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DEVELOPMENT OF MELAYU CULTURAL MATHEMATICS COMIC MEDIA (KOMADAYU) IN MATHEMATICS SUBJECT FOR THIRD GRADE STUDENTS AT SDN BATANG KUIS

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Abstract *This study aims to design and develop a comic-based mathematics learning media that integrates Melayu culture (KOMADAYU) into plane geometry learning for third-grade students at SDN 104230 Batang Kuis. The ADDIE development model, which comprises the phases of analysis, design, development, implementation, and evaluation, is the methodology employed in the Research and Development (R&D) technique. Observations, interviews, expert validation surveys, and teacher and student trials were used to gather data. The research results indicate that the KOMADAYU media received excellent ratings from experts, categorized as "highly feasible" for use in the learning process. Additionally, based on teachers' and students' responses, this media was proven to be practical and effective, as it enhanced students' enthusiasm and motivation in learning mathematics. Therefore, it can be concluded that KOMADAYU effectively improves students' understanding of plane geometry concepts while integrating them with elements of local culture.*

Keyword: *Educational comics, mathematics, Melayu culture, plane geometry, media development*

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Abstrak *Penelitian ini bertujuan untuk merancang dan mengembangkan media pembelajaran berbasis komik matematika yang mengintegrasikan budaya Melayu (KOMADAYU) dalam pembelajaran bangun datar bagi siswa kelas III di SDN 104230 Batang Kuis. Pendekatan yang digunakan adalah metode* Research and Development *(R&D) dengan model pengembangan ADDIE, yang mencakup tahap analisis, perancangan, pengembangan, implementasi, dan evaluasi. Pengumpulan data dilakukan melalui observasi, wawancara, angket validasi ahli, serta uji coba terhadap guru dan siswa. Hasil penelitian menunjukkan bahwa media KOMADAYU mendapatkan penilaian yang sangat baik dari para ahli, dengan kategori "sangat layak" untuk digunakan dalam proses pembelajaran. Selain itu, berdasarkan respons guru dan siswa, media ini terbukti praktis dan efektif, karena meningkatkan antusiasme serta motivasi siswa dalam belajar matematika. Dengan demikian, dapat disimpulkan bahwa media KOMADAYU mampu meningkatkan pemahaman siswa terhadap konsep bangun datar sekaligus mengaitkannya dengan unsur budaya lokal.*

Kata Kunci: *Komik edukasi, matematika, budaya Melayu, bangun datar, pengembangan media*.

A. INTRODUCTION

Education is a deliberate and organized endeavor to establish a learning environment that enables students to actively develop their potential (Dananjaya, 2023). Education is essential for the development and formation of students.potential so that they acquire the necessary skills and competencies in line with advancements in science and technology (Aprianti & Maulia, 2023). As time progresses, the education system continues to evolve to meet challenges in improving the quality of learning. One of the fundamental subjects in the education system is mathematics, which is essential in daily life, particularly in developing logical and systematic thinking skills (Permatasari, 2021).

Teachers play a vital role in achieving national education goals. They are not only responsible for delivering subject material but also for shaping students' attitudes, character, and skills (Ningsih, 2024). The effectiveness of learning depends significantly on teachers' creativity in applying various strategies and methods to enhance student engagement (Mea et al., 2024). The learning process should aim to maximize students' potential, create a space where they can participate confidently, and focus on developing their cognitive, affective, and psychomotor competencie (Siregar & Sari, 2020).

However, many schools in Indonesia still face challenges in improving learning quality. One major issue is the use of monotonous teaching methods that do not actively engage students (Wiryana & Alim, 2023). Teacher-centered learning, particularly through lecture methods, remains widely practiced, especially in elementary schools (Rozali et al., 2022). Although effective in delivering information, this approach often leads to students feeling bored, less motivated, and unable to reach their full potential (Widiyanto et al., 2021). To truly ignite a love for learning, especially in subjects like mathematics, teachers today must go beyond traditional methods and embrace creativity in the classroom. I've seen firsthand how students light up when they're given something engagingsomething that makes them *want* to learn. It's not just about feeding information; it's about sparking curiosity.

During a recent conversation I had with Ms. Decy Anggriani, S.Pd., M.Hum., who teaches third grade at SDN 104230 Batang Kuis, she expressed a common concern: the dominant use of lectures in her school just isn't cutting it anymore. "When all we do is talk, students zone out," she said candidly. Especially in topics like plane geometry where students are expected to distinguish shapes, sides, and angles many just get lost in abstraction.

