



## Development of Project-Based Learning Integrated with Local Culture to Enhance Critical Thinking Skills of Students in Fine Motor Skills Development Course

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Informasi artikel	ABSTRACT
<p>Received : September 7, 2024. Accepted : October 13, 2024. Published : November 15, 2024.</p> <p>Keywords: Project-Based Learning; Local Culture; Critical Thinking; Development of Fine Motor Skills;</p> <p>DOI: 10.30736/jce.v8i2. 2245</p>	<p><i>Students interest in local culture tends to decline, especially in the face of globalization's influence, which shifts cultural values. This study aims to develop a Project-Based Learning (PjBL) model integrated with local culture to enhance students' critical thinking skills in the course on the Development of Fine Motor Skills. This research is a development study or Research and Development (R&amp;D) utilizing the 4D model (Define, Design, Development, and Dissemination). The research sample consists of third-semester students from the Early Childhood Education Teacher Program at Universitas Bengkulu for the 2024/2025 academic year. Data collection is conducted through interviews, observations, questionnaires, and documentation, while data analysis employs qualitative analysis methods. The results indicate that the local culture-based PjBL model meets the criteria of being valid, practical, and effective in improving students' critical thinking skills. This effectiveness is demonstrated through a three-phase trial showing significant differences in students' abilities before and after the implementation of PjBL. Future researchers are encouraged to implement the local culture-based PjBL model more broadly across various study programs and courses, as well as conduct further research to evaluate the long-term impact of PjBL implementation on the development of critical thinking skills and other learning aspects.</i></p>

### INTRODUCTION

Early childhood education plays a crucial role in establishing the developmental foundation for children, including the enhancement of creative thinking skills. Creativity has become an essential competency in navigating the complexities of an ever-changing world, requiring individuals to generate new and innovative ideas. However, challenges arise when the curriculum and teaching methods implemented are insufficient to stimulate creativity and strengthen creative thinking skills among students. Therefore, this research aims to address these shortcomings by developing an innovative learning approach utilizing Project-Based Learning (PjBL) integrated with local culture in the course on Fine Motor Skills Development.

The rapid advancement of science and technology has intensified challenges in preserving cultural heritage, contributing to a decline in the relevance and integration of local cultures within modern education (Elia, G., Margherita, A., & Taurino, 2021). This shift has led to the erosion of traditional knowledge and decreased community engagement in cultural preservation efforts, with educational content often not aligned with regional potentials or community social contexts (Mahmud, A., & Abdullah, 2019). As a result, critical elements of local culture, vital for national identity, are gradually diminishing. Local wisdom-based fine motor skills learning is a tangible manifestation of character education that educators can implement to preserve the local



culture of Bengkulu. In this learning process, students can develop their potential by integrating the resources of local wisdom, enabling the knowledge they acquire to be useful in addressing societal issues.

Integrating local wisdom into education plays a key role in developing both cognitive and non-cognitive skills in students by enhancing their cultural literacy, which in turn improves their social awareness and problem-solving abilities (Suastra, 2018). Revitalizing local knowledge systems in modern classrooms enriches the learning process and student

engagement, while also maintaining cultural identity for educational success (Suryawati, D., & Suharto, 2021). Integrating local wisdom into the development of fine motor skills will provide a fresh perspective for students. Project-Based Learning (PjBL) that involves local wisdom can cultivate various necessary skills, which can be obtained through a learning approach that combines cultural knowledge. The Project-Based Learning (PjBL) approach is a teaching method that incorporates science, technology, engineering, arts, and mathematics (STEAM) into relevant, real-world projects. Through this approach, students participate in genuine problem-solving, interdisciplinary teamwork, and apply their knowledge and skills to real-life situations (Bitter, 2019).

The specific aim of this research is to develop a Project-Based Learning (PjBL) model integrated with local culture within the Fine Motor Skills Development course and to assess its impact on enhancing students' critical thinking abilities. By identifying and incorporating elements of local culture into the learning design, it is anticipated that this approach will stimulate analysis, evaluation, and reflection, thereby strengthening students' critical thinking skills. This method is expected not only to enable students to comprehend the learning material more deeply but also to analyze and interpret information from diverse cultural perspectives, critically evaluate arguments, draw logical conclusions, and provide strong explanations and justifications. Consequently, students are encouraged to cultivate their critical thinking abilities through relevant and meaningful contexts while reflecting on their own learning processes.

