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Development of Scratch Learning Media on The Subject of IPAS Material Form of Objects for Grade IV Elementary School Students

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Abstract: The IPAS subject aims to foster students to become good citizens, who have knowledge, skills, and social care that are useful for themselves as well as for society and the State. From the reflection that has been done, the condition of class IV students during IPAS learning is not optimal, the teacher has not used innovative learning media according to current developments, causing students to be less enthusiastic in participating in learning so that learning outcomes are low. The lowest score is 20 and the highest score is 80, with a class average of 55.2. Students who completed the KKM were 37.5% and students who did not complete were 62.5%. To improve IPAS learning outcomes in grade IV, it is necessary to have learning media that is attractive to students so that it can improve their learning outcomes. The purpose of the study was to develop innovative learning media in the subject of IPAS material on the form of objects for grade IV elementary school students. This research is a Research and Development (R&D) research using the ADDIE development model. This development model has 5 stages, namely: Analysis, Design, Development, Implementation, Evaluation. Data collection instruments in this study used questionnaires and tests. Questionnaires are used to determine the assessment given by media experts, material experts, classroom teachers on the media developed. While the test is used to measure the initial ability and final ability of students after using the media that has been developed. The results of this study are scratch learning media declared valid based on improved student learning outcomes. The conclusion of the results of this study, stated that the development of this media can help teachers to create a pleasant learning atmosphere and can improve the learning outcomes of fourth grade elementary school students.

Keywords: Learning Media, Scratch, IPAS, Object Forms

1. Introduction

Learning is a process of behavior change that involves several aspects that occur in each individual or changes that occur from not knowing to knowing (Fatimah et al., 2022). In the learning process, there are learning activities that must be carried out by each individual, especially in the school phase. According to Sukmawarti, learning is needed in order to prepare students for the era of the industrial revolution 4.0 which demands 21st century skills, namely creative thinking, critical thinking, communication, and collaboration (Sagala & Bahri, 2023). The curriculum used in the current learning process is the independent curriculum. The curriculum was developed with the aim of improving the quality of education because the heart of an education is the curriculum. The independent curriculum creates active and creative learning. Achmad argues that this program is not a replacement for the current program, but to provide improvements to the current system (Aprima & Sari, 2022; Wanti, 2023). One of the subjects in the independent curriculum in elementary schools is the natural and social science subject (IPAS). IPAS is a combination of science and social studies. The content is very close to nature and human interactions. IPAS learning needs to present a context that is relevant to the natural conditions and the environment around students. Seeing how important the material in the IPAS learning is, it is fitting that IPAS should be a lesson that students must be able to master.

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However, the conditions in the field that researchers encountered when practicing teaching IPAS, the material was not well conveyed to students. The use of learning media that is not in accordance with the material being taught makes student learning outcomes low. The teachers still use conventional learning media. Whereas the use of relevant learning media in accordance with existing materials is also very necessary so that learning can be absorbed optimally by students. In the era of the industrial revolution 4.0 which demands 21st century skills, namely creative thinking, critical thinking, communication, and collaboration, it is fitting that teachers use learning media that can activate these students' thinking skills. Scratch media can be one way for IPAS learning to be absorbed by students so that later it will increase their learning outcomes.

Scratch media is a new programming language that makes it easy for you to create interactive stories, interactive games, and animations, and share your creations with others via the internet (Hansun, 2014; Bučková, 2018; Bernard & Setiawan, 2020). Scratch media can be used as an innovation in increasing students' interest in learning and mathematical creative thinking skills (Istiningsih et al., 2018). So that by using scratch we can create learning media that contains material and interspersed with games that are interesting to students. Scratch is an application used to program simple games and animations. Elementary students are more likely to like learning while playing. With this media, it is expected to create an interactive atmosphere and make the teaching and learning process more fun (Nisa et al., 2023). The coding application that can be adjusted by the teacher himself so that it will produce work in the form of learning media will certainly be beneficial for student success in learning including improving learning outcomes.

