

Increasing Student Interest in Interactive Multimedia Product Creation Subject through Scratch-Based Learning Media

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ABSTRACT

Engaging students is essential in education. If students are interested in a subject, they will study it repeatedly, driven by their intrinsic motivation to achieve a goal. However, one of the schools, SMK N 1 Demak, has experienced problems with students' interest in learning. A teacher stated that during lessons for the "Making Interactive Multimedia Products" subject, students were often unfocused and did not pay attention, which is a characteristic of a lack of interest. This study aims to design learning media using the Scratch application to increase the interest of class XII students in making interactive multimedia products at SMK Negeri 1 Demak. The data collection techniques used were interviews and questionnaires. Data validity was ensured using construct validity techniques, while data analysis was performed using comparative descriptive and critical analysis techniques. The research procedure followed the ADDIE model. At the beginning of the application development, the developer consulted with subject and media experts. The measurement instruments were validated by an educational expert. The analysis of the results used descriptive percentages. The findings showed that the application of Scratch multimedia successfully increased students' interest in making interactive multimedia products in the class XII multimedia program at SMK Negeri 1 Demak.

Keywords: Interactive multimedia products, learning interest, learning media, Scratch

1. INTRODUCTION

Based on interviews and observations with a 12th-grade multimedia teacher at SMK Negeri 1 Demak, several problems were identified in the teaching and learning process, particularly in the "Making Interactive Multimedia Products" subject. This is evidenced by the fact that 60% of students have not reached the Minimum Completeness Criteria (KKM). The daily test results for this subject in 2021 showed that only 40% of students achieved the KKM. This is a significant issue, as this subject is crucial for honing skills that are relevant in everyday life.

Interviews with the homeroom teacher and several students provided more detail. The teacher observed that across all 12th-grade multimedia classes, students tended to be unfocused and did not pay attention during lessons. They were passive, rarely asked questions, and seemed disengaged, especially during topics related to making interactive multimedia products.

To investigate further, interviews were conducted directly with 12th-grade multimedia students. They stated that they were not impressed with the lessons because the learning media was limited to boring modules that they found difficult to absorb. One student added that they prefer learning that uses more interactive media, which helps them feel more enthusiastic and develops their interest in the subject.

These findings suggest a negative relationship between the current learning media and student interest. According to Slameto (2010), characteristics of students who lack interest include not enjoying the learning process, not being involved, and not paying attention. In this case, students have difficulty understanding the material because the learning media is monotonous, which leads to low interest.

The importance of good learning media is supported by Ruth Lautfer (as cited in Tafonao, 2018), who stated that supportive media can make students more interested in learning and can help overcome boredom. Without engaging media, the teaching process becomes monotonous, and students will feel bored with what the teacher teaches. Therefore, appropriate learning media is necessary to improve the quality of teaching and learning; the more interesting the media, the higher the students' level of interest.

To address this issue at SMK Negeri 1 Demak, this research will develop a new learning medium for the "Making Interactive Multimedia Products" subject. The goal is to create a more supportive and creative learning process that can increase student interest. The chosen tool is Scratch, a program that allows for the creation of interactive media equipped with user controls, enabling students to choose what they want to interact with.

Initial interviews showed that the subject teacher was interested in learning and using the Scratch program. Based on this, this research aims to examine whether the use of Scratch-based learning media can successfully increase students' interest in learning.

2. RELATED WORK

Prior to this research, several studies have been conducted by researchers on creating learning media using Scratch. This section will describe previous research that developed learning media using this tool. First, a 2017 study by Lutfi Permatasari from the Sebelas Maret University Informatics and Computer Engineering Education Study Program produced the following results: classical completeness in the first cycle was 71.4%, which then increased to 94.3% in the second cycle. The utilization of the Scratch application was also able to increase student learning motivation; the average percentage of motivation reached 75.1% in cycle 1 and then increased to 83.9% in cycle 2.