This research is crucial for preparing a generation capable of rapidly adapting to the ever-changing era and the complex challenges faced by society. By integrating local culture as a fundamental component in project activities, the goal is to holistically enhance students' critical thinking skills. Furthermore, by strengthening critical thinking skills through a learning approach that incorporates local culture, it is expected that students will be better equipped to tackle challenges in a more innovative and adaptive manner, thereby fostering individual development and overall societal progress. The contribution of this research is anticipated to provide new insights into the development of more contextual and practice-oriented learning approaches, as well as to deepen our understanding of how the integration of local culture can enrich the learning experience and reinforce students' critical thinking skills.

#### 1. Project Based learning (PjBL)

The Project-Based Learning (PjBL) approach is a teaching method that engages students in challenging and meaningful projects or activities. This approach encourages students to actively participate in problem-solving, explore personal interests, and apply their knowledge in real-world contexts (Stanley, 2020).

The Project-Based Learning (PjBL) approach is an instructional method that emphasizes active exploration, collaborative work, and the application of knowledge within meaningful project contexts (Suradika et al., 2023). The syntax of PjBL is outlined by Kemdikbud (2014: 34) as follows:

a) Phase 1: Establishing Essential Questions

Learning begins with essential questions, which serve to assign tasks to students as they engage in activities. These questions are formulated based on topics relevant to real-world realities and initiate a deep investigation. The questions should be challenging to answer and guide students in creating a project. Such questions are typically open-ended (divergent), provocative, challenging, require higher-order thinking skills, and are connected to students' lives. The teacher ensures that the topics raised are relevant to the students.

b) Phase 2: Designing the Project

Planning is carried out collaboratively between teachers and students. This collaboration ensures that students feel a sense of ownership over the project. The planning phase includes establishing guidelines, selecting activities that support answering essential questions, and integrating various materials as needed. Additionally, it involves identifying accessible tools and resources that can assist in completing the project.

c) Phase 3: Creating the Schedule

Teachers and students collaboratively develop a schedule for completing the project. Activities during this stage include: (1) creating a timeline for project completion, (2) setting a deadline for the project's final submission, (3) encouraging students to plan innovative approaches, (4) guiding students when they devise methods unrelated to the project, and (5) asking students to provide explanations for their time management choices. The agreed-upon schedule must be mutually accepted to allow the teacher to monitor learning progress and project work outside the classroom.

d) Phase 4: Monitoring Students and Project Progress

The teacher is responsible for monitoring students' activities while they complete the project. This monitoring is conducted by facilitating students at every stage of the process. In other words, the teacher acts as a mentor for student activities. To simplify the monitoring process, a rubric is created to record all significant activities.

e) Phase 5: Assessing the Outcome

Assessment is conducted to assist teachers in measuring the achievement of competency standards. It plays a role in evaluating each student's progress, providing feedback on the level of understanding that students have achieved, and helping teachers formulate strategies for subsequent learning.

f) Phase 6: Evaluating the Experience

At the end of the learning process, both the teacher and students engage in reflection on the activities and outcomes of the completed project. This reflection process is conducted both individually and in groups. At this stage, students are encouraged to express their feelings and experiences while completing the project. The teacher and students facilitate a discussion aimed at improving performance during the

learning process, ultimately leading to new inquiries to address the problems posed in the first phase of learning.

Assessment of project-based learning must be comprehensive, evaluating the attitudes, knowledge, and skills acquired by students throughout the learning process. In project assessment, at least three key factors need to be considered (Kemdikbud, 2014):

- 1) Management Skills: The students' ability to select topics, seek information, manage data collection time, and write reports.
- 2) Relevance: The alignment with the subject matter, taking into account the levels of knowledge, understanding, and skills within the learning process.
- 3) Originality: The projects undertaken by students should reflect their own work, considering the teacher's contributions in the form of guidance and support for the students' projects

## 2. Critical Thinking

One of the life skills that need to be developed through the educational process is thinking skills. A person's ability to succeed in life is largely determined by their thinking skills, especially in efforts to solve problems (Zubaidah et al., 2015). Critical thinking in the teaching and learning process can be exhibited by students who are able to answer the questions of how and why using a particular concept. Therefore, critical thinking skills play a crucial role in the learning process (Nurul Fazriyah, 2016)

