EduStream : Journal of Elementary Education

Volume 8, Number 2, 2024
E-ISSN : 2614-4417
Open Access: https://journal.unesa.ac.id/index.php/jpd/index

Interactive Learning Media Loaded with Human Growth and Development Materials in Science Learning in Elementary Schools that is Decent and Practical

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ARTICLE INFO

Article history:
Received 26 September 2024
Acccepted 06 November 2024
Published 20 November 2024

Keywords:
Interactive Learning Media, Science Education, Human Growth and Development

DOI:
10.26740/eds.v8n2.p89-99

ABSTRACT

Interactive learning media is needed to improve the quality of science learning in elementary schools. The purpose of this study is to produce interactive science learning media for growth and development materials in grade 3 of elementary school. This research method is in the form of research and development (R&D) with the ADDIE development model. This article focuses on the "D&D" stage of design and development. The subjects of the study were 27 grade 3 elementary school students. Data collection techniques are interviews and questionnaires. The data collection instruments are in the form of expert validation questionnaires and student and teacher response questionnaires. The data analysis technique by calculating the average and percentage of the questionnaire score then converts it into qualitative data for interpretation. The results of the study showed that media expert 1 gave a score of 88% (Very Valid), media expert 2 gave a score of 98% (Very Valid), and material expert 88% (Very Valid). The results of the one to one and small group tests show a percentage of 100% (Very Practical). The teacher's response questionnaire obtained a score of 100% (Very Practical). In conclusion, interactive learning media to teach growth and development material in science lesson content in grade 3 elementary school is declared feasible and practical to use.

INTRODUCTION

Elementary school is an important stage in a person's education because it is at this level that basic concepts are developed and instilled in students (Rachmadyanti & Wicaksono, 2017). The government's commitment to comprehensively improve the quality of basic education is one of them by encouraging the use of digital technology in education. The idea was conveyed at the G20 presidency forum hosted in Indonesia in 2022. The 21st century is an era of globalization that can be seen from the rapid advancement of technology, innovations that have an impact and influence on the field of education in the country. Education plays an important role in helping a person to

acquire the ability to take advantage of technology, communication, and information media in this era (Nurmala, et al., 2021). As a result, the development of science and technology requires teachers to be able to prepare more creative and innovative learning media for students (G20 Indonesia, 2022).

The results of observations and interviews in several schools in Surabaya found that the average educator or teacher still depends on conventional learning media in the form of government printed books or publishers. As a result, from the results of the interviews, it is known that the students have many difficulties in understanding the learning material. One of the learning materials that is difficult for students to understand is human growth and development. This material is a new material that appears in grade 3 of elementary school and includes abstract concepts. The material is contained in science subjects. Therefore, interactive and appropriate learning media is needed to make it easier to learn. Interactive learning media plays an important role in learning activities. The quality and quality of student learning will increase when a learning media is designed creatively and innovatively (Muthoharo, 2021). Learning media can convey stimuli from teachers to students and vice versa so that learning media is one of the supporting means in achieving learning goals (Sanaky, 2013).

A movement for technology-based education reform aimed at integrating digital technology into the classroom to innovate in education has been observed in many countries since the early 2010s (Lee & Lee, 2022). Researchers share the same vision that technology-based learning infrastructure or media can innovate the education system, which is often described as outdated and inefficient, to be more modern (Romanowski et al., 2013; Tay et al., 2014; Milla, Kurt, and Mataruna-Dos-Santos, 2019). One of the learning media that is in accordance with this opinion is interactive learning media based on digital technology in the form of an android application.

Based on the results of the preliminary study, it was found that science learning is one of the learning that makes it difficult for students because of the large amount of memorization. In addition, some concepts from science learning are also abstract concepts. For example, the concept of growth and development. Although both are close to daily life, the concept of what grows and develops is sometimes still difficult for students to distinguish. One of these problems can be overcome by using interactive learning media that can provide learning experiences that are appropriate for the child's world and of course can provide meaningful learning (Fathurohman et al., 2023; Valentina & Sujana, 2021; Setyawan et al., 2021; Humaida & Suyadi, 2021; Taupik et al., 2023).

