Vifada Journal of Education , E-ISSN 3021-713X

Development of LKPD in the Context of the Thomas Parr Monument for the Ability to Think Critically in Junior High School Classroom VIII Building Materials

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Received: 2026, 06,25 **Accepted**: 2026, 07,20
Available online: 2026, 08, 28

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KEYWORDS

Keywords:
Student Worksheet, Ethnomathematics, Thomas Parr Monument, Critical Thinking, Solid Geometry.

ABSTRACT

This study aims to develop a Student Worksheet (LKPD) based on the ethnomathematics of the Thomas Parr Monument for solid geometry in Grade VIII junior high school that is valid and practical to support students' critical thinking skills. The study employed a Research and Development (R&D) method using the 4D development model (Define, Design, Develop, Disseminate), but was limited to the Develop stage. The procedures included needs and student analysis, LKPD design, product validation, revision, and field testing. Validation was conducted by two validators using an instrument covering content feasibility, presentation, language, graphics, appearance, and application. The practicality test involved 30 Grade VIII A students of SMP Negeri 7 Bencoleen and one mathematics teacher. The results showed an average validation score of 82.19%, categorized as valid. The practicality response from students reached 81.2%, while the teacher response reached 87.5%, both categorized as practical. The LKPD integrates the Thomas Parr Monument context with critical thinking indicators, namely interpretation, analysis, evaluation, inference, and explanation. Thus, the developed LKPD is valid and practical for use as mathematics teaching material on solid geometry. The study has not yet tested the effectiveness of the LKPD in improving learning outcomes or students' critical thinking skills.

1. Introduction

Mathematics learning in junior high school students are not only required to understand concepts, but also to acquire the ability to think critically, which is a 21st century skill (Mukaromah, 2023). However, the results of the study show that Indonesian students still lack in critical thinking mathematically, especially in solving contextual problems in accordance with PISA (Mardliyah, Herman and Febrianti, 2024). One of the factors causing this is that learning mathematics is still procedural and less related to students' real-world situations (Widodo, 2021). Today, the success of education does not depend on what students learn, but on their ability to solve problems and think critically which is one of the very important thinking skills (Syahril & Saragih, 2021). High-level thinking skills, which include critical, innovative, collaborative, and communicative thinking skills, are essential in 21st century education. These skills are needed for students to be able to face the challenges of globalization, technological advancements, and the complexities of social life. Mathematics is one of the subjects that is very important to improve those skills. Students are not only taught concepts and techniques, but also trained to think logically, analytically, systematically, and critically in mathematics.

Critical thinking skills are the ability of learners to analyze problems, interpret data, evaluate arguments, and make rational decisions based on evidence. This ability helps students understand math concepts more deeply than just memorizing formulas (Fauziah Adelis, et al, 2025). Critical thinking skills are the ability of students to understand mathematical concepts more deeply, so that they not only memorize formulas, but also understand the process of solving them. Critical thinking skills also allow learners to analyze problems, assess information, and find appropriate solutions (Siti, Gumilang and Tsurayya, 2021). Critical thinking skills are one of the essential skills of the 21st century

that support logical reasoning, problem-solving, and the application of mathematics in real life. Actively designed and contextual learning can help learners improve their critical thinking skills (Sumarna and Rahmawati, 2024). In math learning, activities such as problem analysis, reasoning, and contextual problem-solving can help improve students' critical thinking skills (Harahap, Bentri and Musdi, 2024). Students who have critical thinking skills tend to be more active in lessons and better at solving math problems (Khafidh and Sajiman, 2025).

According to the Ministry of Primary and Secondary Education (Kemendikdasmen) No. 13 of 2025, the Merdeka curriculum in Phase D mathematics learning emphasizes reasoning, problem-solving, analysis, evaluation, interpretation, and drawing conclusions that support the development of students' critical thinking skills. Mathematics learning at the junior high school level in the Independent Curriculum requires students not only to understand mathematical concepts and procedures, but also to be able to apply knowledge to solve problems. These demands include thought processes such as interpreting, analyzing, evaluating, concluding, and giving logical reasons for the answers obtained. These processes are closely related to the development of students' critical thinking skills.