From what I observed, their learning resources mainly consist of textbooks. While teachers try to connect lessons to real lifepointing to the classroom ceiling to explain angles, for instancethe lack of multimedia support makes the concepts harder to digest. It's like trying to teach someone how to swim by reading a manualwithout ever stepping into water.

Research backs this up. As noted by (Titin et al., 2023), incorporating dynamic and varied media significantly improves learning outcomes. (Magdalena et al., 2021) emphasize that engaging tools don't just transmit knowledgethey invite students into it. When students are presented with content that is both fun and informative, like videos, illustrations, or comics, they're not just learningthey're participating. According to (Nisa Maghfiroh et al., 2024), these types of media are powerful for building comprehension and excitement in class.

One medium that has particularly piqued my interest lately is educational comics. They're not your average Saturday morning cartoons. These comics serve as a fusion

of storytelling and instruction. (Sholehah & Syamil, 2025) argue that comics excel at breaking down complex ideas into digestible scenes. Imagine explaining fractions or symmetry through a character's adventure across different "shape kingdoms"suddenly, math becomes a narrative students care about.

And there's more to comics than meets the eye. (Nafala, 2022) suggests that comics also help sharpen critical thinking. When stories require students to interpret meaning, make predictions, or infer character motives, they're engaging in high-level cognition. Plus, (Mahendra, 2021) points out that elementary students are naturally drawn to bright visuals and familiar characterselements that comics naturally provide.

There's something inherently empowering about letting students learn through stories. Comics create space for student-driven learning, where learners can interact with the material at their own pace. (Kurniawarsih & Rusmana, 2020) found that when students used comics during math lessons, not only did their understanding improvethey became more independent thinkers. This aligns beautifully with Indonesia's *Merdeka Curriculum*, which places autonomy and active learning at its heart.

But why stop at math? Comics are also powerful for transmitting culture. At SDN 104230 Batang Kuis, students' understanding of Melayu heritagefrom language to traditionsis minimal. Why not integrate this cultural identity into their learning tools? Educational comics can act as a bridge between modern education and local wisdom. Through stories, students can explore traditional dances, attire, and proverbsmaking culture feel alive, not like something stuck in the past.

In light of all these reflections, it's clear: students deserve learning media that move thememotionally, cognitively, and culturally. Educational comics offer a vibrant, multidimensional way to support learning, especially in subjects that are often seen as difficult or dull.

With that in mind, this study focuses on designing a culturally rooted educational comic to support math learning in plane geometry for third graders. That's why I've titled the research: "Development of Melayu Culture-Based Mathematics Comic Media (KOMADAYU) for Mathematics Learning in Third Grade at SDN 104230 Batang Kuis."

METHOD

This research utilizes the ADDIE development model, which comprises five primary stages: analysis, design, development, and implementation, with the exception of the evaluation stage, to implement the Research and Development (R&D) method. This model was chosen due to its systematic nature, allowing for the structured development of learning media tailored to students' needs.

The analysis stage aims to identify challenges in mathematics learning at SDN 104230 Batang Kuis. Based on observations and interviews with third-grade teachers, it was found that the conventional teaching methods and the lack of engaging learning media caused students to struggle in understanding plane figure concepts. To address this issue, the design stage focused on developing a comic-based Melayu cultural mathematics learning medium (KOMADAYU). This medium integrates Melayu cultural elements, such as traditional houses and Melayu ornaments, to enhance student engagement and motivation in learning mathematics. The design process includes creating storyboards, designing characters, and adjusting the language to match the comprehension level of elementary school students.

The development stage involves creating the media using graphic design applications. Once completed, the media undergoes validation by media experts, language experts, and subject matter experts to ensure its feasibility in terms of content, language, and visual presentation. Subsequently, the implementation stage is carried out by testing KOMADAYU in third-grade mathematics classes at SDN 104230 Batang Kuis. Teachers and students provide feedback regarding the practicality and ease of understanding the material using this medium. Data is collected through questionnaires and interviews to assess the extent to which this media can be used as an effective learning aid.

In this study, I adopted the ADDIE development frameworkwell-known for its step-by-step structureto guide the creation of an innovative learning medium. Though the classic ADDIE model includes five stages (Analysis, Design, Development, Implementation, and Evaluation), this research focuses on the first four, intentionally setting aside the final evaluation stage due to specific research limitations. The reason

behind choosing ADDIE is simple: it's structured, adaptable, and incredibly helpful in organizing creative processes that still remain grounded in real classroom needs.

