

## Implementation of Deep Learning Based on the Batobo Tradition to Improve the Cooperative Character of Elementary School Students

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**Abstract.** The character of cooperative is an important aspect that must be possessed by individuals in everyday life. Therefore, the learning carried out should facilitate the development of students' cooperative character. The problem in this study is that students' cooperative character is still relatively low. This study aims to improve students' cooperative character through the implementation of a deep learning approach based on the batobo tradition in science learning for fourth-grade students of SDN 105 Pekanbaru through collaboration with the principles of mindful, meaningful and joyful learning. The batobo tradition is one of the local wisdoms found in the Riau Province community in the agricultural sector that emphasizes cooperative, communication, and shared responsibility. The research method used is a one-group design pretest-posttest experiment with data collection techniques through observation, interviews and documentation. Based on the results of the study, it was found that the implementation of deep learning based on the batobo tradition in science learning can improve the cooperative character of fourth-grade students of SDN 105 Pekanbaru which was previously medium with a percentage of 57,15% increasing to 81,83% with a high category. This can be seen from students helping each other complete assignments in groups, being responsible for individual assignments, respecting the opinions of others, sharing with each other, and being open in expressing opinions. It can be concluded that the implementation of deep learning based on the batobo tradition can be used as an innovative learning method to improve the cooperative character of elementary school students.

**Keywords:** Cooperative Character, Deep Learning, Batobo Tradition

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### INTRODUCTION

Character is one indicator of success in education (Megawati., Rully; 2024). Successful education is not solely measured by academic knowledge, but by the ability of students to demonstrate integrity and empathy in real life (Budimansyah,2019). According to Lickona (1991), good character consists of three main components, namely moral knowledge, moral feeling, and moral action (Lickona, 1991). These three aspects need to be developed in an integrated manner through learning experiences that foster social and humanitarian values. In line with this, Megawangi (2004) emphasizes that character education must be directed at the formation of a whole person, namely an individual who is faithful, moral, and has social responsibility towards the environment and others.

Character building is the foundation for achieving 21st-century skills. Schools not only serve as places for the transfer of knowledge, but also as spaces for identity formation in line with

the needs of the times (Erlisnawati, 2020). 21st-century skills include critical thinking, creativity, communication, and collaboration (Darmawan & Tjalla, 2021). Among these four skills, collaboration has a strategic position as the basis for work readiness, social cohesion, and the ability to solve problems collectively in an interconnected world (Naila et al., 2023). The ability to work in harmony with others, share responsibilities, and respect differences in opinion reflects not only the social competencies needed in life, but also moral integrity. International frameworks such as the OECD Learning Compass 2030 also emphasize the importance of fostering social-emotional dispositions in the form of collaboration and cooperative character from the primary education level as a foundation for lifelong learning and responsible citizenship (Organisation for Economic Co-operation and Development, 2021).

In reality, the understanding and development of cooperative character in schools is still not optimal (Erlisnawati, 2020). Learning in Indonesia is generally still dominated by a teacher-centered approach with an emphasis on individual academic achievement and standardized tests (Budimansyah, 2019). This pattern limits students' opportunities to collaborate actively and morally in the learning process. As a result, students often view education as an individual competitive process, rather than a shared activity that fosters empathy and social responsibility (Nabila et al., 2025). This condition is a matter of serious concern, especially at the primary education level, which is a critical period for the formation of values, attitudes, and interpersonal behavior (Hasibuan et al., 2025). In addition, another problem found is that classroom learning has not integrated local wisdom into the learning process, so that social character values such as cooperative have not been instilled in a contextual manner (Wibowo dan Gunawa, 2021).

In response to these challenges, various studies offer learning approaches that can foster collaboration and social character among students. One of these is the Deep Learning (DL) approach, a pedagogical framework that encourages higher-order thinking, collaboration, and internalization of values (G. X. Sinaga & Simbolon, 2025). Unlike conventional learning, which emphasizes memorization, the Deep Learning approach emphasizes meaningful engagement, critical thinking, and inquiry-based learning. The effectiveness of this approach is highly dependent on contextual relevance and emotional closeness to the students' life experiences. Therefore, the pedagogical principles of Deep Learning are in line with the ethnopedagogical approach, which emphasizes the integration of local wisdom in learning to strengthen identity, motivation, and cultural sustainability (Suryanti et al., 2020).

