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DEVELOPMENT OF INTERACTIVE LEARNING MEDIA IN IPAS LEARNING ON FOOD CHAIN MATERIAL FOR 5TH GRADE ELEMENTARY/MADRASAH STUDENTS

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ABSTRACT

The development of technology has changed the educational landscape significantly, demanding innovation in the learning process. However, the use of technology, such as interactive learning media, in the learning process remains suboptimal, particularly at the elementary school/Islamic elementary school level. Many teachers still rely on conventional methods and textbooks, which are less likely to stimulate students' interest in learning. As a result, students often struggle to understand abstract concepts like the food chain. The aim of this study was to create interactive learning materials that could enhance science education on the food chain topic for fifth-grade students in elementary schools and Islamic elementary schools. This study employs a research and development (R&D) approach, utilizing the ADDIE stages. The study results showed that the interactive learning media developed can facilitate fifth-grade students at Al Ghaffaar Islamic Elementary School in understanding the concept of science, especially regarding the food chain. The validity of the developed media supports this, with an average percentage of 93.75% classifying it as highly valid. The positive response of teachers and students to this media, as well as the results of the recapitulation of the media's practicality based on student questionnaire data, which obtained a percentage of 86%, show that the media is very practical to use and is able to attract interest in learning and involve students in the learning process. The developed media has demonstrated efficacy in enhancing student learning outcomes, as evidenced by the high average N-Gain of 0.71. The research's results suggest that creating interactive media is an effective way to enhance learning quality, particularly for abstract subjects like food chains. Interactive learning media can also be a solution to overcome the limitations of conventional methods..

Kata Kunci
Media Pembelajaran Interaktif, Pembelajaran IPAS, Sekolah Dasar

ABSTRAK

Perkembangan teknologi telah mengubah lanskap pendidikan secara signifikan hingga menuntut adanya inovasi dalam proses pembelajaran. Namun, penggunaan teknologi seperti media pembelajaran interaktif dalam proses pembelajaran, khususnya di tingkat SD/MI masih belum optimal. Banyak guru masih mengandalkan metode konvensional dan buku teks, yang mana kurang mampu merangsang minat belajar siswa. Akibatnya pemahaman siswa terhadap materi yang bersifat abstrak seperti konsep rantai makanan seringkali masih rendah. Tujuan penelitian ini adalah untuk mengembangkan media pembelajaran interaktif yang dapat memfasilitasi pembelajaran IPAS pada materi rantai makanan bagi siswa kelas V SD/MI. Penelitian ini menggunakan pendekatan Research and Development (R&D) dengan tahapan ADDIE. Hasil penelitian menunjukkan bahwa media pembelajaran interaktif yang dikembangkan dapat memfasilitasi siswa kelas V SD Islam Al Ghaffaar dalam memahami konsep IPAS, khususnya mengenai konsep rantai makanan. Hal tersebut didukung dengan validitas media yang menyatakan bahwa media yang dikembangkan tergolong sangat valid dengan rata-rata persentase sebesar 93,75%. Respon positif guru dan siswa terhadap media ini serta hasil rekapitulasi kepraktisan media berdasarkan data angket siswa yang memperoleh persentase sebesar 86% menunjukkan bahwa media sangat praktis digunakan, serta mampu menarik minat belajar dan melibatkan siswa dalam proses pembelajaran. Media yang dikembangkan juga terbukti efektif dalam meningkatkan hasil belajar siswa yang terlihat dari rata-rata N-Gain yang diperoleh yakni sebesar 0,71 yang dikategorikan tinggi. Berdasarkan hasil penelitian tersebut, dapat disimpulkan bahwa pengembangan media interaktif merupakan langkah yang tepat untuk meningkatkan kualitas pembelajaran, khususnya pada materi yang bersifat abstrak seperti rantai makanan. Media pembelajaran interaktif juga dapat menjadi solusi untuk mengatasi keterbatasan metode konvensional..

