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Getarkan: An Interactive Game Slide Pull Food Chain to Improve Students' Learning Outcomes in Elementary School

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ABSTRAK

Rendahnya minat belajar siswa pada pembelajaran IPA disebabkan oleh beberapa hal seperti tidak diterapkannya model dan metode pembelajaran yang inovatif serta penggunaan media pembelajaran yang kurang interaktif. Diperlukan media pembelajaran yang menyenangkan untuk meningkatkan hasil belajar siswa. Tujuan penelitian ini adalah mengembangkan media pembelajaran game interaktif "Getarkan" yang valid, praktis, dan efektif untuk meningkatkan hasil belajar siswa kelas V sekolah dasar pada materi rantai makanan. Penelitian pengembangan ini menggunakan model ADDIE yang terdiri dari lima tahapan yaitu, analyze, design, development, implementation, evaluation. Pada penelitian ini, jenis data yang digunakan terdiri dari dua yaitu data kualitatif dan data kuantitatif. Penelitian ini mengambil subjek media Game interaktif Getarkan, sedangkan objek yang diambil adalah validitas, kepraktisan, dan efektivitas dari media Game interaktif Getarkan. Metode pengumpulan data yang digunakan yaitu rating scale dan tes hasil belajar siswa. Hasil penelitian menunjukan bahwa media Game interaktif Getarkan mendapat kevalidan dari ahli dengan kategori sangat tinggi, serta kepraktisan yang dinilai oleh siswa dan guru mendapatkan nilai sangat tinggi. Untuk uji efektivitas media terhadap hasil belajar, media interaktif dinyatakan efektif untuk meningkatkan hasil belajar siswa pada materi rantai makanan. Karena adanya perbedaan sebelum dan sesudah pembelajaran menggunakan media interaktif.

ABSTRACT

The low interest of students in learning science is caused by several things such as the lack of innovative learning models and methods and the use of less interactive learning media. Fun learning media is needed to improve student learning outcomes. The purpose of this research is to develop a valid, practical, and effective interactive game learning media "*Getarkan*" to improve the learning outcomes of grade V elementary school students on food chain materials. This development research uses the ADDIE model which consists of five stages, namely, analyze, design, development, implementation, and evaluation. In this study, the type of data used consists of two, namely qualitative data and quantitative data. This study takes the subject of the interactive game media of Vibration, while the object taken is the validity, practicality, and effectiveness of the interactive game media of Vibration. The data collection methods used are rating scales and student learning outcome tests. The results of the study show that the interactive game media of *Getarkan* received validity from experts with a very high category, and the practicality assessed by students and teachers received very high scores. To test the effectiveness of media on learning outcomes, interactive media was declared effective in improving student learning outcomes on food chain materials. Because there is a difference before and after learning using interactive media.

1. INTRODUCTION

Ideal learning is active, creative, and effective learning. Learning should use various models and strategies to improve the optimality of students in following the learning process that is carried out (Hayati & Lailatussaadah, 2016; Rafikasari et al., 2021). Science learning should touch on aspects of student involvement in the learning process so that they are able to experience a scientific process in obtaining information or materials being studied. Science learning should be implemented with a variety of models and strategies that aim to optimize and provide high effectiveness to the ongoing student learning process.

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Science or natural science is a collection of scientific knowledge that is arranged systematically and uses general statements through scientific methods accompanied by a scientific attitude so as to produce a new theory or product to solve a problem (Dwisetiarezi & Fitria, 2021; Irsan, 2021). In achieving a mature understanding of the concept of science, sometimes there will be difficulties, both difficulties in facilities and infrastructure and the scarcity or rarity of scientific events that illustrate the concept. The scarcity of scientific events that illustrate a science concept will hinder the learning process, especially in thematic learning students are required to be more active and creative (A. Nisa et al., 2015; Yuliana et al., 2022). Not a few events in science learning materials are rarely directly observed by students, such as events that are far from urban settlements or events that occur unpredictably and sometimes never happen.