The term "critical" comes from the Greek word "kritikos," which means to distinguish. The word "critical" is derived from the Ancient Greek "krites," which refers to a person who gives opinions, reasons with analysis, or uses considerations or observations. Etymologically, critical thinking encompasses the mental activity carried out by an individual to provide judgments using certain criteria or standards (Oktaviani, 2014). Critical thinking is associated with higher-order cognitive processes, such as analyzing and evaluating (Zubaidah et al., 2015). According to Robert Ennis, critical thinking is defined as "thinking that makes sense and focused reflection to decide what should be believed or done (Fisher, 2008)." This means reasoning that is logical and reflective in deciding what should be believed or acted upon. Critical thinking involves the ability to regulate one's judgments through processes such as interpretation, analysis, evaluation, and inference, along with presenting evidence, concepts, methodologies, criteria, or contextual factors as the foundation for decision-making (Facione, 2015). Inquiry-based learning models play a crucial role in fostering critical thinking skills among students by encouraging them to critically assess problems and explore multiple perspectives in educational contexts (Mahmud, M., Wibowo, H., & Suryani, 2018).

Saputra explains critical thinking as an organized process for solving problems that involves mental activities, including the ability to formulate problems, present arguments or opinions, conduct evaluations, and make decisions (Saputra, 2020). Based on the various viewpoints above, it can be concluded that critical thinking skills are cognitive processes that encourage students to think according to their abilities or to think reflectively about problems. The importance of critical thinking skills for elementary school students lies in their ability to face and respond to the information explosion in the digital era (Dewi, S., & Jatningsih, 2015), build quality thinking, precision, and rational thinking within themselves (Syafitri et al., 2021), and develop

students' abilities to think logically, organize problems, and solve various types of problems (Zakiah & Lestari, 2019).

Critical thinking is the ability to think clearly and rationally, analyzing information and evaluating evidence to make reasoned judgments. It involves questioning assumptions, interpreting data, and reflecting on one's own beliefs and biases. Critical thinkers can assess the credibility of sources, draw logical conclusions, and consider multiple perspectives, which is essential in navigating complex issues in today's information-rich environment. This skill not only fosters independent learning but also prepares individuals to solve real-world problems effectively and make informed decisions

## **METHOD**

This research is a development study that employs the 4D model approach. The 4D model consists of four main stages: Define, where the needs and objectives of the research are identified; Design, which involves creating the product design; Development, focusing on product trials and revisions; and Dissemination, where the product is distributed after undergoing a validation process (Sugiyono, 2020). The research is conducted in the Early Childhood Education Teacher Program at Universitas Bengkulu from August to September 2024. The population of the study includes students from the Early Childhood Education Teacher Program, with a limited trial subject group consisting of 9 students with varying abilities (high, medium, and low). The field trial involves one class comprising 15 third-semester students for the 2024/2025 academic year.

The data analysis technique used to assess the validity and practicality of the model employs a rating method with five validity categories: very valid (5), valid (4), fairly valid (3), less valid (2), and not valid (1). The effectiveness of the local culture-based PjBL model is tested using an independent sample t-test on critical thinking skills test results.

## **RESULT AND DISCUSSION**

### **1. Define**

The Define stage is the initial phase for establishing the requirements for developing a learning model that meets user needs. It consists of five analytical stages: (a) initial and final analysis; (b) curriculum analysis; (c) student analysis; (d) content analysis; and (e) analysis of the final learning objectives. These five analytical stages can be conducted through field observations and literature reviews. Additionally, during this stage, focus group discussions (FGDs) are held as an initial step in defining the learning model to be developed in collaboration with expert teams.

### **2. Design**

The product design stage is the initial phase for developing the learning model, which includes: (a) media selection; (b) learning format; and (c) initial product design. The research media used is a guide for the Project-Based Learning (PjBL) research project, systematically structured in accordance with the local culture of Bengkulu City. The developed learning format is project-based learning, specifically in the context of developing fine motor skills.

The project involves visits to batik BESUREK artisans, LANTUNG craftsmen to create miniatures of the Rafflesia flower and other miniatures, TABOT makers, Marlborough Fort, and the Bung Karno House. This activity will not only enhance students' critical skills but also encourage them to better understand and appreciate the local culture of Bengkulu. Furthermore, the outcomes of the research project can be presented in the form of papers, presentations, and works referred to as research products.

In the initial product design, a concept emerges in the process of generating new knowledge from the PjBL model. This model can be categorized into two distinct processes based on the activities involved. The first process is content-matter culture, which means that new knowledge will be derived from the materials studied beforehand. This information is then linked to the fine motor skills being learned to identify which aspects of culture are relevant and interconnected with these fine motor concepts. The second process is culture content-matter, indicating that new knowledge will be gained by first observing and engaging with local culture, followed by exploring the connections between the observed culture and the known concepts of fine motor skills.