Introduction

Education has an important role in preparing the next generation to be competent and competitive in the future. In the midst of an era of very rapid technological development, fundamental changes have occurred in the world of education (Wahyuni & Marno, 2024). Not only that, educational challenges are increasingly complex, especially in dealing with students' dynamic learning needs. Accordingly, we need to enhance the quality of education by incorporating technology into the learning process (Rosmana et al., 2023). Improving the use of technology to develop learning media is crucial in the learning process. It's important to keep in mind that learning media not only serves as a tool, but also plays a crucial role in effectively and engagingly presenting lesson material to students (Supriyono, 2018). Conversely, an interactive approach is essential as it can pique students' interest in learning and enhance their comprehension of the fundamental concepts they are teaching. Therefore, the very rapid development of technology in this modern era is considered to provide enormous opportunities for teachers to develop technology-based learning media that are more interactive and interesting.

Based on information and communication technology software and hardware, interactive learning media serves as an intermediary or liaison tool, conveying the content of teaching materials from learning resources to students (Pribadi, 2017). According to research by Rasmani et al. (2022), interactive learning media is effective in making teaching and learning activities more effective, efficient, and diverse. Research by Suharti (2022) also confirms that interactive learning media can boost student learning motivation and improve learning

outcomes. Researchers predict that students will find interactive learning media more enjoyable and meaningful (Amatullah & Sutrisno, 2023). Therefore, we can assert that interactive learning media holds immense potential to enhance the quality of learning.

Despite its potential to support the teaching and learning process, the use of interactive media often lacks optimization. Based on the results of observations and interviews at Al-Ghaffaar Islamic Elementary School Malang with homeroom teachers and class V students, it was found that, although there are several supporting and adequate facilities and infrastructure, such as projectors and good electrical power, their use is still minimal. Teachers continue to utilize printed books as learning media, often containing brief texts that lack student interest. Apart from that, the teacher's continuous use of the lecture method makes students feel bored and tend to be passive. As a result, students have low learning motivation, as evidenced by students' low understanding of abstract material, such as food chain material.

Food chain material in natural and social sciences (IPAS) learning requires a visual and interactive approach so that students can more easily understand concepts related to energy flows and relationships between living things. In accordance with the Merdeka Curriculum, the science and sciences subject aims to develop students' interest, curiosity, and critical thinking skills (Agustina et al., 2022). Therefore, the teaching and learning process necessitates the use of interactive learning media, particularly for abstract subjects like the food chain. So we need interactive learning media that can provide a more interesting, relevant, and meaningful learning experience.

Canva is an alternative digital learning media application that supports an active and creative learning process by developing interactive learning media. We chose Canva due to its ease and flexibility in designing attractive visual elements and interactive features suitable for students, particularly at the elementary level (Rizanta & Arsanti, 2022). Canva facilitates the adaptation of various design elements to learning material (Afianti, 2024), such as the food chain, thereby enhancing students' comprehension and visualization of the concepts under instruction. We hope that Canva can contribute significantly to the creation of engaging and user-friendly learning media.

Several previous studies have highlighted the use of Canva to develop interactive learning media for elementary school science subjects, such as in the research conducted by Oktavia (2024); Barus (2024); Pramudita (2024), which found that the development of Canva-based interactive learning media is considered practical and effective for students to understand the material, and enjoyable, especially for IPAS learning in the classroom. Additionally, Syamsi's (2023) research demonstrates that interactive learning media development is a viable alternative that can enhance students' learning outcomes. This research aims to fill the gap left by previous studies by developing learning media equipped with interactive features based on Canva, specifically focusing on the food chain material for fifth-grade students at SD Islam Al Ghaffaar Malang.

The main aim of this research is to develop interactive learning media that can facilitate science and science learning on food chain material for fifth-grade SD/MI students. We expect the developed media to meet the criteria of validity, practicality, and effectiveness, thereby enhancing students' understanding of the food chain concept and boosting their learning motivation. In addition, we hope this media can address the educational needs of the digital era. Following the above explanation, researchers aim to create interactive learning media that is valid, practical, and effective, with the goal of enhancing fifth-grade SD/MI students' comprehension of the concept of food chains in science subjects. In addition, we anticipate that this media will enhance students' engagement in the learning process, both cognitively and emotionally.

