

Digital Learning Media Integrated with Malay Culture to Improve Students' Numeration Ability and Motivation

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Abstrak

Media pembelajaran yang terintegrasi dengan budaya suatu daerah merupakan sarana penting dalam mentransfer materi dan melestarikan budaya. Penelitian ini bertujuan untuk mengembangkan Media Pembelajaran Matematika Digital Terpadu Budaya Melayu. Metode penelitian yang digunakan dalam penelitian ini adalah metode penelitian dan pengembangan (R&D). Model pengembangan yang digunakan adalah model ADDIE yang terdiri dari 5 tahap dan dimodifikasi menjadi tiga tahap yaitu Analysis, Design, dan Development. Produk yang dikembangkan adalah media pembelajaran Adobe Animate CC yang akan diimplementasikan melalui materi spasial. Subyek penelitian adalah seluruh siswa sekolah dasar di Pekanbaru Provinsi Riau. Instrumen penelitian berupa lembar validasi untuk melihat apakah media pembelajaran sudah valid dan praktis. Teknik analisis data yang digunakan dalam penelitian ini adalah deskriptif kuantitatif untuk melihat apakah media yang dikembangkan valid dan praktis sesuai dengan kriteria yang telah ditetapkan oleh ahli pengembangan. Hasil analisis menunjukkan bahwa media pembelajaran digital yang terintegrasi dengan budaya melayu adalah valid dan praktis. Menurut para ahli dan praktisi, media pembelajaran mengandung nilai-nilai budaya melayu yang dapat meningkatkan motivasi dalam pembelajaran budaya, meningkatkan kemampuan berhitung siswa.

Kata Kunci: media pembelajaran digital; motivasi budaya melayu; numerasi.

Abstract

Learning media that is integrated with the culture of a region is an essential means of transferring material and preserving a culture. This study aims to develop Malay Culture Integrated Digital Mathematics Learning Media. The research method used in this study is the research and development (R&D) method. The development model used is the ADDIE model consisting of 5 stages and modified into three stages: Analysis, Design, and Development. The product being developed is Adobe Animate CC learning media which will be implemented through spatial materials. The research subjects were all elementary school students in Pekanbaru, Riau Province. The research instrument is a validation sheet to see whether the learning media is valid and practical. The data analysis technique used in this research is descriptive quantitative to see whether the media developed is valid and practical according to the criteria set by development experts. The analysis results show that digital learning media integrated with Malay culture is valid and practical. According to experts and practitioners, learning media contain Malay cultural values, which can increase motivation in a learning culture, improve students' numeracy skills.

Keywords: digital learning media; culture learning motivation; numeracy.

I. INTRODUCTION

Based on the results of PISA and TIMSS, Indonesia showed worse results. Indonesia in 2018 still ranked 72nd, from 78 countries participating in this competition (OECD, 2018). Indonesian students are only able to master basic mathematics and have not been able to communicate facts, relate to various topics, apply complex and abstract concepts (Mullis et al., 2020). These results conclude that the ability and mastery of mathematics at the international level is very low because Indonesia's ranking is below neighboring countries such as Malaysia, Thailand and Singapore. The low mathematical ability of Indonesian students is due to their low interest in learning, understanding, reading and showing seriousness in learning mathematics (Korpershoek et al., 2015; Yüksel, 2014). The low performance of students' mathematics is because students do not have any interesting learning experience, and the teacher only provides material monotonously (Amir et al., 2021; Harsy et al., 2020). As a result, students do not have the confidence to be competent in mathematics (Kyaruzi & Kyaruzi, 2021). This poor mathematics learning experience increases students' anxiety in learning mathematics and the students are reluctant to learn mathematics (Dalitz, 2021). Beside the low ability of mathematics, another emergence phenomena of the erosion of Malay culture in Riau Province is worthy discussing. The rapid development of technology causes students ignoring the characteristics of Malay culture (Rezeki et al., 2021). Students prefer playing games rather than participating in cultural activities. Many

students do not know about Malay cultural games, cooking, dance, and other Malay culture (Rezeki et al., 2020).

Effort to increase motivation, literacy, and numeracy in mathematics and love for Malay culture is to create learning media that can attract students' interest in learning. Learning media is a solution in improving math performance and cultural love by increasing students' interest and motivation (Lombardi et al., 2019; Permatasari & Afriansyah, 2022). Students' high interest and motivation in learning will increase their desire to master mathematics (Hikmah, 2021). Abstract mathematical material can be visualized by digital learning media with interesting animations, and the media can also stimulate students to understand more complex lessons (Matsun et al., 2019; Trisanti, Ernawati, & Hidayati, 2021). Digital learning media with animation can increase interest or motivation so that students' literacy and numeracy will improve (Marthani & Ratu, 2022; Rahmawati, Cholily, & Zukhrufurrohmah, 2023). Furthermore, by integrating of culture and education, cultural maintenance can be carried out optimally.

