

Development of interactive learning media based on Google Sites on energy source materials for grade III elementary schools

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Abstract

This study aims to determine the validity of Google Sites-based interactive learning media in Chapter 4 Getting to Know Energy Topic B Energy Sources Around Us for grade III elementary school students. This type of research is research and development or Research and Development (R&D). The development design used in this study is a 4D model consisting of four stages, namely define, design, develop, and disseminate, but in this study the researcher limited it to the develop stage. The subjects in this study are material and design experts. The instrument used is an expert product validation questionnaire. This study carried out an expert validity test. The assessment of the design aspect got an average percentage of 80%, the material and content aspects got an average of 70%, and the navigation and accessibility aspects got an average of 80%. Based on the results of the study, there is a conclusion that the teaching materials based on Google Sites in Chapter 4 Getting to Know Energy Topic B Energy Sources Around Us in grade III elementary school are in the valid category, but need to be revised.

Keywords: google site; ipa; interactive media

INTRODUCTION

In the rapidly changing digital era, technology has emerged as a significant change in various areas of life, including education. The field of education is inseparable from the influence of technological advances. Technological advances have changed the way teachers view learning. The existence of online learning platforms, e-learning, and interactive learning media such as Google Sites opens up opportunities for learning to be more creative and effective. According to Roza et al., (2021) the percentage of online learning platform use during the Covid-19 pandemic reached 98%.

However, in this digital era, there are still many teachers who use conventional learning media. Although conventional media excels in ease of use and accessibility, it still makes students bored, non-interactive, and monotonous when learning. No wonder many students do not understand the material delivered by teachers because of the use of this learning media. To improve students' understanding of learning materials, it is necessary to make new breakthroughs in presenting subjects, one of which is by using interactive learning media. Plus many children today are already familiar with technology, it will feel foreign if taught using conventional media. This is in line with research conducted by Mukaromah (2020) which stated that most students like technology-based learning, because students find it interesting and not monotonous.

Interactive learning media can solve the problem because they have the ability to display engaging multimedia content, such as videos, animations, and interactive simulations, which can increase students' interest and engagement and make the learning process more engaging (Kuswanto & Radiansah, 2018). Students can also access up-to-date and in-depth information

about their subjects by using the internet. Interactive learning media allows students to access materials through electronic devices anytime and anywhere, which makes learning easier. It supports self-paced learning and gives students the opportunity to learn at their own pace.

The use of interactive media can stimulate students' cognitive confrontation and have an active attitude, personal reflection, critical thinking, imagination, creativity, and interaction, where students are required to interact with others to complete assigned tasks (Tudor, 2013). Students' cognitive, affective, and psychomotor development is assisted by interactive media as a learning stimulus. Safira et al., (2020) found that there are problems with the learning process of energy source materials because teachers are less varied and efficient in using learning models or methods (usually conventional learning). To support the learning process and student activity in the classroom, especially in the learning content of science source material.

Energy source materials are very important to teach to students because of their relevance to daily life. As well as the use of the sun which is used for drying clothes, exercising, photosynthesis, and so on. An energy source is anything that produces energy either directly or through a transformation process. The energy source materials that will be taught to grade III elementary school students include: solar energy sources, food energy sources, fuel energy sources, wind energy sources, water energy sources, battery energy sources, and geothermal energy sources. Based on the learning objectives, students are expected to be able to identify energy sources.

Referring to research conducted by Dewi & Handayani (2021); Sumarli et al., (2021); and Budiarti et al., (2014) who researched that students' understanding of energy source materials is still low because most students tend to memorize material from books without understanding the content and supported by the lack of media used. In addition to these factors, the role of teachers in delivering material still uses lecture methods, too many abstract concepts are conveyed that are not in accordance with Jean Piaget's theory which at elementary school age should use concise concepts in learning delivery, and lack of support for learning facilities.

Interactive media helps teachers deliver lessons. Interactive multimedia has the ability to engage students directly in the learning process, encouraging students to be more active in learning. However, to make this happen, it is necessary to develop interactive multimedia that combines student materials and activities in the learning process. Daryanto (2013) stated that if multimedia is chosen, developed, and used correctly, it will have many benefits for students. Some of the benefits include the learning process becoming more engaging and interactive, the amount of time spent learning can be reduced, the quality of student learning can be improved, learning can be done anytime and anywhere, and students' learning attitudes can be improved. Attitudes, students' attention to learning are improved and centered, and the quality of learning can be motivated. Ariani (2010) also stated that learning with multimedia will be more interesting and interactive, and the time spent teaching can be reduced. Students can be motivated to improve the quality of their learning, and their attention to the lesson can be enhanced and centered.