One of the efforts that can be made to develop students' critical thinking skills is to apply ethnomathematics-based learning. Ethnomathematics relates mathematical concepts to the culture and living environment of students, so that students are faced with contextual problems that encourage them to identify information, analyze mathematical relationships, provide reasons, evaluate solution strategies, and draw conclusions. Thus, the use of local cultural contexts in mathematics learning can create more meaningful learning while supporting the development of students' critical thinking skills (Wahyu, Retno and Ardyanti, 2023). Based on the results of initial observations and interviews, students have not received specific ethnomathematics learning. Mathematics learning that takes place still uses more textbooks and examples of general problems. Therefore, research on developing LKPD using the context of the Thomas Parr Monument so that students can see the relationship between the concept of building space and the local culture in their environment.

Ethnomathematics relates the concept of mathematics to the culture, traditions, customs, and daily activities of the community. This allows students to learn math more contextually because the material is associated with their local culture. This approach helps students understand mathematical concepts while also fostering a love for their local culture (Pratiwi, Nurmaina and Aridho, 2022). The new study shows that ethnomathematics not only serves as a learning method but also serves to preserve local culture. Cultural elements such as traditional houses, traditional games, batik, regional dances, historical buildings, and community activities can be used in mathematics learning to explain the concepts of geometry, number patterns, statistics, and measurements (Hermanto, 2025). In mathematics learning, the application of ethnomathematics can be one of the approaches that supports increasing student interest and involvement, understanding of mathematical concepts, creativity, and critical thinking skills through associating mathematical concepts with cultural contexts that are close to students' lives (Kurniawati and Anwar, 2024). The use of ethnomathematics can also enhance an active, interactive, and fun learning atmosphere because students can learn through cultural experiences they are familiar with (Tindaon *et al.*, 2025). Ethnomathematics relates the concept of mathematics to the culture, traditions, customs, and daily activities of the community. This helps students understand mathematics more contextually because the material is associated with their own cultural environment (Pratiwi, Nurmaina and Aridho, 2022).

D'Ambrosio (1985), a mathematician from Brazil, first introduced ethnomathematics, who said that ethnomathematics is the result of mathematical activities influenced by the surrounding culture. This concept emphasizes the relationship between mathematical knowledge and the cultural practices of society. Ethnomathematics serves as a bridge between education and culture, offering students knowledge with values that are easy to understand as they relate to habits. Thus, these habits can be integrated with the traditions and customs of the people around them as they teach math. By using ethnomathematics when teaching mathematics, learning becomes more meaningful. Understanding how culture and mathematics are related, particularly as it relates to mathematics, will help students and society understand mathematics better. Another goal of ethnomathematics

education is to utilize culture, including ways of thinking, working, behaving, and speaking, particularly as it relates to mathematics. Characteristics as markers of an area and its culture can be used in ethnomathematics, such as historical buildings, typical foods, tourist attractions, and sociocultural activities (Farida Abadi, Kusuma Anggun Badu, Hanum Agus Maman Abadi, 2024). This method increases students' cultural appreciation and enhances their critical thinking abilities in addition to improving their understanding of mathematical concepts. Therefore, ethnomathematics can be a source of learning for students, especially those related to mathematics, as it allows them to develop creativity in solving problems (Agustina, Jumri and Ariani, 2025).

The Thomas Parr Monument is a historical monument of the British colonial period in the city of Bengkulu which was built in memory of Thomas Parr, the British Resident in Bengkulu who died in 1807. The monument was built in 1808 and is located not far from Fort Marlborough. Architecturally, the Thomas Parr Monument has an octagonal shape, equipped with columns and a dome-shaped roof. The Thomas Parr Monument is called *the Bulek Cemetery* by the people of Bengkulu. The British erected this monument as a tribute and tribute to Thomas Parr while for the people of Bengkulu it is interpreted as a tribute to the unknown warriors who died in their resistance and defended the rights and independence of their ancestral lands from British colonial oppression.

