

Buna Woven Fabric Based Teaching Materials: ADDIE Model

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Article submitted: 26-04-2023, revised: 19-07-2023, published: 31-07-2023

Abstrak

Bahan ajar merupakan salah satu alat yang dapat membantu guru dan siswa mempelajari sesuatu. Tujuan dari penelitian ini adalah untuk mengembangkan bahan ajar berbasis budaya lokal yang berkualitas baik. Bahan ajar berbasis budaya lokal yang dikembangkan berfokus pada materi bangun datar untuk mahasiswa Pendidikan Guru Sekolah Dasar. Kualitas bahan ajar ini diukur menggunakan beberapa instrumen, antara lain: (1) lembar validasi untuk mengumpulkan data kevalidan, (2) lembar observasi aktivitas dosen dan mahasiswa untuk mengumpulkan data kepraktisan, dan (3) soal *pretest* dan *posttest* digunakan untuk mengumpulkan data keefektifan hasil belajar mahasiswa. Simpulan dari penelitian ini adalah bahan ajar berbasis budaya lokal yang dihasilkan berkualitas baik karena memenuhi kriteria valid, praktis dan efektif. Kelebihan dari bahan ajar ini adalah mudah dipahami karena memuat unsur budaya berupa kain tenun, memanfaatkan aplikasi geogebra dalam pengembangannya serta dikembangkan sesuai dengan kebutuhan pelajar.

Kata Kunci: bahan ajar; kain tenun buna; pengembangan.

Abstract

Teaching materials are one of the tools that can help teachers and students learn something. This research aims to develop good quality local culture-based teaching materials. The local culture-based teaching materials developed a focus on flat building materials for Elementary School Teacher Education students. The quality of these teaching materials is measured using several instruments, including (1) validation sheets to collect validity data, (2) observation sheets of lecturer and student activities to collect practical data, and (3) pretest and posttest questions used to collect data on the effectiveness of student learning outcomes. This study concludes that the local culture-based teaching materials produced are of good quality because they meet the valid, practical, and effective criteria. The advantage of this teaching material is that it is easy to understand because it contains cultural elements in the form of woven fabrics, utilizes geogebra applications in its development, and is developed according to student needs.

Keywords: teaching materials; buna woven; development.

I. INTRODUCTION

Geometry is one of the materials in mathematics that students must study because geometry is also an indicator of student success (Auliya' & Widjajanti, 2023). Geometry is essential to learn because, in addition to improving cognitive skills, geometry can also improve one's creative abilities. With geometry skills, one can explore and trust entirely in the real world (Sholihah & Afriansyah, 2017; Nurhanifah, 2022). For example, through woven fabrics, children can fully explore flat building models (Lakapu, et al., 2021). Geometry can also help a person in developing problem-solving skills, including understanding problems, designing models, solving problems using models that have been created, and interpreting the solutions obtained (Rahimah & Asy'ari, 2017; Ali, Lestari, & Rahayu, 2023). Children have long known geometry from an early age through surrounding objects. However, children have not maximally used it (Petrus, Karmila, & Riady, 2017), a tool must be used to guide teachers and students in learning real-life fields and spaces.

Teaching materials are one of the tools that can help teachers and students learn something (Septia & Wahyu, 2023). The teaching materials developed should: (1) be according to the needs and abilities of students (Lakapu, Dosinaeng, & Leton, 2021), (2) is 'easy' to use to understand complicated things (Wahyudi, 2022), (3) Utilizing information and communication