Interactive multimedia can be used as an alternative to address the problem of learning quality in educational institutions. Interactive multimedia can enhance sensory abilities and attract students' attention. People can only remember 20% and 30% of what is seen and heard,

but they can remember 50% and 80% of what is seen, heard, and done at once, according to Computer Technology Research (CTR) research. The researchers used interactive media for learning, which was packaged on Google Sites.

Types of interactive media such as Google Sites can be used by teachers because they are easy and the use of Google Sites-based websites. Google Sites is a service from Google that aims to make it easier for Google users to create websites. This free web hosting service is provided by Google which gives users the opportunity to create websites that can be used for various purposes on the internet. Google Sites-based learning media is able to include audio, visual images, and text that can increase students' interest and motivation in following the learning process in the classroom. In addition, teachers can organize and present learning materials in the form of interactive web pages so that learners can visit these websites to learn independently and repeat the material. (Kurniadi in Hidayat et al., 2023).

According to Aulia & Khalid (2021), Google Sites has features in providing easy-to-use design and layout templates, with a capacity of up to 100 Mb. In Google Sites-based learning media, students can conduct experiments without the need for laboratory facilities, while receiving direct feedback on their learning achievements. Therefore, by integrating various features in Google Sites-based learning media, the learning process can be more effective, interesting, and learning outcomes can be delivered clearly and efficiently.

Google Sites-based learning media has the advantage of facilitating quick access to the desired information because Google Sites-based learning media can add files and information from various Google sources such as Google Docs, sheets, forms, calendar, awesome tables, YouTube videos, and other components that can be shared according to the needs of users (Harsanto in Johdi et al., 2024). In addition, this learning media provides flexibility for students to understand the material, increase independence, and allow students to manage individual knowledge. Research related to Google Sites-based learning media has been conducted by Suryaman and Azizah (2023), Google Sites learning media is very interesting to use because it can increase students' interest in learning, facilitate material understanding, and make learning more interactive and fun.

Based on this discussion, the researcher created an interactive learning media based on Google Sites that makes it easier for teachers and students to access it. The use of Google Sites will be more effective if coupled with the Phet.colorado website and wordwall as learning and evaluation media that support learning energy source materials.

METHODS

Researchers use research and development (R&D) and literature studies to create new educational products (Amali et al., 2019). According to Thiagarajan (1974), the 4D development model consists of four stages: definition, design, development, and deployment. However, the researchers in this study only limited the development stage. In the first stage, the researcher analyzes the learning objectives and sets the limits of the material developed to define, with the conditions needed during learning. It consists of four main steps: (a) Curriculum analysis, (b) Student attribute analysis, (c) Material analysis, and (d) Formulating objectives.

This stage is carried out in the development of teaching media to make teaching media in accordance with the content framework produced from analysis and materials. This stage is also filled with activities to create an open media conceptual framework. The design of learning media products must be validated before proceeding to the next stage. Product designs are validated by experts. The results of expert validation can indicate that the product design may need to be improved according to the experts' suggestions.

Thiagarajan divides the third stage of development into two actions: expert assessment and development assessment. Expert assessment methods validate or give rise to product plans. In this activity, experts in the field conduct evaluations. The materials and lesson plans that have been created are improved with the suggestions given. Product development trials on real subjects are known as development trials. This trial collects information about the responses, reactions, or comments of the model's target users. The results of the trials are used to develop new products. Once the product is repaired, it is tested again until it produces effective results. At this stage, researchers can only use expert judgment as an option for the development stage.

A method of literature study, where data is collected by searching for information through books, articles, and other literary works. To analyze the application or use of this media, literature related to Google Sites and use of Google Sites is used. The foundation of this theory is built from this literature.

RESULT AND DISCUSSION

The researcher developed an interactive learning media based on Google Sites in the science subject of grade III elementary school Chapter 4 Topic B Energy Sources Around Us. This research was compiled and developed based on a 4D model. The 4D model consists of 4 stages, namely define, design, develop, and disseminate. This model is ready to be validated by media experts and design experts and validation from material experts on Google Sites-based interactive learning media development products. The results obtained in the development of the phase will be explained as follows.

Defining Stage

This stage is the initial stage that must be taken in this study before moving on to the next stage. In the definition stage (Define) there are four criteria that must be analyzed, namely curriculum analysis, student characteristics analysis, materi analysis and formulating goals.

Curriculum analysis is needed to find out the curriculum currently used. The curriculum used during the research is the independent curriculum. In the independent curriculum, there are curriculum structures such as CP and ATP that must be achieved by each student during learning. Meanwhile, the content of the independent curriculum consists of character, literacy, numeracy and technology where these things must be present in the implementation of learning. Based on the content and structure of the independent curriculum, the researcher will create learning media in accordance with the components that must be in the learning media. To make an ideal learning medium, you must have a helpful teaching module or lesson plan.