Good science learning must be based on student activities such as observing, assessing, researching, analyzing, and clarifying the concepts learned based on what actually happens. During the learning process, the process experienced by students should be able to provide innovation and motivation to students so that students are willing to follow the lesson seriously and carefully which will have an impact on students' ability to understand the concepts they are learning (Medyasari et al., 2017; Rohana, 2020). The role of teachers is important as facilitators to realize ideal science learning. Learning requires a professional teacher and learning media that are appropriate to the needs of students and their environment in order to attract students' attention in the learning process.

Ideal learning is certainly able to provide a fun learning experience for students. One aspect that influences learning is the use of learning media. The use of appropriate learning media will certainly make it easier for teachers to carry out their teaching process. Science is a learning content whose concept is based on what is obtained from a research process in the field or based on existing facts. The use of science learning media should provide real experience regarding the concept that will be conveyed through the media (Marwanto, 2021; Zahwa et al., 2022). Learning media will have an impact on the efficiency and effectiveness of learning in achieving its learning objectives. Learning media in science content in elementary schools is very important considering the stages of cognitive development. Children aged 6-12 years are at the concrete operational stage. At the concrete operational stage, children will be able to think logically based on what they see. Basically, the use of learning media in learning in elementary schools is very important considering the characteristics of students based on their stages of cognitive development (Anjarani et al., 2020; Valentina Dewi et al., 2023). With the development of technology, the learning media used is also increasingly developing by starting to utilize technology as a learning medium or in creating learning media.

In reality, ideal learning has not been implemented in Elementary Schools. Based on the results of observations carried out at SDN 1 Penglumbaran, the problem found was the lack of student participation and interest in learning. The learning models and methods used still use conventional learning models, which have implications for low student learning outcomes. The low student learning outcomes are evidenced by the student's grades in science content learning obtained from the results of document observations carried out at SDN 1 Penglumbaran (Fravitasari, 2018; Mareti & Hadiyanti, 2021). Of the total 9 students in grade V, 77.8% obtained scores below the KKM and only 22.2% of students obtained scores above the KKM that had been set, namely 65. The cause of the low learning outcomes of these students was because innovative and interactive learning media had never been used during their learning (Sakiah & Effendi, 2021; Sukma & Handayani, 2022). Considering that in the concept of science there are several concepts that cannot be explained concretely in the school environment because there are several phenomena that are quite difficult to find. The facilities at SD Negeri 1 Penglumbaran are also quite adequate such as two projector units, Chromebook devices, and wifi internet access. Judging from the facilities provided, the use of more interactive digital media can be used to support the learning process in the classroom.

Based on the problems above, the solution that can be given is to develop digital learning media in the form of educational game media to improve student learning outcomes. This media has advantages because from observations in the student environment, almost all students have mobile phones and understand how to operate them (Citra & Rosy, 2020; Sarji & Mampouw, 2022). This media is also based on the enthusiasm of students in playing Android Games and computer or laptop devices. This research is relevant to be carried out because previously there have been several experts who have conducted similar research. The use of educational Game media can improve student learning outcomes with a percentage of 84%. The use of educational Game media is effective in improving student learning outcomes with a percentage of 90.3% with a very good indication.

The novelty of this research lies in the development of digital learning media in the form of an educational game "*Geser Tarik Rantai Makanan (Getarkan)*" which is designed to improve the learning outcomes of fifth grade elementary school students. This research stands out because it integrates interactive technology in the form of a Role Playing Game (RPG), which allows students to act as predators

in the wild and actively choose prey that suits their animal type. This approach not only makes learning more interesting and fun, but also helps students understand the concept of the food chain more concretely through an immersive gaming experience. In addition, the use of this educational game media is supported by the fact that most students are familiar with technological devices such as mobile phones and computers, making it easier to implement and increase student engagement (Arini, 2023; HPS Muttaqin et al., 2021). The use of applications like this is a significant innovation in education that answers the challenges of conventional learning, especially in increasing student participation and learning outcomes. This study also pays attention to the validity and practicality of the media developed, ensuring that the *Getarkan* game is not only interesting, but also effective as a learning aid.