Based on the description above, the development of mathematics learning media integrated with Malay culture is an important part in improving the quality of learning mathematics and maintaining culture. This digital learning media can provide an interesting learning experience through the animation of the Adobe Animate program. In addition, media packed with animation and Malay cultural content can protect culture from extinction from the rapid development of technology.

This media can be effective tool to preserve Malay culture from the technological development. This study aims to answer 3 questions; (1) How is the quality of digital mathematics learning media integrated with Malay culture to increase literacy, Malay cultural learning and motivation, and students' HOT (High Order Thinking) skill?, (2) What are the validity and reliability of test and non-test instruments to measure students' literacy, motivation to learn Malay culture and student HOT? (3) Is digital mathematics learning media integrated with Malay culture effective in increasing literacy, motivation to study Malay culture and HOT students?

Learning media is a learning tool as an effort to improve student learning outcomes (Ge, 2019; Dewi & Afriansyah, 2022). Media is an effective learning tool in increasing learning progress at schools (Nagel et al., 2021; Sholikhah & Ratu, 2022). Digital learning media can be a means of changing learning success which was initially not good or unsatisfactory (Wood et al., 2021; Sarji & Mampouw, 2022). Digital learning media is an effective solution for changing uninteresting learning and improving student learning outcomes (Yang & Chen, 2021). Utilizing digital media to increase motivation and learning outcomes in mathematics is an effective way (Rutherford et al., 2021; Sungkono, Apiati, & Santika, 2022).

Motivation is an external force to achieve the desired goals. Learning motivation is an external encouragement from various sources to achieve excellent learning outcomes (You et al., 2021; Zhou

et al., 2020). Students' motivational values enable them to learn in any condition and to solve any problems in their learning (Tossavainen et al., 2020). Motivation that comes from students is a determinant factor of learning success (Ning, 2020).

Mathematical numeration is the knowledge to apply mathematics to the context of everyday life (Ojose, 2011). Mathematical numeration is a student's ability to formulate or relate mathematical concepts in everyday life (Fair et al., 2021). Mathematical numeracy skill is the ability of students to combine knowledge, search for relevant relationships in learning mathematics that students get with their environment (Kyttälä & Björn, 2021). Numeracy skills are abilities that students must have because they affect other cognitive processes that can improve student learning outcomes (Gabriel & Buckley, 2020). Mathematical numeracy ability is a student's ability to understand and use mathematics in various contexts with the aim of solving problems (Mononen et al., 2021). Numeracy is a mathematical performance that is obtained through a comprehensive understanding of solving mathematical problems in various contexts (Clerkin, 2018). Literacy ability can affect other math performance such as math anxiety and can be a solution to any math learning difficulties (Bryant et al., 2019).

Based on the statement above, the development of digital learning media based on Malay culture is the right strategy to improve numeracy skills and motivation to learn culture. Digital learning media that is designed optimally and with strict

procedures will produce the goals to be achieved. Therefore, this research is very important to do to facilitate teachers and students to interact optimally in the learning process.

II. METHOD

The research method used in this study is the research and development (R&D) method. The R&D method is a method that produces the latest innovations, both in the form of new products and the development of existing products to make them more attractive, and to be in line with the learning objectives of certain subjects. The ADDIE model consists of 5 stages: Analysis, Design, Development, Implementation and Evaluation. This ADDIE model was used as a research method to develop teaching materials and others. This product was created and produced in Adobe Animate CC learning media which was applied in flat shape material. The choice of this material made it easier for the teacher to explain and provide examples related to flat shapes, so that the teacher was not necessary to bring props and other media.

The data collection technique in this study was to provide validation sheets to expert validators. The data collection instruments in this study consisted of material and media expert validation sheets, practicality sheets, and student response questionnaires. The data obtained was calculated in a quantitative descriptive manner which refers to the validity standard proposed by (Akbar, 2013) as presented in Table 1.

Table 1.
Scoring Criteria

| Criteria | Score |
|----------------|-------|
| Very Good (VG) | 4 |
| Good (G) | 3 |
| Fair (F) | 2 |
| Poor (P) | 1 |

Furthermore, the results of the expert validator's score of the learning media listed on the validation sheet was analyzed using the following formula.

Validation Percentage = (score obtained : maximum score) x 100%

For the criteria of learning media validity, it referred to (Akbar, 2013) and could be seen on Table 2.