Second, research conducted by Johan Edy Prayitno in 2019 with students from the Semarang State University Physics Department found that Scratch-based interactive animation media for the subject of lenses met satisfactory criteria in both trial stages. It was concluded that the media was successful and suitable for use as an alternative medium in learning physics, with the note that further improvements could make it even better.

Third, a 2019 study by Nadia Satriana, Yusran, and Basrul with students from the UIN Ar-Ramory Banda Aceh Information Technology Education Study Program included a comparison between the Scratch and Macromedia Flash 8 applications. It was concluded that the learning interest of class XI students majoring in Multimedia at SMK Negeri 1 Mesjid Raya in 2D Animation lessons increased after they learned to use the Scratch application compared to Macromedia Flash 8. The average percentage of student responses indicated they were "very interested" in the subject, with an average score of 97.48 and a percentage of 81.2%.

Fourth, research by Sulaiman Aula, Hendri Ahmadian, and Basrul Abdul Majid in 2020 evaluated a game called "Student Adventure," which was validated by a material expert and a media expert. Most of the suggestions given by the experts were corrected in the final learning game. The feasibility assessment resulted in an average value of 4.65 (very feasible) from the material expert and 4.35 (very feasible) from the media expert. The student assessment also yielded high scores, with the motivational aspect receiving an average of 4.48 (very good) and the interest aspect receiving an average of 4.37 (very good).

Fifth, research conducted by Ayu Putri Martanti, W. Hardyanto, and A. Sopyan in 2013 with Semarang State University students found that Scratch can help students understand abstract physics concepts. The study also found that students were interested in learning with a two-dimensional animation program based on Scratch.

3. RESEARCH METHOD

This study adopts a Research and Development (R&D) approach. Borg and Gall (as cited in Setyosari, 2013) define development research as a process used to develop and validate educational products. The product developed in this study is a learning medium titled "Making Learning Media Using Scratch to Increase Student Learning Interest in Subjects for Making Interactive Multimedia Products for Class XII Multimedia at SMK Negeri 1 Demak."

The ADDIE model was used for the learning media development process. This model is structured programmatically with a systematic sequence of activities designed to solve learning problems related to specific needs and resources. The test subjects for this stage included two subject matter experts and one learning media expert. The subject matter experts chosen were an Interactive Media teacher and a 12th-grade homeroom teacher at SMK N 1 Demak. The learning media expert was a lecturer in informatics and computer engineering education. The analysis of the data collected was then used to improve and revise the product.

The data collected through formative evaluation was grouped into two parts: (1) first-stage evaluation data, consisting of results from subject matter and learning media experts, and (2) field trial data, consisting of reviews from students and the subject teacher. The instruments used for data collection in this development research were questionnaires and interviews. Both instruments were used to collect data from the reviews provided by the subject matter and learning media experts.

Descriptive statistical analysis techniques were used to process the quantitative data from the expert reviews. Qualitative data regarding students' learning interests in the "Making Interactive Multimedia Products" subject were obtained from interviews and analyzed qualitatively. Quantitative data on learning interests were obtained from the questionnaires and were analyzed using descriptive statistics, where the data is described using numbers, namely through the calculation of scores and other statistics. The research flow can be seen in Figure 1.

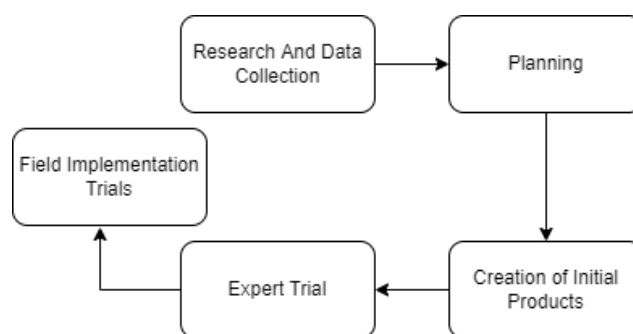


Figure 1. Research Method

4. RESULT AND DISCUSSION

4.1. RESULT

The development of the learning media to increase interest in learning interactive multimedia products followed the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation) as proposed by Sugiyono (2008).

