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Development of Contextual Learning Media Mimi Grass (Miniature Earth Rotating House) in Science Education at Elementary School

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ABSTRACT

This research is motivated by the limited use of concrete media in learning, where teachers are still dominated by the use of conventional media such as textbooks and images that are less interactive. The purpose of this research is to develop contextual learning media Mimi Grass (Miniature Earth Rotating House), to meet the feasibility criteria and be implementable in the IPAS learning of V grade students at Rambutan 03 Elementary School. This research uses the Research and Development model with the 4D model. In the 4D model, there are several stages, namely: (1) Define, (2) Design, (3) Develop, and (4) Disseminate. The instrument used is a questionnaire. The data obtained in this study through the questionnaire are based on responses and suggestions from expert validation and responses from fifth-grade students at Rambutan 03 Elementary School. This research was conducted on a small group involving 7 students and on a large group involving 27 students. The results obtained from media expert validation were 93%, material expert validation 93%, small-scale trials 99%, and large-scale trials 91%. Overall, the Mimi Grass media is declared very feasible for use in IPAS learning for V grade students at Rambutan 03 Elementary School.

1. Introduction

Education is the main key to improving the quality of a nation because through education, one can develop intellectual and emotional abilities, as well as shape attitudes and behaviors. Therefore, the better the quality of education, the greater the opportunity for a nation to advance (Khoiro et al., 2024). Education plays a crucial role in creating a generation that is ready to face future challenges, so the quality of learning at every level, especially in elementary schools, needs to be taken seriously, because they are the future leaders of the nation in various aspects of life.

IPAS is an important subject that integrates science and social studies, and is designed to enhance students' critical thinking and problem-solving skills through a contextual approach that enables direct and meaningful learning. This subject aligns with the objectives of science education, providing students with the opportunity to thoroughly understand the cause-and-effect relationships of various natural phenomena (Sephia et al., 2024). Critical thinking is highly beneficial for students as it prepares them for future success and helps in solving everyday problems (Yanti et al., 2024).

Science is the study of what we can see with our eyes and what we cannot see, including objects on the Earth's surface, inside the Earth, and in outer space (Hidayat, 2021). Science material often consists of abstract concepts; science learning will be more effective if it uses engaging and simple media. With this media, abstract concepts can be transformed into more concrete forms that are easier for students to understand (Salsabila & Aslam, 2022). Science subjects are often considered monotonous and teacher-dominated because teachers frequently ask students to memorize concepts, terms, and theories, while integrated lessons such as procedures, attitudes, and applications are neglected. As a result, students tend to feel bored and uninterested.

Learning media in teaching and learning activities serve as a mediator for the recipients of the message, stimulating thoughts, feelings, attention, and desires, resulting in students becoming motivated and actively involved in the learning process (Iskandar & Mayarni, 2022). Learning media is one of the tools that can help teachers convey learning materials so that children can develop interest and engagement in the presented learning materials (Wulandari et al., 2023). Contextual media can be utilized in teaching and learning activities. Contextual learning media are tools that present something real and can be seen, heard, or touched by students (Ningrum & Ninawati, 2022). This makes learning easier for students to understand because it is clearer and more concrete. Contextual learning media are intended to refer to the students' lives so that they can enhance their ability to think critically and creatively in understanding the subject matter (Kero & Wewe, 2024). Students usually find it easier to understand the ideas or material being taught if they use real and tangible teaching aids or media that can be seen and touched (Fauziah & Ninawati, 2022).

The Mimi Grass learning media (Miniature Earth Rotating House) is an innovation designed to help students understand concepts such as the lithosphere, hydrosphere, atmosphere, rain cycle, and Earth's structure more concretely. As a three-dimensional medium, Mimi's Rotating House provides an engaging and interactive learning experience through direct visualization. With this innovation, teachers can convey material more easily and creatively, making learning more enjoyable and meaningful. This media can help improve the quality of IPAS learning because it helps students understand difficult concepts in a real and fun way. With media like this, teachers are expected to use more innovative and creative approaches to deliver the material and provide a more meaningful learning experience for students.

