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Development of 3D Motion Diorama Learning Media To Improve Students' Critical Thinking Skills

Pengembangan Media Pembelajaran Diorama Gerak 3D untuk Meningkatkan Kemampuan Berpikir Kritis Siswa

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Abstract

The research and development of 3D motion diorama media is motivated by the low critical thinking ability of grade VI students at SD Negeri 010140 Perkebunan Gunung Melayu. The purpose of this study is to develop teaching materials in the form of 3D motion diorama media on solar and lunar eclipse materials to improve the critical thinking skills of grade VI students. This research uses the Research and Development (R&D) method with the Analysis, Design, Development, Implementation, and Evaluation (ADDIE) model developed by Robert Maribe Brach. The results of the study show that first, the dioramic media developed was declared very valid by experts, with a media feasibility percentage of 93% and material feasibility of 94% while the feasibility of the instrument question was 93%. Assessment by teachers obtained an average of 97% while student assessment obtained an average of 99%. Second, classroom trials showed a significant improvement in students' critical thinking skills, with an average pretest score of 52.7 and posttest 91.7 (a difference of 39 points), and an N-Gain of 0.82, indicating a high category. The implications of the use of 3D motion diorama media are also able to improve critical thinking skills, on the other hand, also in the use of this media in understanding an eclipse concept, it is very clear and the active involvement of students is very visible. This study recommends the application of similar media in science learning to support the development of students' critical thinking skills in primary school.
Keywords: Learning Media, 3D Motion Diorama, Critical Thinking Skills

Abstrak

Penelitian dan pengembangan media diorama gerak 3D ini dilatarbelakangi oleh rendahnya kemampuan berpikir kritis siswa kelas VI di SD Negeri 010140 Perkebunan Gunung Melayu. Tujuan dari penelitian ini yaitu mengembangkan bahan ajar berupa media diorama gerak 3D pada materi gerhana matahari dan bulan untuk meningkatkan kemampuan berpikir kritis siswa kelas VI. Penelitian ini menggunakan metode Research and Development (R&D) dengan model Analysis, Design, Development, Implementation, and Evaluation (ADDIE) yang dikembangkan oleh Robert Maribe Brach. Hasil penelitian menunjukkan bahwa pertama, media diorama yang dikembangkan dinyatakan sangat valid oleh para ahli, dengan persentase kelayakan media 93% dan kelayakan materi 94% sedangkan kelayakan instrument soal 93%. Penilaian oleh guru memperoleh rata-rata sebesar 97% sedangkan penilaian siswa memperoleh rata-rata sebesar 99%. Kedua, uji coba di kelas menunjukkan peningkatan signifikan dalam kemampuan berpikir kritis siswa, dengan rata-rata nilai pretest 52,7 dan posttest 91,7 (selisih sebesar 39 poin), serta N-Gain sebesar 0,82, yang menunjukkan kategori tinggi. Implikasi penggunaan media diorama gerak 3D ini ternyata mampu meningkatkan kemampuan berpikir kritis, di sisi lain juga dalam penggunaan media ini dalam memahami sebuah konsep gerhana terlihat sangat jelas juga sangat terlihat keterlibatan aktif siswa. Penelitian ini merekomendasikan penerapan media serupa dalam pembelajaran sains untuk mendukung pengembangan keterampilan berpikir kritis siswa di sekolah dasar.
***Kata Kunci**: Media Pembelajaran, Diorama Gerak 3D, Kemampuan Berpikir Kritis.*

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INTRODUCTION

Thinking is an activity that a person does by involving the cognitive process in receiving various information obtained so that they can decide the right action on a problem (Lismaya, 2019). Etymologically, the word critical is derived from the Ancient Greek *krites* meaning "one who gives a reasoned opinion" or "analysis", "value consideration", "interpretation", or "observation" (Sihotang, 2019). Critical thinking is an activity that is carried out systematically, actively and guided by the principles of logic and considers various points of view in order to understand and be able to manage information that aims to reject, accept or be suspended (Herman et al., 2024). Critical thinking can also be interpreted as the ability to think at a higher level in analyzing, preparing logical arguments, developing strategies, evaluating, being able to solve problems and draw conclusions (Prasasti & Anas, 2023). According to Ennis in (Riyanto et al., 2024), critical thinking is thinking rationally and reflectively with an emphasis on making about what to believe or do. Furthermore, Robert Ennis explained that critical thinking consists of 5 aspects, namely providing simple explanations, building basic skills, concluding, making further explanations, and organizing strategies and tactics (Ananda & Tanjung, 2022). Based on the above opinion, it can be concluded that critical thinking is a person's ability to think in solving problems by making decisions from various information obtained.

