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Development Of Learning Media For Animal Life Cycle Puzzles In Science Subjects At Fourth Grade Elementary School

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ABSTRAK
Rendahnya keaktifan dan partisipasi siswa dalam belajar, karena kurangnya model pembelajaran yang digunakan guru saat proses pembelajaran. Penelitian ini bertujuan untuk mengembangkan media pembelajaran pudar dupan (puzzle daur hidup hewan), mengetahui kelayakan dan respon siswa terhadap produk yang dikembangkan di kelas IV Sekolah Dasar. Tujuan pengembangan media pembelajaran pudar dupan diperoleh dari hasil pada saat pra penelitian bahwa guru menjelaskan materi daur hidup hewan dengan metode ceramah dan berpusat pada guru, selain itu guru juga hanya berfokus pada buku siswa sebagai media belajar sehingga siswa terlihat pasif dalam proses pembelajaran. Metode penelitian yang digunakan adalah metode penelitian dan pengembangan (Research and Development) yang telah dimodifikasi oleh Sugiyono yang diawali dengan tahap analisis masalah, pengumpulan data, desain produk, validasi desain, revisi desain produk, dan uji coba produk. Berdasarkan hasil uji kelayakan media pembelajaran pudar dupan yang dilakukan oleh tim ahli, mendapatkan nilai rata-rata kelayakan oleh tim ahli desain sebesar 86,35% dengan kriteria kategori interpretasi “Sangat Layak”, nilai rata-rata kelayakan oleh tim ahli materi sebesar 92,50% dengan kriteria kategori interpretasi “Sangat Layak”, dan nilai rata-rata kelayakan oleh tim ahli pendidikan sebesar 96,50% dengan kriteria kategori interpretasi “Sangat Layak”. Sedangkan respon siswa diketahui dari uji coba secara terbatas yang dilakukan pada 20 siswa, diperoleh persentase sebesar 92,36% dengan kategori “Sangat Baik”. Berdasarkan hasil penelitian dapat disimpulkan bahwa media pembelajaran pudar dupan (puzzle daur hidup hewan) sangat layak digunakan dalam proses pembelajaran dan mendapatkan respon sangat baik dari siswa.

ABSTRACT
The low activity and participation of students in learning due to the teacher's lack of learning models during the learning process. This research aims to develop learning media of animal life cycle puzzle and determine the feasibility and students' response to the product being developed in fourth-grade elementary school. The purpose of developing animal life cycle puzzle was obtained from the results during pre-research that the teacher explained the animal life cycle material with the lecture and teacher center method, besides that the teacher also only focused on student books as a learning medium so that students looked passive in the learning process. The research method used a research and development method that has been modified by Sugiyono, which begins with the problem analysis, data collection, product design, design validation, product design revision, and product trial trials. Based on the results of the feasibility test of the learning media of animal life cycle puzzle get an average score of eligibility by a design expert team of 86, 35% with the criteria of interpretation category "Very Worthy," the average score of eligibility by the material expert team was 92.50% with the criteria for interpretation category "Very Apprpriate." The average score of eligibility by the education expert team was 96.50% by criterion category of interpretation "Very Appropriate." While the students' response is known from a limited trial conducted on 20 students, obtained a percentage of 92.36% with the category "Very Good." Based on the results of the study, it can be concluded that the learning media of animal life cycle puzzle is very worthy and very good used in the learning process in elementary school.

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1. Introduction

Learning is acquiring subjects or acquiring skills through lessons, experience, or teaching (Fatimah, 2018: 108). The term learning can be broadly defined as a process of interaction between the learning system's components to achieve learning outcomes. It means that learning is a transactional process (giving reciprocity) between the learning system components, educators, students, teaching materials, media, tools, procedures, and learning processes to achieve a comprehensive change in students (Fujiawati, 2016: 21). One of the lessons that must be given to elementary school students in the Science subject materials. The science learning process is designed to produce human resources that are critical, sensitive to the environment, and able to solve environmental problems in everyday life. Therefore, it is necessary to strive for science learning to facilitate students to think critically, have high reasoning power, and think innovatively to solve environmental problems (Iskandar, 2018: 201). Science is a body of knowledge consisting of a collection of facts, concepts, theories, and laws, discovered through a scientific process. Therefore, the science learning process must be adapted to elementary school students' nature and character (Desstya, 2017: 2) (Fatimah & Kartika, 2013). Science is one of the subjects found in Elementary Schools. Science learning is important learning as a provision of knowledge or a foundation for students to the next level and can be applied in everyday life (Utami, 2020: 122) (Panjaitan, 2017). Science subjects are also included in the National Examination so that they are important subjects given to students. Science learning aims to help students understand several science facts and concepts regarding natural phenomena and apply them in everyday life to develop and instill scientific attitudes in students (Nahdi, 2018: 10). Science is concerned with finding out about nature systematically, so that Science is not only the mastery of a collection of knowledge in the form of facts, concepts, or principles but is also a process of discovery (Cahyo, 2013: 212) (Bujang et al., 2014) Science has several competencies that elementary school students must achieve, one of which is to describe the life cycle of animals in everyday life, for example, the life cycle of flies, mosquitoes, butterflies, grasshoppers, cockroaches, and frogs.