In Bengkulu, the Thomas Parr Monument has interesting features to study. In addition to incorporating mathematical concepts such as geometry and patterns, which are relevant for education, its architectural design reflects the British colonial style with symmetrical pillars and monumental geometric structures. This monument, built in 1808 to commemorate Thomas Parr, the murdered British Resident, has historical value. It served as a representation of British colonial power in the archipelago at that time. Because it is in the center of Bengkulu and is easily accessible, this monument is an icon of the city's history. In addition, it shows the cultural relationship between countries and locals. The Thomas Parr monument has many facets. In addition to being a historical relic, it is also an inspiration for education, research, and the preservation of cultural values (Agustina, Jumri and Ariani, 2025)

Previous research on ethnomathematics supported the research of the Thomas Parr Monument in Bengkulu by showing how mathematical concepts could be found. Previous research has shown that cultural heritage such as monuments, monuments, and traditional artifacts contain mathematical values that can be interpreted in geometric, symmetry, and other contexts. Ethnomathematics in this study will examine the mathematical concepts contained in the Thomas Parr Monument building in Bengkulu. The Thomas Parr Bengkulu Monument is a colonial heritage from the British. The purpose of this study is to identify the mathematical concepts contained in the Thomas Parr Bengkulu Monument building.

The Thomas Parr Monument was chosen as the object in this study because it is one of the historical and cultural relics that is part of the identity of Bengkulu City. According to (Agustina, Jumri and Ariani, 2025) It also shows the existence of mathematical concepts such as semicircles, semi-spheres, rectangles, tubes, conjunctions, and parallel lines on the Thomas Parr Monument. The mathematical concepts contained in the Thomas Parr Monument can be used as a "**Contextual Learning Medium through Colonial Heritage Objects**" and can be developed into teaching materials such as modules and LKPDs. Therefore, the researcher sees that the Thomas Parr Monument has the potential as a relevant ethnomathematical context to be developed into LKPD in building space materials while providing activities that encourage students' critical thinking skills.

Figure 1. Thomas Parr Monument

According to the Ministry of Education, Culture, Research, and Technology of the Republic of Indonesia in 2022, the materials for building spaces in junior high schools include students' ability to recognize and solve problems with cubes, blocks, prisms, and limas using problem-solving and contextual approaches. To understand the shape of everyday objects such as cubes, beams, prisms, pyramids, tubes, cones, spheres, and so on, Build space is a branch of geometry that studies shapes with length, width, and height. Junior high school students can gain a better understanding of the concept of building space by using technology-based geometry learning media (Wahyudi et al., 2022). Geometry is a field of mathematics that studies the shape, size, position, and properties of space. Therefore, it is very important for students to understand the concept of building space and visualizing their space (Amaliyah *et al.*, 2022).

One type of teaching material that can be used to help students learn more actively and in a targeted manner is the Student Worksheet (LKPD). LKPD can be designed in the form of activities that help students understand the material, find concepts, process information, and solve problems. In mathematics learning, the use of LKPD that is adjusted to the characteristics of students can produce better results. LKPD can also help learners understand and interpret problems, analyze data, create solution strategies, evaluate results, and draw conclusions. By using the model *4D*, ethnomathematics-based LKPD can be developed. Validity, practicality, and effectiveness are the factors that determine how well the application is (Fitriana, Putra and Murtinasari, 2024). Thus, ethnomathematics-based LKPD can be a teaching material that not only helps students understand mathematical concepts, but also connects mathematics with the culture in their environment. Thus, LKPDs based on ethnomathematics can be teaching materials that help students understand mathematical concepts and make connections between mathematics and the culture in their environment. This study uses the context of the Thomas Parr Monument as an ethnomathematical source because the shape and structure of the building contain geometric elements that can be associated with the building material of the space. It is expected that by using this context, learners will be motivated to develop their critical thinking skills through the process of problem-solving, analysis, reasoning, evaluation, and evaluation. They will also see more real math problems (Lucia Ambarwati, 2023).

2. Research Design and Methodology

Implementation Method

This research is a research and development (*Research and Development/R&D*) which aims to produce a product in the form of an ethnomathematics-based LKPD of the Thomas Parr Monument on the building material of the VIII classroom of junior high school. Research using a development model *4D (Four-D Model*), which consists of a *Define* (definition), *Design* (planning), *Develop* (development), and *Disseminate* (spread) (Sihombing, 2024). The research is limited to the stage *Develop* because the main purpose of the research is to produce valid and practical LKPD as teaching materials.

