2022) and Basariah, et al,. (2022) which show thatThe Discovery Learning model encourages elementary school students to develop critical thinking skills through challenges in solving problems and tasks that require in-depth analysis. This model trains students to identify problems, gather relevant information, and formulate effective solutions, thereby strengthening problem-solving skills in various learning situations. (Eriansyah & Badilla 2023).

Meanwhile, integrating learning materials to encourage students to have critical thinking skills and high analytical skills in facing various problems that arise because educational tourism activities have positive values and are in line with the concept edutainment, namely learning that is packaged through fun activities (Ramdani & Handayani,. 2024). The main objective of this approach is to provide a satisfying experience while adding new insights for visitors, and can be combined with various other aspects to meet the diverse needs of tourists (Ramdani & Handayani, 2024;Latif & Amelia, 2022).

This is based on the results of the critical thinking ability test questions distributed to 48 students, shown by the results of the average score of the Pre-Test questions of 26.29% after being given treatment with the discovery learning model activity based on educational tourism, the average score experienced an increase in the Post-Test of 30.56%. The difference in increase experienced an increase of 4.27%.

Based on the explanation above, it can be concluded that this research can prove the existing theory. The discovery learning model, based on educational tourism, at Sd Negeri 1 Terong Tawah can have a positive impact on critical thinking skills. Therefore, if the discovery learning model is actively participated in and implemented properly, it is assumed that critical thinking skills will also improve significantly.

c. The Influence of Discovery Learning Model Activities Based on Educational Tourism on the Creative and Critical Thinking Skills of Grade 4 Students of SDN 1 Terong Tawah

Research on the influence Discovery learning model activities based on educational tourism towards creative and critical thinking skillsclass 4 SDN 1 Terong Tawah This hypothesis was obtained, namely that the discovery learning model based on educational tourism has an effect on the creative and critical thinking skills of 4th grade students at SD Negeri 1 Terong Tawah.

Table 7 Normality Test Results (*Shapiro-wilk*)

Tests of Normality			
	Shapiro-Wilk		
	Statistic	Df	Say.
Creative and critical thinking	0.961	48	0.108

The results of the data analysis prerequisite test from the regression normality test (*Shapiro-Wilk*) it is known that the results of the calculation of the significance level for the variable of the eduwisata-based discovery learning model on creative and critical thinking skills are 0.108, which means that 0.108 > 0.05, so it can be concluded that the treatment of the eduwisata-based discovery learning model on creative and critical thinking skills is normally distributed.

Table 8 Linearity Test

Anova Table			
			Say.
Creative * Critical	Between Groups	(Combined)	<0,001
		Linearity	<0,001
		Deviation from Linearity	0.289

The results of the linearity test show that the results of the calculation of the significance level for the discovery learning model variable based on educational tourism on creative and critical thinking skills are 0.289, which means (*deviation from linearity*) is 0.289 > 0.05, so it can be concluded that the treatment of the Discovery learning model based on educational tourism on creative and critical thinking skills has a linear relationship.

Table 9 Paired Samples Test Results

Paired Samples Test		
		Significance
		Two-Sided p
Pair 1	Pre-Test - Post-Test	0.037

Test results *Paired Samples T-test* to see the difference in the total pre-test and post-test scores in the discovery learning model treatment on creative thinking and critical thinking skills, then based on the test results *paired samples T-test*, obtained sig. value. (2-tailed) of 0.037 <0.05, it is concluded that there is a significant difference between the total pre-test and post-test scores. The average total post-test (61.04) is higher than the pre-test (52.67) which indicates an increase after treatment. Thus, Ho is rejected and H_1 is accepted, meaning that the treatment of the discovery learning model based on eduwisata on creative and critical thinking skills. It can be seen that the significant value (sig) is 0.037 which is smaller than the alpha value of 0.05 which means that Ho is rejected and H_1 is accepted, from these results it is stated that the discovery learning model based on eduwisata has an effect on the creative and critical thinking skills of 4th grade students of SD Negeri 1 Terong Tawah.