Based on the results of research by Herliana and Rasyid (2016) which discussed the characteristics of students based on the results of interview questionnaires on interactive learning media, it was shown that a percentage of 85.12% could be said that students were very interested in interactive learning media. The learning media plan is designed according to the

operational level of the group. Based on Jean Piaget's developmental theory, 3rd grade elementary school students, aged 8-9 years, show significant development. Cognitively, they begin to think logically and rationally, understand the concepts of time and space, and improve their problem-solving skills. Emotionally and socially, they develop self-awareness, understand the feelings of others, and empathize. Physically, they develop motor coordination and control body movements. In language, they improve their reading, writing, and communication skills. They also show curiosity, creativity, and adaptability. However, they still need guidance and support to control their emotions and understand abstract concepts. Therefore, active, interactive, and varied learning strategies are essential to support their development.

The material used to create this learning media is Energy Source material in grade III elementary school. The material used has been adjusted to CP and ATP. The collection of material comes from student books, and several websites. The learning goal with the development of this learning media is so that students can understand energy source material. In addition, the learning goal that is to be achieved with this learning tool is to increase students' interest in learning. If adjusted to the CP in KURMER, the learning objectives to be achieved in the development of this learning media are: students identify various sources of energy in daily life, students can relate energy sources to the form of energy they produce. While the goals from the ATP perspective are: Students identify energy sources, students explain energy sources, students can explain energy utilization in daily life.

Planning Stage (Design)

The design stage of the researcher prepares the initial concept of the product to be developed such as the preparation of materials, the collection of animations (drawings and designs), learning videos, games and evaluations. Through the design stage, the products to be developed are guaranteed quality Faisal and Sulkipani (2016). Google Sites learning media features a variety of menu options that can support student learning activities. Google Sites can also be used as an interactive learning medium. Here the researcher will describe the menus on Google Sites.

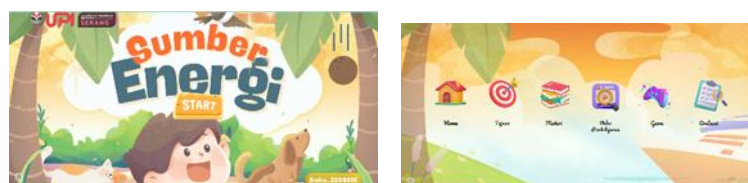


Figure 1. Google Sites Preview

Figure 1 above, is the initial view when opening Google Sites. Google Sites is very interesting to learn and makes it easier for students to access Google Sites links for free. Second, this google website is easy to create and trains teachers' creativity in producing media or applications that are interesting for students. Third, this website allows users to collaborate with other Google features. Fourth, Google Sites provides up to 100 Mb of storage capacity for free. Fifth, Google Sites link access can be set according to needs. And there are many other interesting things that can be developed from this website.



Figure 2. "Destination" Menu View

Figure 2, contains the learning objectives that students will achieve when using Google Sites media. This learning objective can be accessed through the "Objectives" menu. This learning objective is taken from the student's book.



Figure 3. "Material" Menu Display

Figure 3 is the display of the "Material" menu. Where in the "Materials" menu contains materials that will be studied by students in the form of text or writing. Design materials created using Canva based on material from the student book.

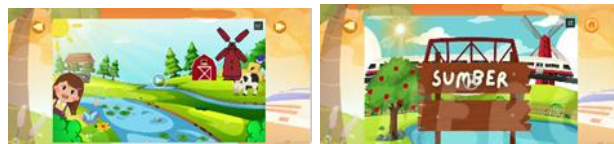


Figure 4. "Learning Videos" Menu Display

The display in figure 4 is the menu display of the "Learning Video". This menu is still the same as in figure 3 which displays teaching material in the form of text. While the material displayed in figure 4 is in the form of a video which strengthens students' understanding of the material given because it is assisted by concrete images. This learning video is edited using Canva by combining several elements and materials from the book.

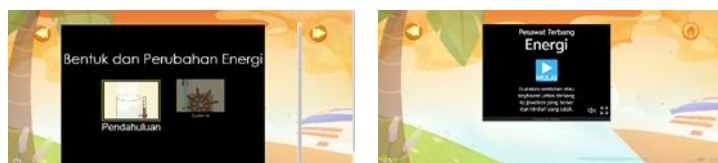


Figure 5. "Game" Menu Display

The "Games" menu in figure 5 contains games and simulations of the material that has been studied. This can help students understand the material that has been studied even more. Students can also relax their minds by playing games. This game or game is taken from the wordwall website with an aliene-shaped airplane template and PhET Colorado. PhET Colorado is a website created by the University of Colorado Boulder in 2001.



Figure 6. "Evaluation" Menu Display

The last image is the image display from the "evaluation" menu. The "Evaluation" menu is created so that students can measure the extent of their understanding of the material they have learned. The researcher's "Evaluation" menu was taken from the wordwall website using a quiz template.