Based on the explanation above, a research was conducted on the development of Interactive Game Learning Media Slide Pull Food Chain (*Getarkan*) to Improve Learning Outcomes of Grade V Elementary School Students. This development research has four objectives, namely: (1) to produce a spatial structure of the *Getarkan* Game media, (2) to produce a *Getarkan* Game media whose validity has been tested, (3) to produce a *Getarkan* Game media whose practicality has been tested, and (4) to produce a Game media. Interactive Game Learning Media Slide Pull Food Chain (*Getarkan*) has advantages over other Game-based learning media by carrying the Role Playing Game (RPG) game so that students will act as predators in the wild. Students are required to choose prey according to the type of animal to continue the level in the Game and when students choose the right prey, a unique sound will appear and vice versa when students choose the wrong prey, another unique sound will appear.

2. METHOD

The development of the interactive game *Getarkan* learning media uses the ADDIE development model which has five stages that are easy to understand and presented in stages, namely analysis, design, development, implementation, and evaluation. Product trials were conducted using a one group pre-test and post-test design (Rustandi & Rismayanti, 2021; Setiawan et al., 2021). In this design, the results of the treatment given can be known more accurately because it is done by comparing the condition of the object before and after the treatment is given. The subject in this study is the interactive learning media Game Slide Pull Food Chain (*Getarkan*) on the science content. Then this learning media will be tested by several experts, practitioners, and student responses. The object of this research trial is the validity and practicality of the interactive learning media Game Slide Pull Food Chain (*Getarkan*) on the science content. For the implementation stage, the subjects of the research trial were grade V students of SD Negeri 1 Penglumbaran and the object of the research trial was student learning outcomes.

In this study, the types of data used consist of two, namely qualitative data and quantitative data. Qualitative data is data that is stated abstractly or expressed through sentences, words, or a picture. In this study, qualitative data is data obtained from suggestions, criticisms, and input based on the results of expert reviews. While quantitative data is data presented in the form of numbers so that the data can be calculated. In this study, quantitative data is data obtained through questionnaires which are converted into values with a value range of 1-4.

The data collection method used in this development research uses a non-test method for validity and practicality in the form of a rating scale. This study uses a Likert scale instrument type of 1 - 4. Validity tests should be met in order to determine whether the learning media created can be used. The next step that needs to be done is to create an instrument grid and consult with the supervisor to obtain suggestions and input. The grid of the instrument that will be used as an assessment of the validity of the interactive Game learning media product *Getarkan* is shown in Table 1, Table 2, Table 3, Table 4, and Table 5.

Table 1. The Learning Content Expert Instrument Grid

No.	Aspect	Indicator
1	Curriculum	1) Suitability of materials and media
		2) Suitability of material and KD
		3) Suitability of materials and indicators
		4) Suitability of materials and learning objectives.
2	Material	5) Suitability of the material to student characteristics.
		6) Clarity of material description.
		7) Ease of material.
		8) Suitability of materials with learning media
		9) The attractiveness of the material.
3	Language	10) Suitability of language use.
		11) Language Standards.

No.	Aspect	Indicator
		12) Punctuation conformity.
		13) Text size conformity.
		14) Appropriateness of sentence usage.
4	Presentation	15) Integration in presentation.

Table 2. The Learning Media Expert Instrument Grid

No	Aspect	Indicator
1	Appearance	1) The media display attracts attention.
		2) Design according to student characteristics
2	Writing	3) Letter model.
3	Picture	4) The image displayed matches the material exactly.
		5) Suitable background.
		6) Proper image placement.
4	Operation	7) Has navigation buttons.
5	Color	8) Colors and letters are in harmony.
		9) The colors and images are in harmony.
6	Audio	10) A clear voice is heard.

Table 3. The Practitioner Response Instrument Grid

No	Aspect	Indicator
1	Content	Compliance with the curriculum.
		Adequacy of learning materials.
		Relevance to learning objectives
2	Attraction	Interest in learning with the help of media.
2	Utility	Ease of navigation in the Game
3	Contents	Student involvement during learning.
4	Language	Contextuality.
3	Design	Game visual aesthetics
		Consistency of interface design.
5	Overall View	The match between design and audience.