According to Kurniawati (2021) the use of learning media is very helpful in the teaching and learning process. Apart from being able to increase students' interest in learning, learning media can also improve student achievement. There are many other benefits that we get by using learning media as a means of improving the quality of education in Indonesia. But in reality, education in Indonesia is still lagging behind compared to other developed countries. Various efforts have been made by the government to improve the quality of education in Indonesia. One of them is by learning that uses interesting and educational learning media games. One of the books used in the Implementation of the Independent Curriculum is the IPAS book. According to Sujana, science teaching in elementary schools (SD) in particular should focus on providing direct knowledge to children to help them build the skills they need to explore and understand the environment scientifically. This is because science is very important to answer many human demands in everyday life (Handayani et al., 2019).

After reflecting on the problems that exist in grade IV students of SDN Pakis 01, the researcher decided to solve the existing problems by developing scratch learning media in the subject of IPAS material on the form of objects for grade IV elementary school. The purpose of this research is to develop scratch learning media in the subject of IPAS material on the form of objects for grade IV elementary school.

2. Methodology

While the subject of the scratch learning media trial was 8 randomly selected fourth grade students of SDN Pakis 01, this was done for a limited trial. The trial design was carried out with a limited trial. This was used by researchers to determine the effectiveness of scratch learning media. Effectiveness is obtained from the results of student pre and post-tests. Pretest is used to determine the results before given the product while post-test results after given the product. The development model used in this research is the ADDIE model developed by Dick and Carry in (Umami et al., 2021) The ADDIE model consists of 5 stages as shown in the following Fig. 1.

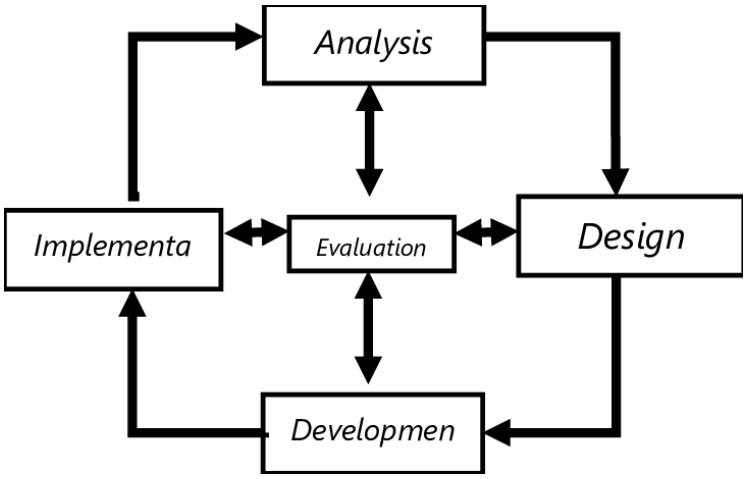

Fig. 1: ADDIE Model Flow (Reflihadi, 2020)

Analysis Stage. Before developing a learning media, the first thing to do is to analyze student learning styles and student competencies and problem points in learning. Design Stage. After the researcher conducts interviews and

observations, at this stage the researcher must choose learning materials, how to make the material easy to learn and the demands of the competencies to be achieved. Development Stage. At this stage the researcher must have ideas about media development which are expected to be in accordance with the media design that has been determined in the initial stage. Implementation Stage. The fourth stage, the media developed by researchers must be applied in learning. But before use, researchers must test the validity, practicality and even effectiveness. Evaluation Stage. In the last stage, researchers must conduct continuous evaluation, this aims to improve the media that has been developed. Following the right steps in accordance with expert opinion will later create learning media that suits the needs of students, especially in the subject of IPAS material in the form of objects in class IV in elementary school.

3. Results and Discussion

The following is a discussion of the research results, including: learning media specifications and media advantages. Scratch learning media contains IPAS subject matter of the form of objects in class IV elementary school, this media is designed with animation, material, quizzes, and an attractive blend of colors, this media can be used offline (gadgets or computers), this media is easy to use because it does not require additional applications, this media contains material and quizzes covering the material of the form of objects.