4.1.1. PHASE I: ANALYSIS

An analysis was conducted to understand the initial conditions of teachers and students in the 12th-grade multimedia program during interactive multimedia learning. A needs analysis was then performed to determine the media requirements at the research site, using suggestions from teachers and students as a source.

The teachers' needs were analyzed through interviews. This was followed by an observation to analyze the lesson plan, focusing on aspects that students must master (behavioral analysis) and observing student behaviors to identify areas of strength and weakness. The skills and knowledge that students needed to master were re-evaluated to see if they could be improved or optimized. This involved identifying the specific skills and knowledge to be included in the learning media.

From the interviews, the following data were obtained:

- The subject is "Making Interactive Multimedia Products" using a website. In this subject, teachers typically use the lecture method and provide learning media in the form of modules.
- The multimedia teachers expressed a need for learning media that could increase the learning interest of all 12th-grade multimedia students.
- Every student owns a laptop, which can be used as a platform for engaging learning media.
- The multimedia teachers usually apply the exposition or lecture method, where the teacher explains and conveys information to the students. This procedure involves the teacher introducing the topic, informing students of the learning objectives, reviewing the subject matter, and motivating the learners. The teacher then explains the material both orally and in writing, after which students are asked to do exercises based on the concepts presented.

Based on observations conducted at SMK Negeri 1 Demak, the following facts were obtained:

- Most students feel bored during the learning process because the methods used are limited to lectures and question-and-answer sessions.
- Most students still do not fully understand the subjects described by the teacher.

- c. Students expect learning media that they can access both in the classroom and outside of school to better understand the subjects.
- d. Audio-visual learning media is the type of media that students expect.

4.1.2. PHASE II: DESIGN

The product developed is interactive multimedia using Scratch for class XII students. Scratch is used to aid the learning and understanding process. Since 2007, various educators—including K-12 classroom teachers, computer science researchers, librarians, and museum educators—have collaborated on the development of Scratch. In July 2009, they started an online community called ScratchEd (now available at <http://scratched.media.mit.edu/>), which serves as a free platform to share experiences, exchange resources, and find collaborators. The product was created with a simple appearance in the .sb3 format as an application that does not require installation and can be accessed online via any PC or laptop.

The media emphasizes examples of making interactive multimedia products and provides comprehensive subject matter supported by videos. It can be used by teachers and students during teaching and learning activities both inside and outside the classroom. The design stage focused on creating a multimedia design that is simple yet attractive to vocational high school students, with a straightforward user interface and accessible language. The process began with compiling a summary of the subjects.

- a. Pre-production stage. The product design stage is crucial in building learning media with Scratch.
- b. Selection and collection of Subjects. The initial process involved preparing the Core Competencies (KI) and Basic Competencies (KD) for the class XII multimedia semester, as set by the government. The KDs were then broken down into several learning indicators. A summary of the subjects was prepared in accordance with the KIs, KDs, learning indicators, and objectives. Images and videos that could support students' interest were selected from the internet and incorporated into the Scratch learning media.
- c. Generate the outline of media contents. At this step, an outline of the program's content was created to serve as a grid for what subjects would be included in the learning media.
- d. Create a flowchart. A flowchart was designed to provide a clear picture and detailed information about the multimedia design.
- e. Create a UI design and storyboard. The user interface (UI) is an integral element and was clearly defined, including template design, navigation buttons, menu locations, and the presentation of subjects. The design and storyboard were first consulted with a supervisor. Revisions and improvements were made if the design was deemed inappropriate. Once the design was approved, the development stage began, guided by the previously created design and storyboard.