Table 2.
Criteria for Level of Validity

| Score | Interval | Note |
|-------|--------------------|--|
| 4 | 85% < Score ≤ 100% | Very Valid and can be used without revision |
| 3 | 70% < Score ≤ 85% | Valid and can be used with minor revision |
| 2 | 50% < Score ≤ 70% | Valid enough and can be used with major revision |
| 1 | 0% < Score ≤ 50% | Not Valid and cannot be used |

III. RESULT AND DISCUSSION

A. Analysis Stage

The development procedure started with a preliminary study including the selection of materials, learning media, and learning design models. Then, the next step was designing learning media using Adobe Animate CC, which included determining the material to be inserted in Adobe Animate CC, introducing learning media, content standards and competency standards, materials, and questions. Then, a validity test was carried out by learning media and material experts on research and development products that had been made. The feasibility test to the developed

Adobe Animate CC learning media was conducted to find out the weaknesses and shortcomings of the media. After the validity test, the weaknesses and shortcomings obtained were revised. Product revision was based on analysis and validity testing with various criticisms and suggestions from expert validators.

B. Design Stage

The design stage is the core stage of this development research. The media developed at this stage is designed. A few designs of the media included: (1) development of flat shape material on the media; (2) media background or theme using Adobe Animate CC; (3) media characteristics, (4) how this media works, (5) determining the name of media. This media used the theme of hill views with several Malay cultural images. The concept followed the trend of Z generation which cannot be separated from technology.

The development of this media used Adobe Animate CC 2018 software. Adobe Animate is a graphics software that creates various animations, interactive websites, learning media, and games. Display buttons and sharing images on this media were made using Coreldraw 2017, while material and answer choices were made using Microsoft Office Power Word 2010. The display of opening page is presented in the following Figure 1.



Figure 1. Opening Page

The start menu can be used to begin the learning activities that are integrated with Malay culture. The result of clicking the start button is presented as follows in Figure 2.



Figure 2. Opening Page after Clicking Start Button

The display of guidebook can be seen in the Figure 3. In this page, there are some explanations of each function and button on each page.



Figure 3. User Guide

The display of the material page can be seen in Figures 4 and 5. This display conveys material that integrates Malay culture such as traditional houses.



Figure 4. Opening Page for Material Section

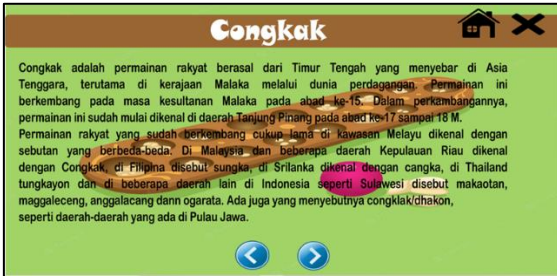


Figure 5. Opening Page for Congkak

The display of the example question page can be seen in Figure 6. Students can explore mathematics integrated with Malay culture through examples of questions that involve congkak, statak, and others.



Figure 6. Example of Question

The media that has been developed was then assessed by media experts, material experts, and teachers. This validation was aimed to get comment and useful suggestions in improving the media before being implemented in learning.

C. Evaluation Stage

This evaluation stage aims to determine the weaknesses of learning media based on Adobe Animate CC, learning outcomes, and

preparation of learning plans. The results of this stage are used as the basis for improving Adobe Animate CC learning media in the development of learning media.

The results of the analysis of students' opinions showed that Adobe Animate CC media could help students in learning mathematics material. An attractive and convenient design could increase students' motivation to learn culture and numeracy. Overall, the Adobe Animate CC learning media received a positive response from students. One of the student responses was that this learning media was attractive for the appearance, convenient, and could attracts student learning interest. Table 3 proves that the digital learning media developed was valid and could be used for class activities.

Table 3.
Result of Validation from Media Experts

| Validation Components | Total Score (%) | Criteria | Conclusion |
|--------------------------|-----------------|------------|------------------------------------|
| Material | 93,75 | Valid | Can be used with minor revision |
| Illustration | 75 | Very Valid | Can be used with a little revision |
| Quality of Media Display | 72,22 | Valid | Can be used with minor revision |
| Attractiveness | 87,5 | Very Valid | Can be used without revision |
| Total | 82,12 | | |

Based on the results of the validity test, in terms of the media aspect, the validity index obtained was 82.12% and included in the valid category. This is because the media had an illustrated and attractive appearance so that it could attract students' interest to be more motivated in learning and the media could also be used offline on all desktops.

