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Development of "Wibisana" Using the Scratch Application for Grade VI Students in Primary School

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Abstract: The aim of this research was to develop a game-based learning media product called Wibisana which is feasible and practical to use. The development of this media uses an application *Scratch*. This research is development research (R&D) which uses a research design using the ADDIE development model. The development stage includes (1) analysis, (2) design, (3) development, (4) implementation, (5) evaluation. Interviews were conducted with three experts who have expertise in technology of art, and electrical engineering, and game-based learning. The findings reveal that Wibisana is a game whose content is appropriate to the learning objectives, has an attractive design, and is easy to use. The Wibisana game also has great potential to be used on an international scale, especially for people who are interested in Indonesian culture.

Keywords: Learning media, Wibisana, Game Based Learning, Scratch

1. Introduction

The development of technology and information has penetrated all areas of life. The rapid development of science and technology has a broad impact on various sectors of society, including education. Learning that initially ran conventionally has shifted to a digital system (Bygstad et al., 2022). This situation also requires teachers to be creative and innovative in using technology so that grade room learning is no longer monotonous by maintaining traditional teaching habits (Miftah & Lamasitudju, 2022). The use of technology has opportunities big in improving the quality of learning in Indonesia. One of the uses of technology in learning is in the form of learning media. The use of learning media adapts to the demands of current developments so that graduate competencies will be relevant to global market needs. Thus, it is important for students to be equipped with competencies through up-to-date alternative learning media (Fathoni et al., 2023).

The reality we face today is the limitations of game-based digital learning media that promote Indonesian cultural values. The lack of innovative learning media causes students' low motivation and interest in studying Indonesia's cultural heritage. This is due to teachers' limited time to prepare learning media and teachers' lack of ability to utilize technological developments in learning (Rich et al., 2019). Teachers only teach based on textbooks provided by the government. The use of textbooks is less attractive to students today because they grow and develop amidst rapid technological advances. Teachers need to develop technology-based learning media so that the learning process is interesting and fun for students (Rahayuningsih & Muhtar, 2022). Interesting learning using technology for students includes using game media or game-based learning.

Game-based learning is a new breakthrough in learning that can attract students' interest and help them absorb information more effectively. The application of game-based learning in learning activities allows students to participate in learning activities. The development of game-based learning can create an atmosphere of teaching and learning activities that is motivating, fun and increases creativity. The game approach to learning can also stimulate children's emotional, intellectual and psychomotor skills.

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According to Saleh et al. (2023) explains that learning media is essentially a means of conveying information from the communicator (teacher) to the communicant (student) as the recipient. If the learning environment is designed systematically it will be able to achieve learning objectives optimally. An example of learning media that can be used is game media based on scratch applications. Scratch is an educational programming language with a user-friendly and engaging multimedia programming framework and can support the development of game-based learning, which will significantly influence student motivation (Pérez-Jorge & Martínez-Murciano, 2022; Chekour et al., 2023).

The use of Scratch programming can be used in the teaching and learning process in elementary schools. Fagerlund and colleagues conducted research to integrate Computational Thinking (CT) into the context of Scratch programming and evaluated CT assessment through Scratch programming in K-9 educational curricula in several countries such as Finland, England, and Estonia. Research findings show that using Scratch can advance and strengthen students' skills. Apart from that, the content and activities in Scratch have a broad and multidimensional scope (Fagerlund et al., 2021).

Other research on Scratch was also carried out by Rosydiana and her colleagues who developed digital game-based learning media using Scratch. Research findings conclude that the use of digital game-based learning media using Scratch is effective in improving students' problem-solving abilities, motivating students, and providing a positive learning experience (Rosydiana et al., 2023). Apart from that, Maola & Irianto's (2023) research to develop scratch-based media showed that the results of the feasibility test from the material validator obtained a percentage score of 91.67%, which is included in the very feasible category; media validators got a result of 92.5%, which falls into the very decent category. The teacher response questionnaire obtained a result of 97.5%, in the very feasible category, and the student response questionnaire obtained a result of 95.75%, which is included in the very feasible category (Maola & Irianto, 2023). Based on the success of the previous research above, researchers want to develop learning media in the form of scratch-based educational games for science subjects for grade VI students which will be named Wibisana. Wibisana is an abbreviation for Indonesia's global cultural heritage. It is hoped that the development of this media will be able to answer the learning challenges of the digital era by passing on the noble values of Indonesian culture that are recognized worldwide.

2. Methodology

This research uses a Research and Development (R&D) approach to create and test Scratch-based learning media, which is a research method used to develop products that begins with needs research, then develops to produce products that have been tested (Okpatrioka et al., 2023). The development model used is the ADDIE model which consists of five stages, namely analysis, design, development, implementation and evaluation (Aini et al., 2023). The selection of the ADDIE research model is based on a simple, complete and systematically arranged model flow as shows in Fig. 1.