Critical thinking is one of the skills that are needed in the 21st century (Humairoh et al., 2024). It is said that the 21st century is because this century demands quality human resources. Therefore, educational institutions need to develop the existing potential to become a characteristic of their institution and be able to produce *superior* outputs (Hasibuan & Prastowo, 2019). 21st century learning is a learning characterized by *learning skills, skills,* and literacy (Mulin et al., 2022). To survive the challenges and complexities of complex 21st century life, the 21st century generation must have a wide range of skills. 21st century skills are that everyone masters the 4Cs to achieve success and can be a part of society in the 21st century. The 4C skills are *Communication, Collaboration, Critical Thinking and Problem Solving, Creativity and Innovation* skills (Widodo & Wardani, 2020). 21st century learning is learning that prepares the next

generation to become a generation that is not only able to master academic knowledge, but also have skills and attitudes that are relevant to the changing times. Through education, humans can acquire various abilities and can develop the abilities they have to be applied in life (Syahfitri et al., 2022).

From the results *of the 2022* Program for International Student Assessment (PISA) *released at the Organisation for Economic Cooperation and Development* (OECD), Indonesia is ranked 67th out of 81 countries. TIMSS is an international study initiated by *the International Association for the Evaluation of Educational Achievement* (IEA) to assess students' abilities in Mathematics and Science, and is conducted every four years. In TIMSS 2015, the focus of the research was on grade 4 elementary school students in Indonesia to assess their achievements in the field of Mathematics and Science in an international context. Indonesia shows a low ranking compared to several other Asian countries. Indonesia's science score in the results of the TIMSS survey in 2015 was 397. These results place Indonesia in the 35th position out of 48 countries (2015). And after that, Indonesia no longer participated in this event (Wicaksono et al., 2020).

Based on the results of observations and interviews conducted in grade VI of SD Negeri 010140 Perkebunan Gunung Melayu in the science subject of solar and lunar eclipse material, data was obtained that students' critical thinking skills are relatively low, this can be seen from the results of the daily test scores of students who have not yet reached the KKM. The KKM score in science subjects at the school is 75, while the score obtained by students is still below the KKM which is 50-65. In addition, it was found that most students showed a low level of critical thinking ability, students who fell into the criteria for low critical thinking ability can be seen in students who showed a lack of interaction both in asking and answering questions that should need explanation, and students who could not identify or consider the source of information can be trusted or not, This happens because of the learning atmosphere that makes students' interest in solar and lunar eclipse materials not formed, the lack of interesting and interactive learning media, and the lack of teachers' ability to facilitate interactive learning.

For example, in real life when learning science in class, students are asked to explain the position of the sun, moon and earth and explain the process of solar and lunar eclipses, but some students become passive in class, and even some students show boredom with learning in class. To increase students' enthusiasm and creativity, it can be

done through the use of learning media in the classroom (Dumayanti & Kusumawati, 2024). Critical thinking skills do not appear just like that, but require stimulating or stimulating activities. The application of critical thinking can be done through the development of interactive media and learning (Anisa & Siregar, 2024), through the use of dioramas, can facilitate a deeper understanding of complex scientific concepts.

Diorama media is a learning medium that describes or illustrates an event in the form of three dimensions that are small in size. According to (Hendrik et al., 2021) diorama media is a three-dimensional learning medium that is in miniature shape that aims to demonstrate and illustrate the actual shape visualized in the classroom. Meanwhile, according to (Pratama, 2023), Diorama is a medium that can attract students' attention made from a skene in three dimensions with color guides and several objects to demonstrate a situation in a small size. Based on some of the definitions above, it is concluded that diorama media is a learning medium in the form of a small, three-dimensional model that describes or demonstrates a situation in real life.

