

Development of Scratch-Based Srikandi Media for Indonesian Cultural Heritage in Elementary School: A Preliminary Study

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Abstract: This research aims to develop Scratch-based learning media called SRIKANDI on IPAS material for grade IV elementary school, especially Chapter 6, "Indonesia Cultural Heritage". This media is designed to increase student motivation, engagement and understanding of the material through an interactive technology approach. The research used the Research and Development (R&D) method with a model of ADDIE (Analysis, Design, Development, Implementation, Evaluation). This research is limited only to the analysis stage. The data collection techniques are questionnaires, observations, interviews and relevant literature studies. The population in this study is SD 4 Gulang. The participants in this study were 21 fourth-grade students and teachers. Data were analyzed using descriptive analysis. The results of this study showed that the learning media used are still limited to handbooks and worksheets, and the use of interactive multimedia is only limited to PowerPoint. Hence, it is necessary to develop interactive multimedia on IPAS material, especially Indonesia's Cultural Heritage material, that suits the needs of students to achieve learning objectives. Based on this, it can be concluded that interactive multimedia with a contextual approach needs to be developed in IPAS subjects. Based on this, it can be concluded that interactive multimedia with a contextual approach needs to be developed in IPAS subjects.

Keywords: ADDIE; Indonesian Culture; Learning Media, Scratch.

Introduction

The era of globalisation places the education world at an important crossroads between challenges and opportunities. Globalization accelerates the flow of information and technology while demanding high adaptability from learners [1], [2]. The inability to think critically, creatively, and adaptively puts the younger generation at risk of being left behind in global competition [3]. 21st-century education must integrate technology mastery as a core element to produce a competent generation capable of competing at the global level [4], [5]. The implementation of technology in education also presents challenges at the pedagogical level. As a learning tool, technology should be designed to improve the quality of student interaction, collaboration and participation [6], [7]. Technology-based learning models such as flipped classrooms and gamification are proven to increase student motivation [8], [9], [10]. However, the success of this method relies heavily on teachers' competence in managing technology, which, unfortunately, is still a big challenge in Indonesia. Many teachers still lack an understanding of how to utilize technology to support relevant learning effectively [11], [12]. Learning media development is one of the important strategies for overcoming this challenge. Well-designed media not only helps students understand the material better but is also able to accommodate various learning needs and styles [13].

In Indonesia, the integration of local culture in the development of learning media is an important element in elevating local values into teaching materials to not only

strengthen students' cultural identity, but also ensure that the materials are relevant to their daily lives [14], [15]. The importance of introducing the richness of Indonesian culture to elementary school students, especially grade IV, lies in the ability to form their understanding of the cultural diversity in Indonesia from an early age. Through this introduction, students are expected to be able to appreciate and preserve the nation's cultural heritage. For example, creating digital modules based on folklore or local traditions can be an effective approach to conveying academic concepts in a more interesting and easy-to-understand way [16]. With this approach, learning becomes more contextual and helps students relate lessons to their real lives, which increases their understanding and engagement in the learning process.

This is in line with the conditions at SD 4 Gulang, where the observations and interviews show that students not only tend to be less motivated by traditional learning methods but also lack sensitivity to the diversity of Indonesian culture. The lack of interactive and contextual learning approaches is one factor that influences the low learning outcomes and students' understanding of local cultural values [17]. Innovation is needed in the form of developing Scratch-based interactive multimedia. This article aims to develop an innovative Scratch-based learning media called Srikandi (Indonesian Folk Art: Wealth of Customs and Inspiration) designed to improve the effectiveness of classroom learning. This media aims to create a learning experience that is more interactive, interesting, and relevant to the needs of students while optimally utilizing the technological facilities available at school [18]. This media development also seeks to answer

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the challenges of utilizing educational technology to the fullest so that it can contribute to efforts to realize more effective and inclusive learning. Therefore, Srikandi media answers these problems by providing innovative learning solutions, utilizing technology to increase effectiveness and inclusivity, and supporting the diversity of students' learning styles.

Research Methods

This research implements the Research and Development (R&D) method by applying the ADDIE model, which includes the stages of Analysis, Design, Development, Implementation, and Evaluation in the media development process. SRIKANDI (Indonesian Folk Art: Wealth of Customs and Inspiration) scratch is used in this development, with the ADDIE model chosen because of its structured and interactive framework, thus supporting the creation of effective and efficient learning products [19].