Based on the results of an interview with one of the teachers in the fourth grade SDN Cipanas Serang on September 3, 2019. Several problems occurred in learning in fourth grade, one of which was the problem in science subjects, especially in animal life cycle material. Students regarding the animal life cycle material. It can be seen from the learning outcomes of students who have not reached the KKM. An animal's life cycle is a stage of change in animal experiences during its life. The problem that occurs is the use of media that is still lacking. The media provided by the school is limited, and in making learning media, teachers also find it difficult. Based on the observations that researchers have made in the fourth grade of SDN Cipanas, the learning process is still teacher-centered. In the learning process, the teacher only uses simple media, the image media in the 2013 curriculum-based student books, so that it does not involve students in its use. It can be seen when the learning process, students tend to be passive in following the learning process. According to the fourth-grade teacher at SDN Cipanas, animal life cycle material will not be conveyed properly if it only uses the lecture method. This material can be taught using learning media that is a game (Hastuti, 2017: 681). Learning media that can be used in animal life cycle materials are image media (Pradanti, 2017: 3). Therefore, one effort that can be made is to develop learning media. The use of learning media in the learning process is important because using learning media can arouse student interest and motivation, reduce verbalism as a channel of information, encourage students, and increase knowledge retention in learning so that learning is more meaningful (Dewanti, 2018).

One of the teachers' efforts to solve this problem is developing learning media that can involve and attract students' attention in participating in learning, media that can be applied in science learning with animal life cycle material, Animal Life Cycle Puzzles. This puzzle learning media was developed because it saw the needs of fourth-grade students of SDN Cipanas. They needed learning media that was able to motivate and make students active in the learning process. Puzzles can foster students' enthusiasm for learning because students can learn while playing so that the learning atmosphere will be more lively and not monotonous.

The puzzle is a game that consists of pieces of pictures or letters arranged into a game that has appeal and optimizes children's abilities and intelligence (Trimantara, 2019: 28) (Srianis et al., 2014). It corresponds to (Husna, 2017: 67) that a puzzle is a kind of game in the form of pieces of images that are played by arranging them so that an image is formed, with the aim of training patience, making it easier for students to understand concepts, solve problems, cooperate with friends, and develop motor skills, and cognitive learners. The researchers chose animal life cycle media by using puzzles. It could improve students' cognitive development, and play puzzles could foster a sense of kinship between students. It is in line with the benefits of puzzle learning media, according to (Yulianty, 2016: 43), that puzzles can sharpen

the brain, train hand, and eye coordination, train reading, train reasoning, train patience, and train knowledge. Furthermore, according to (Nisak, 2011: 110), the puzzle game's goal is to foster a sense of solidarity among friends and a sense of kinship between friends. The advantages of using puzzles in learning are instilling a sense of kinship between students, instilling a sense of family solidity between students, instilling mutual respect and respect among students, encouraging students' enthusiasm for learning (Ayu, 2014: 109).

Several studies have been carried out related to the development of puzzle learning media. Research conducted by (Nisa, 2020: 222) explained that the puzzled media developed through the group investigation model's application experienced increased student learning outcomes. Furthermore, previous research that has been conducted by (Sutiyem, 2018: 72) shows that the puzzle picture game can improve science learning outcomes on the function of human organs in fourth-grade elementary school students. Other studies also explain that the application of puzzle media in science learning can also improve students' abilities in understanding the concept of classification of living things (Munajah, 2020: 55). The difference between previous research and this research is that this research is developing learning media for animal life cycle puzzles based on contextual learning. So this difference is the advantage of this study. The advantages of the developed animal life cycle puzzle learning media are that there are animated images of animals and explanations of the animal's life cycle, so that it can make it easier for students to understand the material content through contextual learning. Students will develop knowledge and link teaching materials in everyday life so that learning can be more meaningful and contextual. In addition, by using learning media for animal life cycle puzzles, students' experience is not just a game. Still, it can interpret the games and lessons given, create a sense of pleasure and allow them to easily understand the lesson.

Based on this background, this study aimed to develop learning media for animal life cycle puzzles in science subjects at fourth-grade elementary schools to examine how the development of animal life cycle puzzle learning media in science subjects in fourth-grade elementary school, how the feasibility of learning media for animal life cycle puzzles in fourth-grade elementary school science subjects, as well as how students respond to learning media for animal life cycle puzzles in fourth-grade elementary school science subjects.

2. Method

This study uses a Research and Development (R&D) method that has been modified by Sugiyono, which begins with problem analysis, data collection, product design, product design validation, product revision, and product testing (limited trial). Research and Development (R & R & R&D) is a research method used to produce certain products and test their effectiveness (Sugiyono, 2016: 4).