Research Method

This research employs a Research and Development (R&D) approach, utilizing the ADDIE stage. We chose the ADDIE model because it offers a systematic framework for developing learning media, from needs analysis to evaluating the effectiveness of the products under development. In this research, we developed the Interactive Learning Media Food Chain Material for Class V Elementary/MI Science and Science Learning. This research process follows the ADDIE model and involves four stages:

1. Analysis: This stage involves analyzing the requirements of students and teachers for interactive learning materials related to the food chain. We collected data by observing, interviewing teachers, and studying related literature.
2. The analysis results will inform the design of the interactive learning media, which will consider the learning needs and characteristics of students. The process of media design involves crafting storyboards and preparing interactive elements for the media.
3. At this stage, we are developing interactive learning media using the Canva application. Experts in media, material, and language will test the validity of the development results.
4. Implementation: The learning process in class V will incorporate validated media. We will test the practicality of this media on a limited basis, using a total of 14 students as test subjects.
5. Effectiveness. Evaluate the feasibility of the student response questionnaire and assess the efficacy of the learning outcomes, specifically the grades of students before and after the test. We conducted an evaluation to ascertain the effectiveness of this interactive learning media in enhancing students' comprehension of the food chain concept. The evaluation encompasses the validity of the media and the practicality of its use.

This research instrument serves as a tool for measuring natural and social phenomena. The instruments used in this research were validation sheets, student response questionnaires, and student learning outcomes (*pre-test* and *post-test*). We analyzed the collected data both qualitatively and quantitatively. We conducted a descriptive qualitative analysis on the results of interviews, observations, and questionnaires to understand students' perceptions and experiences with media use. Simultaneously, we obtained quantitative analysis from the media's validity, student response questionnaire results using the Likert scale, and value pre-tests and post-tests using the N-gain formula. With the following conditions:

Table 1. Criteria of Likert Scale

Classification	Description
0% – 20%	Very inappropriate
21% – 40%	It is not in accordance with
41% – 60%	Suitable enough
61% – 80%	In accordance
81% – 100%	Very suitable

Table 2. Effectiveness Criteria *N-Gain*

Range *N-Gain*	Criteria
N-Gain ≥ 0,70	High/Very Effective
0,30 ≤ *N-Gain* < 0,70	Moderate/Fairly Effective
N-Gain < 0,30	Low/Ineffective

Results

The results of this development research are in the form of interactive learning media on food chain material for science and social (IPAS) learning for class V students. We conducted this research at Al Ghaffaar Islamic Elementary School in the Dau District, Malang Regency, East Java Province, where we had 14 students in class V during the even semester of FY 2024/2025. We hope that the developed interactive learning media will assist teachers in their teaching and learning processes. The ADDIE model guides this research through 5 stages: analysis, design, development, implementation, and evaluation.

1. **Analysis**

Currently, the researcher has conducted an analysis and gathered data on the fundamental requirements of the classroom learning process at Al-Ghaffar Islamic Elementary School, specifically focusing on the learning materials utilized in fifth-grade science and the food chain subject. The results at this analysis stage found that students need learning media that is fun, not boring, and can increase students' learning motivation in class. At this stage, the researcher also distributed post-test questions to see student learning outcomes for food chain material before using interactive learning media.

2. **Design**

At this stage, the researcher initiates the media design process, beginning with the selection of supporting media, choosing the appropriate format, and preparing the initial design. The process of selecting supporting media involves identifying videos or teaching materials from reliable sources that align with the food chain material and the desired learning objectives. Next, the researcher selects an interactive media format through the Canva application, focusing on the media's layout, images, and writing. The next step involves creating an initial design in the form of a storyboard, which covers the template slide in the Canva application. This includes elements such as the initial media display, the home menu, learning objectives, learning activities that involve perception, food chain material, the Koran as a source of knowledge, activities such as let's sing, let's discuss and create, and quizzes. Here's a display of the designed media:

Table 3. Media Plan

Appearance	Information	Appearance	Information
	Initial display of media or cover media		Food Chain Material
	Menu home		The Qur'an as a source of knowledge
	Learning objectives		Let's sing the food chain