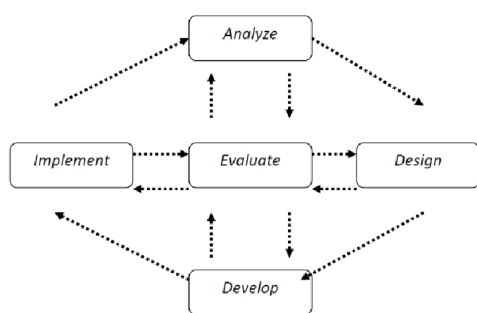


Figure 1. ADDIE Stages [20]

This research aims to develop a learning media product that contains IPAS learning material for grade IV in Chapter 6, "Indonesia's Cultural Heritage", made using the Scratch application.

Data Collection Technique

The data collection technique in this research was carried out at the preliminary study stage with a qualitative approach, aiming to explore in-depth information about the needs of media or product development. Data was collected through in-depth interviews with key informants, such as teachers, students, and education experts, to understand learning media development's needs, constraints, and potential. In addition, observations are made to see the real conditions in the classroom, including learning interactions, use of media, and available facilities. Documentation studies are also carried out by collecting data from documents such as curriculum, syllabus, lesson plans, and student learning outcomes. As a support, literature analysis was used to review relevant theories, research results and education policies. The data from this stage is the main basis for designing products that suit learning needs.

Data Analysis Technique

The data analysis technique used in this research is a descriptive qualitative and quantitative approach. Qualitative data obtained from interviews, observations, and documentation studies were analyzed through the steps of data reduction, data presentation, and conclusion drawing

[21]. This process aims to filter out important information, present it narratively, and draw conclusions relevant to media or product development needs. Meanwhile, quantitative data from the needs analysis questionnaire was analyzed descriptively using percentages to see most respondents' trends, preferences, and needs. The results of this qualitative and quantitative analysis are combined to provide a comprehensive picture of the product development needs appropriate to the learning context. The first phase in this research is the analysis phase; this phase is an information-gathering phase. The methods used in collecting preliminary information were literature study and field study. A literature study is carried out by collecting relevant research and sources and reviewing concepts on IPAS material as the basis for developing scratch-based interactive multimedia. Meanwhile, field studies were carried out by directly distributing media needs questionnaires using needs analysis sheets and interview guidelines to third and fourth-grade teachers and third and fourth-grade students of SD 4 Gulang, Mejobo District, Kudus Regency. Each indicator on the media needs analysis sheet is listed on a Likert scale with a score range of 1-4 to ensure objective and measurable results.

Table 1. Likert scale [22]

Answers	Score
Strongly Agree	4
Agree	3
Disagree	2
Strongly Disagree	1

In the context of the Likert scale applied to the media needs analysis sheet, it is not only to measure the extent to which students accept the media but also to assess its effectiveness in supporting the learning process. The Likert scale, with a rating range from "Strongly Agree" to "Strongly Disagree," allows for a more in-depth exploration of students' perceptions of the extent to which the applied media can assist them in understanding the learning material, increase their engagement, and achieve the expected objectives. This scale provides more objective and measurable data, which can then be used as a reference to evaluate and formulate the type of learning media that is more suitable for student needs. Therefore, the results of this analysis serve as a more critical basis for designing or adapting learning media that are relevant and more effective in improving student learning outcomes.

Results and Discussion

The following are the results of the needs analysis obtained through a series of observations, interviews, and filling out questionnaires conducted on November 4, 2024. This data provides an in-depth picture of the learning needs at SD 4 Gulang, especially related to the use of technology-based media in IPAS learning.

Analysis Stage

The analysis stage is used to understand the problems underlying the need for media development. In this context, learning using technology is often limited to PowerPoint, which is static and less interactive. The analysis also includes

identifying student characteristics, such as low learning motivation and limited access to technology at school. The gap between the potential of technology available in schools and its utilization in learning is a critical point that needs to be addressed through media that can increase active student involvement.

Material Analysis

A literature study of the IPAS Class IV Elementary School book was conducted to review the basic competencies and concept analysis of Indonesia’s Cultural Heritage material. The basic competencies in this material are: (1) Analyze the concept of Indonesian cultural diversity, including ethnicity, language, religion, and customs in various regions. (2) Present the results of an analysis of the benefits of cultural diversity and how to preserve Indonesian culture. The topic Indonesia is rich in culture consists of 6 sub-topics namely: 1) Local wisdom, 2) Benefits of local wisdom, 3) Indonesian cultural diversity, 4) Factors causing Indonesian cultural diversity, 5) Benefits of cultural diversity in Indonesia, 6) How to preserve cultural diversity in Indonesia.

