Analytical Effectiveness using Adobe Flash in Learning Energy Source at Primary School

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Abstract. Information and communication technology in today's world is developing so rapidly and bringing changes to all fields, especially in education. Learning innovations in education are carried out by teachers and students to get a fair learning process. This study aimed to determine the results of student acceptance in using interactive learning media using adobe flash on the energy source material used in the learning process in grade IV primary school. The research method used was quantitative methods with survey techniques and ADDIE development models. The initial stage of the media's validity and feasibility test was carried out by three media experts, three material experts, and 5 class teachers from five different region schools. The number of samples in this study was 156 students from five different region schools. Data were taken using a questionnaire with a Likert scale of 1 to 5. Based on the data obtained, it showed the following values: (1) the average media expert test is (90.56%) including the criteria "Very Valid," (2) the average material expert test score is (83.65%) including the criteria of "Very Valid," (3) the average value of the product feasibility trial to grade IV teachers is (92%) including the "Very Valid," and (4) the average value of product feasibility trials to users or grade IV students is (85.55%) including the criteria of "Very Good." The conclusion was that interactive learning media using adobe flash on energy sources is very feasible and very well used in theme 9, "Kayanya Negeriku," focusing on science lessons on energy sources in grade IV motivates students in learning. For the next research, the development model can be done in the future.

1. Introduction
Education is defined as a complex activity that includes several components that are near related to one another [1]. Education is one of the main factors in developing a nation and a country [2]. Covid-19 is a disease whose spread rate is fast and tends to increase [3]. The coronavirus is a disease that attacks the respiratory system in humans [4]. In the current COVID-19 pandemic situation, one form of learning is carried out is online learning. Online learning is learning that is carried out online, not limited by time and space, and uses the internet network to generate various interactions in the learning process [3]. Online learning can be carried out using smartphones, tablets, and computers, or laptops. In online learning, many various learning media are used to support the online learning process.

Learning media is anything used to convey a message so that the recipient or student can stimulate thoughts, feelings, attention, and interest in the learning process [5]. Learning media is everything related to learning to explain messages or information to improve learning outcomes [6]. Interactive learning media is a method or method of the learning process that allows communication between humans and technology through systems and infrastructure in the form of application programs and electronic media as a method in education [7]. Interactive learning media is multimedia that is equipped with the delivery of information and material that can be controlled and operated by the user to choose what to do first according to the choices and instructions [8]. Adobe flash is a new generation of animation program Macromedia flash 8 [9]. Adobe flash is a combination of learning concepts with
audio-visual technology that is capable of producing new features that can be used in education [10]. Adobe Flash is a powerful application for creating animations that can visualize exciting and interactive learning materials [11]. Science is one of the main subjects in the Indonesian curriculum, including the elementary school level. Students consider it a complicated subject so that it results in poor learning outcomes [12]. Natural Sciences (IPA) is a body of knowledge, consisting of a collection of facts, concepts, theories, and laws, discovered through a scientific process [13]. Science is defined as a collection of knowledge about objects and natural phenomena obtained from scientists' thoughts and investigations using the scientific method [14]. Energy sources are anything that produces energy. Energy sources can be divided into two natural energy sources (primary) and artificial energy sources (secondary) [15].

From the results of interviews with five teachers from five different schools, it is known that in the learning process, the use of learning media used in the form of real objects around, textbooks, and the media used is limited. Not all students like the teacher's learning media in the learning process; some students do not like the learning media used because the characteristics possessed by students are different. Therefore it is necessary to develop interactive learning media using Adobe Flash in the energy source. One of the benefits of interactive learning media is to make the learning process more active, engaging and can be done anywhere and anytime [16].

2. Methodology
The research was using Research and Development (R&D) approach, and the method in this research was using survey research. The instrument used was a questionnaire that was distributed and filled out online using the google form application. The questionnaire in this study was divided into four types, namely (1) validation test instruments by media experts, (2) validation test instruments by material experts, (3) product feasibility tests for grade IV teachers, and (4) product feasibility tests for users or grade IV students. This study adapted the ADDIE development model with five steps (Analysis, Design, Development, Implementation, and Evaluation) [17].

3. Results and Discussion
The feasibility of interactive learning media used Adobe Flash on energy source material.
1. Assessment of interactive learning media using Adobe Flash on energy source material by media expert

Based on the results of media validation conducted by three media experts, interactive learning media is stated to be very valid, with a value of 90.56% with the input and suggestions given. Questionnaire data by media experts are presented in Table 1.

| No | Aspect | Indicator                                                                 | Question Number | Average Percentage | Category    |
|----|--------|---------------------------------------------------------------------------|-----------------|--------------------|-------------|
| 1  | Visual | Appearance match with the background.                                      | 1               |                    |             |
|    |        | Interesting color combination.                                              | 2               |                    |             |
|    |        | Adjustment imaging and animation set.                                      | 3               |                    |             |
|    |        | The suitability of the image presentation with the material discussed.       | 4               | 91.11%             | Very Valid  |
|    |        | The text animation that is displayed is clear and attractive.              | 5               |                    |             |
|    |        | The illustrations are easy to understand and suitable for everyday life.    | 6               |                    |             |
| 2  | Audio  | Music suitability accompaniment with narration.                             | 7               | 84.44%             | Very Valid  |
The sound is presented clearly.  
Accordingly, between sound and animation.

3 Quality  
The quality of interactive learning media using adobe flash is good.  

4 Contents  
The content of developing interactive learning media using adobe flash systematic according to the material.