	Learning Activities		Group discussion and creating works
	Description of the development of interactive learning media		Individual quizzes

3. Development

At this development stage, the learning media that has been designed will be validated by several experts, including material experts, media experts, and language experts. Expert validity tests have yielded the following results for the media under development:

Table 4. Results of the Interactive Learning Media Validity Test

Validator	Percentage of Validation Results	Criteria
Materials Expert	90,50%	Very Valid
Medias Expert	94,75%	Very Valid
Linguists Expert	96,00%	Very Valid
Average	**93,75%**	**Very Valid**

The table above reveals that the three validators - material experts, media experts, and language experts - provided validation results with an average score of 93.75%, demonstrating their high validity. This demonstrates that fifth-grade elementary school students can test interactive learning media in science and science subjects, specifically the food chain material.

4. Implementation

At this stage, the researcher implemented interactive learning media products related to food chains in class V of Al-Ghaffar Islamic Elementary School. Before applying the media, researchers also prepare the necessary facilities and infrastructure. Once the learning process was complete, the researcher distributed questionnaires to gather student responses and administered post-test questions based on the interactive learning media used in science and the science food chain material in class V.

5. Evaluation

We conduct evaluation activities in the final stage, analyzing the questionnaire assessment results and student responses to this interactive learning media to gauge its practicality and effectiveness in the learning process. We analyzed the practicality of this interactive learning media product using student response questionnaires on a Likert scale, and determined the effectiveness level by analyzing the pre-test and post-test values of 14 students using the N-Gain formula. Tables 5 and 6 below present the data on the product's level of practicality and effectiveness.

Table 5. Recapitulation of the Practicality of Interactive Learning Media

Respondent	Number of Respondents	Percentage	Criteria

Class V Students	14	86%	Very Practical

Table 6. Recapitulation of the Effectiveness of Interactive Learning Media

N-Gain rate	Percentage	Criteria
0,71	71%	Very Effective

Table 5 demonstrates that the practicality value of interactive learning media products stands at 86% in the practical category. Table 6 presents the results of the product effectiveness analysis, revealing an average N-Gain of 0.71, or a percentage of 71%. This suggests that the use of interactive learning media in science and science learning on food chain material significantly enhances student learning motivation in the classroom.

Discussion

Expert assessments and trials have demonstrated that this interactive learning media effectively aids fifth-grade students at Al Ghaffaar Islamic Elementary School in comprehending science and technology concepts, particularly in relation to food chains. Several findings support this.

First, the validity of the interactive learning media developed. Nieveen (1999) states that the material's components should rely on state-of-the-art knowledge (content validity) and consistently link to each other (construct validity). If the product satisfies these requirements, it is considered valid. According to Darmojo and Kaligis (Adnyana et al., 2017), media can be considered suitable for science learning if it satisfies the following requirements: (1) didactic requirements that align with the principles of effective learning; (2) construction requirements that address language use, sentence structure, vocabulary, level of difficulty, and clarity; and (3) technical requirements that pertain to writing, images, and appearance. Meanwhile, the Ministry of National Education explained that learning media is suitable for use if it meets the assessment aspects. These factors include the appropriateness of content, language, presentation, and graphics (Vela et al., 2021). Overall, these three factors emphasize the significance of validity in the development of learning media products. The media validation results confirm the high validity of the developed interactive learning media, with an average score of 93.75%. This indicates that the interactive learning media developed has met the criteria for content validity (content), language structure, and media presentation (construction) and is in accordance with the characteristics and needs of fifth-grade SD/MI students.

When it comes to content validity in this case, the learning media's content must be based on the most recent knowledge. This means that the content of the learning media must align with the desired learning objectives and be pertinent to previously studied experience and knowledge. Material experts' assessment results classify the developed interactive learning media as highly valid, scoring a 90.50% rating. The media presents accurate, relevant, and appropriate food chain material for the cognitive development of fifth-grade SD/MI students. We design the food chain material in this media with the assumption that students have a basic understanding of living things, habitat, and the energy-gathering process, as taught in previous science lessons. Constructivist learning theory aligns with this approach, as it builds new knowledge upon the foundation of existing knowledge (Sugrah, 2020). Science is knowledge that is systematic and arranged in an orderly manner (Adilah & Budiharti, 2015). Therefore, we present this food chain material, starting from the definition and components and then visualizing it in the form of simple diagrams to facilitate students' understanding.