In this context, the theory proposed by Hendri Marhadi (2024) in his book *Sentuhan Tradisi Batobo dalam Pembelajaran Berbasis Proyek* (The Touch of Batobo Tradition in Project-Based Learning) is highly relevant. This book explains that the Batobo tradition, which is deeply rooted in the Malay culture of Riau, has pedagogical values such as mutual cooperative, shared responsibility, and collective spirit that can be adapted in the learning process. The Batobo tradition from Riau Province is a communal agricultural practice in which farmers take turns working on each other's land (Ramalis et al., 2021). Although various local traditions in Indonesia contain noble values, their use in learning is still limited. Most previous studies have focused more on the cognitive aspects of the Deep Learning approach or on cultural preservation through ethnopedagogy, without explicitly linking it to the development of cooperative character. The values in the Batobo tradition are in line with the principles of collaboration in shaping cooperative character, but have not been widely used as a learning model. Integrating Batobo into the Deep Learning framework can provide authentic, meaningful, and culturally relevant learning experiences for students.

Initial observations at SDN 105 Pekanbaru show the urgency of the Deep Learning approach and the character of cooperative among students. Based on initial observations, it is known that fourth-grade students show a low level of cooperative. Students still often find it difficult to work together meaningfully, are hesitant to express their opinions, and are not yet able to share responsibilities in groups. Another problem found is that classroom learning has not integrated local wisdom values. This challenge is related to the absence of learning models rooted in local culture that explicitly foster cooperative character. Therefore, learning innovations are needed that not only foster cooperative character but also instill local cultural values as a learning context that is close to the lives of students.

Based on this context, this study aims to implement a Deep Learning approach based on the Batobo tradition to improve the cooperative character of fourth-grade students at SDN 105 Pekanbaru. By integrating local wisdom into the modern educational framework, this study seeks to bridge the theoretical and practical gaps identified in the literature. This study is also expected to produce an evidence-based, culturally responsive Deep Learning model that can be replicated to strengthen students' cooperative character while reinforcing local identity and the value of togetherness in the learning process.

## METHODOLOGY

This study used a one-group pretest–posttest design, which is a form of quasi-experimental design involving a single group of subjects who received treatment without a comparison group. This design allows researchers to measure changes in the behavior or characteristics of research subjects after receiving a specific treatment by comparing the results before (pretest) and after (posttest) the treatment (Creswell & Creswell, 2018). This approach was chosen because it was in line with the research objectives, which focused on improving students' cooperative character through the application of Batobo tradition-based learning with a Deep Learning approach. This design researchers used the one-group pretest-posttest design. This design includes a pretest measure followed by a treatment and a posttest for a single group.

Table 1. Design Research

$O_1$	—————	$X$	—————	$O_2$
<i>Pretest</i>		<i>Treatment</i>		<i>Posttest</i>

Explanation:

- $O_1$  = Pretest score before the treatment is administered
- $X$  = Treatment (the intervention applied)
- $O_2$  = Posttest score after the treatment is administered

(Creswell & Creswell, 2018)

The research was conducted at SDN 105 Pekanbaru, a public elementary school located in Pekanbaru City, Riau Province. This school was chosen because it has a socio-cultural background that is close to the community that supports the Batobo tradition, making it relevant for integrating local wisdom into the learning process. The research subjects were fourth-grade students, with a total of 26 students. The subjects were selected using purposive sampling based on their involvement in IPAS learning, which was the focus of this study.