The concepts and sub-topics of Indonesian culture were analyzed using the method developed by Herron [23]. Herron's classification of concepts includes: 1) concrete concepts, 2) concepts without observable examples/too small to be observed easily or abstract, 3) abstract concepts with concrete examples, 4) concepts based on principles, 5) concepts involving symbols, 6) concepts that state processes, 7) concepts that state properties and attributes, 8) concepts that state properties and attribute names. The topic of Indonesia’s Cultural Heritage has concepts that belong to the category of abstract concepts with abstract concepts, concrete concepts, and concepts that express processes. The concept analysis of the material Indonesia is rich in culture is presented in the following table.

Table 2. Results of concept analysis of Indonesia’s Cultural Heritage material

No	Concept	Concept Type
1.	Local Wisdom	Abstract
2.	Benefits of Local Wisdom	Concrete
3.	Indonesian Cultural Diversity	Concrete
4.	Factors Causing Indonesian Cultural Diversity	Abstract
5.	Benefits of Cultural Diversity in Indonesia	Concrete
6.	How to preserve cultural diversity in Indonesia	Process

The analysis of Indonesia’s Cultural Heritage material concepts shows the importance of deeply understanding Indonesia’s cultural diversity and how we can preserve this cultural wealth daily. Through this understanding, students are expected to appreciate and maintain their cultural heritage as an integral part of the Indonesian identity. To clarify the relationship between the concepts in Indonesia’s Cultural Heritage material, the following Venn diagram illustrates the similarities and differences between the various concepts.

Results of concept analysis of Indonesia Rich in Culture material

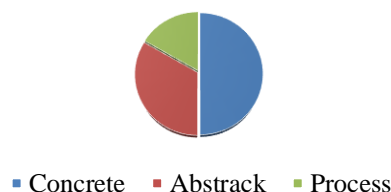


Figure 2. Results of concept analysis of Indonesia’s Cultural Heritage material

Based on the results of the concept analysis of Indonesia’s Cultural Heritage material as the basis for learning development, it can be concluded that the concepts in this material consist of 3 types of concepts, namely: 1) 40% concrete concepts, 2) Abstract concepts 35%, 3) Concepts that state the process 25%. The analysis shows that the topic of Indonesia’s Cultural Heritage is mostly concrete and abstract concepts with almost equal percentages. Abstract concepts, such as cultural diversity and local wisdom, can cause comprehension difficulties for students, potentially lowering their understanding of the material. Students need a more concrete and visual approach to understand these concepts more easily. Therefore, using learning media, such as interactive multimedia, is one of the effective solutions to help students understand abstract concepts in Indonesia’s Cultural Heritage.

Teacher Needs Analysis

Teacher needs analysis is conducted to understand their challenges and expectations in the learning process, especially related to using technology-based learning media. Teachers at SD 4 Gulang identified difficulties in teaching IPAS and local content material, particularly on Indonesia’s cultural diversity, with their current traditional methods. They realized that the method was not interesting enough for students and tended to motivate them less. Guru juga mencatat keterbatasan dalam penggunaan media seperti PowerPoint yang cenderung bersifat pasif dan tidak interaktif. Teachers also noted limitations in using media such as PowerPoint, which tends to be passive and not interactive. Therefore, they expressed the need for more dynamic, interactive media and in accordance with the characteristics of students who prefer technology-based learning. This finding indicates that using Scratch-based learning media, such as SRIKANDI, is needed to improve the effectiveness of classroom learning.

Table 3. Teacher Needs Analysis

Aspect Assessment	Average Score (%)
Teachers' Needs for Interactive Learning Media	77.5 %
Teachers' Skills in Using Technology	77.5%
Teacher's Experience with Conventional Media	65%
Teachers' Expectations of Technology-Based Media	80%

In Table 3, teachers expressed the importance of using interactive media in learning to increase learner

engagement, given the limitations of using conventional media that have been applied so far. In addition, students also showed a desire to use media that is more interesting and in accordance with existing technological developments. Although the technology facilities at SD 4 Gulang are limited, adequate devices allow Scratch-based media to be implemented.

Table 4. Mapping Types of Media Based on Learning Characteristics of Students in Grade IV SD 4 Gulang

Learning Style	Learning Style Characteristics	Types of Learning Media
Visual	Tend to use the senses Remember what they see/read	Animations, images, concept maps, diagrams, photos, text/readings, computer
Audio	Tend to use the senses hearing Remembers what is heard	Video, animation, Music, sound effects, radio, computer
Kinesthetics	Tends to use the body and sense of touch Remembering by doing movements such as walking around and looking Learn by moving around	Artificial models, real objects, computer

Based on the interviews, it was identified that traditional learning media at SD 4 Gulang is less effective in motivating and helping students understand the material, especially regarding Indonesia's cultural diversity. Teachers mentioned that conventional methods based on text and static images could not attract students' interest, which resulted in low learning outcomes. This indicates a gap between the learning approach and the needs of students' learning styles, which are dominated by visual and audio. Students need media that is not only visually appealing but also audio-interactive to optimize student understanding. Thus, developing technology-based media such as scratch is an urgent need. This media addresses the challenge of dynamically visualizing the material and provides an interactive narrative relevant to student characteristics, making it a strategic solution to improve motivation and learning outcomes significantly.