Design and Implementation Procedure

At the *definition* stage, the researcher conducts an analysis of the need for learning facilities, especially to measure critical thinking skills in accordance with the curriculum. After that, the researcher conducted an analysis on students to identify the characteristics of students in grade VIII as a basis for determining the type, language, and activities of LKPD to be developed. Phase D of the Independent Curriculum allows grade VIII students to understand more abstract mathematical concepts and begin to be able to reason, analyze data, evaluate strategies, and draw conclusions. However, learning activities that allow learners to interpret information, analyze the masses, and draw conclusions are still necessary to improve their critical thinking skills. As a result, the LKPD was developed through contextual activities and used the Thomas Parr Monument as an ethnomathematical context. This is done so that students can more easily connect the concept of building a space with their local culture and environment. And the analysis of the learning process is carried out to find out how mathematics is taught in grade VIII and to find the problems that arise

during the learning process. The results of preliminary observations show that the mathematics learning process still tends to depend on textbooks as the main learning resource, and learning activities have not fully provided opportunities for students to learn problems independently. Students' activities should be improved in understanding problems, analyzing data, evaluating solution strategies, drawing conclusions, and providing reasons. In addition, the lack of use of local cultural contexts in mathematics learning causes learners to lack significant experience in connecting mathematical concepts to the environment of daily life. This condition shows that teaching materials that allow students to actively participate in activities and help them learn to think critically. Therefore, the ethnomathematics-based LKPD is designed by considering the Thomas Parr Monument in the building materials of classroom VIII.

At the *design stage*, the researcher designed the LKPD based on the results of the analysis of needs, student characteristics, and the learning process at the *definition stage*. Using the Thomas Parr Monument as an ethnomathematical context, LKPD is designed for grade VIII students on space building materials. The LKPD includes the preparation of materials, the selection of formats, the preparation of learning activities, and the design of displays. The material is systematically arranged and associated with the shape and characteristics of the Thomas Parr Monument so that students can relate the concept of building a space to their culture and environment. LKPD activities aim to help students understand and solve problems independently. Each assignment aims to improve critical thinking skills through the process of interpretation, analysis, evaluation, inferences, and explanation. LKPD also has drawings of the Thomas Parr Monument, work instructions, contextual information, ignition questions, and problems with building spaces. In addition, there is space for learners to write the process and reasons for completion. The language used is adapted to the nature of grade VIII students so that it is easier to understand. The initial prototype of the LKPD was built on that design, and will be used in the Develop stage for validation by validators. Suggestions and inputs from validators are then used as a basis for product revisions and improvements.

In the Develop stage, the initial prototype of the LKPD that has been designed in the Design stage is developed during the Development stage. The product validation and revision process is carried out during this stage. To assess the feasibility of the LKPD in terms of content, presentation, language, and suitability with critical thinking skills and the ethnomathematical context of the Thomas Parr Monument, expert validators conducted validation. They provide evaluations and recommendations for improvements to the prototypes that have been developed. Furthermore, the researcher made improvements based on validator input for the material, activities, language, and display of the LKPD. After the repair, the researcher made a prototype of the repair, which was then tested for practicality through the responses of teachers and students. The results of validation and practical tests were used to determine whether LKPD is feasible and easy to use as a mathematics teaching material for grade VIII.

Research Place and Subject

The research was carried out at SMP Negeri 7 Bengkulu City. The field trial involved 30 students of class VIII A and one mathematics teacher. Before the practicality test stage, the product is validated by two validators, a material expert, a media expert and a linguist. Validation includes the suitability of the building materials, the ethnomathematical context of the Thomas Parr Monument, indicators of critical thinking ability, presentation, design, and readability of the LKPD. The validation results are used as the basis for product improvement. Students responded to the use of LKPD, while teachers gave an assessment of the practicality of LKPD.

Research Instruments

The research instrument consists of validation sheets and practicality questionnaires. The validation sheet is used to assess the feasibility of the LKPD in terms of content, presentation, language, graphics, appearance, and application. The content aspect includes the suitability of learning objectives with activities, the relationship between reading texts and activities, the suitability of critical thinking indicators with activities, the ability of activities to stimulate critical thinking, and the suitability of LKPD with the needs of students. Aspects of presentation include the

collapse of the activity, the suitability of the title, the relationship between activities, the integrity of the meaning of the activity, and the clarity of the instructions. Language aspects include the rules of the Indonesian language, ease of understanding, suitability with the development of junior high school students, and communicative nature. The practicality questionnaire consists of a questionnaire of the response of teachers and students. The teacher's questionnaire covers aspects of content, presentation, language, and graphics, while the student questionnaire includes aspects of design, materials, and language. The questionnaire is used to determine the ease of use, readability, attractiveness, and suitability of LKPD in learning.