The first stage is problem analysis. The analysis carried out is curriculum analysis, material analysis, and needs analysis. Then, the second stage was carried out, data collection using observation and questionnaires. Observations were made to determine the needs needed by teachers and students in the learning process. In contrast, the questionnaire was used to assess the appropriateness of expert tests and student responses to puzzles that had been made. The third stage is product design. Animal life cycle puzzle media which was developed was designed using Corel Draw X7 using image and color designs that could attract students' attention so that students were happy and enthusiastic about participating in the learning. The fourth stage is design validation carried out by design experts, material experts, and education experts. The fifth stage is product revision from the expert team. This revision is carried out by providing criticism and suggestions through an assessment sheet in a questionnaire. The last stage or the sixth stage is a limited trial. This stage is carried out in the fourth grade of elementary schools with 42 students, and the sample used is 20 students. Students are given a questionnaire sheet to determine student responses and assessments of the cycle puzzle media live these animals in this limited trial.

The type of data used in the research and development of animal life cycle puzzle media is qualitative and quantitative. Qualitative data obtained from the results of questionnaires, unstructured interviews, and observations during pre-research. Meanwhile, quantitative data is used to determine the product's feasibility from expert validation questionnaires and student response questionnaires.

The data analysis technique used is qualitative data analysis and quantitative data. Data obtained from field notes from observations were analyzed using qualitative analysis techniques. The data obtained from an expert validation subject assessment questionnaire such as design experts, material experts, education experts and student response questionnaires were analyzed using quantitative data analysis techniques.

3. Result and Discussion

This research and development aimed to develop learning media for animal life cycle puzzles in science subjects, animal life cycle material in the fourth grade of elementary school. The development of learning media for animal life cycle puzzles was carried out based on the development procedure. According to Borg and Gall, which was modified by Sugiyono, which began with problem analysis, data collection, product design, product design validation, product revision, and product testing.

The first is problem analysis. The problem analysis stage is the first step in this research and development. The researcher carried out a curriculum analysis needs analysis and material analysis at the problem analysis stage. The curriculum analysis stage is carried out by identifying the basic competencies in the 2013 curriculum and understanding the depth and breadth of competencies that must be developed, then describing the core competencies (KI) and basic competencies into several indicators. Core competencies in animal life cycle materials are found in KI 3 and KD 3.2, Comparing the life cycles of several types of living things and linking them to their preservation efforts. Based on the KI and KD, the researchers describe eight indicators: compiling a butterfly life cycle puzzle, compiling a fly life cycle, compiling a mosquito life cycle puzzle, compiling a grasshopper life cycle puzzle, compiling a cockroach life cycle puzzle, compiling a frog life cycle puzzle, distinguishing the life cycle of animals undergoing perfect metamorphosis and animals experiencing imperfect metamorphosis, and determining animal conservation efforts. The next stage is material analysis. The material analysis stage is carried out by completing the material with the Core Competencies and Basic Competencies in the 2013 Curriculum. in theme 6 (My aspirations) and sub-theme 1 (Me and my aspirations) in science subjects in fourth grade.

After the material analysis is complete, then proceed to the next stage. Furthermore, the needs analysis stage aimed to determine fourth-grade students' learning tools at SDN Cipanas in science subjects. Based on the results of observations on September 3, 2019 in the fourth grade of SDN Cipanas, it shows that science learning carried out by teachers at SDN Cipanas does not use learning media during the learning process. Teachers only use image media in student books or books available in schools. K13 book. In addition, at the time of observation, it was also seen that students tended to be passive and less involved in the learning process. Therefore, the need for learning media in science learning in grade four SDN Cipanas, puzzles, is involved in the learning process.

Furthermore, the second stage carried out is data collection. After analyzing the problem, data and information related to the research are found, which are then collected. At this stage, the researcher tries to find what kind of media can be a solution to the problems that have been found at the needs analysis stage. Therefore, this study intends to develop 2-dimensional learning media called animal life cycle puzzle learning media. That can help teachers deliver lessons following the objectives to be achieved, especially in science subjects, animal life cycle material, and the development of this media the teacher can involve and attract the attention of students in participating in learning. So, students are enthusiastic about participating in the learning process. According to (Ayu, 2014: 109), this is in line with the opinion that one of the advantages of puzzle media is that it can foster a sense of enthusiasm for students' learning. Another opinion says that the advantages of puzzle games can attract students' learning interest. The pictures on the puzzle can overcome space and time limitations because not all objects can be brought into the classroom. Students can see and carry out experiments with the learning media to add insight (Husna, 2017: 67).