The use of diorama media is very important, especially in subjects that require learning activities by giving direct experience to students such as science subjects. Science is a subject that understands the universe through direct observation, reasoning and a good understanding of concepts (Diana et al., 2022). Science is related to how to find 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 also a way to know and understand natural phenomena through the process of observation and experimentation (Aufa et al., 2023). Science learning can be completed using diorama media because dioramas can provide direct experience, can show objects as a whole, and can show the organizational structure clearly and can show the flow of a process in detail and detail (Murdani et al., 2024). Critical thinking skills can be possessed by students by providing opportunities for students in scientific activities in dioramas to solve various problems.

Many studies have been conducted on the development of diorama media in science subjects, but there are still few who have done the development of diorama on solar and lunar eclipse materials at the elementary school level, such as in the research conducted (Karimah et al., 2023) with the title "Development of Digital-Based Diorama Learning Media Types of Work Materials for Grade III Elementary School Students". The

results of this research are diorama learning media with a level of validity of 97.08 percent and a level of practicality and attractiveness of 97.6 percent.

In other researches, there are those who develop media on lunar and solar eclipse materials, but their research does not focus on improving critical thinking skills, but focuses on student learning outcomes carried out by (Sukmawati, 2024) with the title "Development of Alga Sina Media (Eclipse Simulation Teaching Aids) to Improve the Learning Outcomes of Grade VI Students in Science Subjects of Eclipse Materials SDN 1 Dadapan". The results obtained in this study were 91.5% with the category of very feasible and the average student learning outcomes were 85.5. So it can be concluded that Alga Sina media is very effective in learning.

Then, a study conducted by Shola Ningsih & Novita Frizka (2024) explained that the validation results from the material expert validators obtained a score of 76.3% with the "Feasible" category, and the results of the media expert validators obtained a score of 98.4% with the "Very Feasible" category. This proves that this diorama media is very feasible and safe to use in early childhood learning activities. The results of the teacher's interview also stated that diorama media is suitable for use in early childhood learning activities. Based on the assessment score criteria, it can be said that the Development of Diorama Media in Early Childhood is valid and very feasible to be used in the early childhood learning process.

The research conducted by Rina, et al (2024) with the title "Development of Problem-Based Learning-Based Diorama Media in Grade IV Scientific Learning at SDN Sedayu Kapubaten Kendal" explained that the average score result was 90%, while the average score result from the subject matter expert was 87.5%. So the average score results of the two validators obtained as much as 89%, including in the vulnerable 80% - 100%, so it is categorized as "very good". The results of the student response questionnaire that have been calculated in the table above obtained an average percentage score of 96.5%, while the results of the teacher response questionnaire obtained an average percentage score of 92%. So the average score of the two respondents, which is 94%, is included in the vulnerable 80-100%, so it is categorized as "very good". Based on the above results, it can be stated that diorama media is worthy of acceptance at SDN Sedayu Kendal.

Furthermore, the research conducted by Desy & Sutarini (2024) with the research title "Development of Three-Dimensional Diorama Media Based on Local Wisdom in Thematic Learning in Grade IV Elementary School" explains that the Three-dimensional Diorama learning media Based on Local Wisdom in Thematic Learning in Grade IV of Elementary School is "Very Feasible" with details of the percentage of feasibility provided by media experts of 81% with the category "Very Feasible", material experts by 72% with the category "Feasible", Learning Experts by 82% with the category "Very Feasible", from that it can be concluded that the Three-dimensional Diorama learning media based on Local Wisdom in Thematic Learning in Grade IV of SD Negeri 064954 Medan Amplas. It is suitable for use by students during the learning process.

In this case, the research that will be carried out with the concept of developing an interactive 3D motion diorama learning media, while previous research may focus more on static learning media. This research also uses the latest technology to develop 3D motion diorama learning media, whereas previous research may have used older technology. In addition, this study also has a strong focus on developing students' critical thinking skills, whereas previous research may have focused more on other aspects such as knowledge or skills. This research also developed a 3D motion diorama learning medium that is contextual to students' daily lives, whereas previous research may have focused more on more abstract content. Thus, the research to be conducted has significant novelty compared to previous research.