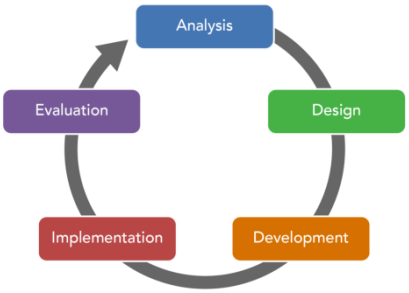

Fig. 1: ADDIE development model (Widyastuti, 2019)

2.1 Phase of Analysis

The initial stage is an analysis to determine the objectives of the mobile application being developed and the problems that need to be resolved. At this stage, teacher creativity and originality are needed to create learning media that are useful for the educational process (Balakrishnan, 2022). The conditions needed are interesting learning media that utilize developments in information technology to provide students with 21st century skills that can be accessed easily. The problem analysis began when carrying out teaching and learning activities in grade VI at SDN Jrahi 01 regarding tangible and non-object cultural heritage material, there was no media that could concretize the material which was still abstract for students.

2.2 Phase of Design

The second stage of design is designing the product concept. Design activities are carried out by making *a storyboard* which is an outline of the general media content which includes template design and materials. During planning, determine supporting media elements such as images, animation, material and the selection of the main character named Wibi who is the icon of the Wibisana game. Wibi's character is described as an enthusiastic and cheerful Indonesian schoolboy. Each design stage uses different software. Table 1. The Wibisana game contains five menus, namely instructions, material summary, practice questions, games and evaluation questions. Each menu allows students to better

understand the Indonesian cultural heritage material being studied. Figure 2 shows the prototype design of the digital game being developed.

Table 1: SoftwareUsed for each Purpose

Software	Objective
Canva	Develop storyboards Designing the display Designing visual elements Designing objects
Microsoft word	Write scripts
Scracth	Make a prototype

Fig. 2: Prototype

2.3 Phase of Developing

The third stage is the development stage. At this stage the design created is realized in concrete form. The elements that have been collected in the design stage are assembled into one complete product. At this stage, the prototype undergoes improvements based on expert opinion. In this research, the results of discussions held during the design phase guided the creation of software and learning materials for the Wibisana digital game. *Scratch* used to program digital games and create applications, according to the development strategy implemented in this research. Every development is tested continuously to ensure that Wibisana games run smoothly and effectively.

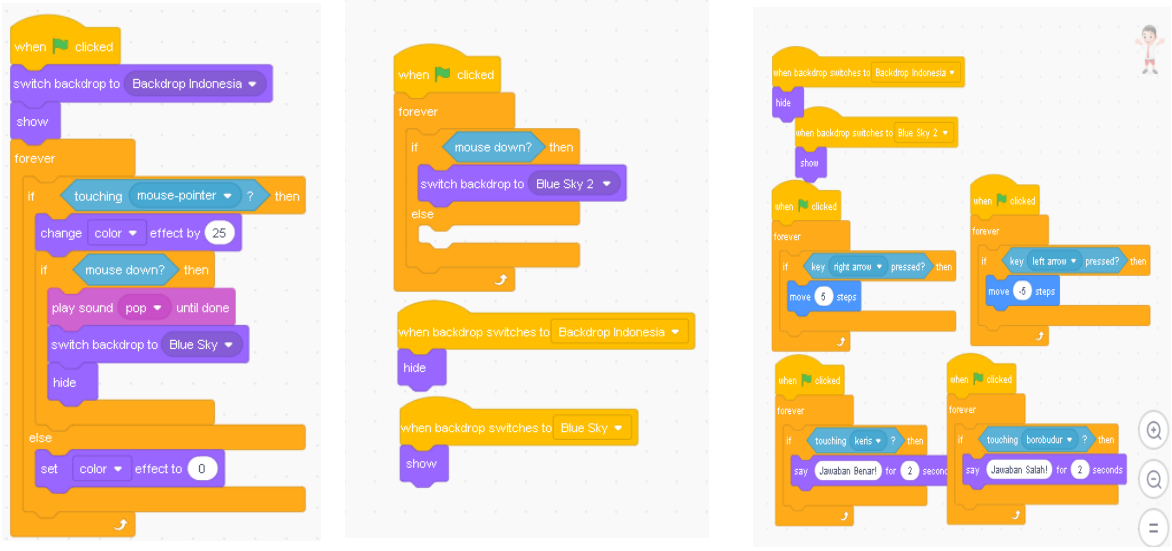

Fig. 3: (a) Coding the Start Button (B) Coding the Next Button (C) Coding the Character Wibisana

At this stage, a validation test of the Wibisana game was carried out by 3 validators, namely 1 lecturer from Universitas Muria Kudus who is an expert in the field of learning media arts, 1 lecturer from the Faculty of Technical & Vocational, Sultan Idris Education University, and 1 senior teacher who is an expert in the field of learning media at Gunungwungkal Regional Police Headquarters. The results of validation by experts can be analyzed to find the validity of the Wibisana game learning media using the application *scratch.* In the interview activity, a series of questions are created which are divided into three parts, namely the first part, the second part and the third part. The experts were asked 5 questions.