technology to communicate and develop themselves (Magdalena, Prabandani, & Rini, 2020), (4) contains study instructions, competencies to be achieved, supporting information, exercises, work instructions and evaluations (Nuryasana & Desiningrum, 2020), (5) Worth using. One of the things that the developer of teaching materials must consider is that old knowledge and new knowledge must be related so that the material delivered can be received as a whole and can last a long time (Puspita, 2017; Jamil, Sa'dijah, & Susanto, 2022). For the knowledge conveyed in teaching materials to last a long time, one solution is that teaching materials will be designed according to students' needs and cultural settings (Divan, 2018). A good quality teaching material, if it meets the teaching material, is valid, practical, and effective (Nieveen, 1999). The validity of a product is seen based on the validity of the content and the validity of the construct. The criteria for the practicality of a product are assessed from its implementation in the field. At the same time, the effectiveness of the product can be seen from the usefulness of the product by its function. One of the development models is ADDIE (Analyze, Design, Development, Implementation, Evaluation). This development model is often used because the stages of the ADDIE model describe a systematic approach to instructional development (Sugihartini & Yudiana, 2018). ADDIE is an instructional design

centered on individual learning, has immediate and long-term phases, is systematic, and uses a systems approach to knowledge and human understanding. Effective ADDIE instructional design focuses on authentic task execution, complex ability, and genuine problems (Hidayat, 2021).

Mathematics in culture is generally a mathematical concept/value that can be seen in cultural practices. Culture positively impacts classroom learning because students are facilitated to learn mathematics in various ways of thinking about mathematics (Astriandini & Kristanto, 2021). Culture can be used to explore several mathematical concepts as a transformation effort to bring mathematics closer to the reality and perception of its people and use culture as a context for learning mathematics in schools (Prahmana & D'Ambrosio, 2020). Explanation of flat buildings in geometry is associated with cultural objects around student settlements. It can be batik motifs, traditional house ornaments, or geometric-shaped objects made by the local community (Zaenuri, Dwidayati, & Suyitno, 2018). For example, some elements of lopo construction mathematically show the existence of a circle model and some other flat shapes (Lapenangga, Rowa, & Lakapu, 2020). This study's novelty lies in creating a teaching material that utilizes Buna woven cloth as a tool or medium for learning.

II. METHOD

This research is a research and development that produces local culture-based teaching materials. The local culture-based teaching materials developed a focus on flat building materials for Elementary School Teacher Education students. The quality of these teaching materials is measured using several instruments, including (1) a validation sheet to collect validity data, (2) an observation sheet of lecturer and student activities to collect practical data, and (3) pretest and posttest questions used to collect data on the effectiveness of student learning outcomes.

This local culture-based teaching material was developed using a model developed by (Carey, 1996), namely ADDIE (analyze, design, development, implement, and evaluate), as shown in Figure 1. At the analysis stage, the development requirements and reasons for the need to develop teaching materials start with identifying student characteristics. The student needs to learn and analyze tasks that students must master to achieve the minimum competencies set. At the design stage, developers make a blueprint starting from designing the concept and content of teaching materials. At this stage, the developer studies the syllabus and semester learning plan (RPS) used by the lecturer concerned and then compiles teaching materials according to the syllabus and RPS design. The result of this

stage is local culture-based mathematics teaching materials that are ready to be assessed by experts. At the development stage, teaching materials are validated by two experts to measure the validity of teaching materials, and developers revise according to expert input. The result of this stage is teaching materials that are ready to be tested on PGSD students and instruments of effectiveness and practicality. At the implementation stage, lecturers test teaching materials, in this case, teaching material, giving assignments, monitoring student progress, and giving grades to the assignments given. After that, analyze the results of the trial, whether the teaching materials can be used practically and effectively or not. The evaluate stage is the stage where the developer evaluates at the end of each stage for revision needs or as a determinant of whether to proceed to the next.

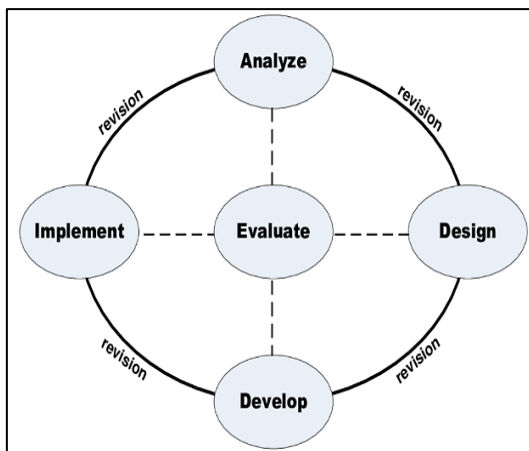


Figure 1. ADDIE Development Model (Branch, 2009).