Data Analysis Techniques

The data was analyzed in a quantitative descriptive manner by calculating the percentage of the validation result score and user response. The maximum value of validation is obtained from the number of items multiplied by the maximum score of each item and the number of validators. The score obtained is the sum of the scores of all validators. The percentage of validity is calculated by comparing the score obtained with the maximum score then multiplied by 100%.

Table 1. Table of Validity Criteria

Interval	Criteria
81% - 100%	Very valid
61% - 80%	Valid
41% - 60%	Valid enough
21% - 40%	Less Valid
0% - 20%	Invalid

Source : (Rahman, Y., & Cerya, 2023)

The validity analysis is calculated by using the validation score percentage of the validator.

- $PV_1 = \frac{Score\ V_1}{Score\ maximuml} \times 100\%$
- $PV_2 = \frac{score\ V_2}{Score\ Maximum} \times 100\%$
- $\bar{P} = \frac{\text{Persentase } V_1 + \text{Persentase } V_2}{2}$

Description:

- $Pv_1 = validator\ score\ 1\ in\ percent$
- $Pv_2 = validator\ score\ 1\ in\ percent$
- $\bar{P} = Average\ validation\ score\ in\ percent$

Table 1. Practicality Criteria

Interval	Criteria
81% - 100%	Very practical
61% - 80%	Practical
41% - 60%	Quite practical
21% - 40%	Less practical
0% - 20%	Impractical

Source : (Rahman, Y., & Cerya, 2023)

The analysis of the practicality of students is usually calculated using the percentage of validation scores from the students. The formula that can be used is:

- $P_r R_i = \frac{Score\ R_i}{Score\ maximum} \times 100\%.$
- $\bar{P_r} = . \frac{\sum P_r R_i}{n}$

Description:

- $P_r = Percentage\ of\ respondents$
- $R_i = Percentage\ of\ respondents$
- $\bar{P_r} = average\ score\ of\ respondents\ in\ the\ process$
- $n = quantity\ of\ respondent$

3. Findings and Discussion

3.1. Findings

Define Stage

In the *Define* stage, observations were made at SMP Negeri 7 Bengkulu City. At this stage, the researcher conducts an analysis of the need for learning facilities, especially to measure critical thinking skills in accordance with the curriculum. After that, the researcher conducted an analysis on students to identify the characteristics of students in grade VIII as a basis for determining the type, language, and activities of LKPD to be developed. Phase D of the Independent Curriculum allows grade VIII students to understand more abstract mathematical concepts and begin to be able to reason, analyze data, evaluate strategies, and draw conclusions. However, learning activities that allow learners to interpret information, analyze the masses, and draw conclusions are still necessary to improve their critical thinking skills. As a result, the LKPD was developed through contextual activities and used the Thomas Parr Monument as an ethnomathematical context. This is done so that students can more easily connect the concept of building a space with their local culture and environment. And the analysis of the learning process is carried out to find out how mathematics is taught in grade VIII and to find the problems that arise during the learning process. The results of preliminary observations show that the mathematics learning process still tends to depend on textbooks as the main learning resource, and learning activities have not fully provided opportunities for students to learn problems independently. Students' activities should be improved in understanding problems, analyzing data, evaluating solution strategies, drawing conclusions, and providing reasons. In addition, the lack of use of local cultural contexts in mathematics learning causes learners to lack significant experience in connecting mathematical concepts to the environment of daily life. This condition shows that teaching materials that allow students to actively participate in activities and help them learn to think critically. Therefore, the ethnomathematics-based LKPD is designed by considering the Thomas Parr Monument in the building materials of classroom VIII.