The following are the characteristics and syntax that form the initial design in developing the Project-Based Learning (PjBL) model integrated with local culture. The designed syntax also includes the identification of the culture to be studied.

Table 1.  
 Characteristics and Syntax of the PjBL Model Integrated with Local Culture

Development Sequence	Description	Characteristics of the PjBL Learning Model	Syntax of the PjBL Learning Model
Initial Model Design	Developed based on the Project-Based Learning model and the integration of local cultural value	Learner-Centered Learning Emphasizes Connection Skills Emphasizes Critical and Creative Thinking Skills Generates New Knowledge The Produced Product Contains Cultural Elements	Preliminary Stage Cultural Identification Stage Problem Identification Stage Design and Project Implementation Schedule Stage Project Implementation Stage Product Creation Stage Product Evaluation Stage Final Evaluation Stage

### c. Results of Product Testing

#### 1) Results of Expert Validation

The validation phase is the initial step to assess the feasibility of the PjBL model by experts. The validation of the PjBL model involves three experts: (a) Validator I, Dr. Nina Kurniah, M.Pd, (b) Validator II, Dr. Didik Suryadi, MA, and (c) Validator III, Prof. Dr. Riyanto, M.Pd. The results of the validation of the PjBL model from each validator can be seen in Table 2.

Table 2.  
 Results of the Validity Analysis of the PjBL Model

Validator	Score	Category
I	39	High
II	37	High
III	38	High
Total	114	
Average	38	High

Based on the validity analysis of the PjBL model from the three validators mentioned above, it was found that all three validators rated the validity as "High" for the developed PjBL model. It can be concluded that the PjBL model is considered valid with a "High" validity category. The validity assessment of the PjBL model for each component was also conducted to gain a more detailed understanding of the model's validity. The results of the component-based validity analysis of the PjBL model can be seen in Table 3.

Table 3.  
 The Results of the Component-Based Validity Analysis of the PjBL Model

Supporting Theory	I	High
	II	High
	III	Very High
Average	High	
Structure of the PjBL Model	I	Very High
	II	High
	III	Very High
Average	Very High	
Desired Outcomes	I	High
	II	High
	III	Very High
Average	High	
Teaching Methodology	I	High
	II	High
	III	Very High
Average	High	
Evaluation and Feedback	I	High
	II	High
	III	Very High
Average	High	

Based on Table 3, it is evident that the average validity assessment from the three validators is categorized as high. This evaluation pertains to the PjBL model for each component. Here are some suggestions from the validators regarding improvements to the developed PjBL model:

- a. Validator I advises adding theories related to local culture
- b. Validator II suggests providing a more detailed explanation of the model and its characteristics to clearly present the developed components.

- c. Validator III recommends enhancing the organization of the writing and language used in the developed model book.

## 2. Results of limited trial

This phase was conducted on a small scale, involving 9 students with varying academic abilities: 3 students with high ability, 3 with moderate ability, and 3 with low ability, as well as 1 course lecturer. The assessment results from the limited trial with these nine students are presented in Table 4.

Table 4.  
Practicality Assessment of the Culturally Integrated PjBL Model in the Limited Trial Phase

Evaluator	Ability categories	Total Average Score	Interval	Practicality Category
Lecturer	-	51	$50,4 < x < 61,2$	Praktis
Student	High	29	$28 < x < 34$	Practical
	Medium	35	$x > 34$	Very practical
	Low	34	$x > 34$	Very practical

Based on Table 4, the practicality assessment of the PjBL model by the course instructor received an average score of 52, classified as "practical." The average score from the nine students was 35.13, also categorized as "practical." In general, the practicality evaluation of the culturally integrated PjBL model by both the instructor and the students indicates that the PjBL model is practical and suitable for use in the learning process during the field trial phase.

### 1. Field Trial Result

#### a) Practicality testing phase of the PjBL model

The field trial involved assessments by both the course lecturer and the students. The course lecturer evaluated the PjBL model that had been implemented. Additionally, all 15 students in the research class participated in evaluating the model. The evaluation of practicality was conducted by filling out the provided assessment sheets. Table 5 presents the results of the practicality assessment conducted by both the course lecturer and the students during the field trial of the PjBL model integrated with local culture. The practicality scores for the lecturer and students were based on the number of statements in their respective evaluation sheets, leading to different practicality interval categories for the two groups, as shown in Table 5.