Table 10 Effect Size Test Results

Paired Samples Effect Sizes			
		Point Estimate	Interpretation
Pre-Test - Post-Test	Cohen's d	-0.310	Small

Test Results*Effect Size*To see how big the influence of the discovery learning model treatment is on creative and critical thinking skills, based on the results of the paired samples T-test, based on the test resultsEffect Sizeobtained value (cohen's d = 0.310) small effect size. So this shows that the discovery learning model treatment on creative and critical thinking skills has a small but significant practical effect.

Research results regarding the application of the model Discovery Learning based on educational tourism on the creative and critical thinking skills of class IV students at SD Negeri 1 Terong Tawah in line with the objectives of the learning model Discovery Learning According to Karlina & Anugraheni (2021), learning encourages student engagement, guides them in independently investigating problems, builds applicable knowledge through direct experience, and trains analytical and experimental thinking skills in problem-solving. Pitaloka & Damayanti (2024) also revealed thatDiscovery Learning not only contributes to enhancing student creativity but also forms a solid foundation for the development of critical thinking skills, which are crucial for supporting future learning processes. Chusni et al. (2021) added that this approach encourages students to actively engage in the process of independent exploration, discovery, and problem-solving. Furthermore, Discovery learning oriented towards students, providing space for exploration, and encouraging them to formulate innovative solutions to various problems (Bastian, 2020; Priantari et al., 2020)

This is based on the results of the creative and critical thinking ability test questions distributed to 48 students, shown by the results of the average score of the Pre-Test questions of 56.67%. After being given treatment with the discovery learning model activity based on educational tourism, the average score experienced an increase in the Post-Test of 61.04%. The difference in increase experienced an increase of 4.37%.

Based on the explanation above, it can be concluded that this research can prove the existing theory. The discovery learning model activity based on educational tourism at Sd Negeri 1 Terong Tawah can have a positive effect on creative and critical thinking skills. Therefore, if the discovery learning model activity is actively followed well, it is assumed that creative and critical thinking skills will also improve significantly.

4. THE KNOT

The results of this study indicate that the Discovery Learning model based on educational tourism is effective in improving the critical and creative thinking skills of elementary school students. Through a one-group pretest-posttest design, evidence was obtained of a significant increase between the pretest and posttest results, although with a relatively small effect size. This finding indicates that the combination of conceptual exploration in Discovery Learning and direct experience based on local culture through educational tourism can create a contextual, reflective, and meaningful learning process. The novelty of this study lies in the integrative approach that combines two strategies at once to develop two domains of thinking skills simultaneously at the elementary education level, which has rarely been studied in an integrated manner before.

Based on these findings, it is recommended that teachers and curriculum developers implement the Discovery Learning model based on educational tourism more broadly, not only in science and social studies subjects, but also in other fields such as PPKn, which are rich in social and cultural values. Educational tourism designs should incorporate local wisdom as an authentic learning resource that supports the development of critical reasoning and creativity in students. Furthermore, further research is needed with an experimental design involving a control group, as well as long-term measurements to assess the sustainability of the effects of this approach in building comprehensive 21st-century skills.

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6. DECLARATIONS

Author Contribution: **Didi Wahyudin**: Conceptualization, methodology development, and data analysis; **Retna Ayu Rachmawati**: Literature review, development of research instruments, data collection, manuscript review and editing, and reference management. **Muhammad Thoriq Bin Ziyad**: Data collection, contribution to the literature strengthening, field coordination, and research permit administration; **Ni Wayan Asri Udayani**: Data collection, contribution to the literature strengthening, and development of research instruments; **Baiq Chunafa Diza Farhana**: Field data collection and development of instructional materials; **Edy Herianto**: Principal supervisor, final validation, and approval of the manuscript for publication.

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