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Deep Learning Approach to Improve Learning Interest in Cultural Heritage Material at Private Elementary School

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ABSTRACT

Learning about cultural heritage in elementary schools is often less popular due to the presentation being theoretical and less relevant to the students' life context. This study aims to test the effectiveness of the deep learning approach in increasing the learning interest of fifth-grade students at Fena Fafan Private Elementary School 12 in this material. Using a quantitative method with a pre-experimental design (one-group pretest-posttest), this study involved 19 students as a sample. Data were analyzed statistically using a paired t-test and the N-Gain test. The results showed that the deep learning approach significantly increased students' interest and learning outcomes. This was evidenced by the results of the hypothesis test, which showed a significant difference between the pretest and posttest scores ($p = 0.000$), as well as the N-Gain score of 0.74, which was included in the High category. The implementation of the principles of mindfulness, meaningful, and joyful learning successfully shifted the learning paradigm to be student-centered and created an interactive classroom atmosphere. In addition to increasing motivation and enthusiasm, this approach proved effective in developing 21st-century skills (4Cs) by contextual media and the involvement of local partners. This research provides practical contributions for educators in adopting alternative strategies that can transform theoretical material into in-depth and enjoyable learning experiences.

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1. INTRODUCTION

Education is a fundamental pillar that determines the quality of human life, especially in facing increasingly complex global dynamics in the future (Hajebi & Bälter, 2024; Hakim & Yulia, 2024). In Indonesia, the philosophy of education has been firmly established in the Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System (Sihab & Achmad, 2025). This constitution emphasizes that education is not merely the transfer of information but rather a conscious and planned effort to create a learning environment that enables students to actively develop their potential. The goal is to produce individuals with spiritual and

religious strength, self-control, a resilient personality, intelligence, noble morals, and skills relevant to themselves, society, the nation, and the state.

However, achieving this ideal vision depends heavily on the quality of the learning process in schools, the smallest unit of formal education. According to Junaedi (2019), effective learning is teaching that produces high-quality learning, characterized by intensive participation and active involvement from students. A quality learning process is an absolute prerequisite for achieving comprehensive national education goals (Asamoah et al., 2025; Sayed & Ahmed, 2015; Setiawan et al., 2022). Without quality interactions between educators, students, and learning resources, educational institutions will become mere formalities devoid of the essence of character and competent transformation (Karatsiori, 2023).

In practice, teachers often face significant challenges related to student heterogeneity. Every student has a different family background, personality, and level of understanding of the material (Gabaldón-Estevan, 2020; Farid, 2022). These differences directly impact students' learning interests, especially in subjects perceived as abstract, less engaging, or irrelevant to their real lives.

Interest in learning is not merely a spice in the learning process but rather its primary fuel. Rahmasari (2023) emphasizes that interest in learning must be a primary consideration for teachers to achieve optimal learning outcomes. Interest acts as an internal motivator that encourages individuals to fully engage in learning activities (Renninger & Hidi, 2022; Sihombing et al., 2024). When interest is present, students will feel joyful and enthusiastic and participate voluntarily without feeling pressured (Cui et al., 2024; Yuwanita et al., 2020).

Conversely, a lack of interest will turn the classroom into a boring environment. The impact is very real: students lose focus, tend to chat with peers, play alone, or even get caught up in daydreams (Hargreaves et al., 2025). This phenomenon is a major obstacle to achieving basic competencies, because the material presented by the teacher cannot be absorbed cognitively or emotionally (Neliwati et al., 2023). Therefore, a learning system is needed that is no longer solely teacher-centered but shifts entirely to the needs and potential of students (student-centered).

In line with the implementation of the Independent Curriculum, education in Indonesia is geared towards becoming more flexible, enjoyable, and responsive to the needs of the modern education system (Darlis et al., 2022; Zainuddin et al., 2025). One paradigm that has emerged in response to this challenge is the deep learning approach. Unlike surface learning, which only touches on the surface of material through brief memorization, deep learning offers a more interactive and contextual learning experience (Mahardhika et al., 2025). Technically, deep learning in education is an approach that encourages students to explore knowledge in depth and systematically (Fitriani & Santiani, 2025). Alom et al. (2019) explains that this approach involves a level-based conceptual structure, where high-level concepts are defined through a solid understanding of lower-level concepts, and vice versa. However, the true essence of deep learning is not merely about cognitive structure but also about how students are able to interpret information (Fatmawaty, 2024).