The purpose of this study is to create an interactive learning medium for growth and development materials in science lesson content in grade 3 elementary school that is feasible and practical to use. The use of technology in science learning in the 21st century can make learning more interesting, effective, and efficient (Hidayah & Salimi, 2023). Digital technology encourages student-centered learning, improves the quality of learning for the better, and promises more enjoyable learning for students (Jonassen, 2013; Iqdami, 2016; King, 2017). The results of this research can contribute to improving the quality of basic education in the country as mandated in the preamble to the 1945 Constitution and the framework of the sustainable development goals (SDG's).

METHODS

This research was research and development (R&D) with the ADDIE model. The products developed were interactive learning media about human growth and development for third graders. The ADDIE model consisted of five stages (Branch, 2009), namely analysis, design, develop, implement, and evaluate. The following figure demonstrated the steps of the ADDIEL model. In this study, the focus was on the design and develop stage.

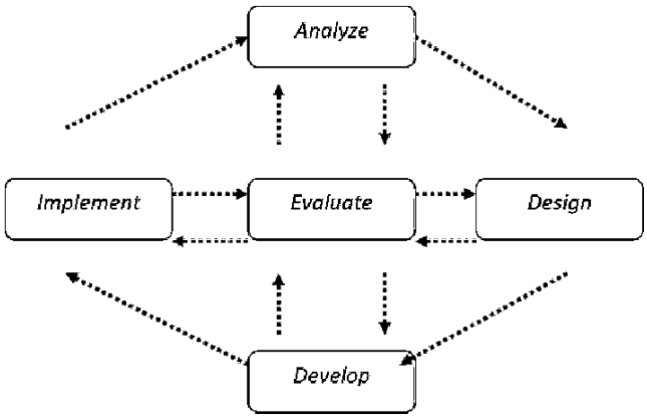

Figure 1. ADDIE Model Development Procedure

The subjects of the study were two learning media experts, one material expert, 27 elementary school grade 3 students, and one classroom teacher. The subject of students was selected through purposive sampling with the criteria of representing students with low, medium, and high abilities. The distribution of subjects in this study was shown in the following table.

Table 1. Research Subject

Due Diligence		Practicality Test		
Media Members	Material Expert	Student		Teacher
		Individual Trial	Small Group Trial	
2	1	5	22	1

The research data was collected by interview and questionnaire techniques. The instruments used were interview guideline sheets, media expert validation questionnaires, material expert validation questionnaires, student response questionnaires, and teacher response questionnaires. The validation questionnaire of media experts and material experts was used to obtain data on the feasibility of the learning media that was collected. Media expert and teachers' validation questionnaire were used obtain product practicality data. The validation questionnaire of media experts and material experts used the Likert scale, while the response questionnaire of students and teachers used the Guttman scale (Table 2).

Table 2. Research Scale

Likert Scale		Guttman Scale	
Criteria	**Scale Value**	**Criteria**	**Scale Value**
Very Blaik	5	Yes	1
Blaik	4	Not	0
Enough	3		
Less	2		
Very Less	1		

The analysis technique used was descriptive statistics by calculating the average score from the expert validation questionnaire and the response questionnaire. The average score of the expert validation questionnaire and the response questionnaire was calculated and then converted into qualitative data with guidelines (Table 3). The data obtained was then interpreted to determine the feasibility and practicality of the product.

Table 3. Product Feasibility and Practicality Criteria

No.	Score in Percentage (%)	Eligibility Criteria	Practicality Criteria
1.	81% - 100%	Highly Worthy	Very Practical
2.	61% - 80%	Proper	Practical
3.	41% - 60%	Quite Decent	Quite Practical
4.	21% - 40%	Not Eligible	Impractical
	0% - 20%	Very Unworthy	Very impractical

RESULTS

Design

At the design stage, an initial product design was produced. Interactive learning media products containing human growth and development materials in this study were designed using *articulate storyline 3.* This media was an interactive learning medium for science subjects in grade 3 of elementary school. The media design was made simple but attractive. The goal was to be easy to use but still have appeal for children. This media could be accessed using *the android system* on smartphone devices. When students opened the application, students would enter the *start* menu containing *login input.* Students were asked to fill in their names and schools. The goal was of course to provide interactive activities for students. After *logging in,* students would be taken to the main menu page. This section consists of three buttons, namely *Introduction, Material,* and *Practice Questions.* In the upper left corner there is an *Information button (i)* and in the upper right corner there is a *music* button that can be adjusted *on* or *off.*

Figure 2. Login Input Display and Main Menu

If the Introduction *menu button* is clicked, then the student will enter the Introduction menu. This menu contains several features, namely an introduction, a brief summary of the material, basic competencies, indicators, and learning objectives. These features can be accessed by clicking the *next* and *back* buttons at the bottom of the menu display (*slide layer*).