AVERAGE  

Figure 1. Diagram Results of Assessment of Interactive Media by Media Experts

2. Assessment of interactive learning media using adobe flash on energy source by material experts.  
Based on the results of media validation conducted by three material experts, interactive learning media is stated to be very valid, with a value of 83.65% with the input and suggestions given. Questionnaire data by material experts are presented in Table 2.

Table 2. Results of Product Validation by Material Experts

| No | Aspect | Indicator | Question Number | Average Percentage | Category |
|----|--------|-----------|-----------------|--------------------|----------|
| 1  | Content| Suitability content with learning outcomes. | 6 and 7 | 80.95% | Very Valid |
|    |        | Specific learning material. | 2 |          |          |
|    |        | The illustration supports the clarity of the material. | 5 |          |          |
|    |        | Communicative and straightforward language. | 10 and 13 |          |          |
|    |        | Stimulates of the curiosity. | 9 |          |          |
| 2  | Serving| Serving techniques. | 4 | 86.67% | Very Valid |
|    |        | A supporter of presentation. | 1 |          |          |
|    |        | Presentation of knowledge. | 3 |          |          |
Coherence and convolution of thought lines.

| No | Aspect     | Indicator                                                                 | Question Number | Average Percentage | Category     |
|----|------------|---------------------------------------------------------------------------|------------------|--------------------|--------------|
| 1  | Material   | Relevant to curriculum goals and learning objectives.                      | 1                |                    |              |
|    |            | The material presented in the following grade IV science syllabus.        | 2                |                    |              |
|    |            | The material is following the necessary competencies and competency standards to be achieved. | 3                | 96%                | Very Good    |
|    |            | The material presented is following the objectives of grade IV science learning. | 4                |                    |              |
| 2  | Learning   | The learning path is clear.                                               | 5                |                    |              |
|    |            | Clarity of material.                                                       | 6                |                    |              |
|    |            | Readability of the writing.                                                | 7                | 90%                | Very Good    |
|    |            | Use sound effects.                                                         | 8                |                    |              |
|    |            | The articulation of language is clear and understandable.                 | 9                |                    |              |

Figure 2. Diagram Results of Assessment of Interactive Media by Material Experts

3. Assessment of interactive learning media using adobe flash on energy source by grade IV teachers.
Based on the results of media validation conducted by 5 grade IV teachers, interactive learning media is stated to be very good with the value of 92% with the input and suggestions given. Questionnaire data by grade IV teachers are presented in Table 3.

Table 3. Results of Product Validation by Grade IV Teachers

| No | Aspect     | Indicator                                                                 | Question Number | Average Percentage | Category     |
|----|------------|---------------------------------------------------------------------------|------------------|--------------------|--------------|
| 1  | Material   | Relevant to curriculum goals and learning objectives.                      | 1                |                    |              |
|    |            | The material presented in the following grade IV science syllabus.        | 2                |                    |              |
|    |            | The material is following the necessary competencies and competency standards to be achieved. | 3                | 96%                | Very Good    |
|    |            | The material presented is following the objectives of grade IV science learning. | 4                |                    |              |
| 2  | Learning   | The learning path is clear.                                               | 5                |                    |              |
|    |            | Clarity of material.                                                       | 6                |                    |              |
|    |            | Readability of the writing.                                                | 7                | 90%                | Very Good    |
|    |            | Use sound effects.                                                         | 8                |                    |              |
|    |            | The articulation of language is clear and understandable.                 | 9                |                    |              |
Interactive learning media using Adobe Flash clarifies the energy source.

There are examples in everyday life on learning science in the real world in interactive learning media using Adobe Flash.

Images and animations on interactive learning media using Adobe Flash are interesting.

The color composition is right.

There is music content in interactive learning media using Adobe Flash.

**Evaluation**

| Aspect | Indicator | Average Percentage | Category |
|--------|-----------|--------------------|----------|
| Software | Media attractiveness. | 85,96% | Very Good |
| | Easy of use. | 85,96% | Very Good |
| Material | Language and purpose materials. | 84,87% | Very Good |
| Visual Communication | Display and text | 85,81% | Very Good |

**Figure 3.** Diagram Results of Assessment of Interactive Media by Grade IV Teachers

4. Assessment trial product of interactive learning media using Adobe Flash on energy source by grade IV students.

Based on the trial product results, interactive learning media is stated to be very good, with a value of 85,55% with the input and suggestions given. Questionnaire data by trial product by grade IV students are presented in Table 4.

| No | Aspect | Indicator | Question Number | Average Percentage | Category |
|----|--------|-----------|-----------------|--------------------|----------|
| 1  | Software | Media attractiveness. | 1 and 8 | 85,96% | Very Good |
| 2  | Material | Language and purpose materials. | 7 | 84,87% | Very Good |
| 3  | Visual Communication | Display and text | 4 | 85,81% | Very Good |
Figure 4. Diagram Results of Trial Product Interactive Media by Grade IV Students

Table 5. Results of Assessment of Interactive Learning Media

| No. | Validator                     | Percentage Average |
|-----|-------------------------------|---------------------|
| 1   | Media Experts                 | 90.56%              |
| 2   | Material Experts              | 87.65%              |
| 3   | Teachers Grade IV             | 92%                 |
| 4   | Students Grade IV             | 85.55%              |

Figure 5. Diagram Results of Assessment of Interactive Learning Media

4. Conclusion
Based on the research and development results above is interactive learning media using adobe flash on energy sources material in primary school is very feasible and very well used in the learning process of theme 9, "Kayanya Negeriku," focusing on science lessons on energy sources in grade IV and motivates students in learning.
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