4.1.3. PHASE III: DEVELOPMENT

4.1.3.1. MEDIA PRODUCTION



Figure 2. Learning Media User Interface

The learning media was built following the approved design. The content was tailored for 12th-grade vocational high school students majoring in multimedia, focusing on basic concepts. The Scratch learning

media is intended as a learning tool, not a replacement for the teacher. The content includes a main page, home page, competency page, subjects page, quiz page, and information page. The user interface for the learning media is shown in Figure 2.

4.1.3.2. DESCRIPTION OF EXPERT VALIDATION

The expert validation stage involved both qualitative and quantitative data collection. Qualitative data was gathered by interviewing students about the multimedia product, while quantitative data was gathered through construct validity using assessment sheets from subject and media experts.

4.1.3.2.1. SUBJECTS EXPERT VALIDATION RESULT

The trial with subject experts was conducted to ensure that the subjects and multimedia display were appropriate and feasible. A diagram of the frequency distribution of the subject experts' assessment can be seen in Figure 3.

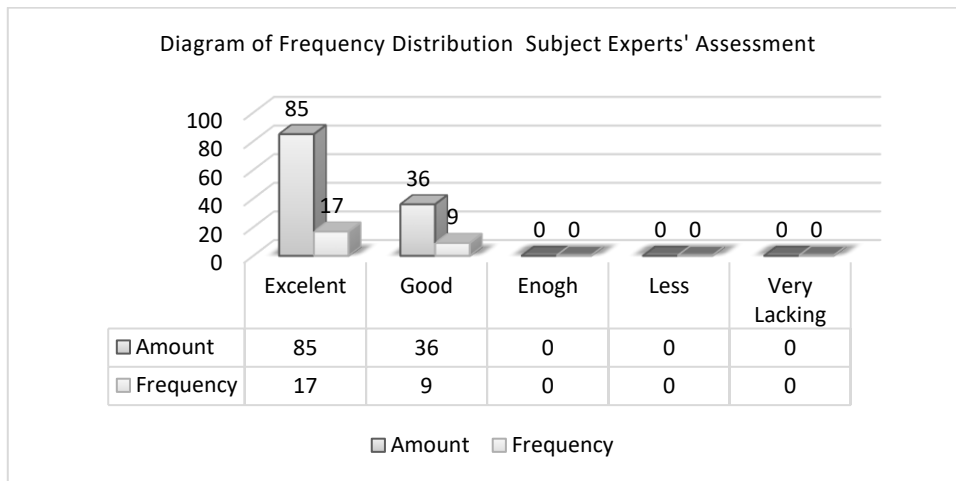


Figure 3. Assessment Diagram by Subjects Expert

Based on the subject experts' validation, the subjects presented in the Scratch learning media received a score of 83% ("Very Good" category on a Likert scale), with an average score of 4.60. It was concluded that the subjects are worthy of being used in the learning medium.