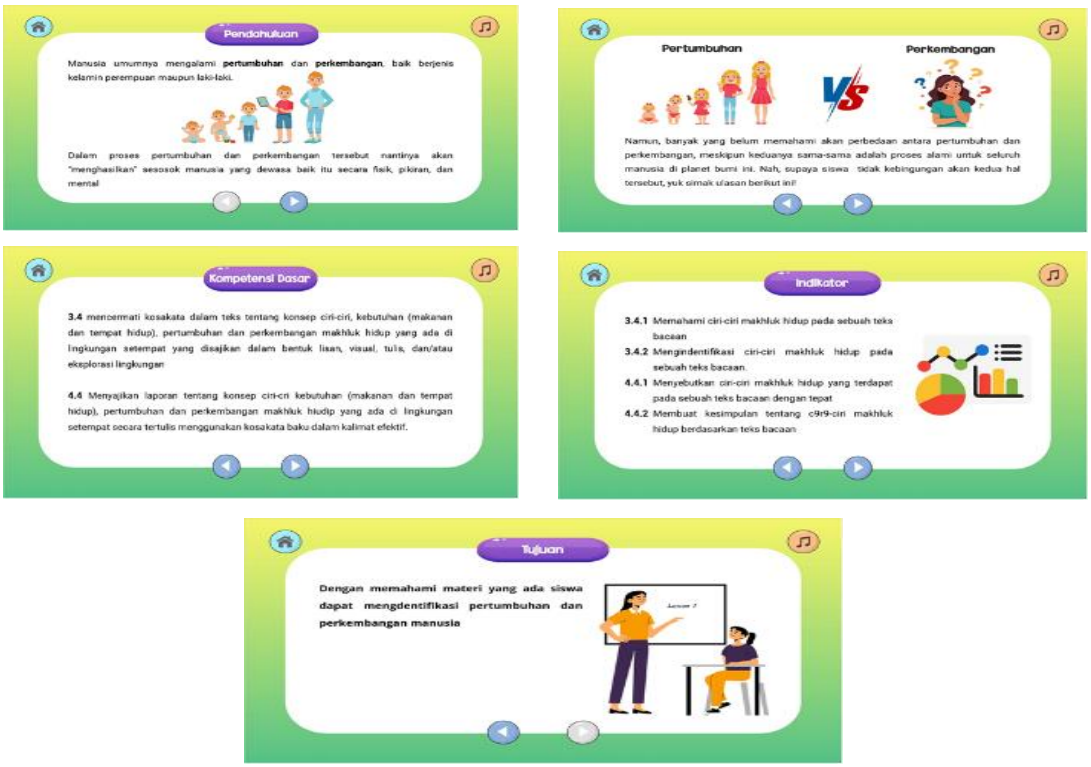

Figure 3. Introduction Menu

The *Material menu* contains science material about human growth and development. Growth and development materials are separated and students can choose by clicking the green button that appears at the beginning of the *Material menu.* The material is displayed in the form of pictures and explanatory descriptions. The *Practice Questions* menu contains evaluation questions that can be done by students. The *Practice Questions* menu begins with a welcome speech. This menu aims to improve students' understanding after studying the material in this media.

Figure 4. Material Practice Menu and Practice Questions

The *Information* menu (*i*) displays the developer profile. The developer profile contains a brief bio of the developer of this interactive learning media. This developer profile is useful for providing information about who the developers of this interactive media are.

Figure 5. Menu Information

Develop

The development stage begun with a product validation process by experts. The experts who gave an assessment of this learning media were two media experts and one material expert. The assessment of the three experts determined the feasibility of interactive learning media containing growth and development materials in science subjects in grade 3 of this elementary school. Media experts assessed the feasibility of this interactive learning media from the aspect of learning media in general and the aspect of android application-based media as a learning medium in the lower grades of elementary school. Material experts assessed the feasibility of the material presented in this learning medium from the truthfulness, appropriateness, and up-to-date material. The material presented was human growth and development. The material was included in the science subject taught in grade 3 of elementary school. Assessments from media experts and material experts were obtained in the form of values (quantitative data) then calculated on average and then converted into percentages. The results of the validation of media experts and material experts were presented in the following bar diagram.

