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THE ATTRACTIVENESS OF GEOMETRY TRANSFORMATION MATERIAL LKPD BASED ON ETHNO-STEM FROM THE PERSPECTIVE OF STUDENTS

Muhammad Al Farabi*)[1], Farha Ashiilah Herwinsyah[2], Charirotul Lathifa[3], Ibrahim Sani Ali Manggala[4]
[1]UIN Maulana Malik Ibrahim, Malang, Indonesia; farabimuhammad01@gmail.com
[2]UIN Maulana Malik Ibrahim, Malang, Indonesia; farhaashiilah@gmail.com
[3]UIN Maulana Malik Ibrahim, Malang, Indonesia; lathifa0628@gmail.com
[4]UIN Maulana Malik Ibrahim, Malang, Indonesia; ibrahimsam@uin-malang.ac.id
*)Corresponding author: Muhammad Al Farabi; E-mail addresses: farabimuhammad01@gmail.com

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Abstract. Mathematics learning needs to be designed into attractive learning so that students can be motivated to learn and improve mathematics achievement. LKPD with Ethno-STEM learning approach becomes an alternative media that attracts students. This study aims to analyze the results of students' attractiveness responses to the use of Ethno-STEM based geometry transformation material LKPD. The data collection technique uses an interest questionnaire, then supported by student interviews. The study showed that the students' response to the use of geometry transformation material LKPD based on Ethno-STEM obtained an average score of 86.0% with the qualification "very attractive". The assessment is based on the components of the attractiveness of the cover, content, images/illustrations, math material, learning related to local culture, and learning related to STEM elements. Ethno-STEM-based geometry transformation LKPD has a very attractiveness response from its users. For further research, it is recommended to test the effectiveness of geometry transformation material LKPD based on Ethno-STEM.

INTRODUCTION

Indonesia's mathematics achievement still lags behind international standards. In the latest Program for International Student Assessment (PISA) 2021 results, Indonesia again recorded unsatisfactory results. The scores obtained by Indonesia in reading, math, and science were 371, 379, and 396, respectively. This score shows that Indonesia is still far behind compared to the average achieved by other participating countries (Zahid, 2020). This low score reflects that the results of mathematics learning in Indonesia still require serious attention and continuous improvement efforts. Munaji & Setiawahyu (2020) revealed that one of the main causes of Indonesia's low scores is the lack of students' habits in working on contextual problems, which require reasoning, argumentation, and creativity. In addition, students' interest in learning mathematics also needs to be considered by educators (Munaji & Setiawahyu, 2020).

Many junior high schools in Indonesia still apply learning methods where students tend to play a passive role (Ribut, 2021). Some of the factors that contribute to low math learning outcomes include the lack of active participation and interest of students during the learning process and the limited skills of educators in delivering material (Sumandya & Widana, 2022). The lack of educators' ability to design and implement learning effectively is one of the factors for students' low achievement in mathematics. In line with Nabillah & Abadi (2019) identified aspects that affect students' mathematics achievement into two aspects, namely internal and external. From the internal side, students are often less interested and less motivated when studying mathematics. On the other hand, teaching methods that are less attractiveness and unable to ignite students' enthusiasm for learning, contribute to the situation. The combination of these aspects leads to low student achievement in learning mathematics.

Among the solutions to overcome internal and external obstacles in learning mathematics is to create an attractive learning environment, so that students are not bored or reluctant to learn. It is important for educators to facilitate the use of diverse and innovative learning media, because they act as a link in conveying knowledge from learning sources to students (Mawardi et al., 2023). In addition, educators have an important role in supporting students to understand, master, and develop the knowledge, skills, and values expected in the education curriculum. Therefore, the role of educators is crucial in fostering student interest in the material presented (Widana et al., 2024). With an attractive learning media approach, it is expected that students will be more motivated to be actively involved in the learning process which leads to improved math learning outcomes.

In increasing students' interest, educators can start by modifying learning media or mathematics teaching materials, one of which is by improving the Student Worksheets (LKPD). LKPD is learning material that is arranged systematically, making it easier for students to understand the lesson content, even when studying independently (Qomario & Agung, 2019). LKPD can be used as a medium to help students master certain competencies, because LKPD is able to provide additional information about the material being studied through a structured learning process (Sagita, 2016). An attractively designed LKPD can make students more interactive and enthusiastic in learning it. One of the effective approaches to be applied in LKPD is the Ethno-STEM approach.