After data collection, the next step is product design. In this third stage, the researcher designed the product to be developed in learning media for animal life cycle puzzles in science subjects in the fourth grade of elementary school. The first step is to prepare material that has been adjusted to the basic competencies of the animal life cycle and predetermined indicators, then design it by making a storyboard. Then, the researchers collected images from the freepik website that matched animal life cycle materials, such as images of butterflies, cockroaches, flies, mosquitoes, grasshoppers, and frogs. After the images are obtained from the freepik website, they are edited again using Photoshop. Then, the researcher made a puzzle design that was following the characteristics of elementary school students. The design was made using Corel Draw X7 by combining several vector images or images that did not have a background. After that, the researchers put together the animal life cycle material and the predetermined images. In this step, the researchers also edited the image position, changed the colors to make it attractive, adjusted the image brightness and color, edited the font, adjusted all layouts. and make patterns of puzzle pieces used as learning media for animal life cycle puzzles using Corel Draw X7.

The final step in making animal life cycle puzzle learning media is printing. The size of the puzzle is made moderate. It aims to make it easier for teachers to use learning media. Besides being easy to carry, this learning media is also practical and simple. This media printed using MDF wood with a thickness of 3mm, which is A4 size. Each animal's life cycle was printed 1, so there were six puzzles that the

researchers printed. The purpose of printing using MDF wood is to make it more durable, not easily broken or damaged. It is following the criteria for choosing a good learning media according to Sudjana and Rivai in (Arsyad, 2017: 80) one of them is the skills of teachers in using media. Another opinion also states that the factors for developing the criteria for selecting learning media are the learning objectives to be achieved, student characteristics or targets, the type of learning stimuli desired, background or environmental conditions, local conditions, and the extent of the range to be served (Abidin, 2017: 12)

This product design validation stage aims to determine the feasibility of learning media for animal life cycle puzzles that have been made. The assessment was carried out by six experts. Validation is carried out by two expert lecturers competent in instructional media design as design experts. Two material expert lecturers competent in science education as material experts, two elementary school teachers, education experts, and classroom teachers who daily learn with students.

The criteria for interpretation categories based on the percentage analysis of validators can be seen in the following table.

Table 1. Criteria for Interpretation Categories

Percentage of Achievement	Interpretation
81% - 100%	Sangat Layak
61% - 80%	Layak
41% - 60%	Cukup Layak
21% - 40%	Kurang Layak
0% - 20%	Tidak Layak

The validation results by design experts are viewed from two main aspects, aspects of the feasibility of graphics and aspects of language feasibility.

Table 2. Validation Results of the Design Expert Team

No	Assessment Aspects	Score		NP (%) Total
		First Expert	Second expert	
1	Graphic Feasibility	94,7%	90,67%	92,69%
2	Language Eligibility	82%	78%	80%
	NP%	**88,35%**	**84,34%**	
	∑ average			**86,35%**
	Kategori Kualitas Desain			**Very Appropriate**

Based on the data analysis criteria table of the design expert validation assessment, the validation results obtained from the first design expert were 88.35%. The validation results from the second design expert were 84.34%. Thus the average or percentage of the final score is 86, 35% with the criteria for the interpretation category "Very Appropriate."

The validation of validation by material experts is viewed from three main aspects: the content feasibility aspect, the presentation feasibility aspect, and the contextual assessment aspect.

Table 3. Results of the Validation of the Material Expert Team

No	Assessment Aspects	Score		NP (%) Total
		First Expert	Second Expert	
1	Content	85%	86,67%	85,84%
2	Presentation	90%	93,33%	91,67%
3	Contextual Assessment	100%	100%	100%
	NP%	**91,67%**	**93,33%**	
	∑ average			**92,5%**
	Material Quality Category			**Very Appropriate**

Based on the data analysis criteria table of the material expert validation assessment, the validation results obtained from the first material expert were 91.67%. The validation results from the second material expert were 93.33%. Thus the average or percentage of the final score is 92.5%, with the criteria for the interpretation category "Very Appropriate."

The validation results by education experts are viewed from two main aspects, aspects of the quality of content and learning objectives and aspects of the quality of learning media.

Table 4. Results of the Validation of the Education Expert Team

No	Assessment Aspects	Score		NP (%) Total
		First Experts	Second Experts	
1	Quality of Content and Learning Objectives	94%	96%	95%
2	Quality of Learning Media	100%	96%	98%
	NP%	**97%**	**96%**	
	∑ average			**96,5%**
	Education Quality Category			**Very Appropriate**

Based on the data analysis criteria table of the education expert validation assessment, the validation results obtained from first education experts were 97%, and the validation results from second education experts were 96%, thus the average or percentage of the final score was 96.5%. With the criteria for the interpretation category "Very Appropriate".

The feasibility of learning media for animal life cycle puzzles can be proven from product validation results that have been carried out by design experts, material experts, and education experts. The validation results from the three experts were 91.79% in the very feasible category. The percentage of the validation results from design experts was 86.35%, validation of material experts was 92.50%, and validation of education experts was 96.50%. From the presentation of the data, it shows that the learning media is fading in science learning according to a team of design experts, material experts, and education experts, which is very feasible to be tested in the learning process by following the suggestions and improvements that the material experts have given.

