

## Development of Interactive Powerpoint Media Based on Ethnomathematics of Batik Kawung Motif on Flat Building Material in Elementary School

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### **Abstract**

*The research aims to produce an interactive powerpoint learning media based on ethnomathematics of batik kawung motifs on flat building material in elementary schools that is valid and practical. This type of research is development research (Research and Development) with the ADDIE research model. The subjects in this study were media experts, material experts and grade III students from two different schools. Third grade students of SD Negeri Jeruk 2 amounted to 8 people who were categorized as small groups and SD Negeri Girimargo 1 amounted to 22 people who were categorized as large groups. Data analysis used two methods, namely descriptive qualitative and descriptive quantitative. The results of the assessment by the media expert test were 80%, the material expert test by two testers and both obtained results of 76.6%, the expert test assessment was qualified as good. The small group trial amounted to 95.31% and the large group test amounted to 91.9%, the assessment of students was qualified as very good. The pre-test results in the small group obtained an average of 37.5 while the large group was 28.5, both of which were in low qualifications. While the post-test results in the small group obtained an average of 90 with high qualifications, and the large group obtained an average of 75.2 with moderate qualifications. Therefore, this learning media development research is feasible and can improve students' math learning outcomes.*

**Keywords:** *interactive powerpoint, ethnomathematics, batik kawung, flat shapes*

## **PENDAHULUAN**

Education is an important foundation for building the quality of the nation and improving the quality of human resources. In this increasingly advanced era, the challenges in education are increasingly complex. Education is the main foundation for the nation's successors. Various fields and majors are also available at various levels of education.

Math is a difficult subject. Not a few students both in elementary school (SD) and up to the senior high school (SMA) level complain about the difficulty of math subjects. Some students dislike math because it is famous for its complexity. In line with research conducted by (Siregar & Restati, 2017) that mathematics is a lesson that is quite difficult, but math lessons are important to learn. Without realizing it, mathematics is one of the essential fields of science in everyday life and is the basis for many other fields.

Research conducted by (Desi Rahayu et al., 2019) shows that 60% of students do not like math lessons. The low interest in learning of some students may be due to lack of interest or low interest in mathematics due to the assumption that this subject is difficult or uninteresting.

The lack of connection with everyday life makes it difficult for students to see the link between mathematical concepts learned at school and situations in everyday life, so they consider it irrelevant.

The lack of functionalized learning means that some students may find it difficult because they only understand mathematical theories without any opportunity for practice or application in real situations. The application of culture-based learning is one model that can be used in mathematics. Education and culture have important elements and roles for society, these two elements cannot be separated. Schoend's opinion (in Rizqi & Lukito, 2021) that culture-based mathematical thinking can encourage students to consider mathematics as a comprehensive part of everyday life. One way to combine educational and cultural elements is through ethnomathematics. Ethnomathematics is a discipline that combines ethnography and mathematics. According to Marsigit (Sutarto et al., 2021), it is a science that integrates mathematics and culture and investigates the relationship between the two. Ethnomathematics as a branch of mathematics that uses broad mathematical concepts for a variety of tasks, including classifying, counting, measuring, making buildings or tools, playing, and discovering. This concept focuses on the study and utilization of the wisdom of local cultures and community groups in the context of understanding and applying mathematics.

With ethnomathematics, it is expected that students can further explore their metacognitive abilities, critical thinking and solving abilities. One interesting approach is to use batik cultural media as a mathematics learning tool. Batik as a symbol of Indonesia's cultural wealth has great potential to be used in the context of mathematics learning. UNESCO has recognized batik as one of Indonesia's world heritages. As a cultured nation, the Indonesian people are obliged to preserve this batik culture (Parmono, 2013). Batik can support the introduction and preservation of local culture.

Research conducted by (NURMANITIA et al., 2023) states that the use of ethnomathematics with local cultural elements of kawung batik motifs can be integrated in mathematics learning material on finding the area and perimeter of flat buildings in grade VI Elementary School. Thus, the use of batik culture in mathematics learning not only increases students' interest and understanding of mathematics, but also supports the preservation and introduction of Indonesian cultural heritage.

However, appropriate media is needed to support this ethnomathematics-based mathematics learning activity. Based on observations made at SD Negeri Jeruk 2 and SD Negeri Girimargo 1, teachers still carry out learning using package books owned by the school. Occasionally the teacher also uses the school-owned LCD projector media to teach in class.