LKPD with the Ethno-STEM approach combines two approaches, namely ethnomathematics and STEM (science, technology, engineering and mathematics). Along with technological advances in education, the current curriculum also requires cultural integration in learning activities at school (Triana, 2020). With the existence of LKPD that integrate the Ethno-STEM approach, students can learn to appreciate their own culture while not being left behind in the technological aspects that are important in modern education. The application of Ethno-STEM-based LKPD in mathematics learning is expected to increase students' interest in mathematics subjects and make it easier for educators to deliver material. In addition, the Ethno-STEM approach also aims to instill cultural values to students. According to Andriyani & Kuntarto (2017), culture-based learning not only allows students to learn math in a more relevant context, but also introduces students to culture and helps build character values. Therefore, there is a need for LKPD that link cultural aspects and STEM elements in mathematics learning.

Researchers have reviewed various literature related to LKPD, Ethno-STEM, and geometric transformation material but show that there is no research that specifically examines the attractiveness of Ethno-STEM-based LKPD in mathematics learning. Based on the results of interviews with mathematics educators, it is known that students' mathematics learning achievement is still low, mainly because most of them have a lack of understanding or basic skills and lack of interest in learning mathematics. Students often experience difficulties, especially in geometric transformation material. One of the main problems faced is the lack of attractive learning media that can help students understand the material better. Students tend to understand lessons more easily if the examples/contexts given are related to everyday life situations.

Based on the explanation previously described, the researcher took the initiative to include cultural aspects in the form of typical Indonesian batik and STEM in mathematics learning in the form of Ethno-STEM-based LKPD learning media to foster interest in learning mathematics for grade IX students at the junior high school level. Therefore, this study aims to analyze the attractiveness of Ethno-STEM-based LKPD geometry transformation material from the perspective of students.

METHOD

This research is included in the type of qualitative research that uses qualitative descriptive methods. According to Moleong (2017) qualitative research aims to understand the phenomena that occur related to various aspects experienced by research subjects, such as motivation, behavior, and action. The focus of this research is to evaluate the attractiveness of Ethno-STEM-based geometry transformation LKPD material from the perspective of students. Data collection was carried out using non-test techniques, by giving a questionnaire on the attractiveness of LKPD which was then supported by the results of interviews with students on the LKPD used. The determination of the score in the assessment of the attractiveness questionnaire is determined through 4 scales, namely disagree, less agree, agree, and strongly agree. Before testing the attractiveness, questionnaire has been validated by experts with expert judgement method, where experts provide opinions, insights, and evaluations. The validity and reliability of the instrument in this study were also assessed with the help of the IBM SPSS 25.0 program, it was found that it was valid and reliable according to Ghozali (2018).

The stages of analyzing the attractiveness of the LKPD in terms of students' perspectives were carried out by statistical analysis in the form of a percentage of the questionnaire results obtained and continued with descriptive analysis, presentation of data analysis results, and drawing conclusions from the results of the response to the use of geometry transformation material LKPD based on Ethno-STEM supported by interviews impressions/messages related to the attractiveness conveyed by students. The percentage results of the questionnaire are categorized according to the interpretation in Table 1 (Daniar et al., 2022).

Table 1. Qualification of attractiveness

Percentage (%)	Qualification
81 - 100	Very attractive
61 -80	Attractive
41 - 60	Moderately attractive
21 - 40	Less attractive
0 - 20	Not attractive

RESULTS AND DISCUSSION

The use of geometry transformation material LKPD based on Ethno-STEM is designed to help students adjust to technological advances and interest in integrating mathematics in various science families along with preserving local culture in learning the material. LKPD is attractively designed and equipped with pictures and various illustrations to help students understand the material. Geometry transformation material LKPD based on Ethno-STEM is a solution to learning materials that can be used by educators and students at the junior high school level in the teaching and learning process. LKPD Ethno-STEM-based geometry transformation material is a teaching material that has been developed previously and has been tested, and get an assessment worthy of use from expert validators. The following is displayed LKPD Ethno-STEM-based geometry transformation material.