Assessment of the feasibility of animal life cycle according to the role of learning media in the learning process, students can capture learning well, media arouse students' interest and desire to learn, and media can display objects or events in various ways adjusted with necessity and full of meaning (Tafonao, 2018: 109). (Bagas, 2018) the role of learning media in the learning process, clarifying the presentation of the material so that it is not only verbal (in the form of written words), overcoming the limitations of space and time, and using appropriate and varied media can overcome the passive nature of students.

The next stage is design revision. Product repairs are carried out after being validated by experts. It aims to improve learning media's weaknesses for animal life cycle puzzles following experts' suggestions and input. The following is the follow-up result of the revision of the animal life cycle puzzle.

Table 5. Input on products by the validator

No	Validator	Input/suggestion
1	Design Expert	a. Change the larva and pupa image in the butterfly animal life cycle. b. Change the larva and pupa image in the butterfly animal life cycle.
2	Material Expert	a. Change the larva and pupa image in the butterfly animal life cycle.
3	Education Expert	a. Change the larva and pupa image in the butterfly animal life cycle.

Based on expert input in table 5, learning media products for animal life cycle puzzles have improved. The following is a picture of improvement from each expert.

Before Revision from Design Experts

After a Revision from Design Experts

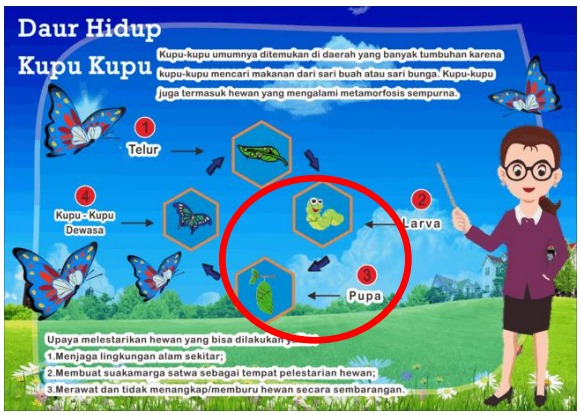

Figure 1. Changes in the image of larvae and pupa in the butterfly life cycle

Before Revision from Design Experts

After a Revision from Design Experts

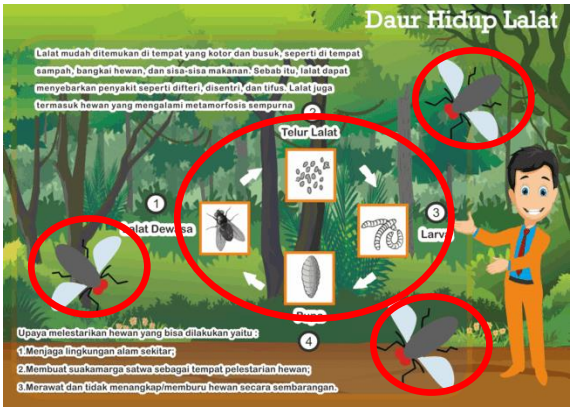

Figure 2. Change in the image of the fly and the position of the fly

Before the Material Expert Revision

After the Material Expert Revision

Figure 3. Added an explanation of the grasshopper population, and simplified the sentence on efforts to conserve animals in point 1

Before the Education Expert Revision

After the Education Expert Revision

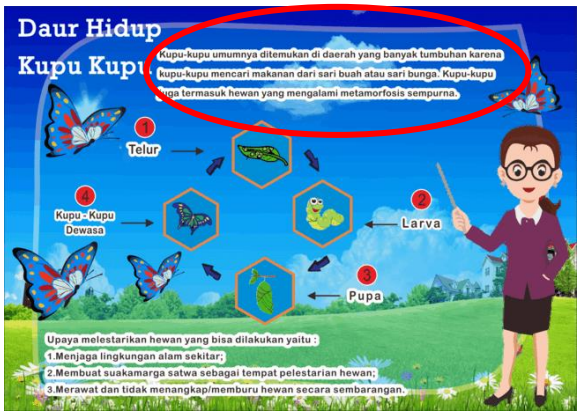

Figure 4. Explanation of the butterfly metamorphosis

Before the Education Expert Revision

Before the Education Expert Revision

Figure 5. Explanation of the grasshopper metamorphosis

Animal life cycle puzzle learning media has been validated and revised based on comments and suggestions from a team of design experts, material experts, and education experts. The next stage is the product trial stage. The product trial was held on Saturday, 19 June 2020 in the fourth grade of SDN Cipanas with a sample of 20 students. In this limited trial, the learning process using animal life cycle puzzle learning media began by dividing students into several groups, consist of 4-5 students. The purpose of forming groups is to foster a sense of togetherness for each student and make it easier for students to compose puzzles given the limited time used to overcome the limited time available. It is following the advantages of puzzle learning media, according to (Ayu, 2014: 109), fostering a sense of togetherness between students, arousing students' enthusiasm for learning, fostering a sense of kinship among students, and fostering mutual respect and respect among students. Furthermore, the researchers distributed puzzles that contained animal life cycle materials to each group. In addition, other opinions say that puzzles' advantages can attract students' learning interest. The images on these puzzles can overcome space and time limitations because not all objects can be brought into the classroom. (Husna, 2017: 67).