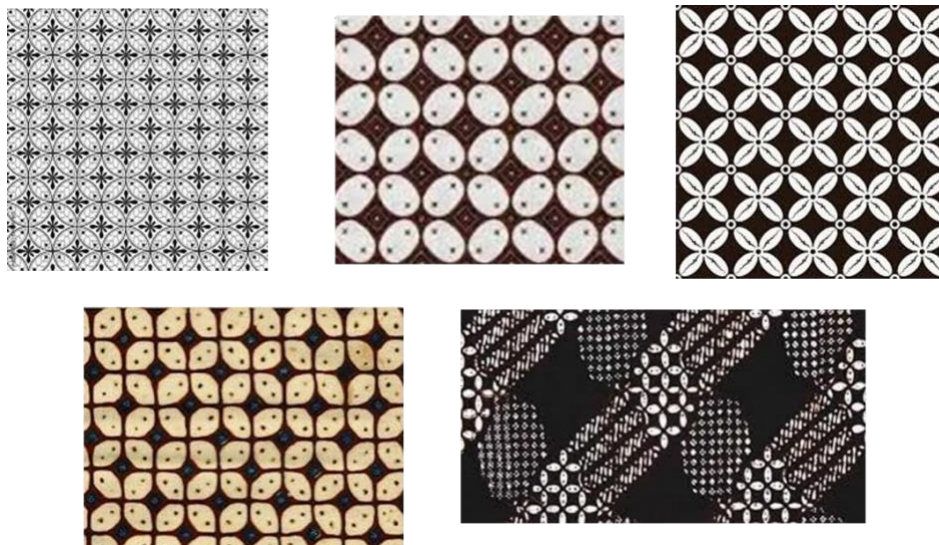
So from him the teacher needs a tool as a bridge to help realize learning goals, one of which is learning media. According to (Zaini & Dewi, 2017), teachers need an intermediary, namely learning media to divert the attention of students so that they do not quickly feel bored and bored in the learning process. One of the math materials, namely flat shapes, requires concrete media that is sustainable in everyday life. According to Damyanti (in Wahyuni & Ananda, 2022) media is a tool or means of communication that connects teachers and students in the world of education. It is important for the world of education to consider the use of diverse media in learning mathematics

Microsoft Powerpoint is a computer program that can be used for presentations. Through the use of powerpoint, it is considered sufficient to display the material because on the other hand there is limited time for learning. If the teacher only writes the material on the board, learning will take a lot of time. Powerpoint can be considered practical and technology-based.

Batik is a cultural heritage owned by Indonesia that has been recognized by the world. Batik has been inaugurated by UNESCO as a humanitarian heritage for oral and intangible culture since 2009 (Astriandini & Kristanto, 2021).

In research conducted by (NURMANITIA et al., 2023) mentioned that one of the batik motifs, namely kawung batik, has a flat shape. Among them, there are 5 types of batik with flat shapes, batik kawung bibil motif has a circle shape, batik kawung sen motif has a rhombus shape, batik kawung sari motif has a circle and square shape, batik kawung picis motif has a rhombus shape, and batik kawung sekar ageng motif has a rhombus motif.

Figure 1 Batik Kawung Motif



Based on the previous explanation, the purpose of this research is to produce an interactive powerpoint media based on ethnomathematics of batik kawung motifs on grade III flat building material that is valid and practical.

## METHOD

This research uses the development method (Research and Development). The development method or Development & Research is a research method used to produce a certain product in the form of learning tools or learning media, by testing the validity of the product (Ariawan & Putri, 2020). In the development of interactive powerpoints based on ethnomathematics of kawung batik motifs on grade 3 flat building material, this uses the ADDIE model which has 5 stages, namely analysis, design (planning), Development (Development), Implementation (Implementation), and Evaluation (Evaluation) (Aras et al., 2023).

The ADDIE model starts from the analysis stage, carried out in competency analysis activities, needs analysis and material analysis. Furthermore, at the design stage, this stage the activities carried out are designing the concept of the product to be developed according to the results of the analysis that has been done previously. After that, enter the development stage, at this stage the process of making and developing interactive powerpoints is carried out. At this stage, tests are also submitted to media experts and material and learning experts to determine the feasibility of the products that have been made. Then the implementation stage, this implementation stage is the process of applying the results of the product development that has been carried out to obtain the level of product effectiveness in the learning process in elementary schools. Ended with the evaluation stage, at this stage data collection is carried out, improvements are made to the product as well as improving the products that have been made. The design of the development product trial in this study is divided into two, namely the expert test and the product trial on students. In the expert test, interactive powerpoint products are tested by learning media experts, and learning design experts.

The subject of the expert test is one learning material expert, namely the lecturer who teaches the communication information technology media course. While the subject of the trial to students is grade 3 students of SD Negeri Jeruk 2 and SD Negeri Girimargo, Miri District, Sragen Regency. After the learning media is declared feasible, then the effectiveness test is carried out. This interactive powerpoint effectiveness test design uses a *one group pre-test and post-test design*. Starting with giving a *pre-test* to students, then providing learning activities using interactive powerpoint media that has been developed, then afterwards a *post-test* is carried out to students.