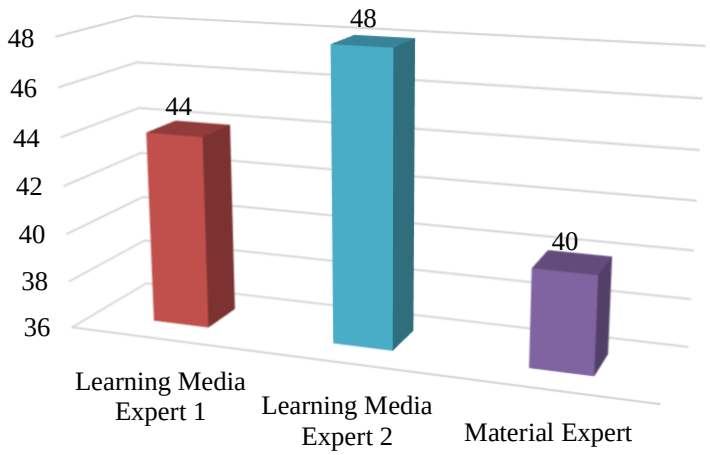

Figure 6. Results of Validation of Media Experts and Material Experts

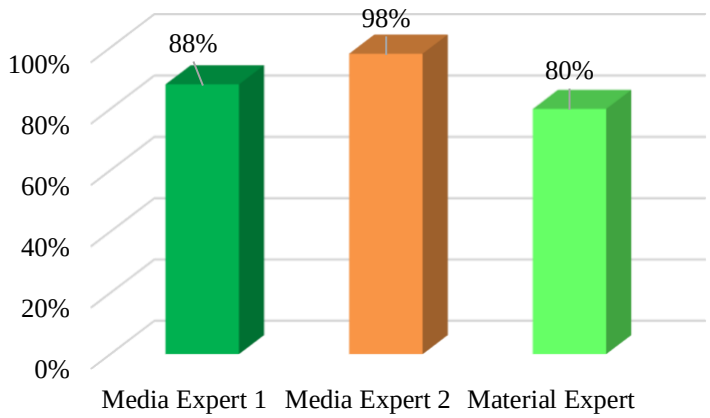

Figure 7. Percentage of Validation Results of Media Experts and Material Experts

Based on the results of the expert validation test, it was concluded that the interactive learning media developed in this study was declared feasible. After being declared feasible, the learning media can be used in the trial. The trials carried out are one-to-one trials (individuals) and small group trials (small groups). The one-to-one trial involved 5 students and the small group trial involved 22 students. This trial also involved a classroom teacher. The trial was carried out to determine the practicality of the product based on the results of the students' responses and the teachers' responses as users of learning media. The student response questionnaire used as a data collection instrument in this trial consisted of 10 questions. The teacher response questionnaire consisted of 10 statements. The student response questionnaire collects data in the form of a Likert Scale of 1-5 while the teacher response questionnaire was in the form of a Guttman scale of 0-1. This trial obtained results, namely the interactive learning media developed in this study was considered practical to be used based on the responses of students and classroom teachers. The results of the trial were shown in the following bar chart.