Image 1. Display of geometry transformation material LKPD based on Ethno-STEM

This geometry transformation material LKPD based on Ethno-STEM contains geometry transformation material at the junior high school level which is adjusted to the Merdeka Curriculum. In order to help students understand geometry material better. LKPD is also equipped with applications of visual-spatial thinking ability indicators put forward by Susilawati et al. (2017). Ethno-STEM-based LKPD geometry transformation material consists of a cover page, preface, instructions for use, description of the presentation of LKPD content, table of contents, introduction, concept map, learning activities that contain ethno-science, ethno-technology, ethno-engineering, and ethno-mathematics learning, and a bibliography page.

Researchers implemented the Ethno-STEM-based geometry transformation LKPD material in mathematics learning for 4 lesson time, then at the end of the lesson, researchers distributed an attractiveness questionnaire and interviewed students regarding the impression of the attractiveness using LKPD in learning. Students through interviews broadly revealed that the attractive cover design of the LKPD creates a positive first impression and makes students eager to engage with the material. The integration of Ethno-STEM and local culture, such as batik motifs, helps students connect emotionally with the material, increasing their curiosity and motivation. Although some students found the STEM terminology challenging, the use of images and illustrations supported understanding and engagement. The materials are presented in a clear and accessible manner, helping students to explore geometric transformations independently, especially with tools such as GeoGebra. The results of the

acquisition of the percentage of students' responses to the use of geometry transformation material LKPD based on Ethno-STEM in terms of its attractiveness are shown in Table 2.

Table 2. Students response results

Component	Percentage	Qualification
Cover attractiveness	94.3%	Very attractive
Content attractiveness	85.2%	Very attractive
Image/illustration attractiveness	87.5%	Very attractive
The attractiveness of the math material	88.6%	Very attractive
The attractiveness of learning related to local culture	84.1%	Very attractive
Learning attractiveness related to STEM elements	76.1%	Attractive
Average percentage	86.0%	Very attractive

Based on the results of the questionnaire from the answers of 22 students shown in Table 2, the results of students' responses to the use of geometry transformation material LKPD based on Ethno-STEM obtained an average value of 86.0% with the qualification "very attractive". Small samples are acceptable in decision making because the population under study is relatively homogeneous with a limited population size (Sugiyono, 2022). The assessment is based on the component of the attractiveness of the cover which obtained a percentage of 94.3%, the percentage of the attractiveness of the content of 85.2%, the percentage of the attractiveness of the image/illustration 87.5%, the percentage of the attractiveness of the math material 88.6%, and the percentage of the attractiveness of learning related to local culture 84.1%; each component obtained the qualification "very attractive". And the learning attractiveness component related to STEM elements obtained a percentage of 76.1% with the qualification "attractive". Based on these results, it can be concluded that the Ethno-STEM-based geometry transformation LKPD has a very attractive response from its users. Attractiveness is important in learning to increase students' interest in learning mathematics (Ulfah et al., 2016 & Sukendra et al., 2024). In addition, using attractive learning media can encourage students to feel happy, more active, and excited in learning mathematics material (Farabi et al., 2024). These results show that the visual aspects as well as the relevance of culture and STEM in LKPD play an important role in increasing students' attractiveness to the material. A recapitulation of the results of students' responses based on the component of cover attractiveness is presented in Table 3.

Table 3. Results of student responses on the cover attractiveness component

Component	Score			
	1	2	3	4
Cover attractiveness	0 students	0 students	5 students	17 students
Average percentage of students	0%	0%	22.7%	77.3%

Table 3 shows that the majority of students responded strongly agree to the attractiveness of the cover on the LKPD of Ethno-STEM-based geometry transformation material. It is shown that 5 students expressed agree and 17 students expressed strongly agree. The acquisition of this response assessment means that students assess the appearance of the cover of the geometry transformation material LKPD based on Ethno-STEM is attractive to them. Cover design can affect the attractiveness of using mathematics teaching materials

(Sinaga & Rakhmawati, 2022). The use of the right cover design gives an attractive first impression and makes students feel more excited to learn more about the material. Through the right and attractive cover design, it not only becomes more aesthetically appealing but also more informative and functional (Sumandya et al., 2023). Students revealed that the cover design of the LKPD is cute and the colors are pleasing to the eye, making students not feel bored when looking at the LKPD. In addition, students also revealed that the cover used made them curious about the contents of the LKPD. Furthermore, the recapitulation of the results of students' responses based on the content attractiveness component is presented in Table 4.