Previous research on the rotating house was conducted by (Farda et al., 2023) on the development of a rotating house media with the material of Earth's rotation, which received a very feasible category with media validation of 91% and material expert percentage of 97.3%. Research by (Nafiah & Fatimah, 2024) on the development of audiovisual-based miniature media in science learning with the material of Earth's layers and atmosphere in the fifth grade, which received a very feasible category with media validation of 94.5%, material expert percentage of 94.7%, and language expert percentage of 98%. This research was declared effective with a percentage of 87.5%. and research by (Feby Riana & Lisnasari, 2024) on the development of a miniature structure of Earth's layers in IPAS learning in the fifth grade, which received a very feasible category with media validation results of 96.25% and teacher response of 97.5%. These three studies show that media with visual and interactive displays can help students clarify their understanding of concepts and foster active participation during learning activities. The novelty of this research is that the researcher created a more 3D media concept and also added short video materials for each displayed topic.

Science learning still faces problems due to the limited availability of concrete media and conventional teaching methods. Therefore, innovative contextual learning media are needed to meet the demands of 21st-century learning. Teachers must have the ability to implement strategies that keep pace with advancements in technology and education. To support the learning process, 21st-century teachers must possess knowledge and skills in providing learning innovations both modern and traditional. Therefore, 21st-century learners are expected not only to understand concepts theoretically but also to be able to think critically, collaborate, and utilize technology for learning (Darwati & Purana, 2021).

Based on the explanation above, this research aims to develop the contextual learning media Rumput Mimi (Rumah Putar Miniatur Bumi) to meet the eligibility criteria in IPAS learning. Rumput Mimi is a miniature earth carousel-shaped media designed to help students understand the concept of the earth more realistically. The use of Mimi grass can be rotated and observed together, which fosters students' curiosity and increases learning engagement. Therefore, this media not only serves as a visual aid but also encourages students to actively participate in the learning process, particularly in the fifth-grade IPAS lessons at Rambutan 03 Elementary School.

2. Methodology

The research method used in this study is development research or research and development. Research and development is an activity conducted to create new products and processes or to improve existing products (Mesra, 2023). These products can include learning materials, training materials, teaching media, questions, and learning management systems. The results not only involve the improvement of existing products but also encompass the discovery of new knowledge or solutions to existing problems (Pertiwi et al., 2023). This research uses the 4D model (define, design, development, disseminate). The Define stage is

conducted to identify learning needs and problems. The Design stage involves designing media according to the needs and characteristics of the material. In the Development stage, the media is developed, validated by experts, and tested on a small and large scale. Finally, the Disseminate stage involves the distribution of the media, but in this research, it is limited to large-scale testing.

The Mimi Grass learning media is created with specifications of tools and materials that support visual, structural, and functional aspects. The main materials used include styrofoam, wood, plywood, and hollow iron as the framework of the media. Decorative elements such as miniature plants, stones, dacron, polymer, sponge/foam, and transparent acrylic are used to enhance the visualization of the concept. Coloring is done using oil paint and acrylic paint applied with a brush. Functional features are added through collar rings, hinges, single push magnets, impraboard boards, as well as adhesives and connectors such as glue, screws, and nails. The manufacturing process is assisted by tools such as saws, hammers, scissors, stationery, and brushes. With those specifications, Mimi Grass is suitable for use as a contextual learning medium for fifth-grade IPAS.

The instrument in this study is a questionnaire used to collect data from media experts, material experts, and students. The produced Mimi grass media was validated by media experts and material experts, as well as empirical validation conducted by students, and the results were analyzed using the percentage descriptive technique with the formula shown below, and the calculation results can be determined according to the percentage criteria and feasibility criteria for media experts, content experts, and student responses, as shown in Table 1 as an assessment of the learning media's feasibility.

$$P = \frac{f}{N} \times 100\%$$

Explanation:

f = Frequency for which the percentage is being calculated

N = Total number of individuals/frequency

P = Percentage

Table 1. Criteria Table for the percentage and eligibility criteria of media experts, material experts, and student responses

Percentage Range	Category
76% - 100%	Very feasible
51% - 75%	Feasible
26% - 50%	Less feasible
0% - 25%	Not feasible

Source: (Humaira & Ninawati, 2023)

3. Results and Discussion

This research was conducted through several stages, such as the validation process by media and content experts, as well as large-scale and small-scale studies. This was done to determine the feasibility of the media to be used. The research on the development of the Mimi Grass (Miniature Earth Rotating House) learning media uses the 4D model, which includes define, design, development, and disseminate. This 4D model serves as a systematic reference for designing and disseminating media, and its development stages will be explained in more detail in the following description.