Design Stage

At the *design stage*, the researcher designed the LKPD based on the results of the analysis of needs, student characteristics, and the learning process at the *definition stage*. Using the Thomas Parr Monument as an ethnomathematical context, LKPD is designed for grade VIII students on space building materials. The LKPD includes the preparation of materials, the selection of formats, the preparation of learning activities, and the design of displays. The material is systematically arranged and associated with the shape and characteristics of the Thomas Parr Monument so that students can relate the concept of building a space to their culture and environment. LKPD activities aim to help students understand and solve problems independently. Each assignment aims to improve critical thinking skills through the process of interpretation, analysis, evaluation, inferences, and explanation. LKPD also has drawings of the Thomas Parr Monument, work instructions, contextual information, ignition questions, and problems with building spaces. In addition, there is space for learners to write the process and reasons for completion. The language used is adapted to the nature of grade VIII students so that it is easier to understand. The initial prototype of the LKPD was built on that design, and will be used in the Develop stage for validation by validators. Suggestions and inputs from validators are then used as a basis for product revisions and improvements.

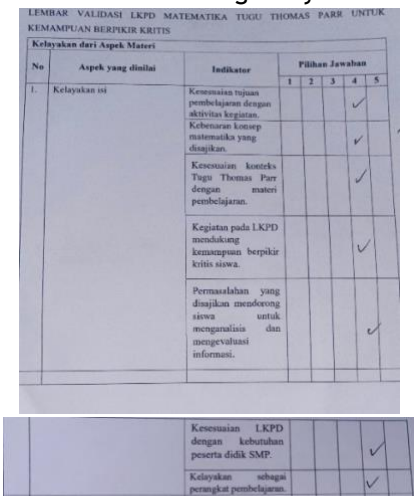
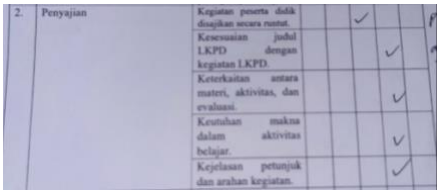
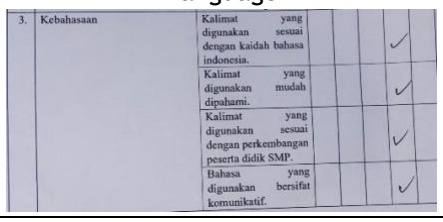
Develop Stage

Furthermore, the *Develop stage* is that at this stage the LKPD is validated to determine the feasibility level of the LKPD before being used in the trial. The product is validated by validators who have competence according to the field being studied. Validators provide assessments on several aspects, such as **the feasibility of content, presentation and language. Conformity with ethnomathematics, as well as indicators of critical thinking ability**. The process of product validation and revision is carried out during this stage. They provide evaluations and recommendations for improvements to the prototypes that have been developed. After the LKPD is declared feasible based on the results of validation and revision, then **a practicality test** is carried out. The practicality test aims to determine the ease of use of LKPD in the learning process. This test

can involve **mathematics teachers and grade VIII students**. The final stage of Develop is to revise based on the results of practicality and validation tests. To improve the critical thinking skills of students in grade VIII, revisions were made to the LKPD section which still needs improvement. This improvement includes materials, language, displays, learning activities, and presentation of problems related to critical thinking skills.

The LKPD prototype was validated by two validators. The assessment includes three aspects, namely the feasibility of content, presentation, and language. The results of the validation recapitulation are presented in Table 3

Table 3. Results of LKPD validation by two validators

No.	Validated Aspects	Score obtained		Maximum Score	Percentage of Validators		Average Percentage	Criteria
		V_1	V_2		V_1	V_2		
1.	Content eligibility 	28	30	58	0,8	0,85	82,8%	Very valid
2	Presentation 	19	21	40	0,54	0,6	80%	Valid
3	Language 	16	17	33	0,45	0,48	82,5%	Very valid
	Average				0,825		82,5%	Very valid

Testing the Practicality of Students

The field trial involved 30 students of class VIII A SMP Negeri 7 Bengkulu City and one mathematics teacher as an observer. The trial was carried out during two meetings. At the first meeting, students formed a group consisting of five people and worked on activities 1 to 4. At the second meeting, students presented the results of the group's work and filled out a questionnaire in response to the LKPD.

Table 5. Results of the Student Response Questionnaire

Yes	Aspects assessed	Scores obtained	Maximum score	Value of practicality	Categories
1	Design	317	360	81,5%	Practical
2	Material	486	600	81%	Practical
3	Language	488	600	81,3%	Practical
	Overall average			**81,2%**	**Practical**

From the results of the students' practicality questionnaire, the aspect with the highest practicality value results is the design aspect. In this case, students liked the design of the LKPD that was made. These results also show that LKPD is considered practical in terms of design, materials, and language.