Table 4. Results of students responses on the content attractiveness component

Component	Score			
	1	2	3	4
Content attractiveness	0 students	0 students	13 students	9 students
Average percentage of students	0%	0%	59.1%	40.9%

Table 4 shows that the majority of students gave an agreeable response to the attractiveness of the content in the geometry transformation material LKPD based on Ethno-STEM. It is shown that 13 students express agree and 9 students express strongly agree. The acquisition of this response assessment means that students assess the appearance of the contents of the geometry transformation material LKPD based on Ethno-STEM is attractive to them. The majority of students revealed that the content of the LKPD attracts the attention of students, LKPD is attractive to learn more. The appearance of attractive content can maintain the attention of students, so that they are more focused in following the learning (Novanda et al., 2024). Attractive content also contributes to a more pleasant and relaxed learning atmosphere (Affandi et al., 2024). The existence of this geometry transformation material LKPD based on Ethno-STEM, students become directed to learn independently. But during the process of applying LKPD to learning, there are students who reveal the existence of language that is difficult to understand, namely the terms in STEM, thus making educators re-explain the meaning of a sentence (Sukendra et al., 2023). The use of communicative language and in accordance with the level of development of students is important so that the message and content of the learning media can be clearly captured by students (Humaidi et al., 2022). Furthermore, the recapitulation of the results of students' responses based on the attractiveness component of the image/illustration is presented in Table 5.

Table 5. Results of student responses on the image/illustration attractiveness component

Component	Score			
	1	2	3	4
Images/illustrations attractiveness	1 students	0 students	8 students	13 students
Average percentage of students	4.5%	0%	36.4%	59.1%

Table 5 shows that the majority of students responded strongly agree to the attractiveness of the images/illustrations in the geometry transformation material LKPD based on Ethno-STEM. This is indicated that 1 student expressed disagreement, 8 students expressed agreement, and13 students expressed strongly agreement. The acquisition of this response assessment means that students assess the appearance of images/illustrations on the LKPD of Ethno-STEM-based geometry transformation material is attractive to them. Students assess that the geometry transformation material LKPD based on Ethno-STEM clearly

presents mathematical images/illustrations that can help students' understanding. The number of images/illustrations presented is able to attract students' enthusiasm for learning which consists of images of batik motifs, illustrations of the application of the concept of geometric transformations in batik motifs, and sketches of geometric transformations in both the material and the problem. Images/illustrations can simplify concepts and help students' understanding of mathematical material (Firdausi & Suparni, 2022). Students revealed that the images/illustrations can help to make it easier to solve problems. In addition, pictures/illustrations are often used in learning because they are more attractive to students than writing, especially when the images presented are colorful and realistic (Rozi & Rahayu, 2022). Furthermore, the recapitulation of the results of students' responses based on the component of the attractiveness of mathematics materials is presented in Table 6.

Table 6. Results of student responses on the attractiveness component of mathematics material

Component	Score			
	1	2	3	4
Attractiveness of mathematics materials	0 students	1 students	8 students	13 students
Average percentage of students	0%	4.5%	36.4%	59.1%

Table 6 shows that the majority of students responded strongly agree to the attractiveness of the mathematical material in the geometry transformation material LKPD based on Ethno-STEM. This is indicated that 1 student expresses less agree, 8 students express agree, and 13 students express strongly agree. The acquisition of this response assessment means that students assess the material on the LKPD of Ethno-STEM-based geometry transformation material is attractive to them. The presentation of geometric transformation concepts in the LKPD is well organized, structured, and easily understood by students. The information provided is not confusing and in accordance with the learning needs. Students feel easy access to the material. The material has been presented in full in the LKPD or supported by an easily accessible source, so there is no difficulty in finding or understanding the information needed.

Developers need to pay attention to the ease of access of students to learning materials from the teaching materials developed to minimize the occurrence of barriers to learning and limited access to learning (Benny & Pribadi, 2019). Explanations related to geometry transformation in the Ethno-STEM context are delivered in a simple, logical way, and in accordance with the level of understanding of students. Students also feel more interested because of the uniqueness of the LKPD, students have never done learning with LKPDs related to culture and STEM before (Purnadewi & Widana, 2023). The discussion also uses language that is not too technical or complicated, so that students can follow the learning flow well.