Each menu display that is opened has tools to make it easier to use the Google Sites website. Function tools ← to go to the "Home" menu or to the previous page. While tool → to go to the next page. Finally, the tool with the "home" image functions to immediately close the open menu display or go directly to the "Home" menu.

Development Stage

The development stage, also referred to as the development stage. According to Irwan et al., (2014), the development stage is the part that has been made before at the deformation stage. The design is gathered together and transformed into ready-to-use media. At this stage, the researcher realizes the design that has been made beforehand.

Because it has not been passed or validated by a team of experts to determine whether the developed learning media is feasible or not, the development stage has not yet carried out the development of learning media. Validation is essential for product development. Google Sites-based interactive learning media is provided for validation tests through direct explanations or presentations in front of experts.

Table 1 shows the expert assessment.

NO	ASPECTS	INDICATOR	SCORE					PRESENTASE
			1	2	3	4	5	
1.	Design and Appearance	a. The visual design of the learning media is in accordance with the theme and attracts the attention of the user.			√			80%
		b. The page layout is neat, consistent, and easy for users to navigate.					√	
		c. The selection of colors and font types supports readability and does not interfere with the user's focus.					√	
		d. Media can be accessed on a variety of devices, such as computers, tablets, and smartphones.			√			

2.	Content or Materials	a. The content presented is in accordance with the applicable learning objectives and curriculum.	√	70%
		b. The information conveyed in the learning media is accurate, valid, and up-to-date.	√	
		c. The delivery of the material is clear and easy for students to understand.	√	
		d. The material presented covers all the essential aspects to achieve the learning objectives.	√	
3.	Navigation and Accessibility	a. The menus and links on the media are easy to use and help learners find information quickly.	√	80%
		b. Media can be accessed by learners with special needs, such as providing alternative text for images.	√	
		c. The use of the media is done quickly and does not experience technical glitches when accessed.	√	

Table 2. Criticism and Suggestions

No.	Aspects	Criticism or Suggestions	Revision or Improvement
1.	Design and Appearance	a. The visual design on this media is attractive and according to the theme based on an expert point of view. Experts give a score of 3 because the appeal for this media has not been proven for users (students). b. The layout on this media is appropriate and easy to navigate c. The selection of colors and fonts from an expert's point of view is readable and appropriate. d. The media access used does not cover the whole thing. Because the researcher only displays	a. There is no proof of interest in this media for users (students). Therefore, it is recommended to implement it directly in the field. b. (None) c. Because it is only seen from one point of view. Experts recommend trying to several children so that this validity can be proven. d. It is recommended to focus on the use of this

		through a computer or PC. Therefore, the expert gave a score of 3	media for PCs, tablets or mobile phones.
2.	Content Materials	or a. The content and materials almost achieve the learning objectives. It's just that there are 2 learning objectives that have not been conveyed in this media. b. The information displayed is indeed up-to-date. However, accuracy and validity have not been proven. c. The presentation of material in the form of videos is clear and easy to understand. However, there are some sentence boosts that are inappropriate because they use AI dubbing. d. The material only covers 1 learning objective out of 3 learning objectives.	a. The learning objectives listed are taken from the student book. It would be good if the goal was taken from the syllabus because the concreteness of the goal is not guaranteed if it is taken from the book. b. To implement the media in order to know the level of accuracy and validity. c. The explanation of the material in the video would be better delivered in an original voice. d. Add material or LKPD that is consistent with the learning objectives made.
3.	Navigation and Accessibility	a. The menus and links are easy to use and help students find information. b. This media can already be used for inclusion children. Where in the material or content section it already includes. c. The use of media is fast when viewed from an expert point of view. However, this has not been proven.	a. Reinforce it with evidence in the field. b. Improve the subtitle writing to make it more appropriate and use original audio. c. Implement it in the field to be more in line with the conditions.

The calculation carried out through the formula from sugiyono in table 1 will get the results of the percentage of values obtained can be seen the value of the validity of the design and appearance, content or material, and navigation and accessibility with valid criteria and need revision. Media revisions will be made in accordance with the advice and comments of experts in table 2.

CONCLUSION

The product made is an interactive learning media based on Google Sites that discusses class III energy sources with science material. This study uses the literature and the 4D development model, which consists of 4 stages: definition, design, development, and dissemination. However, in this study, the researchers only focused on the development stage. At the definition stage, the researcher conducts curriculum analysis, student characteristics analysis, material analysis, and objective analysis. At the design stage, the researcher creates a

product concept to be developed, namely Google Sites. At the development stage, the researcher conducts an analysis. The validation results were carried out by material experts and media experts. Validation by media experts and material experts obtained a score of 80% with design and display aspects, then in the content and material aspects obtained an average score of 70%, while in the navigation and accessibility aspects 80%. Overall, the validation of media and material experts is included in the category of valid and needs a slight revision.

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