During the analysis phase, I dove into the root of the problem. After a few classroom visits and honest chats with third-grade teachers at SDN 104230 Batang Kuis, a clear picture emergedstudents were having a tough time wrapping their heads around basic geometry. Why? The teaching approach was mostly textbook-driven, and students were barely staying awake, let alone engaged. The materials lacked color, both literally and figuratively.

That insight sparked the design stage, which is where the real fun began. Inspired by local wisdom and the richness of North Sumatran heritage, I conceptualized a comic-based math learning toolKOMADAYU. This wasn't just any comic it was infused with cultural pride. Traditional Melayu houses, iconic patterns, and relatable characters filled the storyboard. I paid close attention to the language too, making sure it was accessible and age-appropriate for elementary students. Crafting the storyline was like writing an adventure novelone where kids could see themselves as part of the journey.

Then came the development phasethe translation of ideas into visuals. I used graphic design software to bring characters and scenes to life. But of course, before anything could hit the classroom, the media had to pass several quality checks. Experts in media, language, and subject content reviewed KOMADAYU to ensure that it wasn't just pretty, but also educationally sound and linguistically clear.

Finally, the implementation stage was the moment of truth. KOMADAYU was tested in an actual third-grade mathematics class. I watched as students flipped through the pages with excitementand this wasn't just anecdotal. Both teachers and students provided feedback, which I collected through questionnaires and follow-up interviews. Their responses revealed whether this comic medium could truly function as an effective and enjoyable teaching aid.

In many ways, this journey wasn't just about developing a productit was about bridging the gap between culture and curriculum, between tradition and technology. KOMADAYU is more than a comic it's a conversation starter, a visual storyteller, and hopefully, a game-changer in how we teach mathematics.

B. RESULT AND DISCUSSION

Result

The development results of the investigation of the Melayu culture-based mathematics comic media (KOMADAYU) for the mathematics subject in third grade at SDN 104230 Batang Kuis were obtained through several stages. These stages were adapted from the ADDIE model, which consists of analysis, design, development, implementation, and evaluation stages.

1. **Analysis Stages**

   The development of the Melayu culture-based mathematics comic media (KOMADAYU) was carried out during the analysis stage, which included needs analysis, curriculum analysis, material analysis, and student analysis.

2. **Design Stages**

   This stage is carried out with the aim of producing an effective, engaging, and student-oriented learning media design. The design phase steps undertaken by the researcher include the following: visual concept and comic structure design, scriptwriting and storyboard development, integration of Melayu culture into the comic design, validation, and refinement of the design. The initial design created by the researcher is as follows:

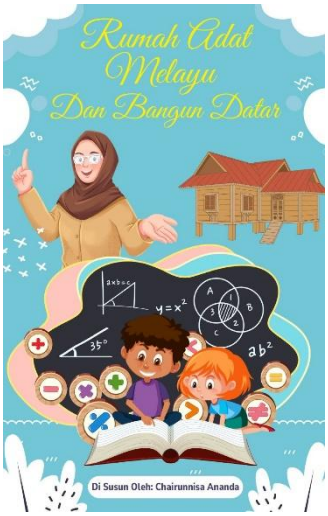


Figure 1. Initial Product Design

3. Development Stages

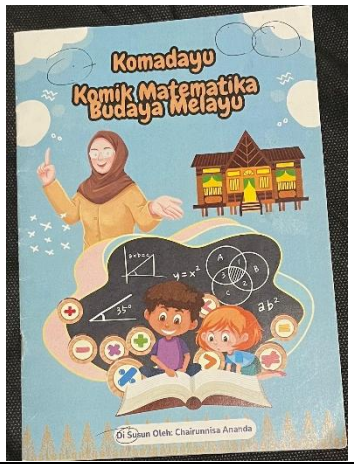
a. Media Making Process

At this point in the process, the spotlight shifts to the actual creation of the producta mathematics comic book infused with Melayu cultural elements. Using Canva as the primary design tool, the comic will be crafted in alignment with the narrative and visual structure laid out during the planning stage.

The design process includes the following steps: Open Canva to begin the design process, click "Create a design", and select the type of design to be made. Determine the design size. Add a background and elements to form panels and illustrations. Use the "Elements" feature, then type keywords according to the images needed. After completing the comic cover, add the next pages for content such as the preface, character introduction, instructions, material, conclusion, and exercises by clicking "Add Page." Once the entire design is complete, click "Share," select "Download," and save the final version.

b. Product Validation

Table 1. The Results Of The Revision

Melayu Culture Mathematics Comic Media	
Before Revision	**After Revision**
	

4. Implementation Stages

When the researcher conducted a practical trial in class III, 29 students were present. One of the results of the questionnaire from one of the class III students who filled out the student response questionnaire sheet about the development of Melayu cultural mathematics comic media, namely Zihan Nadya Mouza.