The data collection method in this study uses observation, validity test, and documentation. Indicators in the validity test used by researchers to be tested on media experts, material experts and student trials. Data analysis used uses two methods, namely descriptive qualitative and descriptive quantitative. Table 1. Likert scale assessment score instrument, Table 2. interactive powerpoint is declared valid if the minimum criteria are in the feasible category.

**Table 1.** Likert Scale Assessment Score Instrument

Skor	Qualification
1	Very good
2	Good
3	Simply
4	Less
5	Very Less

Source: Sugiyono in (Permata & Bhakti, 2020)

**Table 2.** Category of Media Validity

Achievement Level %	Qualification	Description
84%-100%	Very good	Very feasible
68%-84%	Good	Worth
52%-68%	Simply	Decent enough
36%-52%	Less	Not worth it
0%-36%	Very Less	Very unfeasible

## RESULT AND DISCUSSION

### Result

The product produced from this development research is an interactive powerpoint based on ethnomathematics of kawung batik motifs in the mathematics subject of flat building material for grade III elementary school students. The product was developed by applying the ADDIE development model which has five systematic stages starting from the analysis stage, then continuing with the design or design stage, development stage, implementation stage, and evaluation carried out at each stage. Based on the results of the analysis stage, it was found that students had difficulty understanding math material. It is known that every school now has LCDs, projectors, and audio devices but their use is only occasional. So this interactive powerpoint supports the use of these electronic devices in learning. Then analyze the material and batik motifs that are in accordance with the flat building material of grade III SD and obtain an analysis as in the following table

**Table 3.** Basic Competencies (KD) and Indicators

Kompetensi Dasar	Indikator
3.10 Menjelaskan dan menentukan keliling bangun datar	3.5.1 Menyebutkan bagian-bagian bangun datar (persegi, lingkaran, dan belah ketupat) dalam motif batik kawung(C1)
	3.5.2 Menjelaskan rumus keliling bangun datar dalam motif batik kawung(C2)
	3.5.3 Menghitung keliling bangun datar (C3)
4.10 Menyajikan dan menyelesaikan masalah berkaitan dengan keliling bangun datar.	4.5.1 menentukan masalah berkaitan dengan bangun datar (P2)
	4.5.2 menyajikan penjelasan berkaitan keliling bangun datar (P3)

The next stage is carried out product design which includes making storyboards as a reference, collecting images, compiling lesson plans, and compiling product assessment instruments. Assessment instruments include validity tests by experts, product trials on students and pre-test and post-test questions for students. The validity test in research uses a Likert scale containing five levels of decisions. Then at the development stage begins with collecting and making images, making and editing interactive powerpoints, determining background images, and creating material and activity narratives. After all the elements are prepared, the development of the appearance and content of the interactive powerpoint is carried out which includes inputting text and images into the powerpoint, then to connect one display with another display is done by adding a trigger. After the interactive powerpoint media was completed, the development results were then tested for feasibility by experts in the expert test consisting of learning media content experts and learning material experts. After the expert test was carried out and received improvements and input, the powerpoint was tested on students at SD Negeri Jeruk 2 totaling 8 students or categorized as a small group and third grade students at SD Negeri Girimargo 1 totaling 22 students or categorized as a large group.

**Tabel 4.** Presentase Hasil Uji Coba *Powerpoint* interaktif

No	Test Subjects	Results	Qualification
1.	Media Expert	80%	Worth
2.	Material Expert 1	76,6%	Worth
3.	Material Expert 2	76,6%	Worth
4.	Small group test	95,31%	Very feasible
5.	Large group test	91,9%	Very feasible

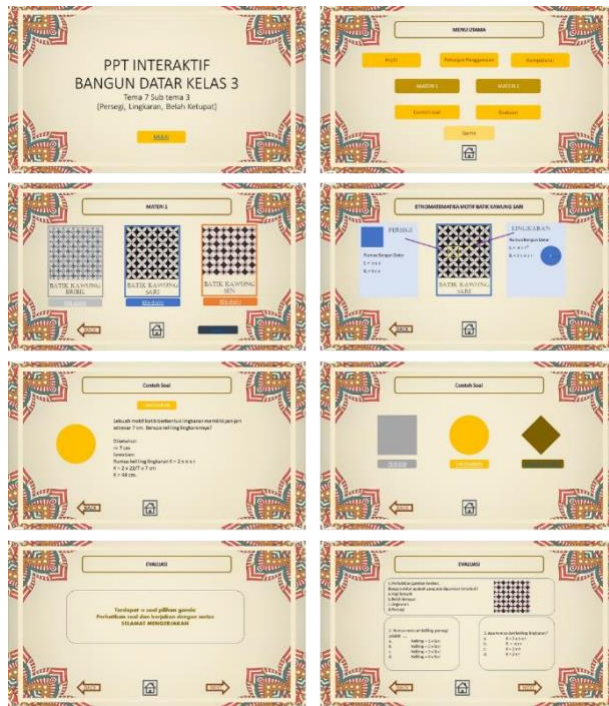
Based on the results of product trials to determine the feasibility of interactive powerpoints by experts and students, it can be stated that the product is suitable for use in learning. In the product validity test research, there are suggestions from experts who revise in table 5 and the results of interactive powerpoint products in figure 2