The next stage is each group distributed one animal life cycle puzzle. The students asked to read the material in the media previously shared. Each group played the learning media under the teacher's supervision and guidance. At this stage, it begins with removing the pieces on the puzzle, then randomizing the pieces, then students are given 2 minutes to arrange the puzzle pieces to form a complete picture of the animal's life cycle. The purpose of giving a short time challenge is to train finger dexterity and train students' patience in arranging puzzles in a short time. It is in line with the benefits of puzzle learning media, according to (Yulianty, 2016: 43), that puzzles can sharpen the brain, train hand, and eye coordination, train reading, train reasoning, train patience, and train knowledge. Another opinion also

said that puzzle learning media's benefits were training attention, recognizing colors and shapes, practicing problem-solving, practicing persistence, and training hand and eye coordination (Oktafianto, 2018: 3). After each group had finished compiling the pieces in the media, each group presented the learning media's life cycle material. It is because the material in this media is different. The material is the life cycle of butterflies, flies, mosquitoes, grasshoppers, cockroaches, and frogs. After that, each student was asked to compare the animals' life cycle in learning media and explain the efforts in preserving the animals.

Based on the learning process carried out using media in Science learning animal life cycle material, students look more active and enthusiastic in following the learning process than in previous learning when observing. Furthermore, students are given a questionnaire sheet to determine students' responses and assessments to the animal life cycle puzzle learning media. Then, to see the response of students to the puzzle learning media that was developed. Following are the results of student response data to animal life cycle puzzle learning media presented in the following table.

Table 6. Results of Student Response Validation

No	Assessment Aspects	Score	NP (%) Total
1	Display	88,75%	
2	Presentation of Material	95%	92,36%
3	Benefits	93,33%	
	Student Response Quality Category		**Very Good**

Based on the data analysis criteria table of the student response validation assessment, the validation results obtained from 20 students were the display aspect of 88.75%, the validation result of the material presentation aspect was 95%, and the benefit's validation result aspect was 93.33%. From the results of the percentage of student response questionnaires that 20 students have filled in, it shows that the average or percentage of the final score is 92.36%, this indicates that the learning media for animal life cycle puzzles have a very good response to be used as a learning media in Science learning cycle material. It can be seen during the learning process. Students are very enthusiastic, active, and eager to participate in the learning process. An attractive appearance using colors and images appropriate for elementary students makes students interested in participating in the learning process.

Several relevant studies that support the development of puzzle learning media include research conducted by (Widiana, 2019: 354) shows that puzzle learning media is effective for improving fourth-grade student learning outcomes in elementary science knowledge competencies. It is in line with research conducted by (Hastuti, 2017: 679) explained that puzzle media could significantly affect student learning outcomes, especially in science subjects. In line with research conducted by (Londa, 2018: 119), the use of puzzle media on students positively impacts learning outcomes in science learning. Then, the research that has been done by (Pradanti, 2017: 8–9) shows that the development of puzzle learning media is effectively applied in animal life cycle materials. In line with research conducted by (Rumakhit, 2017: 8), puzzle media is very effective in learning and can improve student learning outcomes.

4. Conclusion

Based on the results of research and development that have been carried out on animal life cycle puzzle media, the results of this research and development can be concluded that the development of animal life cycle puzzle is compiled using the Borg and Gall research and development method that has been modified by Sugiyono which consists of analysis problems, data collection, product design, product design validation, product revision, and product testing. This research and development produce learning media products for animal life cycle puzzles in science subjects in the fourth grade of elementary school. The validators assessed that the animal life cycle puzzle learning media was very suitable for use as a learning medium. It was evident from the appropriateness assessment of animal life cycle puzzle learning media obtained from design experts, material experts, and education experts. Furthermore, students' responses to learning media for animal life cycle puzzles in science learning tested on a limited basis show very good results.

References

Abidin, Z. (2017). Penerapan Pemilihan Media Pembelajaran. *Edcomtech Jurnal Kajian Teknologi Pendidikan*, *1*(1), 9–20. http://journal2.um.ac.id/index.php/edcomtech/article/view/1784

Arsyad, A. (2017). Media Pembelajaran. In *Raja Grafindo Persada*.

Ayu, S. (2014). Segudang Game Edukatif Mengajar. In *Diva Press*.