The novelty of this research lies in the integration of the three main pillars of deep learning proposed by [Arif et al. \(2025\)](#) and [Warman et al. \(2025\)](#), namely (1) mindful learning: students engage consciously and attentively with the material. (2) Meaningful Learning: The material is linked to prior knowledge and its usefulness in life. (3) Joyful Learning: The learning process is designed to spark joy and enthusiasm. Through this approach, literacy and numeracy are no longer taught separately as numbers and letters but rather as tools for understanding the world ([Atmojo & Widiyanto, 2025](#)). Students are encouraged to build connections between personal experiences and the concepts of the texts being studied ([Akhyar, 2024](#)). By actively involving students in the process of discovering meaning, interest in learning is expected to grow organically and sustainably.

The gap between deep learning theory and classroom reality was clearly discovered through initial observations conducted on Tuesday, March 25, 2025, in a fifth-grade class at Elementary School 12 Fena Fafan. The observation focused on subjects containing material on cultural heritage. The findings indicated a sharp disparity in interest among students. On the one hand, a small number of students showed high enthusiasm when cultural material was directly linked to local traditions and customs they encountered in their daily lives in the Fena Fafan region. This positive response was evident in their courage to discuss and ask critical questions. However, on the other hand, most students displayed a passive attitude. This was due to the teacher's teaching approach, which tended to be monotonous, one-way, and lacking in interactive content. Students appeared bored, often distracted, and engrossed in conversations with their classmates.

Cultural heritage material should provide an opportunity for students to learn about themselves and their environment. The failure to generate interest in this material indicates that the methods used have not been able to facilitate students' need for in-depth learning. If left unchecked, local cultural richness will be viewed merely as memorization for exams, rather than as values to be internalized.

Building upon these identified problems, implementing a deep learning approach is an urgent need at Elementary School 12 Fena Fafan. Through deep learning, learning about cultural heritage can be transformed from simply listening to teacher stories to a meaningful cultural investigation process. Students will be invited to "experience" the culture through mindful and joyful activities. This implementation is expected to not only bridge the gap in low learning interest but also increase students' levels of understanding and motivation in the long term. By understanding the relevance of the material to everyday life, students will feel that learning is a necessity, not a burden.

2. METHOD

The type of research used is quantitative research with a pre-experimental approach. The research design applied is a one-group pretest-posttest design, which involves a single subject group as the unit of analysis. In this design, the effectiveness of the intervention is measured by comparing the level of student learning interest before being given treatment (pre-test) and after being given treatment (post-test). This

procedure is specifically implemented to test the effect of the Deep Learning approach on student learning interest in cultural heritage material in Grade V of Elementary School 12 Fena Fafan. Systematically, the changes that occur are assumed to be the result of the treatment given, which can be measured through the difference in scores between the two stages of the test.

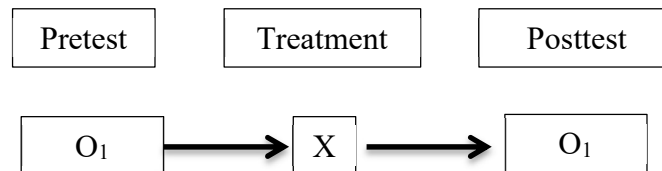


Figure 1. Pretest-Posttest Design

Description

O_1 = Pretest (Before Using Deep Learning Approaches)

X = Treatment (Use of Deep Learning approaches)

O_2 = Posttest (After Using The Deep Learning Approach)

This study involved two main variables: an independent variable (free) using the Deep Learning approach, and a dependent variable (bound) focusing on student learning interests. The study subjects consisted of all 19 fifth-grade students at SD Swasta 12 Fena Fafan. This saturated sample size was used to obtain a comprehensive picture of the effectiveness of the interventions provided to this group.