Table 5.  
Results of the Practicality Assessment of the PjBL Model Integrated with Local Culture

Evaluator	Average score	Interval	Category
Lecturer	53	$50,4 < x < 61,2$	Practical
Student	35,13	$x > 34$	Very practical

#### b) Stage of Testing the Effectiveness of the Locally Integrated PjBL Model

The effectiveness testing phase is conducted through pre-tests and post-tests assessing critical thinking skills in a broad research class. The effectiveness of the model is evaluated based on the initial test (pre-test) used to determine the students' capabilities



before implementing the PjBL model. The end-of-learning test (post-test) is employed to assess the final abilities of the students after using the locally integrated PjBL model.

The analysis of pre-test and post-test scores in critical thinking, integrated with local culture, illustrates the effectiveness of the developed PjBL model. Statistical analysis is performed using the t-test to determine the significance of the differences in students' abilities before and after utilizing the locally integrated PjBL model. Prior to conducting the t-test, normality and homogeneity tests are carried out as prerequisites. Both datasets (pre-test and post-test) have been tested and satisfy the prerequisites for subsequent analysis using the parametric independent sample t-test. The results of the t-test for critical thinking skills are presented in Table 6.

Table 6.  
 t-Test for Pre-Test and Post-Test Data on Critical Thinking Skills  
 t-test for Equality of Means: Conclusion and Notes (Variances Not Assumed)

T	df	Sig (2-tailed)	Ho rejected	The average post-test score is higher than the average pre-test score.
53,013	14	0,000		

The significance value obtained from the independent sample t-test for critical thinking skills is 0.000, leading to the rejection of Ho. This indicates that H1 is accepted, meaning that the average post-test scores for students' critical thinking skills are significantly higher than their average pre-test scores. The significance of the difference in critical thinking skills before and after using the culturally integrated PjBL model demonstrates that the developed PjBL model is effective for the course on Developing Fine Motor Skills.

This research adopts the 4D development model, which consists of four stages: Define, Design, Development, and Dissemination, serving as a systematic framework for developing a locally integrated Project-Based Learning (PjBL) model. In the Define stage, an in-depth analysis of user needs is conducted, including curriculum analysis and student characteristics. This aligns with constructivist theory, which emphasizes that effective learning should be built on experiences and contexts relevant to students (Creswell, 2018). Through this approach, the resulting PjBL model not only meets academic standards but is also relevant to the local culture of Bengkulu, which is expected to enhance student motivation and engagement in the learning process.

In the design stage, the PjBL model is created with consideration for learner-centered characteristics. Research indicates that learning models focused on developing critical and creative thinking skills can significantly improve student learning outcomes. In this context, projects such as visits to batik artisans and the creation of culture-based miniatures serve as practical activities that effectively link theoretical knowledge with real-world practice (Larmer, J., & Mergendoller, 2019). In this way, students not only learn about fine motor skills but also understand and appreciate local cultural values, which are integral to meaningful learning.

The results of the validity test and limited trials indicate that the developed PjBL model has high levels of validity and practicality. Integrating local contexts in project-based learning can enhance the relevance and effectiveness of education (Bell, 2020). The findings of this study provide evidence that the locally integrated PjBL

model is not only effective in improving students' critical thinking skills but also contributes to the development of social skills and cultural understanding. Therefore, the implementation of this model is expected to enrich students' learning experiences and enhance the quality of education in the Early Childhood Education Teacher Program at Bengkulu University.

## CONCLUSION

The development of a locally integrated Project-Based Learning (PjBL) model in the Early Childhood Education Teacher Program at Universitas Bengkulu has demonstrated significant potential in enhancing critical thinking skills among students. Through the structured 4D model approach—Define, Design, Development, and Dissemination—this research has effectively aligned educational practices with the cultural context of Bengkulu, promoting a deeper understanding and appreciation of local heritage.

The validation and limited trial results indicate that the PjBL model is both valid and practical for implementation in educational settings. By engaging students in hands-on projects related to their cultural environment, the model not only fosters critical and creative thinking but also enhances social skills and cultural awareness. This integration of local culture into the learning process contributes to a more meaningful educational experience, making learning relevant and applicable to students' lives.

In conclusion, the findings suggest that adopting the locally integrated PjBL model can significantly improve educational outcomes in the Early Childhood Education Teacher Program. This model serves as a promising framework for future educational practices, encouraging educators to consider local contexts when designing curricula that aim to develop essential skills in students. The research underscores the importance of culturally relevant education in shaping well-rounded individuals who are equipped to engage with their communities.

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