4.1.3.2.2. MEDIA EXPERT VALIDATION RESULTS

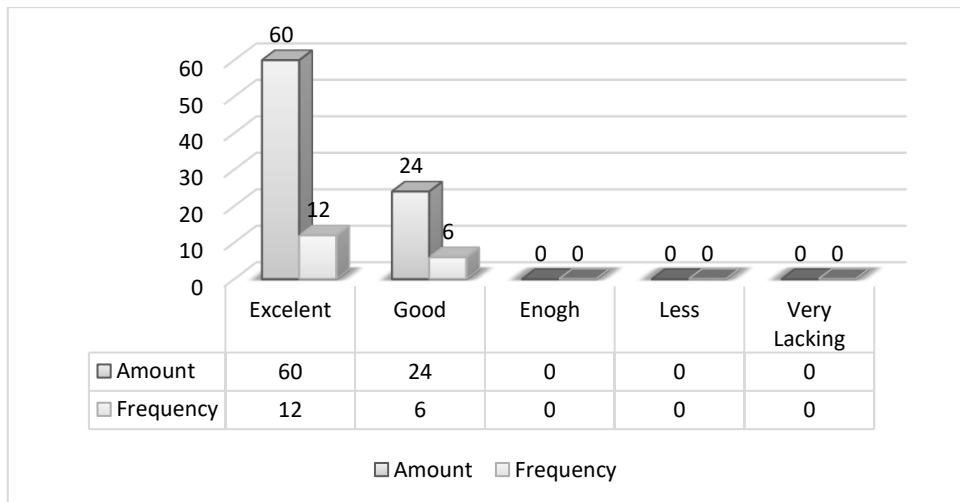


Figure 4. Assessment Diagram by Media Expert

The media expert was a lecturer from the informatics and computer engineering education department at Universitas Sebelas Maret. The validation instrument was the LORI (Learning Objects Review Instrument) from Nesbit et al. (2007), which contains eight aspects: Content Quality, Learning Goal Alignment, Feedback and Adaptation, Motivation, Presentation Design, Interaction Usability, Accessibility, and Reusability. A diagram of the assessment can be seen in Figure 4.

Based on the media expert's validation, the media received a score of 70% ("Very Good" category on a Likert scale), with an average score of 3.90. It was concluded that the developed media is worthy of being used as a learning medium.

4.1.4. PHASE IV: IMPLEMENTATION

4.1.4.1. SMALL GROUP TRIAL

The implementation phase included a small group trial and a main field test. The small group trial was conducted online on Monday, April 4th, 2022, with nine randomly selected 12th-grade multimedia students. The results were validated by media experts. In this stage, students assessed the learning media created by the researcher. The data was then evaluated to understand student responses and inform the next stage. The instrument contained ten questions covering several aspects. Figure 5 shows the results.

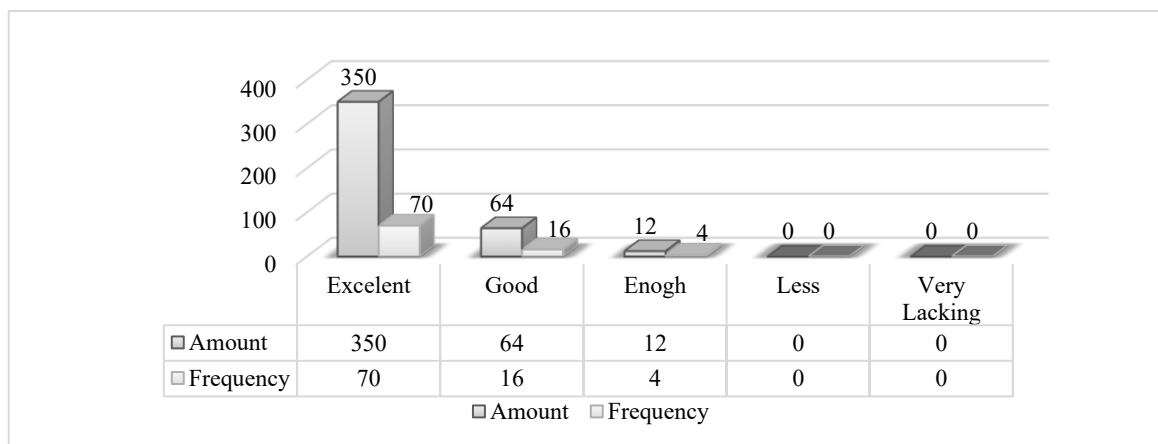


Figure 5. Small-Group Trial Diagram

The results of the small group trial showed an average score of 4.31, which corresponds to 86% ("Excellent" category on a Likert scale). It was concluded that the media was ready to be tested in the main field trial.