Geographically, this study was conducted at Elementary School 12 Fena Fafan, located in Mingeswaen Village, Fena Fafan District, South Buru Regency. Data collection and treatment implementation lasted one month, from July 21 to August 21, 2025. This timeframe was adjusted to the academic calendar to ensure consistency in the delivery of cultural heritage materials to students.

Data collection techniques were triangulated using questionnaires, direct observation, and documentation to strengthen the validity of the findings. Next, the collected data is processed using a series of statistical analysis techniques which include: (1) questionnaire data analysis, (2) calculation of the average value (mean), (3) standard deviation analysis, (4) analysis requirements testing (such as normality and homogeneity tests), and (5) hypothesis testing to determine the significance of the influence of the independent variable on the dependent variable.

3. RESULTS AND DISCUSSION

Results

The implementation of this research was divided into three main stages carried out sequentially: (1) administering a pre-test to measure students' initial conditions, (2) implementing learning activities using the Deep Learning approach as a form of intervention, and (3) administering a post-test to evaluate changes in learning interest after the treatment was given. This procedure was designed to ensure that the influence

of the independent variable could be measured accurately through a comparison of scores before and after the intervention. Before entering the core stage of the research, the researcher first conducted a pilot test of the questionnaire instrument on Grade VI students of Elementary School 1 Passo. This step was crucial to ensure that the instrument used met scientific feasibility standards. The validity of the statement items was determined by comparing the calculated value to the table value; the instrument was declared valid if the calculated result was greater than the table value ($r_{\text{calculated}} > r_{\text{table}}$). In addition to the validity test, a reliability test was also conducted to measure the instrument's consistency in collecting data. An instrument was categorized as reliable and suitable for use in research if it had a Cronbach's Alpha coefficient value above 0.6. Through this series of tests, the data obtained was expected to have a high level of accuracy and credibility to support the generalization of research results in the main location.

Validity Testing

Validity testing is used to determine whether the questionnaire is valid or not for use as an instrument in research. The validation test used is the Pearson product-moment correlation test, which is processed using SPSS Ver-27. Based on the Pearson correlation output, we compare the r_{table} value for $N=18$ at a significance level of 5%, which is 0.468. If the r_{hitung} value is $> r_{\text{table}}$, then the statement item is declared valid. Conversely, if $r_{\text{hitung}} < r_{\text{table}}$, then the statement item is not declared valid. The following is an analysis of the validity of the student learning interest questionnaire test using SPSS Ver-27.

Table 1. Results of the Learning Interest Questionnaire Validity Test

No	r_{count}	r_{table}	Description
1	0,556	0,468	Valid
2	0,678	0,468	Valid
3	0,304	0,468	Invalid
4	0,637	0,468	Valid
5	0,538	0,468	Valid
6	0,848	0,468	Valid
7	0,188	0,468	Invalid
8	0,640	0,468	Valid
9	0,588	0,468	Valid
10	0,556	0,468	Valid
11	0,650	0,468	Valid
12	0,503	0,468	Valid
13	0,571	0,468	Valid
14	0,536	0,468	Valid
15	0,410	0,468	Invalid
16	0,279	0,468	Invalid
17	0,550	0,468	Valid
18	0,546	0,468	Valid
19	0,530	0,468	Valid
20	0,662	0,468	Valid

The results of the statistical analysis conducted using SPSS Version 27 software obtained a comprehensive picture of the level of validity of the research instrument. Of the total of 20 questionnaire statements that were tested, the analysis results showed that 16 statements were declared valid. This validity determination was based on a comparison of the correlation coefficient value ($r_{\text{calculated}}$) to the critical value (r_{table}) at the specified significance level. The items declared valid had strong internal consistency in measuring student learning interest variables, making them suitable for use in the primary data collection stage. Meanwhile, statement items that did not meet the validity criteria were excluded from the final instrument to maintain the accuracy and credibility of the measurement results in the experimental group.