III. RESULT AND DISCUSSION

Some of the stages that have been carried out include:

A. Analyze

At this stage, researchers conducted observation activities on the needs of flat building teaching materials and interviews with students and lecturers who taught the Low-Grade Mathematics Education course. The results of the analysis obtained are: (1) teaching materials (flat building materials) available are incomplete, do not contain supporting images, material reinforcement, and evaluation questions, (2) teaching materials prepared by lecturers are sourced from expert writings on the internet, additional media that lecturers often use are whiteboards and LCD projectors, (3) teaching materials provided are lecturers' handles only, (4) the lack of relationship or relationship between the material taught and everyday life, (5) after learning students are expected to be able to mention the properties, circumference, and area of the flat build correctly, be able to draw the flat shape in question correctly, and students must know the relationship between the material learned and events/situations in the real world, (6) the learning results show that there are more than 50% of students who do not meet the KKM, (7) most students come from the island of Timor. Based on these results, it was evaluated that it was necessary to design teaching materials based on local culture following the

teaching and learning needs of flat building materials in the PGSD study program.

B. Design

After studying the syllabus and RPS used, the developer began to design the initial teaching materials based on local culture in an initial format (Figure 2), determine sub-CPMK (course learning outcomes), study materials, make material

summaries, practice questions, and evaluation questions. Next, collect weaving drawings and draw flat wake models using the geogebra application. The developed teaching materials focused on rhombic balanced builds (Figure 3). The introduction of teaching materials contains cover and identity, the content of teaching materials, and the evaluation section consists of practice questions.



Figure 2. Teaching Material Format.

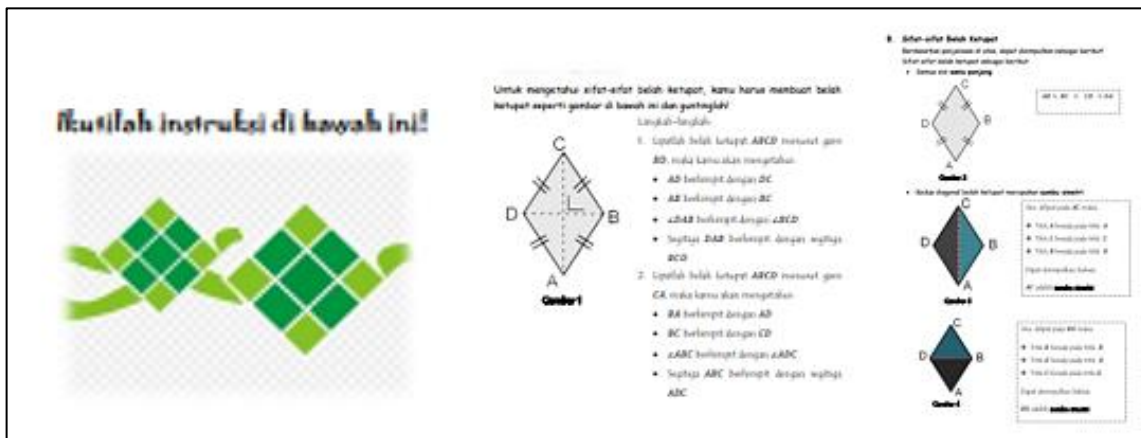


Figure 3. Teaching Material Content.

C. Development

At this stage, the data collected is the validity data of teaching materials

validated by two experts. The general assessment conclusion is that it can be

used with a little revision. Suggestions and comments can be seen in Table 1.