Define

This stage analyzes the needs at Rambutan 03 Elementary School by conducting observations. Based on the observation results, it was found that the fifth-grade students at Rambutan 03 Elementary School have a poor understanding of the material and a lack of utilization of learning media because the teaching is still conducted conventionally, such as through lectures and using printed media like books. Therefore, concrete media that is engaging and contextual is needed. The preparation of materials in the Mimi Grass Media is adjusted based on the teaching module for 5th grade in the IPAS subject, chapter 4, Introduction to Our Earth. The topics discussed in this chapter are about the lithosphere and hydrosphere, atmosphere, water cycle, and the structure of the Earth. These materials are abstract in nature, so they require concrete visualization to be easily understood by students. Next, an analysis of tools and materials was conducted, including the use of main materials such as styrofoam, plywood, wood, and iron holo, as well as supporting materials like plant miniatures, stones, dacron, polymer, sponge, and clear acrylic. The tools used included saws, hammers, scissors, brushes, and stationery. Finally, a media specification analysis was conducted, where Mimi Grass was designed in the form of a rotatable house, with openable sides, equipped with a learning video barcode, a single push hinge and magnet system, and characterized as interactive, portable, and safe for elementary school students to use.

Design

The stages are carried out with the creation of Mimi Grass (Miniature Earth Spinning House), including the creation of flowcharts, storyboards, materials, and image designs in the creation of the logo, Mimi Grass ludo, question cards, and instructional videos. The flowchart in the Mimi Grass (Miniature Earth Rotating House) media serves to illustrate the systematic usage flow of the media from start to finish. The storyboard is an overall depiction included in the Mimi Grass (Miniature Earth Rotating House) media and serves as a guide in the media creation process. The storyboard is systematically arranged so that each part of the media has a function and appearance that aligns with the learning objectives. The material included in this media comes from the fifth-grade IPAS subject, specifically Chapter 4 "Getting to Know Our Earth," which covers discussions on the lithosphere and hydrosphere, atmosphere, water cycle, and the structure of the Earth. To support the visualization and appeal of the media, a collection of icons

used in the Ludo game interface and instructional videos was gathered. All visual designs such as icons, graphic elements, and layouts were created using the Canva application to make the Mimi Grass media more attractive, interactive, and easy for students to understand.

Development

At this stage, it is carried out by creating the mimi grass media (miniature earth rotating house) using the prepared tools and materials. After the media creation, validation is conducted before moving on to the dissemination or implementation stage. Mimi Grass Media (Miniature Earth Rotating House) is designed with iron hollow and wooden plywood as the frame, the miniature is made with styrofoam, and the trees are made using sponges and parts of the completed miniature. This media not only shows the Earth's rotatable shape but also presents a contextual atmosphere that supports students in understanding the concept of Earth's rotation more concretely. With the right combination of materials, Mimi Grass (Miniature Earth Rotating House) becomes a strong, durable, and visually appealing medium. The final result of developing the Mimi Grass (Miniature Earth Rotating House) learning medium, which showcases the details of each designed part of the medium, can be seen in figures 1 to 8.



Figure 1. exterior view of Mimi Grass (Miniature Earth Rotating House)