Overall, this shows that this geometry transformation material LKPD based on Ethno-STEM is able to attract students because the material presented is unique, clear, easy to access, and understand. This is in line with Ardiyanti et al. (2024) that learning related to cultural elements can provide a sense of interest for students to learn. Furthermore, the recapitulation of student response results based on the component of learning attractiveness related to local culture is presented in Table 7.

Table 7. Results of student responses on the component of interest in learning related to local culture

Component	Score			
	1	2	3	4
Attractiveness of learning related to local culture	0 students	2 students	10 students	10 students
Average percentage of students	0%	9%	45.5%	45.5%

Table 7 shows that the majority of students responded agree and strongly agree to the attractiveness of learning related to local culture in the LKPD of Ethno-STEM-based geometry transformation material. It is shown that 2 students expressed less agree, 10 students expressed agree, and 10 students expressed strongly agree. The acquisition of this response assessment means that students assess learning related to local culture on the LKPD of Ethno-STEM-based geometry transformation material is attractive to them. Learning using local culture makes the material more contextual and close to the daily lives of students. Students can see how the concept of geometric transformation is applied in batik motifs, so the material is more meaningful and not abstract. Relevance to daily life in contextual learning can attract students' interest (Wicaksono et al., 2020). By integrating local culture, students feel proud and more engaged in the learning process as they feel more emotionally connected. This can increase curiosity and motivation to learn. The learning process becomes more varied and attractive, as it involves exploring aspects of culture and history that students have never been aware of before. Variety in math learning can improve learning effectiveness (Rumapea & Gunanto, 2022). The combination of mathematics learning related to local culture creates a learning atmosphere that is more interactive, relevant, and memorable for students so that it can attract students' interest to learn more deeply. Furthermore, the recapitulation of student response results based on the component of learning attractiveness related to STEM elements is presented in Table 8.

Table 8. Results of student responses on the component of learning attractiveness related to STEM elements

Component	Score			
	1	2	3	4
Attractiveness of STEM-related Learning	0 students	4 students	13 students	5 students
Average percentage of students	0%	18.2%	59.1%	22.7%

Table 8 shows that the majority of students gave an agreeable response to the attractiveness of learning related to STEM elements in the geometry transformation material LKPD based on Ethno-STEM. This is indicated that 4 students expressed less agree, 13 students expressed agree, and 5 students expressed strongly agree. The acquisition of this response assessment means that students assess learning related to STEM elements in the LKPD of Ethno-STEM-based geometry transformation material is attractive to them. Learning using STEM (Science, Technology, Engineering, and Mathematics) elements in teaching materials makes the material more applicable (Sadea, 2024). Students can see how geometry concepts are used in technology or engineering, which makes learning more relevant to real life and less theoretical. Students can apply technology to explore geometric transformations in more depth, using geogebra software. The use of technology makes learning more interactive and

engaging especially for students who enjoy technology (Ghafara et al., 2023). This process is attractive because it challenges them to think creatively and analytically.

Based on the exposure of the data above, it shows that students respond positively to the attractiveness of using geometry transformation material LKPD based on Ethno-STEM in mathematics learning. Although there are some comments or input that are also received for improving LKPD. Research by Ardiyanti et al. (2024) and Sadea (2024) show that learning related to cultural elements or STEM can make the material learned more applicable and provide its own appeal for students to learn more deeply. By using attractive media for mathematics learning, it will encourage students to feel happy, more active, and excited in learning mathematics material (Farabi et al., 2024). This is a step to vary math learning in order to increase the effectiveness of learning in the classroom (Rumapea & Gunanto, 2022).

CONCLUSION

Based on the study that has been done, it can be seen that the results of students' responses to the use of geometry transformation material LKPD based on Ethno-STEM obtained an average value of 86.0% with the qualification "very attractive". The assessment is based on the components of the attractiveness of the cover, content, images/illustrations, math material, learning related to local culture, and learning related to STEM elements. Ethno-STEM-based geometry transformation LKPD has a very attractive response from its users. Suggestions for further research research with a wider scale of testing and experiments to determine the effectiveness of geometry transformation material LKPD based on Ethno-STEM, especially in accordance with the LKPD that has been developed.

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