**Table 5.** Media Trial Comments

No	Test Subjects	Comments	Revised
1.	Media Expert	We recommend adding maze In the evaluation section, you should use VBA in power point, so that the final score appears immediately.	Adding slides in the form of puzzles and try to make scoring on the evaluation.
2.	Material Expert 1	In the powerpoint added / accompanied by a batik display video so that students understand more about the material being studied. Added	Adding a video of the batik motif being studied. And add identity as suggested.

identity (school name, class,  
semester, theme, subtheme)

**Figure 2** Interactive Powerpoint Media based on Ethnomathematics



The fourth stage is the implementation of media in learning. Before carrying out learning using the developed product, a pre-test of students was conducted. Next, carry out learning using interactive powerpoint media and conduct a post-test after using the media. Finally, the evaluation stage, which is after applying the media in learning activities, is to measure the effectiveness of interactive powerpoints on student learning outcomes. The pre-test results in the small group obtained an average of 37.5 while the large group was 28.5, both of which were in low qualifications. While the post-test results in the small group obtained an average of 90 with high qualifications, and the large group obtained an average of 75.2 with moderate qualifications. So it can be concluded, interactive powerpoint media based on ethnomathematics of kawung batik motifs on flat buildings is able to improve the mathematics learning outcomes of third grade students at SD Negeri Jeruk 2 and SD Negeri Girimargo 1, Miri District.

## Discussion

This research produces a product in the form of an interactive powerpoint in which the learning material is based on ethnomathematics of kawung batik motifs for grade III students. On the other hand the introduction of ethnomathematics in flat building material has never been given and is different from other powerpoint media for grade III students. PowerPoint is effective enough to introduce new theories or concepts to students (Permata & Bhakti, 2020)

Learning media has been declared feasible based on the results of expert tests and product trials on students. The development model on this interactive powerpoint implements the ADDIE development model. In learning media development research because the ADDIE model is a model that provides opportunities for continuous evaluation and revision at each stage so that the resulting learning media design will become a valid and reliable learning media. Research using the ADDIE model is a very simple model but still carried out systematically (Mardhiyah et al., 2023)



Based on the analysis stage, an interactive powerpoint based on ethnomathematics of flat building material is obtained which is very important and suitable for development. This interactive powerpoint adjusts the needs and abilities of schools that teachers or students can operate. Interactive powerpoint learning media that can be used by teachers to facilitate the process of teaching and learning activities. Through this interactive powerpoint media, students will have experiences and do activities that allow them to find positive and creative things for themselves (Sugiyarto et al., 2021). In the learning process, media is indispensable, through media difficulties in mathematics lessons will be avoided and the teaching and learning process can take place optimally (Risma Handayani & Surya Abadi, 2020)

The use of ethnomathematics is by incorporating the kawung batik motif, one of the local cultures owned by the Javanese tribe. Through this learning, students are able to understand the material and get a meaningful learning experience. The advantage of this interactive powerpoint learning media is that besides being easy for teachers to make, it is also able to build smooth animations. Thus this media is favored, power point is also an animation media that is easy to use and produces good animation (Wahyuni & Ananda, 2022).

The implication in this study is to facilitate students' learning activities during learning, so that the increased motivation and enthusiasm of students in carrying out learning activities, especially in mathematics content which can affect students' mathematics learning outcomes increase. This research is limited to the development of interactive powerpoint learning media for the introduction of flat shapes based on ethnomathematics for grade III students, so it is hoped that other researchers can develop ethnomathematics-based interactive powerpoint learning media on other content and material so that it can facilitate students' learning activities. The use of ethnomathematics can be further developed, so that students do not only get one-way learning material, local culture can continue to be instilled from an early age.

## CONCLUSIONS AND SUGGESTIONS

The development of interactive powerpoints based on ethnomathematics of batik kawung motifs on flat building material for grade III elementary school students using the ADDIE development model through five stages has produced interactive powerpoints that are feasible to use in learning activities and can improve the mathematics learning outcomes of grade III elementary school students. The involvement of this research in the world of education is that students can be motivated to learn mathematics using learner worksheets that are concrete, meaningful, and enjoyable, and teachers are encouraged to develop learning tools that are in accordance with the needs, characteristics of students, and the times.

Suggestions from this study, teachers can explore more cultures that can be applied in learning. Because students will not only learn from one direction, namely learning material but can increase knowledge about the surrounding culture. This is also as a form of maintaining and preserving culture.

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