Research gaps on the development of 3D motion diorama learning media to improve students' critical thinking skills are that previous research may focus more on the development of other learning media, such as videos or applications, while research focuses more on improving students' abilities so that there will be gaps in research on the development of 3D motion diorama learning media.

Based on the explanation above, the implications contained in this study are that this research can help learning media developers to create learning media that are more effective in improving students' critical thinking skills. This research can also help teachers and teachers to improve the quality of learning by using 3D motion diorama learning media that is more interactive and effective and this research can help students to develop better critical thinking skills, so that they can be better prepared to face future challenges.

Based on this, the researcher created and developed 3D motion diorama media in science subjects on solar and lunar eclipse materials that can help students understand the concept of eclipses better, and can hone and improve their critical thinking skills.

METHOD

The method applied in this research is *Research and Development* (*R&D*) which can be interpreted as research and development. The *R&D* method is a research technique used to produce a specific product and evaluate its effectiveness. Borg and Gall in (Sugiyono, 2021) define that research and development are research methods used to develop and validate products used in learning. His research was conducted at SD Negeri 010140 Perkebunan Gunung Melayu in grade VI students of SD Negeri 010140 Perkebunan Gunung Melayu with a total of 15 students.

In this study, researchers will develop a product in the form of 3D motion diorama media. *ADDIE* is an acronym for *Analysis, Design, Development, Implementation, and Evaluation*. The stages of this research are: (1) *Analysis*, the analyses carried out aim to support this development process, including needs analysis, material analysis, and performance analysis; (2) *Design*, the next stage is the initial design stage of diorama media by collecting data in the form of information and concepts related to 3D motion diorama media; (3) *Development*, the dioramas media that have been designed are then validated by media expert validators and material experts, the validation process is carried out to produce teaching materials with good feasibility to be applied in elementary schools; (4) *Implementation*, the next stage is to conduct a trial for students, the application of 3D motion diorama media is carried out in grade VI of SD Negeri 010140 Perkebunan Gunung Melayu; (5) *Evaluation*,. This stage was carried out to determine the success of the development of 3D motion diorama media in the subject of science of solar and lunar eclipse materials. The procedure for developing 3D motion diorama media with *the ADDIE* model can be seen in figure 1.

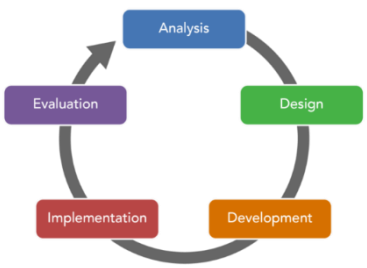

Figure 1. Model *ADDIE*

The data collection techniques used by the researcher in this study were interviews, critical thinking skills rubrics, validation sheets, critical thinking tests, and student response questionnaires. In this study, the data that has been obtained is analyzed qualitatively and quantitatively. Qualitative analysis is used to describe the product development process, while quantitative analysis is used to describe product quality assessments, response questionnaires and critical thinking skills tests. The results of the data analysis are used for product improvement.

The average score is interpreted based on the validity level category presented in table 1. as follows:

Table 1. Category Validity Level of 3D Motion Diorama Media

No	Information	Score
1	Highly Valid	81% - 100%
2	Valid	61% - 80%
3	Quite Valid	41% - 60%
4	Less Valid	21% - 40%
5	Invalid	0% - 20%

The average score is interpreted based on the category of practicality presented in table 2. as follows:

Table 2. Category Level of Practicality of 3D Motion Diorama Media

No	Information	Score
1	Very Practical	81% - 100%
2	Practical	61% - 80%
3	Quite Practical	41% - 60%
4	Less Practical	21% - 40%
5	Impractical	0% - 20%

The results of the average obtained after being searched with the gain formula, then interpreted into table 3. The following gain rate criteria:

Table 3. Gain Rate Criteria

G	Information
n-gain > 0,7	Tall
0,3 ≤ n-gain ≤ 0,7	Keep
n-gain < 0,3	Low

The average score is interpreted based on the category of students' critical thinking ability level presented in table 4. as follows:

Table 4. Critical Thinking Ability Level

Ability Level	Value
Very Critical	81 – 100
Critical	61 – 80
Quite Critical	41 – 60
Less Critical	21 – 40

Very Less Critical	0 – 20

RESULT AND DISCUSSION

This research produced a product in the form of 3D motion diorama media in the subject of science on solar and lunar eclipse materials for grade VI elementary school students, the stages that have been carried out by researchers include:

Analysis Stage

This stage is the first step for the researcher in designing the 3D motion diorama media developed. This diorama media was developed to improve students' critical thinking skills. The stages analyzed are:

Needs analysis

The results obtained from the observations and interviews carried out, can be concluded several characteristics of students during the learning process, namely:

- Learners. The researcher conducted an analysis of students by directly observing the basic characteristics of grade VI students at SD Negeri 010140 Perkebunan Gunung Melayu that students do not pay attention to the teacher, students look vulnerable to boredom and boredom, when the learning process takes place students are more fun to play with their classmates, they tend to be interested in things that interest them.
- The learning process in the classroom. During the learning process, some students only listen, take notes, and then do the assignments given by the teacher.
- Teaching materials used. In the learning process, the teaching materials used are not optimal. When the homeroom teacher was interviewed, it was found that SD Negeri 010140 Perkebunan Gunung Melayu had not used media in the learning process, the teacher only explained based on the books obtained from the school.

Based on these problems, the researcher concluded that because the teaching materials used were not optimal, learning media was needed. 3D motion diorama media can overcome existing problems that aim to provide students' interest and enthusiasm in the learning process so that students can optimize their critical thinking skills.

Material analysis

Material analysis is carried out to determine the content of the material to be taught according to the product to be produced, as well as the selection of the learning method used. Through this analysis, it aims to enable students to achieve the desired competencies and be able to fulfill the main tasks that must be mastered so that they can meet learning outcomes. The material to be taught in chapter 5 Topic A, and can be seen in the Figure 2.

Tahap Pengajaran	Jumlah JP	Materi Pokok	Tujuan Pembelajaran per Tahapan	Strategi Pengajaran	Referensi dan Media Ajar
Topik A: Menjelajahi Bumi, Bulan dan Matahari	5	1. Revolusi dan Rotasi Bumi 2. Revolusi dan Rotasi Bulan	1. Peserta didik memahami perbedaan gerak rotasi dan revolusi. 2. Peserta didik memahami fungsi model atau simulasi sebagai alat bantu untuk menganalisa dan memberikan prediksi 3. Peserta didik bisa menjelaskan hubungan Bumi, Bulan dan Matahari disertai dengan bukti dari hasil simulasi	1. Orientasi topik 2. Aktivitas eksplorasi 3. Membuat prediksi 4. Pembuatan model 5. Diskusi bersama teman 6. Presentasi 7. Refleksi bersama 8. Belajar lebih lanjut 9. Memilih tantangan (opsional)	• Perlengkapan peserta didik: 1. Alat tulis 2. Buku tugas 3. Alat mewarnai 4. Kertas karton 5. Kancing tekan/ kancing jepret 6. Gunting 7. Lem • Persiapan lokasi: 1. Halaman sekolah 2. Pengaturan tempat duduk berkelompok.

Figure 2. Material Content Coverage Information

Performance analysis

Performance analysis is conducted to see the extent to which students can understand the scientific concepts involved in eclipse phenomena and how they can relate that information to rational and logical reasoning. This analysis can be carried out through *a pretest* to measure students' initial understanding of the concept of eclipses. From the results of the *pretest*, it can be seen that students already understand the concept of eclipse but are still often mistaken about the eclipse process and the impact of the eclipse phenomenon on real life and are still unable to explain the eclipse phenomenon scientifically.