This is also in line with research by Seiawan et al. that the use of learning media that involves audio-visual elements can increase students' interest and understanding, especially for those who have visual and auditory learning styles [24]. These results are supported by the opinion of Rahmadika et al. that digital technology such as Scratch can provide a deeper learning experience by allowing students to interact directly with learning material [25]. This technology-based media facilitates students to explore and create, increases their involvement in the learning process, and reduces boredom that often occurs in conventional learning. Moreover, in Indonesia's cultural diversity, the use of technology-based media also provides the opportunity to present more diverse and authentic material, including

cultural videos, traditional music and other multimedia elements. This makes it easier to understand and helps students better appreciate and understand the diversity around them.

Student Needs Analysis

Student needs analysis was conducted to identify their level of engagement and understanding of IPAS and local content learning materials, particularly related to Indonesia's cultural diversity. Based on observation and questionnaire filling, students revealed that they often feel bored with traditional learning methods that do not involve them actively. Students are more interested in learning that uses interactive and fun media, such as videos, animations, or educational games. Students also stated that material about Indonesian culture is often difficult to understand if only delivered through lectures or written text.

Table 5. Student Needs Analysis

Assessment aspect	Average score (%)	Identification
Class IV IPAS Learning Needs	77.97%	There is an urgency to develop more effective methods and materials to support student understanding, especially on the material "Indonesia is Rich in Culture"
Learning Needs Using Technology Media	81.19%	There is a high need for technology-based media to increase student engagement and understanding in IPAS learning, especially the material "Indonesia is Rich in Culture"
Students Contextual Understanding of IPAS Materials	79.24%	The importance of the contextual approach in IPAS learning is to relate the material to students' real lives and culture to improve students' understanding.
Learning Technology and Media Experience	74.8%	There is limited student experience with technology, so it is necessary to increase access and understanding to make technology-based learning more effective.

Table 5 shows the results of the students' needs analysis; they show high enthusiasm for the use of technology-based learning media that is more interactive and interesting. Students feel that conventional learning methods are less able to motivate, so students need a more innovative approach in accordance with the times. These results indicate that the Scratch-based SRIKANDI learning media designed to visualize IPAS material in Chapter 6, "Indonesia is Rich in Culture", will be very relevant and effective in increasing student engagement and understanding in learning.

Based on the analysis of the interviews with teachers and students, it can be concluded that at SD 4 Gulang, both teachers and students experienced challenges in learning science and technology, especially related to the limitations

of existing learning media. Teachers realize that traditional methods are ineffective enough to increase student motivation and understanding, while students are more interested in learning using technology and interactive media. The urgent need for technology-based media that is more interesting and relevant to students' lives is very clearly visible, especially in teaching materials about Indonesia's cultural diversity. In line with these findings, research by Ali (2024) shows that the use of technology-based learning media can increase students' motivation and understanding of complex subject matter [26]. A similar thing was found in research by Rahayu and Harefa (2024), who emphasized that learning technology that integrates local values can deepen students' understanding of culturally related subject matter [27]. Despite limited facilities, developing technology-based learning media such as Srikandi, which integrates local cultural values, is expected to increase student engagement, contextual understanding and learning outcomes with a more innovative and interactive approach. Research by Hasani et al. (2025) also confirms that using interactive media can overcome the limitations of traditional methods and increase students' active participation in the learning process [28]. Therefore, it is hoped that further development of technology-based learning media can solve these challenges.

Conclusion

Based on the results of this initial research, it is recommended that further research be carried out regarding developing Scratch-based SRIKANDI media on science material to improve the learning outcomes of 4th-grade elementary school students. This further research is important to illuminate in more depth the effectiveness of learning media in various learning contexts and to identify the factors that influence the success of its implementation. Therefore, the development and application of learning media that are more structured and based on scientific evidence will be very beneficial in creating a more interactive and meaningful learning environment and helping students master scientific concepts more effectively.

Author's Contributions

This research contributes to improving the quality of education through products developed especially for schools that are the subject of research. Researchers also hope that the results of this research will be useful for other educational units so that they can be implemented as study material or references for further or similar research.

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