Table 4. The Student Response Instrument Grid

No	Aspect	Indicator
1	Display design	1) The appeal of using applications for learning.
		2) Ease of use of media.
		3) The attractiveness of the media display.
		4) Clarity of instructions for using Vibrate Interactive Game Media.
2	Contents	5) Ease of material.
		6) The interestingness of the material presented.
		7) Clarity of the text presented.
3	Evaluation	8) Clarity of the questions presented.
		9) Suitability of questions and materials.
		10) Suitability of language to student characteristics.

Table 5. The Student Learning Outcome Instrument Grid

No	Basic competencies	Question indicator
1	Analyzing the relationship between ecosystem components and food webs in the surrounding environment	Presented with a picture of a food chain, students are able to correctly describe the roles of plants and animals in the food chain. Given a question, students can describe the types of food chains correctly. Given pictures of animals, students are able to determine the type of animal based on its food chain correctly. Given a description, students are able to choose the type of animal based on the type of food it eats correctly.

No	Basic competencies	Question indicator
		Given a picture, students are able to arrange the food chain in the correct order. Presented with a statement, students are able to correctly link the components in a food chain. Given a question, students are able to choose a food chain according to the type of ecosystem.

The instrument of content experts, media experts, and individual trials that have been made in order to be said to be valid, then a validity test is needed first of the instrument content. The validity of the instrument content in this study was tested using the Gregory formula. Product validity is carried out to determine whether the product developed is valid for use in the learning process. The validity test of the product developed was carried out by content experts, media experts, and practitioners. The data was taken using a questionnaire instrument. Then, the data obtained was analyzed using the Aiken V formula. The practicality test of the product developed was carried out by practitioners (teachers) and students. Respondents' answers to each instrument will be analyzed using a Likert scale. Analysis of the effectiveness of the interactive Game learning media Slide Pull Food Chain (*Getarkan*) on student learning outcomes using the correlated t-test formula. The effectiveness test was carried out to prove the effectiveness of the interactive Game learning media Slide Pull Food Chain (*Getarkan*) to improve student learning outcomes.

3. RESULT AND DISCUSSION

Result

This study aims to produce interactive Game media *Getarkan* which has been tested for its effectiveness in improving the learning outcomes of fifth grade elementary school students. This study went through 5 stages in its development. These stages include the first stage of analysis (analyze). At this analysis stage, identification of needs is carried out which aims to find a problem that is occurring in the learning process, especially in the science subject matter. The analysis carried out includes needs analysis, student character analysis and curriculum analysis. The second stage is planning (design). The design of the Game learning media begins with determining the material to be developed in the learning Game, making a storyboard, and making a flowchart then shown to the supervising lecturer to get input and suggestions to be able to make improvements to the Game learning media. In addition, the preparation of validity instruments and practitioner responses is carried out. The game media design can be seen in Figure 1.

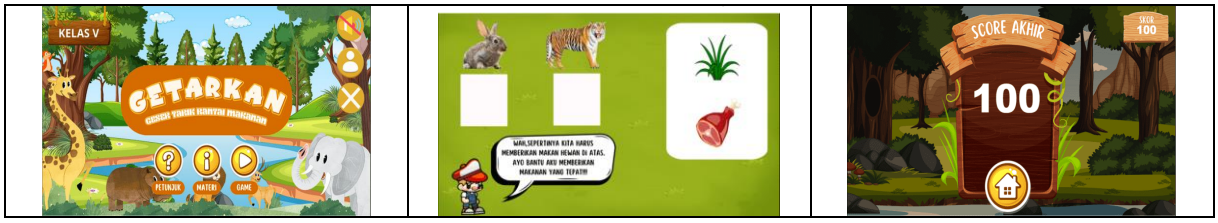

Figure 1. Game Media Design

The third stage is product development (development). At the media development stage, things that have been designed previously. The results of this product development are the subjects that will be used for testing. Before being used in the learning process in the classroom, the Interactive Game Learning Media product *Getarkan* based on Construct 2 on the Food Chain Material for Grade V Elementary School Science content must first go through a feasibility or validity test stage. The product feasibility test activity will be carried out in two stages, namely the first stage is a review or assessment from material experts and learning media experts. While the second stage is a practicality test consisting of a practitioner (teacher) response test and individual trials. The following are the results of the media validity test, practicality and individual trials on Table 6.