The Reliability Test

The reliability test was conducted using SPSS ver-27. Based on the reliability test results in Table 2, the Cronbach's alpha value for the valid questionnaire instrument was 0.8, which is greater than 0.6. Therefore, it can be concluded that all questionnaire items are reliable or consistent and can be used by researchers as instruments for research.

Table 2. Reliability Test Results

Cronbach's Alpha	N of Items
,888	16

Pretest Implementation

After testing the validity and reliability of the questionnaire data, the researcher then conducted a pretest or initial test on class V of Elementary School 12 Fena Fafan. The pretest was conducted on 22 July 2025 to observe the students' interest in learning about cultural heritage material before Deep Learning instruction. The pre-test scores of the 19 fifth-grade students at Elementary School 12 Fena Fafan are listed in Table 3.

Table 3. Student Pretest Data

Name	Pretest Data
AS	45,093
FWS	34,895
FS	44,401
GL	30,842
GL	38,857
IFS	49,437
IS	43,354
JS	20,830
JS	40,495
JL	34,806
KS	37,813
MJ	41,603
NS	31,293

Name	<i>Pretest Data</i>
NJS	37,206
NS	37,741
OSL	27,778
RS	50,752
RL	23,856
SB	39,141

Learning Activities Using the Deep Learning Approach

The implementation of the Deep Learning approach to cultural heritage material in fifth grade at Fena Fafan Private Elementary School 12 was carried out through two meetings that integrated the principles of mindful, meaningful, and joyful learning. This process began with an initial assessment to map students' characteristics, level of understanding, and interest in local culture. To strengthen contextual relevance, teachers engaged learning partners such as parents and traditional leaders as authentic sources of information for students in understanding the history of cultural heritage in their environment.

In the implementation phase, activities were designed to develop the graduate profile dimensions, including independence, critical thinking, and creativity. The first meeting focused on strengthening self-awareness through mindfulness activities and in-depth discussions on types of tangible and intangible cultural heritage. The use of tangible media, such as bamboo flutes, enabled students to meaningfully connect the subject matter to their daily lives, while group work served as a means of collaboration and communication between students.

In the second meeting, the learning environment was directed toward joyful learning, where students compiled the results of their cultural explorations into creative works such as posters, infographics, or short videos. Each group was given space to express their understanding independently and present them to the class. The learning process then concludes with an in-depth reflection session to strengthen the internalization of cultural values and build students' sense of national identity.

The final stage is a comprehensive assessment that includes assessments as, for, and of learning. Evaluation focuses not only on results but also recognizes the entire process of student development through product assessment, observation of performance during discussions, and self-reflection. This holistic approach aims to measure increased interest in learning while ensuring a deep understanding of local cultural heritage materials.

Post-Test Implementation

The post-test was conducted after the learning process using the Deep Learning approach. The post-test was conducted on 14 August to see whether there was a difference/increase in students' interest in learning after the learning process using the Deep Learning approach. The results of the student post-test can be seen in Table 4 below.

Table 4. Students Posttest Data

Name	Posttest Data
AS	47,406
FWS	37,146
FS	51,831
GL	32,307
GL	40,615
IFS	50,386
IS	47,281
JS	27,750
JS	44,514
JL	40,403
KS	42,648
MJ	51,831
NS	44,289
NJS	37,860
NS	45,740
OSL	35,383
RS	44,286
RL	28,951
SB	51,831

Observation Results

The implementation of the Deep Learning approach by teachers in fifth grade demonstrated a very high success rate, with a score of 92.5%, categorized as excellent. This success was driven by the teachers' consistency and creativity in adapting learning media to school conditions, as well as the involvement of local partners who enriched the students' learning experience. Although students' independent reflection still requires further development, the overall classroom atmosphere proved conducive, interactive, and objective in terms of assessment.

Observations of student activity during two meetings showed a significant upward trend in aspects of learning enjoyment, interest in the material, focus, and active participation. In the second meeting, there was a surge in the number of students categorized as very active, demonstrating the effectiveness of the Deep Learning approach in building self-confidence and engagement in group discussions. Overall, the implementation of this method successfully created a more meaningful learning atmosphere and positively impacted on the academic enthusiasm of fifth grade students.