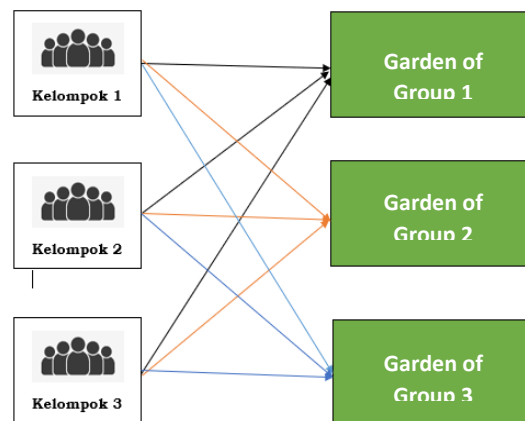
## Research Procedure

In the first meeting, the teacher conducted a pretest in class as an indication of the students' cooperative character through a questionnaire filled out by the students. The second, third, and fourth meetings were used to conduct learning about the Batobo tradition-based science material, starting with introducing the Batobo tradition to students. The teacher explained the history, meaning, and values contained within the tradition and showed documentation of

Batobo activities in the community. At this stage, students were introduced to Batobo as not only a collective farming activity, but also a means to foster a spirit of cooperative, togetherness, and responsibility.

The Batobo tradition-based learning activities are carried out collaboratively by dividing students into small groups. Each group will complete a project, creating a mini garden planted with plants. The Batobo concept implemented is a cooperative system with a rotating pattern. Each group not only works on its own garden but also takes turns helping to work on the gardens of other groups. This way, all groups will work together, so that each garden is completed together.

The Batobo concept that was implemented can be seen in the image below:



**Figure 1.** Batobo Activity

The fifth meeting is to conduct a post-test. After the learning activities are completed, the next activity is to conduct a post-test in the form of filling out a Cooperative questionnaire by students which aims to obtain an overview of the character of student cooperative after learning through the application of deep learning based on the Batobo tradition in science learning.

### **Instruments and Data Collection Techniques**

The instruments used in this study were an observation sheet, a student cooperative character questionnaire, and an interview guide. Data collection techniques included observation, interviews, and documentation.

The observation sheet was used to record student learning activities. The cooperative character questionnaire was used to obtain an overview of students' cooperative character during the learning process. Interviews were conducted with teachers and students to obtain responses regarding the implementation of deep learning based on the Batobo tradition in teaching. The questionnaire on student cooperative character used a Likert scale consisting of positive and negative statements completed by students. Positive statements were scored on a 1-5 scale, with the following weights: 1 (Strongly Disagree), 2 (Disagree), 3 (Sometimes), 4 (Agree), and 5 (Strongly Agree). Negative statements were scored on a 1-5 scale, with the following weights: 1 (Strongly Agree), 2 (Agree), 3 (Sometimes), 4 (Disagree), and 5 (Strongly Disagree).

### Data Analysis Techniques

The data analysis technique for assessing student cooperative behavior using Microsoft Excel uses the following formula. The formula for determining the scale and interval is:

$$N = \frac{R}{MR} \times 100\%$$

Description:

N = The desired score

R = The student's questionnaire score

SM = Maximum questionnaire score

100% = Fixed number

Table 2. Scale and Categories of Cooperative Character

Skala (%)	Kategori
86 – 100	Very High
66 – 85	High
46 – 65	Medium
26 – 45	Low
0 - 25	Very Low

Modification of (Purwanto, 2014)

Next, to get an increase in cooperative character, use the N-Gain formula. Next, to determine the improvement in cooperative characteristics, the N-Gain formula is used. The N-gain test

was performed using Microsoft Excel. According to Hake (2002), normalized gain (N-Gain) is formulated as the following equation:

$$N - Gain = \frac{Skorposttest - Skorpretest}{Skormaksimal - Skorpretest} \quad \text{Hake (2002)}$$

Gain Index Category:

Score (g)  $\geq$  0.70 Very High

Score  $0.03 \leq (g) \leq 0.70$  Moderate

Score (g)  $\leq$  0.30 Low

The n-gain test was conducted using Microsoft Excel. Meanwhile, qualitative data from observations, interviews, and documentation were analyzed using thematic analysis techniques to identify patterns of behavior and student responses to Batobo tradition-based learning.

## RESULTS AND DISCUSSION

### 1. Implementation of Deep Learning Approach Based on Batobo Tradition

This study aims to determine the application of Deep Learning based on Batobo tradition in improving the cooperative character of fourth grade elementary school students. The study was conducted using a one-group pretest–posttest design to see the extent of improvement in students' cooperative character before and after treatment. At the initial stage of the study, 26 students took a pretest. This test aimed to measure the initial level of cooperative among students. The pretest results showed that the average cooperative level of students was 60.64%, which was categorized as low. After the pretest, the treatment in the form of deep learning based on Batobo tradition was given. The implementation of student activities was observed by researchers and teachers using observation sheets. The application of deep learning based on Batobo tradition was carried out in the fourth grade IPAS subject with the theme “Cultural Diversity in My Neighborhood.” The lesson began with the teacher introducing students to the history, stages, and values of the Batobo tradition. After students learned about the Batobo tradition, the teacher divided them into small groups. Each group had a garden that had to be planted with plants.