Teacher Practicality Test

Table 6. Results of the teacher's practical questionnaire

Yes	Aspects assessed	Scores obtained	Maximum score	Value of practicality	Categories
1	Contents components	21	24	87,5%	Practical
2	Presentation aspect	10	12	83,3%	Practical
3	Language aspects	4	4	100%	Practical
4	Graphics	7	8	87,5%	Practical
	Overall average			**87,5%**	Practical

Based on table 6, the results of the questionnaire on the practicality of mathematics teachers in the linguistic aspect obtained the highest score which shows that the language used in the LKPD is considered feasible and in accordance with the standards with EYD writing.

3.2. Discussion

The results of the development show that LKPD that raises the context of the Thomas Parr Monument can be an alternative teaching material that connects mathematical concepts with local culture. At the Define stage, the limitation of learning resources and the dominance of the use of printed books became the basis for the development of LKPD. The use of cultural context makes the material build space closer to the students' environment and supports contextual learning.

The LKPD integrates five indicators of critical thinking ability. Interpretation is directed at the ability to understand information about the Thomas Parr Monument and determine the information that is known and questioned. The analysis directs students to model the building parts into the shape of the building space and choose the right concept. Evaluation requires students to check the accuracy of strategies and calculation results. Inference directs students to make conclusions based on information and calculation results, while explanatory requires students to explain the process and reasons for using concepts or formulas.

An average validation value of 82.5% indicates that the product has met the very valid criteria. These findings are in line with research (Talo *et al.*, 2022) which shows that ethnomathematics-based LKPD can be developed as a viable teaching material. The results of the practicality of students by 81.2% and teachers by 87.5% showed that the product was easy to use and

acceptable in learning. The difference in the response of teachers and students can be influenced by the assessment point of view; Teachers assess the function and feasibility of the product, while students assess based on direct experience when doing activities.

Theoretically, the results of the research support the use of ethnomathematics as a context of mathematics learning that connects concepts with the cultural environment. Practically, LKPD can be used by teachers as contextual teaching materials in building spaces. However, this study has only tested the validity and practicality so that the effectiveness of LKPD in improving critical thinking skills or learning outcomes cannot be concluded.

Conclusion

The ethno-based mathematics LKPD of the Thomas Parr Monument for critical thinking skills in the building materials of the VIII Junior High School classroom has been developed using a 4D model up to the Develop stage. The product obtained an average validation of 82.5% with a valid category. Practicality based on the responses of 30 students obtained an average of 81.2% and the teacher's response obtained an average of 87.5%, both of which are included in the practical category. Thus, the LKPD developed is declared valid and practically used as a mathematics teaching material that integrates the local cultural context and indicators of critical thinking ability. Belum research tested the effectiveness of LKPD on learning outcomes or improving critical thinking skills.

Acknowledgment

The author would like to thank all parties who have assisted the author in completing the creation of this article. The author also thanks the author's parents for praying and supporting the author in completing this article. The author would like to thank especially the supervisors, heads of study programs and mathematics education lecturers who have supported the implementation of this research. The author also expressed his gratitude to SMP Negeri 7 Bengkulu City, school principals, mathematics teachers, and students of class VIII A who have given permission, assistance, and participated in the LKPD trial process. Thank you also to the validators who have provided assessments, inputs, and suggestions for improving the developed products. Lastly, the author would like to thank himself for being at this point, even though sometimes the author feels hopeless and feels left behind, but the writer can finish everything well. The author appreciates all parties who have provided support, both directly and indirectly, so that the research and preparation of this article can be completed properly.

Statement on the Use of Generative Artificial Intelligence(AI)

During the preparation of this manuscript, the authors used generative artificial intelligence (AI) tools solely to support the scientific writing process. Specifically, Grammarly was used to improve grammar, language quality, readability, and writing clarity. The AI tools were not used to generate research ideas, analyze data, interpret findings, or draw scientific conclusions. All study design, data collection, analysis, interpretation of results, and conclusions were conducted and verified entirely by the authors. The authors take full responsibility for the accuracy, integrity, and originality of the content presented in this manuscript.

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