Prerequisite Test

Normality Test

A normality test was conducted to determine whether the collected data was normally distributed or not. If the Sig. value was > 0.05 , then the data was normally distributed. Conversely, if the Sig. value was < 0.05 , then the data was not normally distributed. The test used in this study was the Shapiro-Wilk test because the sample size used in this study was < 50 . The following are the results of the normality test analysis for the pretest and posttest data using SPSS ver-27.

Table 5. Normal Test Results

	Shapiro-Wilk		
	Statistic	Df	Sig.
Learning Interest Pre-test	,976	19	,879
Learning Interest Posttest	,941	19	,270

The results of the normality test presented in Table 5 show that the significance value (p-value) for the pretest data was 0.879 and the posttest was 0.270. Given that both values are greater than the significance level of $\alpha = 0.05$, it can be concluded that the research data is normally distributed, thus fulfilling the basic assumptions for subsequent parametric statistical analysis.

Hypothesis Testing

The Paried Sample T-Test

The paired sample T-test is used to determine whether there is a difference in the meaning of two paired samples but with two data points. The results of the paired sample T-test analysis can be seen in the following Table 6.

Table 6. The Paried Sample T-Test Results

		Paired Differences					T	Df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error	95% Confidence Interval of the Difference				
Pair 1	Pretest	-			-	-			
	-	4,856	4,60940	1,05747	7,07	2,63	-	18	,000
	Posttest	053	7	0	7715	4390	4,592		

The analysis results in Table 6 obtained a significant value (2-tailed) of 0.000. Considering that this value is smaller than the significance level of 0.05 ($p < 0.05$), the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_a) is accepted. Thus, it can be statistically concluded that there is a significant average difference between the pretest and posttest results, which indicates that the implementation of the Deep Learning approach is effective in increasing fifth grade students' interest in learning cultural heritage materials.

N-Gain Testing

The N-gain test is used to determine the effectiveness of a treatment on the expected results. The following are the results of the N-gain test on the pretest and posttest scores of Grade V students at Private Elementary School 12 Fena Fafan.

20

Table 7. The N-Gain Score Results

	N	Minimum	Maximum	Mean	Std. Deviation
Ngain_Score	19				
Valid N (listwise)	19	-,131	,209	,7471	,76802

The N-Gain Score test results presented in Table 7 yielded an average value of 0.7471. Referring to the effectiveness criteria, this value falls within the range of $(0.70 \leq g \leq 1.00)$, which is statistically classified as "High." This finding indicates that the increase in student understanding and interest after the intervention was highly significant compared to the initial level before the treatment.

5

Thus, it can be concluded that the implementation of the Deep Learning approach in the learning process has a very high level of effectiveness. These results demonstrate that this method is capable of substantially optimizing student learning outcomes, making it highly suitable for implementation as a superior learning strategy, particularly for cultural heritage material in fifth grade.

Discussion

This quantitative study, using a one-group pretest-posttest pre-experimental design, aimed to test the effectiveness of the Deep Learning approach in increasing the learning interest of fifth-grade students at Elementary School 12 Fena Fafen in the subject of Cultural Heritage. During the research period, from July 21 to August 21, 2025, observations revealed positive student responses, reflected in their enthusiasm for the material, their courage to ask questions, and their strong collaborative skills during project work and group discussions.

The results confirmed that the implementation of the deep learning approach was highly effective in increasing student interest and learning outcomes. This validation was based on a significant increase in the average score from pretest to posttest, statistical test results showing a meaningful difference, and a high N-Gain score. These findings confirm that the deep and contextual learning strategy can substantially transform students' academic engagement in social studies (Kamaruddin & Saqujuddin, 2025).

The implementation of the deep learning approach significantly increases student interest in learning by creating contextual and meaningful learning. By connecting cultural heritage material directly to everyday life, students can understand and internalize knowledge more deeply. In line with the thinking of Maulidya et al. (2025) and Mulyani et al. (2025), this approach is not only cognitively oriented but also effective in developing students' independence, responsibility, and ability to reflect on learning outcomes as real-life experiences.