4.1.4.2. MAIN FIELD TEST

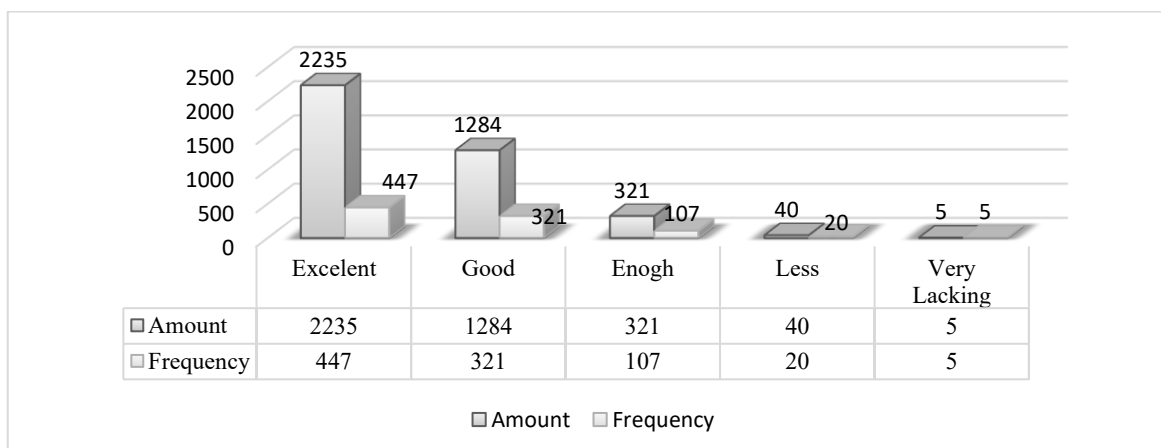


Figure 6. Main Field Trial Diagram

The main field test was conducted after the small group trial. The difference in this trial was that it occurred before students formally evaluated the product. A diagram of the assessment results can be seen in Figure 6.

The main field test resulted in an average score of 3.60, which corresponds to 72% ("Good" category on a Likert scale). It was concluded that the developed media is worthy of being used as a learning medium for the subject of making interactive multimedia products in the 12th grade.

4.1.5. STAGE V: EVALUATION

To get a comprehensive picture of students' learning interests, a questionnaire was distributed. The instrument for measuring interest had four components (questionnaire component, identity, formulation, and language) across six question items. The interview instrument for students focused on the impact of the Scratch learning media and included six question items. Both instruments were based on Safari (2013).

The measurement of students' learning interest was carried out after the main field trial with a sample of 50 students from classes 12 A and 12 B. Initial interviews conducted before the research revealed that these students were not interested in the subject, with the average student stating that the previous learning media made them less interested.

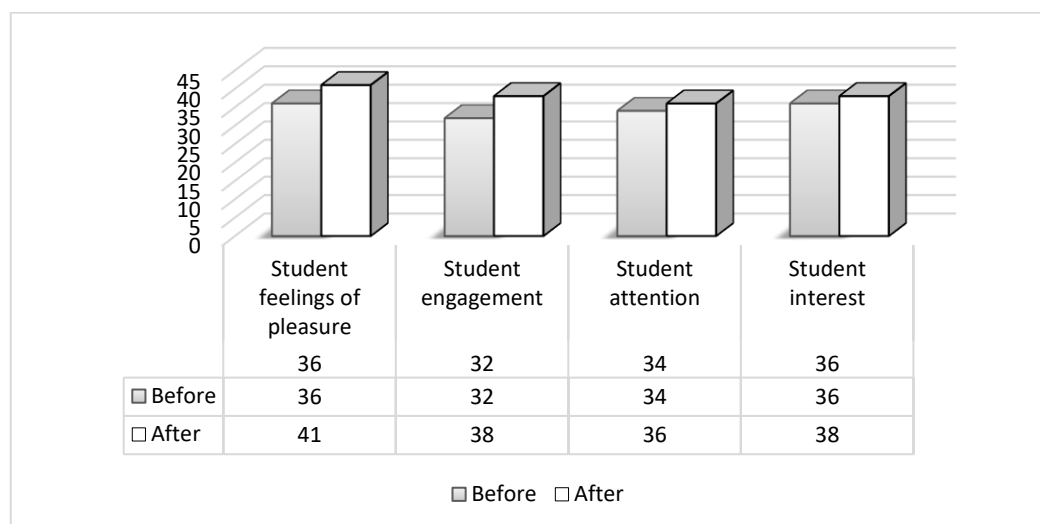


Figure 7. Evaluation diagram of student interest in learning

As seen in Figure 7 and Table 1, students' interest in the subject increased after using the Scratch learning media. The "feelings of pleasure" aspect increased by 6%, "student engagement" increased by 9%, "student attention" increased by 3%, and "student interest" increased by 3%.