**Figure 2.** Teachers conduct lessons in the classroom  
*Source: Researcher Document*

Next, learning was conducted outside the classroom. The teacher guided the students in carrying out a simple simulation of the Batobo tradition.



**Figure 3.** Teachers direct the Simple Batobo Simulation activity  
*Sourcer: Researcher Document*

The Batobo concept that is applied is a mutual assistance system with a rotation pattern. Each group not only works in its own garden, but also helps work on other groups' gardens in turn. Thus, all groups will work together, so that each garden is completed collectively.



**Figure 4.** Students Carry Out Batobo Activities  
*Source: Researcher Document*

After implementing Batobo tradition-based deep learning activities for students, they were given a posttest based on cooperative character indicators. In this study, cooperative character was measured through six indicators: (a) group discussion, (b) participation in completing group tasks, (c) cohesiveness within the group, (d) cooperative with group members, (e) mutual assistance, and (f) mutual sharing.

When all research data had been collected, the researchers conducted an n-gain test to measure the effectiveness of the Batobo tradition-based deep learning approach and to determine the extent of its influence on the cooperative character of students. The results of the n-gain test showed an increase in the cooperative character of fourth-grade students who had been given the Batobo tradition-based Deep Learning treatment. Before the treatment, the students' cooperative character was in the low category. After the treatment, the students' cooperative character increased to the high category of 84.57%.

## 2. Improvement in Students' Cooperative Character

The implementation of Batobo tradition-based deep learning in science learning can improve the cooperative character of fourth-grade students at SDN 105 Pekanbaru. This improvement in cooperative character can be seen in the following table:

**Table 3.** Character of Cooperatif Students

Number	Indicator	Score (%)	
		Pretest	Posttest
1	Collaboration	56,6%	83,3%

2	Responsibility	52%	80%
3	Communication	60%	80%
4	Respect	60	84%
Average		57,15%	81,83%
Category		Medium	High

Based on table 3, it can be seen that the cooperative character of fourth-grade students at SDN 105 Pekanbaru increased before and after learning through the implementation of deep learning based on the batobo tradition in science learning. The cooperative character of students pretest score was 57.15% (medium category) and posttest score was 81.83% (high category). The increase in student cooperation character with a normalized n-gain of 0.58 with a moderate category.

Based on the results of observations carried out, it can be seen from student behavior during the learning process, such as discussing in groups, participating in completing group assignments, showing solidarity in groups, engaging in meaningful collaboration with group members, showing a helpful attitude during the learning process, and showing a sharing attitude during the Batobo simulation.

The results of this study indicate that the implementation of the Batobo tradition-based Deep Learning approach has a positive effect on improving student cooperative character. Based on the results of the study, it is known that the application of Batobo tradition-based learning with the Deep Learning approach can improve student cooperative character, which was initially in the low category to the high category. This can be seen from the students' behavior during the learning process, such as during group discussions, participating in completing group assignments, showing solidarity within the group, engaging in meaningful cooperative with group members, showing a helpful attitude during the learning process, and showing a sharing attitude during the Batobo simulation.

In the Batobo simulation activity at school, students were asked to work in groups, sharing roles such as preparing the soil, planting seeds, watering, and caring for plants. This process was not just a game, but a learning tool that required social responsibility, communication, and teamwork. As they interacted, Batobo values such as “mutual assistance, mutual trust, and sharing the fruits of labor” were clearly reflected in the students' behavior. This condition shows that learning that utilizes the local cultural context not only enriches the meaning of learning

but also strengthens the students' emotional connection with the moral values around them (Lickona, 1991).