Increased student motivation and enthusiasm are also driven by the creation of a joyful yet challenging learning environment. Referring to research by Amalia et al. (2025) and Yetti (2025), providing students with the freedom to explore, discuss, and

express their opinions has been shown to foster a passion for learning in the classroom. The integration of play and creativity elements into activity planning ensures students are actively engaged and enthusiastic throughout the entire instructional process (Kangas et al., 2017).

Furthermore, the deep learning approach plays a crucial role in transforming the learning paradigm from teacher-centered to student-centered, focusing on the development of 21st-century skills. Through project work and group discussions, students are honed to master the 4C skills (communication, critical thinking, collaboration, and creativity) (Tohani & Aulia, 2022). As emphasized by Safitri et al. (2025) and Zuhri et al. (2025), mastering analytical and problem-solving skills through the integration of digital technology is a crucial foundation for students' future in today's global era.

The implementation of the deep learning approach to cultural heritage material at Fena Fafan 12 Private Elementary School has been shown to have a significant positive impact on increasing student interest in learning. The transformation of learning methods from conventional to more interactive, relevant, and enjoyable has significantly increased enthusiasm and motivation to learn. Consistent with the theory of Biggs et al. (2022), mindful learning practices have been shown to effectively strengthen student concentration and engagement because the material presented feels more contextualized to their lives.

The effectiveness of this approach was empirically reinforced through the results of hypothesis testing using SPSS version 27, where a paired sample t-test showed a significance value (2-tailed) of 0.000 ($p < 0.05$), thus rejecting H_0 and accepting H_a . Furthermore, the N-Gain test achieved a score of 0.74, placing this learning effectiveness in the "High" category (≥ 0.70). Based on these statistical data and qualitative observations, it can be concluded that the Deep Learning approach is a highly effective strategy in optimizing student interest and learning outcomes in the Cultural Heritage subject.

This research makes a significant contribution to the realm of elementary education, both theoretically and practically, particularly in the development of innovative learning models. This research provides empirical evidence that the Deep Learning approach that integrates the principles of mindful, meaningful, and joyful learning is highly effective for implementation at the elementary school level. This contribution strengthens the foundation that deep learning is superior to conventional methods in increasing students' cognitive and emotional engagement. Practically, this research offers a framework for educators to transform Cultural Heritage material that is often considered theoretical into a contextual learning experience. By involving local partners and authentic media, this research shows how to internalize the values of character and national identity that are relevant for fifth grade students. Furthermore, this research contributes to demonstrating a strategy for implementing the 4C skills (Communication, Collaboration, Critical Thinking, and Creativity) in practice. Through creative projects and structured group discussions, this research proves that

mastery of simple technology and analytical skills can be formed from an early age through a student-centered approach.

4. CONCLUSION

The implementation of the deep learning approach to cultural heritage material in fifth-grade students at Fena Fafan Private Elementary School 12 has proven highly effective in increasing student interest and learning outcomes. Hypothesis testing results showed a significant difference between pretest and posttest scores ($p = 0.000$), supported by an N-Gain score of 0.74, which falls into the High category. This approach successfully shifted the learning paradigm from conventional (teacher-centered) to student-centered. The integration of mindfulness, meaningful, and joyful learning principles created an interactive classroom atmosphere, where students demonstrated increased enthusiasm, focus, and courage in communicating. Through project-based and collaborative learning, students not only mastered the material cognitively but also honed 21st-century skills (the 4Cs: Communication, Collaboration, Critical Thinking, and Creativity). The use of contextual media and the involvement of local partners reinforced the internalization of cultural values as real-life experiences for students.

As a suggestion, teachers are encouraged to consistently use the Deep Learning approach by continuing to explore creative and contextual learning media. Special attention needs to be paid to optimizing reflection sessions to help students become more accustomed to evaluating their learning process independently. Given that this study used a one-group pretest-posttest design, future researchers are advised to conduct a pure experiment with a control group or apply this approach to a broader range of materials and grade levels to test the consistency of its effectiveness.

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