The percentage of students in each interest category was calculated to determine the change after using the Scratch-based media. The total score before the study was 138, and after the study, it was 172.

Criterion	Before		After	
	Number of Student	%	Number of Student	%
Not Interested	0	0	0	0
Lack of Interest	12	24%	0	0
Quite Interested	38	76%	28	56%
Interested	0	0	22	44%
Very Interested	0	0	0	0

The average overall increase in interest was around 14%. This average was calculated by taking the difference between the post-Scratch and pre-Scratch scores for each student and then averaging these differences.

4.2. DISCUSSION

4.2.1. LEARNING INTEREST DATA REVIEWED FROM THE INTERVIEW RESULTS

Interviews were conducted after students finished using the Scratch media. The seven students selected for these interviews were chosen based on the results of the initial learning interest questionnaire. The findings from the student interviews are as follows:

- a. Students felt happy when the Scratch media supported the learning process because it was not monotonous and became more fun.
- b. Some students said that the new learning media made them more interested in the learning process.
- c. Students said they found the learning media fascinating due to its attractive visualization.
- d. Students gave suggestions and input regarding the Scratch learning media. Overall, they found the multimedia used to be excellent and exciting.
- e. Students stated that the learning media was good but noted some drawbacks. For example, one mentioned, "the learning media can't be used offline." Another commented that "the media sometimes crashes or closes unexpectedly."
- f. Most students conveyed that the learning medium seemed very interesting. They noted that the inclusion of audio, sample images, and interactive quizzes made them more interested, and stated that they would also use the media to learn at home.

4.2.2. DISCUSSION OF LEARNING INTEREST

This research aimed to solve the problem of low student interest by using Scratch-based learning media. To answer the research question, the results of the media analysis were discussed in the context of increasing student interest.

According to the analysis of the questionnaire and interview data, the use of Scratch learning media can increase student learning interest. There was an increase of 14% in learning interest after using Scratch. This is supported by the questionnaire analysis, which shows a positive shift in the aspects of students' learning interest from the beginning to the end of the study. There was a notable, though not drastic, increase in the number of students categorized as "interested" and "very interested."

The qualitative data from student interviews supports these findings. Students expressed that they were happy learning with the Scratch media, which they found more interactive than the previous media. The inclusion of random quizzes and challenges motivated them to learn the material first to obtain a perfect score. Attitudes indicative of interest—such as paying attention to the teacher's explanations, completing tasks, and being active in learning—were observed. Based on the interview data, most students stated that the Scratch learning media was a tool that successfully increased their interest in the subject of making interactive multimedia products.

5. CONCLUSION

Based on the media validation calculation, it is concluded that the Scratch learning media received a score of 72% (in the "Good" category when converted to a Likert scale), with an average score of 3.60. The ADDIE model was successfully implemented in creating the learning media for the "Making Interactive Multimedia Products" subject for Class XII Multimedia at SMK N 1 Demak.

While this research on developing students' learning interest using Scratch was successful, further study is still needed in terms of its scope and depth. Therefore, several recommendations are offered for subsequent researchers. Future studies could expand beyond the SMK N 1 Demak environment by taking samples from students in urban or other geographical areas. Additionally, since the scope of this research was only at the vocational high school (SMK/MK) level, further research could be conducted at higher or lower levels of education. Finally, it is necessary to conduct further research on the influence of learning media on learning materials by expanding the scope to include physical, psychological, technological, and socio-cultural aspects to achieve more comprehensive results.

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