Design Stage

At the design stage, the researcher prepares a plan for the 3D motion diorama media which includes the design of the media, the selection of manufacturing materials, and the determination of the material to be applied to the media. This planning process involves several important steps, including: (1) designing the eclipse in digital form, (2) selecting materials to be used to improve the quality of the planned media. The main components in 3D motion diorama media are projection of the sun, moon and earth. In

this case, the materials used are: 1) Pipe cup caps, 2) Pipa paralon, 3) woot, 4) sterofoam, 5) wire, 6) plastic ball, 7) pilox, 8) small switc, 9) lightbulb, 10) light fitting, 11) dynamo, 12) car wheels, 13) lamp cable, 14) cat acrylic, 15) glue and 16) bottle caps.

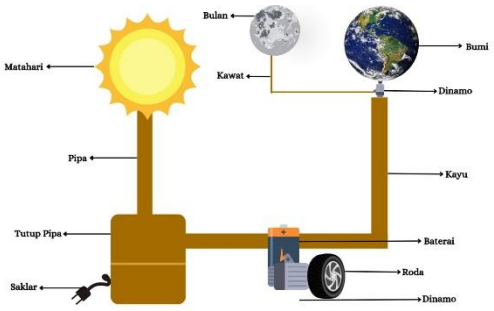

Figure 3. Sketch of Eclipse 3D Motion Diorama Media Design

Development Stage

The third stage is *development*, a 3D motion diorama media that is completed and then realized in the form of a final product that is ready to be tested to students. During the development process, researchers have created a 3D motion diorama medium that conforms to the previously established design. The following is an overview of 3D motion diorama media that has been successfully realized into a finished product.

Figure 4. Eclipse 3D Motion Diorama Media

The 3D motion diorama media that has been realized into a finished product is then validated by 3 expert validators to determine the feasibility of the media made. Eligibility consists of the feasibility of media, materials and questions. The aspects assessed by media experts are aspects of material, appearance and quality of media. The aspects that are assessed by material experts are aspects of material content, material presentation and material usefulness. While the aspects that are assessed by the question experts are the aspects of material, construction and language.

Media Eligibility

The feasibility of 3D motion diorama media is known from the validation of media experts. The results of validation by media experts can be seen in table 5. next.

Table 5. Media Expert Validation Results

Aspects	Scores Obtained	Maximum Score	Persentase	Criterion
Material	11	12	92%	Highly Valid
Media Quality and Appearance	15	16	94%	Highly Valid
Sum		**26**		
Maximum Score		**28**		
Percentage		**93%**		
Category		**Highly Valid**		

Based on data from table 5, the results of the evaluation of 3D motion diorama media by media validators showed a score of 26 out of a maximum score of 28, with a percentage of 93%. This result puts 3D motion diorama media into the "highly valid" category. Thus, the study shows that the 3D motion diorama media regarding solar and lunar eclipses developed by the researcher can be considered valid and ready to be implemented in the field.

Material Eligibility

The feasibility of the material in the 3D motion diorama media is known from the validation of material experts. The results of validation by subject matter experts can be seen in table 6.

Table 6. Material Expert Validation Results

Aspects	Scores Obtained	Maximum Score	Persentase	Criterion
Material Contents	14	16	88%	Highly Valid
Presentation of Materials	23	24	96%	Highly Valid
Material Usefulness	8	8	100%	Highly Valid
Sum		**45**		
Maximum Score		**48**		
Percentage		**94%**		
Category		**Highly Valid**		

Based on table 6, the validation evaluation of 3D motion diorama media showed a score of 45 out of a maximum score of 48, with a percentage of 94% in the "very valid" category. From these results, it can be concluded that the 3D motion diorama media regarding solar and lunar eclipses developed by the researcher can be considered valid and ready to be implemented in the field.

Question Eligibility

The feasibility of questions in 3D motion diorama media is known from the validation of question experts. The results of validation by question experts can be seen in table 7.

Table 7. Question Expert Validation Results

Aspects	Scores Obtained	Maximum Score	Persentase	Criterion
Material	19	20	95%	Highly Valid
Construction	9	10	90%	Highly Valid
Language	14	15	93%	Highly Valid
Sum		**42**		
Maximum Score		**45**		
Percentage		**93%**		
Category		Highly Valid		

Based on data from table 7, the results of the evaluation of pretest and posttest questions by question validators showed a score of 42 out of a maximum score of 45, with a percentage of 93%. This puts the question in the "very valid" category. Thus, the research shows that the pretest and posttest questions regarding solar and lunar eclipses developed by the researcher can be considered valid and ready to be implemented in the field.