Bujang, Halidjah, S., & Margiati, K. Y. (2014). *Peningkatan Hasil Belajar Siswa Dalam Pembelajaran Ipa Menggunakan Media Realita Di Sekolah Dasar*. *7*, 219–232. https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&ved=2ahUKEwjupeTrksPtAhXHTX0KHZBdDhoQFjABegQIAxAC&url=https%3A%2F%2Fmedia.neliti.com%2Fmedia%2Fpublications%2F210480-peningkatan-hasil-belajar-siswa-dalam-pe.pdf&usg=AOvVaw0Bb00ijXd2dXZmSBSGwm1I

Cahyo. (2013). Panduan Aplikasi Teori-teori Belajar Mengajar. In *Diva Press*.

Desstya, D. (2017). Refleksi pendidikan IPA sekolah dasar di Indonesia (relevansi model pendidikan Paulo Freire dengan pendidikan IPA di sekolah dasar). *Profesi Pendidikan Dasar*, *1*(1), 1–11. http://journals.ums.ac.id/index.php/ppd/article/view/2745

Dewanti, D. (2018). Pengembangan Media Pop-Up Book Untuk Pembelajaran Lingkungan Tempat Tinggalku Kelas Iv Sdn 1 Pakunden Kabupaten Ponorogo. *SKRIPSI Jurusan Teknologi Pendidikan-Fakultas Ilmu Pendidikan UM*. http://journal2.um.ac.id/index.php/jktp/article/view/4551

FALLA. (2019). Pengembangan Media Puzzle berbasis Make A Match Tentang Sistem Kerangka Manusia Pada Pembelajaran IPA di Sekolah Dasar. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, *7*(1). https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-penelitian-pgsd/article/view/27568

FATIMAH, D. (2018). Strategi Belajar dan Pembelajaran dalam Meningkatkan Keterampilan Bahasa. *Pena Literasi*, *1*(2), 108–113. https://doi.org/10.24853/pl.1.2.108-113

Fatimah, S., & Kartika, I. (2013). Pembelajaran IPA Sekolah Dasar Berbasis Pendidikan Karakter. *Jurnal Al-Bidayah*, *5*(2), 381–297. https://doi.org/10.14421/al-bidayah.v5i2.125

Fujiawati, F. S. (2016). Pemahaman konsep kurikulum dan pembelajaran dengan peta konsep bagi mahasiswa pendidikan seni. *JPKS (Jurnal Pendidikan Dan Kajian Seni)*, *1*(1). http://dx.doi.org/10.30870/jpks.v1i1.849

Hastuti, W. (2017). Pengaruh Media Puzzle Terhadap Hasil Belajar Ipa Konsep Daur Hidup Makhluk Hidup Murid Kelas IV SDN Nomor 25 Panaikang Kecamatan Bisappu Kabupaten Bantaeng. *Pena: Jurnal Kreativitas Ilmiah Mahasiswa Unismuh*, *4*(1), 679–687. https://core.ac.uk/download/pdf/233601270.pdf

Husna, N., Sari, S. A., & Halim, A. (2017). Pengembangan Media Puzzle Materi Pencemaran Lingkungan di SMP Negeri 4 Banda Aceh. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, *5*(1), 66–71. http://www.jurnal.unsyiah.ac.id/JPSI/article/view/8413

Iskandar, R., & Kusmayanti, I. (2018). Pendekatan Science Technology Society: Ipa Di Sekolah Dasar. *Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, *2*(02). https://doi.org/10.31326/jipgsd.v2i02.129

Londa, A. H., Mete, Y. Y., & Sadipun, B. (2018). Penggunaan Media Puzzle untuk Meningkatkan Hasil Belajar Peserta Didik pada Pembelajaran IPA. *Journal of Elementary School (JOES)*, *1*(2), 113–120. https://doi.org/10.31539/joes.v1i2.359

Munajah, R. (2020). Penerapan Media Belajar Puzzle Untuk Meningkatkan Hasil Belajar Ipa Pada Materi Penggolongan Makhluk Hidup Siswa Kelas Iii Sekolah Dasar Negeri Mandalasari 2 Pandeglang. *Jurnal Ilmiah Pendidikan Guru Sekolah Dasar*, *4*(1), 45–56. https://doi.org/10.31326/jipgsd.v4i1.615

Nahdi, D. S., Yonanda, D. A., & Agustin, N. F. (2018). Upaya Meningkatkan Pemahaman Konsep Siswa Melalui Penerapan Metode Demonstrasi Pada Mata Pelajaran IPA. *Jurnal Cakrawala Pendas*, *4*(2), 9–16. http://dx.doi.org/10.31949/jcp.v4i2.1050

Nisa, S. K., Pratiwi, I. A., & Ismaya, E. A. (2020). Penerapan Model Group Investigation Berbantuan Media Puzzle untuk Meningkatkan Hasil Belajar Siswa Sekolah Dasar. *Lectura: Jurnal Pendidikan*, *11*(2), 211–224. https://doi.org/10.31849/lectura.v11i2.4722

Nisak, R. (2011). *Lebih Dari 50 Game Kreatif Untuk Aktivitas Belajar–Mengajar.* Diva Press.