Table 2. Student Response Practicality Questionnaire

No	Indicator	Rating Scale				
		1	2	3	4	5
1.	The material presented in the comic is easy for me to understand.					✓
2.	I can solve the exercises easily.					✓
3.	The use of the developed comic media for plane geometry material is very beneficial for me.					✓
4.	The background design and text in the comic are very attractive.					✓
5.	The appearance of the developed comic media for plane geometry material is not boring.					✓
6.	I understand plane geometry better after learning with the developed comic media.					✓
7.	I feel more enthusiastic about learning plane geometry when using the developed comic media.					✓
8.	Delivering material through comic media helps me understand plane geometry.					✓
9.	I enjoy learning plane geometry using the developed comic media.					✓
Total Score				**45**		
Student Response Questionnaire Results				**100%**		

The researcher also asked the teacher of class III B, Mrs. Decy Anggriani, S.Pd., M.Hum., to fill out the questionnaire sheet of practicality of teacher responses regarding the development of Melayu culture mathematics comic media that the researcher developed for the trial of product practicality. The following are the results of the teacher response questionnaire.

Table 3. Teacher Response Practicality Questionnaire

No	Indicator	Rating Scale				
		1	2	3	4	5
1.	Material suitability					✓
2.	Material presentation					✓
3.	Material completeness					✓
4.	Quality of language usage					✓
5.	Quality of sentence structure				✓	
6.	Media appearance					✓
7.	Quality of images used					✓
8.	Quality of text used in the media					✓
9.	Layout					✓
10.	Ease of media use					
Total Score				**45**		
Student Response Questionnaire Results				**90%**		

5. Evaluation

Results of Validity Data Analysis

The product revision stage is carried out if, after validation by material and design experts, deficiencies and feedback are found regarding the Melayu culture-based mathematics comic book using Problem-Based Learning, as stated in the questionnaire. Therefore, improvements need to be made in accordance with the suggestions provided by the validation team in the questionnaire.

With an impressive 96% from media experts, 90% from language reviewers, and another 96% from content specialists, the comic earned a solid stamp of approvalclearly marked as "highly feasible" for classroom application. These scores speak volumes: visually appealing, linguistically appropriate, and content-rich, KOMADAYU ticks all the right boxes for effective learning tools. This aligns with earlier studies, such as (Dwi Safirah & Suhartiningsih, 2023), who emphasized how educational comics can make math not just understandablebut genuinely engaging.

Table 4. Overall Expert Validation Results

Validation	Percentage	Interpretation
Media Expert Validation	96%	Highly Feasible
Language Expert Validation	90%	Highly Feasible
Material Expert Validation	96%	Highly Feasible

Scoring within the 81% to just under 100% range, the comic clearly passed validation benchmarks with flying colorsno extra revisions needed. Visually polished, well-designed, and easy to read, it proved itself ready for the classroom. To gauge its effectiveness, we turned to the people who matter most: teachers and students. Their feedback, collected through questionnaires, offered insights into how practical and useful the comic truly was in a real learning environment. If the obtained score was below 60, the comic would be considered ineffective and require further revisions. Conversely, if the score exceeded 60, the comic would be deemed effective as a learning medium in helping students grasp plane figure concepts.

Table 5. Practical Results of Teachers And Students

Practitioner	Percentage	Interpretation
Teacher	90%	Highly Practical
Students	98%	Highly Practical

The responses from teachers and students indicate which this medium is suitable for educational purposes. 90% of teachers rated KOMADAYU as highly helpful in explaining the concept of plane figures, while 98% of students felt more enthusiastic and motivated to learn mathematics through this comic. The use of media based on local culture has been proven to enhance student engagement in learning.