Table 4.
Result of Material Validation from Experts

| Validation Components | Total Score (%) | Criteria | Kesimpulan |
|-----------------------|-----------------|------------|---------------------------------|
| Content Eligibility | 87,5 | Very Valid | Can be used without revision |
| Language | 75 | Valid | Can be used with minor revision |
| Presentation | 80,5 | Valid | Can be used with minor revision |
| Total | 81 | Valid | Can be used with minor revision |

Based on Table 4, the results of the validity test in terms of material aspects produced a validity index of 81%, which was included in the valid category. This is because the material in this media has KI (Core Competence) and KD (Standard Competence) and a variety of questions. This indicates that Adobe Animate CC media was valid for use with minor revisions.

Table 5.
Teacher's Response to Learning Media Adobe Animate CC

| Validators | Percentage of Average Score | Criteria |
|-------------|-----------------------------|-----------|
| Validator 1 | 80,7 | Practical |
| Validator 2 | 84,7 | Practical |
| Validator 3 | 83,3 | Practical |
| Total | 82,85 | Practical |

As seen in Table 5 above, it can be concluded that the evaluation of practitioners (teachers' responses) on Adobe Animate CC learning media, it was obtained an average score of 80.7%, 84.7, and 83.33% with the criteria practical. The result of assessment on each point of the Adobe Animate CC learning media is presented in Table 6.

Table 6.

Teacher's Response to Each Component of Learning Media Adobe Animate CC

| Validators | Evaluation Indicators | Score Percentage (%) | Criteria |
|-------------|-----------------------|----------------------|----------------|
| Validator 1 | Media Display | 75 | Practical |
| | Media Content | 83,3 | Practical |
| Validator 2 | Attractiveness | 83,3 | Practical |
| | Media Display | 87,5 | Very Practical |
| Validator 3 | Media Content | 75 | Practical |
| | Attractiveness | 83,3 | Practical |
| Validator 3 | Media Display | 75 | Practical |
| | Media Content | 83,3 | Practical |
| | Attractiveness | 87,5 | Very Practical |

As seen from Table 6, from the result of practicality test scores on Adobe Animate CC learning media, it could be concluded that the average total score of assessments by teachers on the use of Adobe Animate CC learning media with the ADDIE learning design was 81.45%, with practical criteria. Therefore, Adobe Animate CC learning media with ADDIE learning design can be used in learning.

D. Discussion

Based on the results of observations during research and development of Adobe Animate CC media conducted by researchers, we have obtained several findings. In general, students were interested and enthusiastic about Adobe Animate CC media. This is because the media being developed was attractive, interesting, and competitive. According to the teachers' responses, Adobe Animate CC media could be played on the desktop and could add insight to teachers and students about media that could be used in learning.

Based on experts and practitioners in validation tests, learning development products was declared valid and practical to be used as learning media in improving students' numeracy skills in solving problems systematically. Learning media that are valid and practical will provide best practices in learning activities (Danielsson & Wiberg, 2006; Rochmad, 2012). Learning media that are valid and practical are the best media for carrying out learning activities to the fullest (Maclinton & Andrian, 2022; Spikol & Eliasson, 2010). This should be the concern of each education stakeholder because learning carried out without correct procedures will produce bad results (Thomas et al., 2015). Every education stakeholder needs to think about how to provide valuable experiences to students, and this can only be done by developing new educational products such as interactive learning media (Nofriyandi & Andrian, 2022; Root et al., 2020). Developing media will be an effective strategy to get the best learning practices so students can experience something new which makes their motivation and interest better than before.

Educational products in the form of digital learning media are developed to produce products that are practical to use. Products in the form of practical digital learning media will foster students' interest in learning so that students' abilities can be enhanced properly (Bektaş et al., 2020; Liu & Hallinger, 2018). The practicality of digital learning media that is designed with the right steps will make a significant contribution in improving students' numeracy skills (Berry & Staub, 2011; Mohsan et al., 2011; Pepler & Kafai,

2007). Students can explore their numeracy skills through instructional media that have been rigorously designed so that teachers can maximize these students' abilities to streamline the teaching and learning process in class (Sailer et al., 2021; Susanti et al., 2020; van Gennip et al., 2010). Ensuring valid and practical learning media is an important aspect that should not be abandoned in the development of educational products

IV. CONCLUSION

Interactive learning media based on Adobe Animate CC integrates Malay culture to produce valid and practical learning media. The media is suitable for learning activities, easy for teachers to use, and helps students understand math material at a higher level of thinking. The developed culture-based digital learning media can increase student motivation in learning Malay culture so that the preservation of Malay culture in learning mathematics can work well. The average validation result is above 80%, with valid assessment criteria. The average value of product development practicality tests is above 80%, with practical criteria and good learning media used in the learning process. Based on media validation criteria, Adobe Animate CC learning media which is integrated with Riau Malay culture can be directly beneficial in improving numeracy skills and developing students' love for Malay culture.

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