Figure 2. Miniature lithosphere and hydrosphere

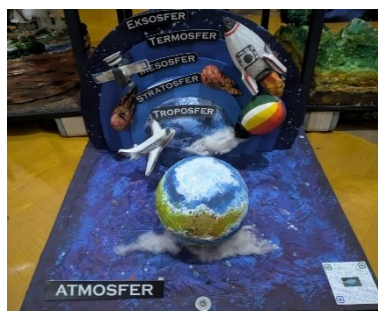


Figure 3. Miniature atmosphere



Figure 4. Miniature water cycle



Figure 5. Miniature of the Earth's structure

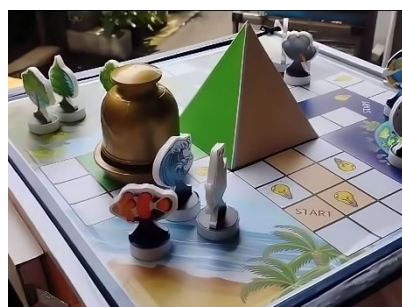


Figure. 6 Mimi Grass Ludo



Figure 7. Video material barcode



Figure 8. Guidebook

The results of the research conducted have undergone a validation stage. Validation was carried out after the media creation was completed. The results of the validation, which include critiques and suggestions, can be used as a basis for making improvements to the developed media in order to achieve better results. Validation was conducted by subject matter material experts and media experts. The subject matter validation was carried out by 3 experts consisting of 2 lecturers and 1 teacher. The results of the material expert validation calculations can be seen in Table 2.

Table 2. Material expert validation table

Aspect	Percentage range	Percentage Overall	Category
The suitability of the media with the material	92%	93%	Very feasible
Media usage	93%		

Based on the table above, it can be seen that the quality of the learning media in terms of the media's suitability with the material is 92%, categorized as very feasible. In terms of video usage, it is 93%, also categorized as very feasible. Overall, the learning media Mimi Grass (Miniature Earth Spinning House) was rated 93% by material experts, categorized as very feasible. Media expert validation was conducted by 3 experts consisting of lecturers. Additionally, validation was also conducted by media experts to assess the appearance, design, and technical feasibility of the learning media. The results of this validation showed that Mimosa Grass is not only suitable in terms of content, but also effective and visually

appealing to support the learning process. The results of the media expert validation calculations can be seen in Table 3.

Tabel 3. Expert media validation table

Aspect	Percentage range	Persentage Overall	Category
Aspect of physical appearance	93%	93%	Very feasible
Supporting media components	92%		

Based on the table above, it can be seen that the quality of the learning media is reviewed at 93% from the aspect of physical appearance, which is categorized as very feasible. The appearance of the product is made to align with the material and the intended objectives. When reviewed from the supporting components, it is at 92% with a very feasible category. Based on the suggestions provided by material and media experts, improvements were made to enhance the media. One suggestion for improvement from media experts is to add rainwater and adjust the blurred information. Meanwhile, one of the suggestions for improvement from material experts is to add curtains so that students can focus more on one subject.

Disseminate

After the media has been deemed suitable by the experts, the next step is to distribute the learning media to the students for direct application in the field. At this stage, the aim is to determine students' responses to the developed Mimi Grass (Miniature Earth Rotating House) media, as well as to gain an understanding of the media's level of interest, ease of use, and feasibility from the students' perspective. The results of the students' responses obtained through filling out questionnaires regarding the Mimi Grass learning media (miniature earth carousel) can be seen in Table 4.

Table 4. Small group and large group table

Group test	Number of students	Persentage	Categori
Small	7	99%	Very feasible
Large	27	91%	

At this stage, it was conducted using the Mimi Grass learning media (Miniature Earth Rotating House) for fifth-grade students at Rambutan 03 Elementary School, utilizing student response questionnaires. The dissemination was carried out in two stages, namely small scale and large scale. In the small scale stage, it was conducted with 7 fifth-grade students. The results obtained from the small scale questionnaire were 99% with a very feasible category. The quality of the Mimi Grass learning media from the large scale with 27 fifth-grade students obtained results from the questionnaire dissemination of 91% with a very feasible category.

4. Conclusion

Based on the research conducted, the development of the contextual learning media Rumput Mimi (Miniature Earth Carousel) for science learning on the topic of "Getting to Know Our Earth" is deemed suitable for use. This research has gone through the 4D development model stages (define, design, development, and disseminate) and obtained validation results from content experts and media experts, as well as student responses conducted in both small and large groups, which also show that the Rumput Mimi media is not only feasible but also captures students' attention, fosters curiosity, and makes it easier for them to understand learning concepts more concretely. The validation process from experts and implementation with students shows that the development of this media successfully addresses the problem of limited concrete media in science learning. Thus, this research can be said to be successful, as it was able to produce innovative, contextual, and enjoyable learning media. Mimi's Grass Media has the potential to be used more widely in science learning in elementary schools. This success shows that visual and interactive media are very important for supporting the quality of 21st-century learning.

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