To make the material more relevant and easy for students to understand, the interactive learning media developed also uses various examples that can be found in students' daily lives,

such as rice fields, rivers, and forest ecosystems. The use of familiar examples can help students connect abstract concepts with their real experiences so that students' understanding becomes deeper and more meaningful. According to Egok & Hajani (2018), interactive learning media can facilitate students' understanding of abstract concepts by making them more concrete, thereby enhancing their learning experience. On the other hand, this media not only focuses on the food chain concept but also connects it with other related concepts, such as ecosystems and environmental balance. So this media can help students build a more comprehensive understanding of the concept of food chains. The research results of Aisah, et al. (2024) support the claim that the use of interactive multimedia in the learning process can increase students' understanding of science concepts.

In terms of construct validity, Tambunan & Siagian (2022) emphasize the need for consistent connections between all components in learning media. This means that both the language and technical aspects of the learning media must contribute to achieving the goals overall learning. The assessment results from both media experts and language experts categorize the developed interactive learning media as highly valid, scoring 94.75% and 96.00%, respectively. This indicates that the interactive learning media has successfully presented the food chain material in an interesting and interactive manner, using language that is easy to understand and appropriate for class V SD/MI students.

The use of simple language and interactive features in this media has succeeded in making students actively involved in the learning process. The application of interactive learning media is again in line with constructivist learning theory, which emphasizes that active learning and involving students in the learning process will produce deeper understanding (Raehang & Karim, 2024). Meanwhile, the interactive learning media developed contains images, audio, video, and movement activities such as singing songs related to the food chain while dancing, with the aim of accommodating students' individual differences. Given that every student has a unique learning style, this media aims to cater to each student's specific learning needs by offering a variety of educational stimuli. Dewi, et al. (2023) assert that learning media tailored to students' learning styles can enhance their learning activities by involving them directly in the process, thereby boosting their motivation and improving their learning outcomes. The research results of Arya Anggara (2024) also support this, indicating that interactive learning media can boost students' interest in learning and motivate them to actively participate in the process. Therefore, people consider interactive learning media as a solution to overcome the limitations of conventional learning methods, which are primarily focused on the teacher and do not actively involve students. Therefore, the developed interactive learning media incorporates both informative and engaging elements, thereby creating a fun and meaningful learning experience for students.

Second, let's discuss the practicality of the interactive learning media under development. Nienke Nieveen bases the practicality of the product on the teacher's opinion, asserting that both teachers and students can easily use the developed media (Riva'i et al., 2020). The fifth-grade teacher at Al Ghaffar Islamic Elementary School holds the belief that the interactive learning media on food chain material is user-friendly, with both menu parts and buttons easily operable. The recapitulation of the student questionnaire revealed that 86% of the students found the developed interactive learning media to be highly practical. Students perceive this media as engaging due to its use of engaging images, animations, videos, and graphics that align with the studied material. As a result, students are interested in understanding the abstract concept of the food chain. This aligns with the theory of learning motivation. Abraham Maslow emphasized that motivation is a need. According to Cahyono et al. (2022), students must feel the need to study in order to meet their needs. The interactive learning media developed seeks to help students fulfill their need for knowledge.

On the other hand, this media also seeks to meet students' self-esteem needs. When students succeed in understanding the concept of food chains through the interactive learning media developed, they will feel more confident. Students realize that they are able to master material that was previously considered difficult; this also has an impact on increasing students' self-esteem. Research by Idriana and Fadhlurrohman (2024) supports this, stating that students' self-esteem and self-confidence influence their achievement motivation. By forming self-esteem and self-confidence, students will become confident and optimistic in achieving the achievements they desire. Therefore, students tend to be bolder in setting higher and more challenging learning goals, persistent in not giving up easily, and more motivated to continue learning and developing. This aligns with the growth component of Clayton Alderfer's ERG learning motivation theory, which emphasizes the desire to continuously grow, develop, and experience progress in life (Hendra et al., 2023). This implies that the design of this medium effectively motivates students to persist in their learning and personal growth.