Table 6. The Validity Results

No	Validity	Score	Qualification
1	Validity of Learning Media	0.93	High Validity
2	Validity of Material	0.91	High Validity
3	Practitioner's Practicality	3.95	High Validity
4	Media Practicality By Students	3.97	High Validity

The fourth stage is implementation. When the developed product has been completed and has been validated by each expert in their field. Then it is continued with the use of interactive Game learning media *Getarkan* based on Construct 2 in learning in the science content of class V of SD Negeri 1 Penglumbaran. The use of media is carried out to determine the effect of game learning media on student learning outcomes and its effectiveness. In the field trial, the samples taken were class V students of SD Negeri 1 Penglumbaran. The trial was carried out using a one group pre-test and post-test design. The data that has been obtained is then analyzed to determine the conclusion. The data was analyzed using the correlated t-test formula and previously a prerequisite test had been carried out including data distribution tests, homogeneity of variance and finally the t-test. The results of the normality test are shown in Table 7.

Table 7. The Results of the Normality Test of Pretest and Posttest Data Distribution

Variable	Class	Kolmogorov-Smirnova			Shapiro Wilk		
		Statistics	df	Sig.	Statistics	df	Sig.
Student Learning Outcomes	Pretest	0.304	9	0.016	0.843	9	0.063
	Post Test	0.178	9	0.200	0.960	9	0.800

Based on Table 7, shows the results of the normality test of the distribution of the data above, in the Shapiro-Wilk column the sig. data value for the pretest data is 0.063 and the sig. value for the posttest data is 0.800. Because the sig. value for the pretest and posttest > 0.05, it can be concluded that the data is normally distributed. The results of the homogeneity of variance test are shown in Table 8.

Table 8. The Results of Homogeneity of Variance Test

Parameters		*Levene Statistics*	df1	df2	Sig.
Learning outcomes	Based on Mean	0.714	1	16	0.411
	Based on Median	0.470	1	16	0.503
	Based on Median and with adjusted df	0.470	1	10.678	0.507
	Based on trimmed mean	0.494	1	16	0.492

Based on the results of the homogeneity of variance test on Table 8 get a sig. value based on mean of 0.411 > 0.05. It can be concluded that the pretest and posttest data have homogeneous variance. After the data has been declared normal and homogeneous, it can be continued for hypothesis testing. The results of the hypothesis test are shown in Table 9.

Table 9. Hypothesis Testing

Pair		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Test - Post-Test	-14.81333	13.24249	4.41416	-24.99241	-4.63425	-3.356	8	0.010

Based on the results Table 9, which has been displayed, it is known that the sig. value (2-tailed) is 0.010 < 0.05, then H_0 is rejected and H_1 is accepted. So it can be concluded that there is a significant difference in student learning outcomes before and after the use of the *Getarkan* interactive Game learning media. So the use of the *Getarkan* interactive Game learning media is effective in improving the learning outcomes of fifth grade students on the food chain material.

The last stage in this research is evaluation. The evaluation stage is used to determine the feasibility and achievement of the objectives of the development of interactive Game *Getarkan* learning media based on Construct 2 as a tool in the learning process in this fifth grade science subject. At this evaluation stage, it is carried out using the basis of assessment from the validation of media experts, material experts, practitioner response tests, and small group trials of the interactive Game *Getarkan* product based on Construct 2 so that the advantages and disadvantages of the product can be identified so that actions can be taken for improvement that can make the product better in the future.

Discussion

Education is an important factor that everyone must have. Education is an effort that is done consciously and planned which aims to provide a conducive learning and teaching atmosphere so that it has an impact on the development of students in terms of spirituality, knowledge, personality, intelligence, morals, and abilities needed in community life (Abdul Aziz, 2017; Satya Yoga et al., 2015). Learning is an interaction carried out by teachers and students where the teacher is the source of information and the student is the recipient of information. Learning occurs because of the integration of the learning and teaching process. The learning process is also interpreted as an activity carried out by someone to provide new knowledge to others. The learning process usually takes place in the classroom with guides that have been made. The learning process plays an important role in increasing success in achieving the expected learning objectives (Bararah, 2020; Buchari, 2018). Learning implemented in Elementary Schools (SD) currently uses integrated or thematic learning. Thematic learning is learning that is programmed with a theme or topic broken down into several parts based on an analysis of subjects that are usually taught in schools.