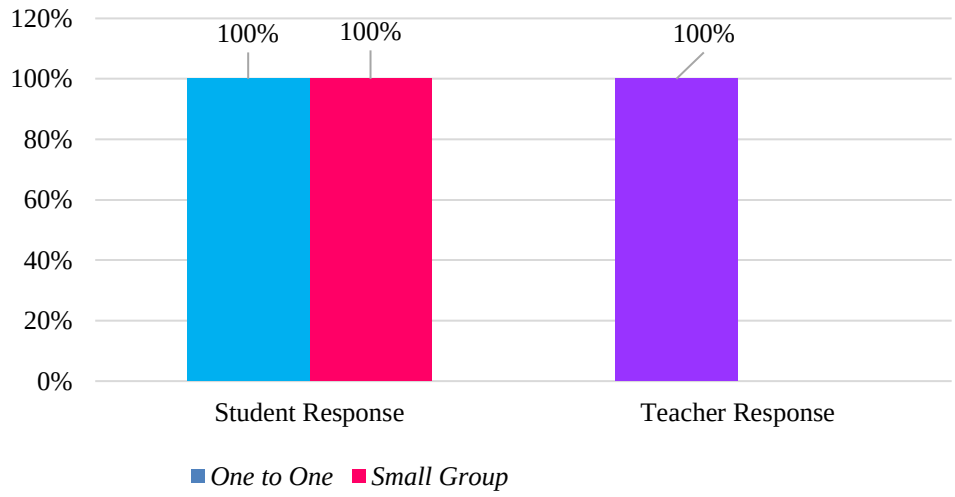

Figure 8. Results of Student and Teacher Responses

DISCUSSION

The product produced from this study is an interactive learning medium for growth and development materials in science subjects in grade 3 of elementary school. The media is developed by referring to the stages of media development according to Branch (2009) in the ADDIE model. From the design stage, the initial product design of the developed media has been obtained. The interactive learning media developed is a digital technology-based media. Digital-based media can improve the quality of learning (Mahoney & Hall, 2017). The results of the study show that learning media in the form of mobile applications can improve learning outcomes and students' attitudes towards learning (Oyelere et al., 2018; Arain et al., 2018; Zhonggen et al., 2019). But of course, it is necessary to pay attention to the quality of the media.

A good learning medium should meet three qualities, namely feasible, practical, and effective (Akker et al., 2013; Hermanto & Kharisma, 2023). The initial product of interactive learning media developed from the design stage has been validated by media experts and material experts. As a result, the product was declared feasible with a percentage of 88% of media experts 1, 98% of media experts 2, and 80% of material experts. The product has also been tested to students and teachers through one-to-one and small group trials. As a result, this interactive learning media was declared practical with a percentage of 100% both from the response of students and classroom teachers.

The material on human growth and development includes abstract concepts for students, especially in grade 3 of elementary school. Students at the 3rd grade elementary school level are generally still in the stage of concrete operational development. The material delivered and the presentation of the material in the media must be in accordance with the characteristics of the students (Hergenhahn & Olson, 2008; Schunk, 2019; Kharisma & Hermanto, 2023a). The application-based interactive learning media developed in this study can concretize the abstract concept so that it is easier for students to understand (Sanaky, 2013). Feasible means that the media developed has been in accordance with the criteria based on the latest theoretical studies (Sanaky et al., 2013). According to Smaldino (2014), learning media for children must have a combination

of bright and attractive colors. The letters or fonts used also need to be considered. The goal is that the material presented can be read easily (legible) and interesting to see. One type of font that is suitable for display on the monitor screen is the Sans Serif type (Hojjati & Muniandy, 2014) as used in this interactive learning media.

Practical means that it can be used easily according to the designed settings, easy to make, easy to use, easy to read, and easy to maintain and store (Akker et al., 2013; Smaldino, 2014; Akbar, 2016; Sudjana & Rivai, 2017). Practical learning media means that the media can be used in a normal context. One of the factors that affect the readability of a digital technology-based learning media is the type of font and background color (Smaldino, 2014; Cheng, 2015). Therefore, these two aspects need to be taken seriously. The type, size, and color of fonts in the interactive learning media in this study have been arranged in such a way that they are easy to read. To support this readability, the color and background contrast of the learning media developed in this study have also been arranged so that they do not interfere with the eyes.

The learning media products developed in this study are a form of innovation in the field of education. These innovations are in accordance with the demands of the all-digital era. The results of this study have an impact on the quality of education in Indonesia, especially basic education. The implementation of technology-based education has become one of Indonesia's commitments in an effort to improve the quality of education in the country which has been conveyed in the G-20 Indonesia Presidency forum in the field of education (G20 Indonesia, 2022; Kharisma & Hermanto, 2023b).

CONCLUSION

This research produces interactive learning media for growth and development materials in science lesson content in grade 3 elementary school that is feasible and practical. The product is in the form of an android-based digital learning media that has several menus, namely login, introduction, materials, practice questions, information, and there are customizable music buttons. The feasibility of the media is evidenced by the results of the expert validation test which obtained a percentage of 88% of media experts, 98% of media experts 2, and 80% of material experts. The practicality of the media is proven through one-to-one trials and small group trials which obtained results in the form of a 100% percentage both based on student responses and classroom teacher responses.

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