Table 2: Expert Background and Expertise

Respondent	Gender	Background
R1	Male	Lecturer at Universitas Muria Kudus
R2	Male	Lecturer at the Faculty of Technical & Vocational, Sultan Idris Education University
R3	Male	Senior Teacher

Part B describes the findings regarding the content of the Wibisana game. The five questions include content analysis of student challenges, whole number material, and recommendations for improvement. The following table explains the above statement in Table 3.

Table 3. Questions and Expert Opinions

Question	Expert opinion
What about the cultural approach used in this game to represent Indonesia's global cultural heritage?	The cultural approach used in this game is materially quite good in representing forms of Indonesian cultural heritage
Is this game design effective in conveying Indonesian cultural heritage material to players from various backgrounds?	The game design has successfully combined interesting gameplay elements with relevant learning material
Is the use of Scratch as a game development platform optimal in realizing an interactive and interesting game concept?	The use of Scratch as a development platform has provided enough flexibility to realize this game concept because this Scratch based game is easy to use
How much potential does this game have to attract international players?	The game has great potential to attract international players, especially those interested in Asian culture
What is the most relevant evaluation method to measure the effectiveness of this game in achieving learning objectives and attracting player interest?	To measure the effectiveness of the game, evaluation methods such as questionnaires and interviews can be used, apart from that it is necessary to carry out regular testing to see the development of players' understanding of the material presented

Section C contains questions for suggestions and improvements to the Wibisana game that has been developed. This section consists of three (3) questions for experts.

Table 4: Questions and Expert Opinions

Question	Expert opinion
Are there any features that need to be added?	Add multiplayer features to encourage collaboration
What about the visual and audio aesthetic aspects used to support cultural narratives?	The visual and audio aesthetic aspects are sufficient to support the cultural narrative to be conveyed
What are the plans for further development to increase the quality and reach of this game?	Add more challenging game levels, develop new relevant content, or carry out more intensive promotions

3. Results and Discussion

Different teaching methods have been designed and implemented to stimulate children's creative thinking skills when learning at school or doing assignments at home (Behnamnia et al., 2020). Scratch is an application that can be utilized for initial programming learning and also for creating educational and entertainment content, creating math and science projects, simulating and visualizing experiments (Iskrenovic-Momcilovic, 2020). The aim of this project is to develop media game-based learning called Wibisana which is feasible and practical to use. The development of this media uses the Scratch application. The method used is the ADDIE method. The first to fifth stages of the ADDIE method include analysis, design, development, implementation and evaluation (Anggraini, 2021). Therefore, there are five stages involved in creating electric digital games: analysis to design learning materials, creating learning materials and planning activities as well as testing and evaluating the digital game as a whole (Alfani & Wijaya, 2024).

In the first stage, namely analysis, problems are found and then identification of these problems. In elementary school, specifically in grade VI, there is a science course. In terms of Indonesian cultural heritage material, which is worldwide, most students find it difficult to differentiate between tangible and intangible cultural heritage. In the second stage, the application used by researchers to develop media is scratch. The game being developed is named Wibisana which is an abbreviation for Worldwide Indonesian Cultural Heritage. The Wibisana game is a tool to help students understand the material on Indonesia's Worldwide Cultural Heritage. In this media, students are presented with material regarding Indonesian cultural heritage, both tangible and intangible, and how to distinguish them.

In the third stage, researchers develop media scratch existing ones, with more interesting innovations to foster student learning motivation (Liu et al., 2023). The products made are arranged according to the design created in the previous stage. Product design designed by using programming applications viz scratch. Reviews from three experts found that the Wibisana game was in line with students' needs. Starting from the features in the media scratch, colors, images, student attraction, game mechanics, and learning materials. However, it is recommended to add several features and game levels to make the Wibisana game more interesting.

4. Conclusion

Scratch It is very effective to use as a game in special science learning subjects about Indonesia's global cultural heritage. Researchers use the ADDIE method in developing game-based media scratch. The ADDIE stages are also very systematic so that a product is produced that is ready to use and meets standard product development testing. The aim of this research is to develop a game-based learning media product called Wibisana which is feasible and practical to use. The development of this media uses an application scratch. However, this research is limited to the development stage and does not include post-development product implementation or evaluation. Platform potential scratch and game products are quite promising, and it is recommended that these products be tested for their usability and effectiveness in learning on a sufficient sample size.

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Conflict of Interest

The authors declare no conflicts of interest.

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