Table 6. Practicality Assessment Data of Melayu Cultural Mathematics Comic Media Based on Student Response Questionnaire

No	Name	1	2	3	4	5	6	7	8	9	Raw Data	Score	Percentage	Criteria
1.	AZA	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
2.	APP	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
3.	AS	4	5	5	4	5	5	5	5	4	42	1	100%	Practical
4.	AGL	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
5.	AAA	5	5	5	5	5	5	5	5	4	44	0,98	98%	Practical
6.	AA	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
7.	AND	5	5	5	5	4	5	5	5	5	44	0,98	98%	Practical
8.	CA	5	4	5	5	4	5	4	5	4	41	0,91	91%	Practical
9.	DIH	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
10.	FFA	5	5	5	5	5	5	4	5	5	44	0,98	98%	Practical
11.	GAS	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
12.	GMTW	4	4	5	4	5	5	5	4	5	41	0,91	91%	Practical
13.	IRS	5	5	4	5	5	4	5	5	4	42	0,93	93%	Practical
14.	JNM	5	5	5	5	5	5	5	5	5	45	1	100%	Practical

15.	KFD	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
16.	MA	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
17.	MGAHN	5	5	5	5	5	4	5	5	5	44	0,98	98%	Practical
18.	MAS	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
19.	MA	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
20.	MAK	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
21.	MF	5	5	5	5	4	5	5	4	4	42	0,93	93%	Practical
22.	NAN	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
23.	NR	5	4	5	5	5	5	5	5	5	44	0,98	98%	Practical
24.	RZ	4	5	5	4	5	5	4	5	5	42	0,93	93%	Practical
25.	RH	5	5	5	5	5	5	5	5	4	44	0,98	98%	Practical
26.	RPG	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
27.	SF	5	5	5	5	5	5	5	5	5	45	1	100%	Practical
28.	WGAH	5	4	5	5	4	5	4	4	5	41	0,91	91%	Practical
29.	YK	5	5	5	4	5	5	5	5	5	44	0,98	98%	Practical
Average Score													**98%**	

Based on the recapitulation of The students' results and teacher questionnaires, it was concluded that the results of the student and teacher response questionnaires to the Melayu cultural mathematics comic media that were developed on average met the criteria of "very practical" at 98%.

Discussion

The ADDIE model applied in this study consists of four stages: Analysis, Design, Development, and Implementation, excluding the Evaluation phase stage as a separate process. The Analysis stage aims to identify learning needs, student characteristics, and challenges in understanding the material through observations, interviews, or questionnaires. The results of this analysis serve as the foundation for the Design stage, where the learning media concept is developed, including determining learning objectives, structuring content, and creating a storyboard. The Development stage focuses on creating a prototype of the learning media, revising it based on expert feedback, and refining it before implementation. In the final phaseImplementationthe comic was put to the test in a real classroom setting, allowing teachers and students to explore its practicality and impact firsthand. While the Evaluation stage wasn’t carried out as a distinct phase, feedback and revisions were integrated throughout the process, ensuring the media evolved with each step.

The findings speak for themselves: KOMADAYU, a comic-based learning tool rooted in Melayu culture, proved both effective and practical in helping students grasp plane geometry concepts. Expert validation confirmed its quality across media design, content clarity, and language appropriateness. Teachers gave it a 90% rating, while students rated it even higher at 97.62%a strong sign that the comic not only supports comprehension but also boosts enthusiasm for mathematics through culturally relevant storytelling.

Although the study followed the ADDIE frameworkcovering Analysis, Design, Development, and Implementationthe final Evaluation phase couldn't be fully completed due to time limits typical of thesis projects. Even so, the outcomes clearly highlight the power of comic-based media in learning. More than just an instructional tool, KOMADAYU reflects the core of constructivist theory: that students learn best when they're actively engaged in meaningful, relatable experiences. By integrating mathematical concepts with Melayu culture, this research aligns with the contextual learning approach, which places learning materials in more relevant real-world situations for students.

C. CONCLUSION

Based on the research findings regarding the development of the Melayu Culture-Based approach Mathematics Comic Media (KOMADAYU) for the Mathematics Subject in Third Grade at SDN 104230 Batang Kuis, it can be concluded that the validation results from experts indicate that KOMADAYU has a very high level of feasibility for use as a learning medium in third-grade classrooms. The validation was conducted by media experts, material experts, and language experts, with high average scores, demonstrating that this media meets quality standards in terms of content, visual appearance, and language use, which aligns with students' comprehension levels.

The practicality of KOMADAYU was tested through questionnaires distributed to teachers and students. The results of the questionnaire analysis show that this media received a very positive response from both groups of respondents.

The development of KOMADAYU followed The ADDIE development model, which unfolds through the stages of Analysis, Design, Development, Implementation, and Evaluation. In this study, the first four stages were successfully completed, while the Evaluation stage was not fully conducted due to time constraints. However, based on the trials that have been carried out, KOMADAYU has been successfully developed as an engaging and contextual culture-based learning medium.

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