Fig. 2: Prototype Design

In the step of designing learning materials, it is necessary to design the general form of the digital game, structure, theoretical approach, media type, and technology. This stage is very important because it includes the elaboration of strategies to achieve the objectives of the digital game (Azman et al., 2024).

Fig. 3: Initial Display of Scratch Learning Media

In the initial appearance of scratch, it can be seen that there is a penguin named Blupin who will learn together with students. If Blupin goes forward to touch the brown egg then he doesn't want to learn yet, but if he touches the red egg, then Blupin is ready to continue learning. The arrow button will help Blupin to enter the learning material about the form of objects.

Fig. 4: Display of Material Form of Objects

After students know the name of the penguin who will learn with them, on the next slide students will be presented with material about the division of the form of objects and examples of objects in everyday life. To continue, click the right arrow button, to go back, click the left arrow button, and to return to the main page, click the home button.

Fig. 5: Display Quiz Material Form of Objects

Display for quizzes containing questions for students to better understand the material on the form of objects. Blupin will choose the correct answer according to the question. Thus, this learning media can make students eager to learn so that their learning outcomes are more improved than before. The advantage of this scratch application is that students can create animated videos simply by compiling command blocks consisting of several colors. The use of animated video media can be one solution to stimulate student activeness and creativity in participating in learning (Lenggogeni & Roqoyyah, 2021). Accordance with the current times, technology-based learning that is fun for students is a necessity that teachers must prepare to attract meaningful learning. The goal of this project is to create an engaging learning game for students using the ADDIE paradigm. Phases one to five have been implemented in order

In phase one, a problem analysis has been carried out in the classroom that the flat building material needs learning media that can generate a sense of interest in students to learn it. In phase two, a video game was made using the scratch platform. Where scratch can be used as a tool for students to understand the material. Then developed game media that students can use to learn. With this implementation, it is proven that students understand better and are more interested in the learning process. At the evaluation stage, which has been carried out by experts, in general, digital games in the form of objects are good according to student needs, but the material and questions given must be deepened so that they can provide meaningful experiences for students. There are several findings obtained from the interviews of three experts in the field of games in learning. The three experts have the following backgrounds.

Table 1: Background of Experts

Respondent	Gender	Background
R1	Male	Lecture in Universitas Muria Kudus, Indonesia
R2	Male	Lecture in Universitas Pendidikan Sultan Idris, Malaysia.
R3	Male	Headmaster in one of elementary school, Indonesia.

There are several findings about the content of the material from the digital game of the material form of objects.

Table 2: Questions and Expert Views

No.	Questions	Expert Views
1	The materials selected in the digital game can be operated/customized as a game?	The material chosen in the game is appropriate, it just lacks depth and thoroughness
2	Is the information presented easy to understand?	The information conveyed is clear because there are instructions
3	Can the content in the application strengthen the user's knowledge about the material of the form of objects?	The material in the application can improve the understanding of the user of the game
4	What suggestions can be made to improve the digital game?	1. Deepen the material presented 2. Adding simple instructions on how to use the app

4. Conclusion

This research was conducted at SDN Pakis 01 by means of a limited trial (8 children). Questionnaires were used for expert, material and teacher validation, while tests (pre and post-test) for students. The effectiveness of Scratch Game media obtained a classical completeness value of 85% which was categorized as very effective. Scratch learning media contains material on the form of objects designed with quizzes and interesting animations; this media has the advantage of being used offline and easy to run. This media is expected to increase students' enthusiasm in participating in IPAS learning and can help teachers deliver learning in a fun atmosphere. The product development of this research used the ADDIE model which was only tested on a limited basis. It is recommended that this product be tested on a sufficient number of samples so that its usefulness and effectiveness in learning in elementary schools can be known.

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Conflict of Interest

The authors declare no conflicts of interest.

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