Panjaitan, S. (2017). Meningkatkan Hasil Belajar Ipa Melalui Media Gambar Pada Siswa Kelas Iia Sdn 78 Pekanbaru. *Primary: Jurnal Pendidikan Guru Sekolah Dasar*, *6*(1), 252. https://doi.org/10.33578/jpfkip.v6i1.4105

Pradanti, R. . (2019). Penerapan Media Puzzle Untuk Pemahaman Materi Daur Hidup Hewan Di Sekolah Dasar Dengan Pendekatan Sains-Edutainment. *Tunas Bangsa Journal*, *6*(1), 76–81. https://ejournal.bbg.ac.id/tunasbangsa/article/view/922

Pradanti, R. E. (2017). Pengembangan Media Puzzle Materi Daur Hidup Beberapa Hewan di Lingkungan Siswa Kelas IV SDN 1 Kalibatur Tahun Pelajaran 2016/2017. *Jurnal Simki Pedagogia*, 1–12. http://www.jurnal.unsyiah.ac.id/JPSI/article/view/8413

REZCI OKTAFIANTO, E. Z. A. (2018). Permainan Puzzle Lantai Terhadap Peningkatan Kemampuan Pemusatan Perhatian Anak Autis. *Jurnal Pendidikan Khusus*, *10*(2), 1–10. https://jurnalmahasiswa.unesa.ac.id/index.php/jurnal-pendidikan-khusus/article/view/23423

Rumakhit, N. (2017). Pengembangan Media Puzzle untuk Pembelajaran Materi Mengidentifikasi Beberapa Jenis Simbiosis dan Rantai Makanan Kelas IV Sekolah Dasar Tahun 2016/2017. *Jurnal Universitas Nusantara PGRI Kediri*, *1*(02), 1–10.

Sari, P. M. N., Parmiti, D. P., & Sukmana, A. I. W. I. Y. (2020). Hasil Belajar Matematika Melalui Model CTL Berbasis Masalah Terbuka Di SD. *Jurnal Ilmiah Sekolah Dasar*, *4*(2), 248–256. http://dx.doi.org/10.23887/jisd.v4i2.25558

Srianis, K., Suami, N. K., & Ujianti, P. R. (2014). Penerapan Metode Bermain Puzzle Geometri Untuk Meningkatkan Perkembangan Kognitif Anak Dalam Mengenal Bentuk. *E-Journal PG-PAUD*, *2*(1), 1–11. https://ejournal.undiksha.ac.id/index.php/JJPAUD/article/view/3533

Sugiyono, D. (2016). Metode penelitian kuantitatif dan R&D. In *Bandung: Alfabeta*.

Sutiyem, S. D. N. (2018). Peningkatan Hasil Belajar Ipa Materi Fungsi Alat Tubuh Manusia Melalui Puzzles Picture Game Pada Siswa Kelas Iv Sekolah Dasar. *Surya Buana Pendidikan*, *1*(1), 66–73.

Tafonao, T. (2018). Peranan media pembelajaran dalam meningkatkan minat belajar mahasiswa. *Jurnal Komunikasi Pendidikan*, *2*(2), 103–114.

Thobroni. (2015). Belajar dan Pembelajaran. *Yogyakarta: Ar-Ruzz Media*.

Trimantara, H., & Mulya, N. (2019). Mengembangkan Bahasa Anak Usia 4-5 Tahun Melalui Alat Permainan Edukatif Puzzle. *Al-Athfaal: Jurnal Ilmiah Pendidikan Anak Usia Dini*, *2*(1), 25–34. https://doi.org/10.24042/ajipaud.v2i1.4553

Utami, Y. S. (2020). Penggunaan Media Gambar Untuk Meningkatkan Hasil Belajar Siswa Dalam Pembelajaran Ipa. *Jurnal Pendidikan Dan Konseling (JPDK)*, *1*(2), 122–127. https://doi.org/10.31004/jpdk.v1i2.607

Widiana, I. W., Rendra, N. T., & Wulantari, N. W. (2019). Media Pembelajaran Puzzle Untuk Meningkatkan Hasil Belajar Siswa Kelas Iv Pada Kompetensi Pengetahuan Ipa. *Indonesian Journal Of Educational Research and Review*, *2*(3), 354–362. http://dx.doi.org/10.23887/ijerr.v2i3.22563.g14041

Wilis, R. (n.d.). Meningkatkan Hasil Belajar Ipa Siswa Materi Daur Hidup Hewan Dengan Menggunakan Media Gambar Di Kelas Iv Sdn 012 Simangambat Kecamatan Siabu Kabupaten Mandailing Natal. *JGK (Jurnal Guru Kita)*, *1*(4), 80–85. https://doi.org/https://doi.org/10.24114/jgk.v1i4.9408

Yulianty, R. (2016). P. yang M. K. A. J. L. A. (2016). *Permainan yang Meningkatkan Kecerdasan Anak*. Laskar Aksara.