The following is a recapitulation of the average score of the 3D motion diorama media validity test.

Table 8. Results of the Assessment Recapitulation from the Validator

No	Validation	Average	Category
1	Media Validity Test	93%	Highly Valid
2	Material Validity Test	94%	Highly Valid
3	Test the Validity of the Question	93%	Highly Valid
	Rata-rata	**93%**	**Sangat Valid**

Implementation Stage

The fourth stage is *implementation*, a 3D motion diorama media that has been developed and is suitable for use, then tested in learning science of solar eclipse and moon material in grade VI elementary school. The practicality of 3D motion diorama media can be assessed based on the value of student response questionnaires, as well as the effectiveness of 3D motion diorama media based on *the results of pretest* and *posttest,* the test used is a description test.

Practicality of 3D Motion Diorama Media

During the lesson, students seemed very enthusiastic in following the learning process. Because, during the learning process by using 3D motion diorama media, students can more easily understand the relative position between the sun, earth and moon. 3D motion dioramas provide opportunities for students to see and feel the movement of celestial bodies for themselves, so as to simplify students' understanding of abstract concepts.

Practicality was measured using an assessment instrument in the form of teacher and student response questionnaires. The questionnaire was used to determine the level of practicality in the 3D motion diorama media trial that had been developed. The results of the data obtained can be seen in the following table.

Table 9. Recapitulation of Teacher's Response Questionnaire

Aspects	Scores Obtained	Maximum Score	Persentase	Criterion
Material	25	25	100%	Very Practical
Media	38	40	95%	Very Practical
Sum		**63**		
Maximum Score		**65**		
Percentage		**97%**		
Category		**Very Practical**		

Table 10. Recapitulation Of Student Response Questionnaire

Aspects	Scores Obtained	Maximum Score	Persentase	Criterion
Ketertarikan	225	225	100%	Very Practical
Materi	149	150	99%	Very Practical

Manfaat	372	375	99%	Very Practical
Sum		**746**		
Maximum Score		**750**		
Percentage		**99%**		
Category		**Very Practical**		

Based on the results of practicality by teachers and students on 3D motion diorama media on solar and lunar eclipse materials, it can be concluded that both respondents consider the 3D motion diorama media to be very practical. The teacher gave a validity rating of 97% while the student gave a score of 99%, both of which were in the "very practical" category. Thus, the overall assessment of the practicality of the two groups of respondents was 98%, confirming that the 3D motion diorama media was very practical to be used in learning.

Effectiveness of 3D Motion Diorama Media

The results of the recapitulation of *students' pretest* and *posttest* scores can be seen in table 11.

Table 11. Pretest and Posttest Score Recapitulation

No	Name	Value		Post - Pre	Skor Ideal (100) - Pre	N-Gain Score	N-Gain Persen	Criterion
		Pretest	Postest					
1	Aska	50	85	35	50	0,7	70	Keep
2	Aurell	45	95	50	55	0,909	90,9	Tall
3	Ayu	55	90	35	45	0,778	77,8	Tall
4	Deyca	45	95	50	55	0,909	90,9	Tall
5	Fahmy	50	95	45	50	0,9	90	Tall
6	Icha	60	90	30	40	0,75	75	Tall
7	Khori	60	90	30	40	0,75	75	Tall
8	Marvel	55	95	40	45	0,888	88,8	Tall
9	Miara	45	85	40	55	0,727	72,7	Tall
10	Rahmi	50	95	45	50	0,9	90	Tall
11	Rizki	50	95	45	50	0,9	90	Tall
12	Shylla	50	95	45	50	0,9	90	Tall
13	Sifa	55	95	40	45	0,888	88,8	Tall
14	Syahmi	60	80	20	40	0,5	50	Keep
15	Yoga	60	95	35	40	0,875	87,5	Tall

Average	52,7	91,7		0,82	82	Tall

Based on table 11. The number of students who took the *pretest* and *posttest* was 15 students. The average score obtained from the *pretest* was 52.7. Meanwhile, the average score of the *posttest* amounted to 91.7, which means that the average score was at the level of "very critical" thinking. There was an increase in the critical thinking level of students, which was 0.82. This shows that the level of critical thinking of students increased after the use of 3D motion diorama media in learning, by referring *to the pretest* and *posttest* scores obtained with an n-gain value of 0.82 and meeting the n-gain range of > 0.7 with the high category.