Additional data from observations and interviews also show that students demonstrate increased empathy, responsibility, and appreciation when working with classmates. Cooperative character includes the ability to work with others, respect differences, and actively contribute to achieving group goals (Kurniawati & Mawardi, 2024). This improvement is in line with research Silvani et al. (2022) which states that collaborative learning based on social and moral values can develop empathy, social awareness, and a sense of responsibility among students. Through learning activities adapted from Batobo traditions, students not only learn to work together functionally, but also experience the internalization of moral values contained within these traditions, such as mutual cooperative, helping one another, and appreciating the roles of others in the group. This shows that culture-based learning can shape sustainable and meaningful social character while also influencing cooperative character. (Hasibuan et al., 2025).

The Deep Learning approach emphasizes deep, reflective, and meaningful learning, rather than mere conceptual memorization. Deep Learning involves six core competencies, one of which is collaboration and character, which encourages students to think critically and actively engage in the learning process. In this study, the Deep Learning strategy was implemented through five phases of learning: engagement, exploration, elaboration, reflection, and consolidation (B. Sinaga & Simbolon, 2025). From a learning approach perspective, the application of deep learning serves as an important bridge between local wisdom and 21st-century character development. Deep learning encourages students to analyze, reflect, and connect real-life experiences with broader concepts of values. When the Batobo tradition is used as a context, this deep thinking process becomes more meaningful because the values learned originate from the students' own social environment. Thus, this learning model is not only effective in improving cooperative skills (from 57,15% to 81,83%), but also fosters awareness that cooperative is part of their cultural identity as the young generation of Riau.

The significant improvement in cooperative cannot be separated from the application of local wisdom, which is at the core of this learning design, namely the Batobo tradition. The Batobo tradition in the Malay community of Riau is known as a mutual assistance activity in which groups of people take turns working in the rice fields. In practice, each member of the Batobo

group works selflessly, helps each other, and puts the success of the group above individual interests. These values were then adapted into the learning context through a deep learning approach, so that students could internalize the values of cooperative in an authentic learning experience (Marhadi et al., 2023).

In addition to strengthening social skills, Batobo activities also teach effective communication and focused coordination. Students learn to understand their respective roles, organize group work strategies, and resolve issues that arise through deliberation. This process builds negotiation and collaborative leadership skills, which are important aspects in developing the social character of Pancasila students (Marhadi et al., 2022). Thus, Batobo is not only a traditional activity, but also a concrete educational tool for instilling a spirit of mutual cooperative, concern for others, and the ability to work in a team. These values make the Batobo tradition relevant for adaptation in contextual learning in elementary schools to strengthen students' national character (Rahayu & Fitriani, 2022). These values are parallel to the characteristics of cooperative that we want to develop in primary education, such as responsibility, empathy, and commitment to mutual success. Integrating the Batobo tradition into learning provides students with real experiences to understand the meaning of cooperative in context. This reinforces the view that Suryanti et al. (2020) The application of ethnopedagogy, namely learning that promotes local cultural values, can increase the relevance of education and strengthen the cultural identity of students.

Local wisdom serves as a source of social values and norms that shape the character of society. According to Wibowo and Gunawan (2021), Local wisdom can be used as the foundation for character education because it contains universal values such as mutual cooperative, responsibility, and empathy. By using Batobo as the context for learning, students not only understand the concept of cooperative, but also experience the process of internalizing cultural values through meaningful and emotional activities. The results of this study reinforce the view that education rooted in local culture can enrich students' affective and moral dimensions. The integration of local wisdom in learning has been proven to foster contextual and sustainable social character.

## CONCLUSION

Based on the research results, it can be concluded that the implementation of Batobo Tradition-based Deep Learning can improve the cooperative character of fourth-grade

students at SDN 105 Pekanbaru. This is evident in the students' cooperative character before and after the implementation of Batobo Tradition-based Deep Learning in learning, increasing from 57,15% (medium category) to 81,83% (high category), with an n-gain increase of 0,57 in the medium category. This cooperative character is evident in mutual assistance, individual and group responsibility in completing group assignments, mutual respect, and openness to expressing opinions. This indicates that the implementation of Batobo tradition-based Deep Learning in learning can be used as an alternative learning method to improve students' cooperative character in elementary schools. Therefore, the results of this study can serve as a basis for future researchers to conduct research in different, broader areas of study.

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