Table 1.
Validation Results

No.	Assessment Aspect	Suggestions and Comments
1	Serving	Add instructions for using teaching materials in the identity section Add rhombus-related illustrations based on the local cultural context in question Add sample questions to each sub-chapter Add answer key Revision of some words and numbers (which are miswritten)
2	Graphs	Editing some images can be maximized again Use a consistent typeface across multiple sections

A summary of the results of the percentage of teaching materials validation of teaching materials is developed is 85%, with a valid eligibility presented in Table 2. The average category.

Table 2.
Summary of Validation Results

No.	Assessment Aspect	Percentage	Category
1	National Security	95	Very valid
2	Serving	83	Very valid
3	Application	80	Very valid
4.	Language	80	Very valid
5.	Graphs	85	Very valid
Average		85	Sangat valid

D. Implement

At this stage, we tested teaching materials on PGSD students, as many as 27 people, to collect data on the practicality and effectiveness of teaching materials. The trial of teaching materials lasted for two meetings. The first meeting began with a pretest and continued with the material. While on the second day continued with practice questions and

posttests. Practical data include observation data on lecturer activities (Table 3) and observation data on student activities. Meanwhile, learning effectiveness data is in student pretest and posttest data (Table 4).

Table 3.
Observation data on lecturer activities

No.	Observed aspects	Is done?		Event Description
		Yes	Not	
1	Preparation	√		Lecturers prepare learning tools (teaching materials, test questions)
2	Implementation	√		In the first phase, the lecturer explains the learning objectives,

			describes the relationship of this material with the previous material to motivate students, and explains the media used to learn flat wakes. In the second phase, the lecturer explained explaining the material as a whole and then directed students to use learning media in the form of woven fabrics that had been prepared. Encourage students to prove what flat build models are on woven fabrics, practice problems, and make new problems from existing woven fabrics. In the third phase, lecturers review and evaluate the work of each group In the fourth phase, lecturers guide students to present group work and give assessments In the fifth phase, lecturers and students make conclusions together
3	Time Management	√	Lecturers manage time well
4	Classroom Atmosphere		Student-centered learning and students seem enthusiastic in participating in learning

All aspects are carried out by lecturers well because before the trial takes place, researchers discuss with lecturers so that lecturers understand the steps of learning activities.

Observation data on student activities shows that students actively work on group assignments and participate in discussion activities. Students of each group direct their attention to discussion materials, actively participate in discussion and presentation activities, provide

relevant questions and answers, and respect the opinions and suggestions of presentation friends.

Pretest and posttest data

At the beginning and end of the meeting, five description test questions (different) were given to students to measure students' academic ability on flat material.

Description of pretest and posttest values:

Table 4.
Pretest and posttest data

Value	Lowest Value	Top Rated	Average
Pretest	55	80	66.41
Posttest	80	95	84.23

The teaching materials developed are effective because the class average score is 84.23%, or in this case, more than 60%

of students obtain grades above the class average.

After being tested, the teaching materials developed are of good quality because they are declared valid, practical, and effective. Good quality teaching materials: (1) It is beneficial and affects many things starting from students who are more active in learning, making it easier for students to understand the material taught, and students enjoying lessons without any boredom (Magdalena, Prabandani, Septia, Fitriani, & Putri, 2020); (2) achieve competencies or sub-competencies with all their complexity (Hernandes, Isnaini, & Testia, 2016); (3) accommodating the development of all students' mathematical critical and creative thinking skills (Mulyana, 2012).

IV. CONCLUSION

This study concludes that the local culture-based teaching materials produced are of good quality because they meet the valid, practical, and effective criteria. The advantage of this teaching material is that it is easy to understand because it contains cultural elements in the form of woven fabrics, utilizes geogebra applications in its development, and is developed according to student needs. We suggest that future researchers add more sample questions and display their IT in teaching materials to motivate students to learn more.

ACKNOWLEDGMENTS

The researcher expressed his gratitude to the Rector of Widya Mandira Catholic University, who has provided support and funding for research through LPPM so that this research can be carried out.

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