Moreover, it incorporates interactive features like games and quizzes, enabling students to engage directly with the content, thereby enhancing the activity and enjoyment of learning. The challenging features in this interactive learning media can trigger students' curiosity and intrinsic motivation to learn. Tambunan states that intrinsic motivation arises due to the existence of hopes, goals, and desires within the individual for something, giving rise to enthusiasm to achieve that thing (Cahyono et al., 2022). The media offers various interactive features that encourage students to continue exploring, thereby involving them actively in the learning process rather than merely acting as passive recipients of information. The existence of quizzes in this media makes the learning process more fun, and students are more motivated to learn. Research by Alda Regina Putri (2022) supports this, demonstrating that quizzes in interactive learning media can enhance students' interest in elementary/MI science learning.

The third aspect pertains to the efficacy of the interactive learning materials created. Nienke Nieveen asserts that the consistency of the design and learning objectives with the experiences and learning outcomes students achieve demonstrates the effectiveness of the media (Riva'i et al., 2020). The value analysis pre-test and post-test results indicate that the developed interactive learning media is highly effective in the science learning process, with an average N-Gain of 0.71, or a percentage of 71%. When comparing the results, the pre-test and post-test demonstrate a significant increase the interactive learning media significantly improved student learning outcomes related to the food chain material. This means the average student score is much higher after using the media. According to Jean Piaget's cognitive theory (Fransiska et al., 2024), the use of digital-based interactive learning media enhances students' cognitive abilities. Research by Arisandhi, et al. (2023) further supports this, demonstrating that the use of interactive learning media can enhance the science cognition of elementary/MI students. By providing an active and interactive learning experience, this interactive learning media can help students build stronger and deeper knowledge. This will ultimately have a positive impact on increasing students' science cognitive abilities. It's crucial to keep in mind that the attainment of optimal learning outcomes hinges on cognitive abilities and a thorough comprehension of science concepts. Rahmawati, et al. (2021) research results validate the effectiveness of interactive learning media in enhancing science learning outcomes for elementary/MI students. So this interactive learning medium has proven to be effective in improving student learning outcomes on food chain materials.

Based on the research findings, the developed interactive learning media has met the criteria of validity, practicality, and effectiveness. Nevertheless, there are several limitations that need to be considered for further development. The first limitation of this research is its focus on fifth-grade students at Al Ghaffaar Islamic Elementary School, which limits the generalization of the results to a broader population, including students from diverse socio-

cultural backgrounds or schools with different facilities. Despite the significant effectiveness of this media, we have not thoroughly explored its long-term impact on learning outcomes or changes in students' learning behavior. Third, this research has not yet thoroughly discussed the potential technical constraints that may occur in the application of the media, especially in schools with technological limitations.

The implications of these limitations highlight the importance of further testing this media in various educational contexts, such as in schools with limited technological conditions or with students from different grade levels. Additionally, training teachers in the optimal use of this media is crucial to ensure its effective implementation in daily learning. Future research should also explore the development of similar media that integrate new technologies, such as augmented reality, to enhance interactivity and improve students' learning experience. We hope that by addressing these limitations, interactive learning media can become a more inclusive, relevant, and sustainable educational innovation, not only for IPAS learning but also for other subjects.

Conclusion

The development of interactive learning media on food chain material in science and science learning for fifth-grade students at Al Ghaffaar Islamic Elementary School has met the criteria for validity, practicality, and effectiveness, according to the research results. The interactive learning media developed has proven to be effective in increasing interest and motivation to learn, understanding concepts, and student learning outcomes related to food chain material in science learning. The use of interactive learning media holds significant potential to enhance the quality of classroom learning, particularly in science subjects related to abstract food chains. You can use this interactive learning media to overcome the limitations of conventional learning methods, which tend to be more teacher-centered in their application. Through the use of this interactive learning media, students can be more actively involved in a fun and meaningful learning process.

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