Learning outcomes are the achievements obtained from the student's learning process. Learning outcomes are very much determined by the learning process that is carried out so that to obtain good learning outcomes, ideal learning is needed to improve the learning process so that it can influence student learning outcomes. Student learning outcomes are very important because they concern the understanding of the concepts they are learning (Nastiti & Syaifudin, 2020; Suparmi, 2019). But in reality, student learning outcomes in schools are still not as expected, there are still many students who have low learning outcomes. This is certainly influenced by the learning process that is carried out.

Ideal learning is certainly able to provide a fun learning experience for students. Ideal learning must use a variety of learning models and methods that are appropriate to the situation and material (Adzkiya & Suryaman, 2021; Atika Alwinda & Satria Wiguna, 2022).The use of learning methods and models will give a creative and interactive impression to students and increase the efficiency of time use. In ideal learning, learning media should be used that are related to the material being taught and the interests of students. This is not in line with what is in the field, where the learning methods used only use discussion, lecture, and question and answer methods in each learning. This has an impact on the difficulty of increasing student motivation and interest in learning so that it affects the learning outcomes of students produced (Heri, 2019; Tandi & Limbong, 2021). In addition, the media used in learning is not interactive.

The research entitled "Development of Educational Game Media "Marbel Fauna" for Elementary School Students" states that the media developed produces educational games that can attract students' interest in learning so that it has an impact on student learning outcomes. Then the research entitled "Development of Android-Based Educational Games to Improve Student Learning Outcomes in Elementary Schools" also states that this educational game is effective in improving student learning outcomes because it has interactive features so that students do not get bored in learning (Akbar, HF & Hadi, 2023; MA Nisa & Susanto, 2022).

Getarkan interactive game media is the right solution to provide interesting and interactive learning. *Getarkan* interactive game media provides a concrete picture of the Food Chain material to students because interactive game media presents interesting learning materials, informative and fun games, and quizzes that test students' understanding after playing the game.The media designed is a learning media in the form of an interactive game on the food chain material of science content. This media is intended for grade V elementary school students (Aula et al., 2020; Rohmah & Bukhori, 2020). Interactive Game learning media slide drag food chain (*Getarkan*) is designed using one application maker software, namely Construct 2 and 1 editing website, namely Canva. Interactive Game learning media *Getarkan* consists of several menus, namely the main menu, instructions menu, material menu, Game menu, and developer identity menu.

This research has significant implications in the world of education, especially in the application of digital learning media in elementary schools. The development of *Getarkan* interactive game media can be an innovative model that can be adopted by other schools to improve student participation and learning outcomes. By combining interactive technology and a game approach, this media provides a new, fun and effective way to learn science concepts, especially the food chain. Teachers can utilize this media to make the learning process more dynamic and interesting, which can ultimately increase students' motivation and interest in learning.

Although this study shows positive results, there are limitations that need to be considered. This study was only conducted in one elementary school with a limited sample, so the results may not be fully generalizable to a wider population. This learning media requires technological devices such as computers or tablets that may not be available in all schools, especially in remote areas or with limited resources. In addition, this study did not evaluate the long-term effects of using this interactive game media on student learning outcomes.

4. CONCLUSION

This study successfully developed an interactive game learning media called *Getarkan*, which was specifically designed to improve the learning outcomes of fifth grade elementary school students on the food chain material in science content. Through a series of stages including needs analysis, planning, development, implementation, and evaluation, this media showed significant effectiveness in improving student learning outcomes. The validity and practicality of the media have been tested through expert tests and field trials, showing that this media is not only interesting and interactive but also able to convey learning concepts in a fun and in-depth way. Although there are several limitations, such as the limited scope of the study and dependence on technological devices, the interactive game media *Getarkan* makes a positive contribution to the world of education and can be an innovative model to be applied in other schools. The implementation of this media is expected to increase student motivation, interest, and learning outcomes, as well as provide a more creative and interactive learning experience.

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