Evaluation Stage

The last stage is evaluation, the 3D motion diorama media that has been validated is then tested to see the level of effectiveness and practicality to be applied in science learning solar and lunar eclipse materials. After a trial run, there are no suggestions and inputs or special criticisms from users that can be used as revisions for product improvement. Based on the evaluation carried out, it was obtained that the valid 3D motion diorama media according to the expert team of validators was positively assessed by teachers and students in the trial of the 3D motion diorama product so that the diorama media did not undergo revision for the implementation stage.

The problem that is the reference for this research is the lack of use of learning media so that it makes learning activities more using methods that have often been carried out. This triggers the understanding of students who think that only package books and guidebooks are the main ones, thus causing a lack of students' desire to learn. In addition, the limited learning facilities cause low critical thinking skills of students.

Based on research carried out on March 7, 2025 at SD Negeri 010140 Perkebunan Gunung Melayu, Rahuning District, it was found that 3D motion diorama media produced a significant influence on students' critical thinking skills. Based on the results of the research conducted in grade VI, it began with a *pretest* analysis which had an average score of 52.7 and then continued with a *posttest* analysis which had an average score of 91.7 students' critical thinking skills. This shows that students have a good improvement with an increase in students who have a difference of 39 points.

At the stage of developing diorama media validated by 3 expert validators, the feasibility of 3D motion diorama media received a very feasible category with a score percentage of 93%. In terms of material feasibility, 3D motion diorama media received a very decent category with a percentage of 94%. Meanwhile, in the feasibility of the question, the 3D motion diorama media got a score percentage of 93% and was included in the very feasible category. This shows that this 3D motion diorama media is suitable for use as additional teaching materials for teachers in the science learning process on solar and lunar eclipse materials in elementary schools. This is in line with (Dewi et al., 2021) which states that the assessment of the good or feasible from the validator after the revision of the development product is carried out shows that the development product is already suitable for use in the learning process.

This 3D motion diorama media is very suitable for use in the learning process. This can be seen from various aspects. First, the material presented on the 3D motion diorama media is in accordance with learning outcomes, and helps students understand solar and lunar eclipse material in a direct way. The second is media design that includes clear shapes, color combinations and their use so that students can understand the material directly. Learning media is a tool used to achieve educational goals. Learning media will make learning easier for teachers and will increase learning effectiveness (Putra & Suniasih, 2021).

The results of a study conducted by (Lestari et al., 2024) regarding the use of diorama 3-dimensional learning media on the learning outcomes of grade 3 students on weather change materials stated that 3-dimensional media can improve learning outcomes with posttest data results of 86.23, which is higher than the pretest results of 53.30. These results state that there is a significant influence between 3-dimensional diorama media on student learning outcomes.

Based on the results of the study, learning using 3D motion diorama media has a positive impact on students to think more critically about solar and lunar eclipse materials, and it can also be found that the learning process is more active and effective when using media than not using media. It is clear how the influence and difference in the use of media can stimulate students' activeness in learning. Without using 3D motion diorama media, there are still many students who lack enthusiasm and lack enthusiasm and are confused when answering the questions given. The learning process that makes

students feel happy and enthusiastic will make them more curious and interested in learning so that the results obtained are more satisfying.

CONCLUSION

The product produced in this research and development is a 3D motion diorama media for science learning in grade VI elementary schools. Through a series of validations by media experts, material experts, question experts and teachers as practitioners, this 3D motion diorama media was declared valid and suitable for use as accompanying teaching materials in learning. Validation by media experts ensures that the appearance and interactivity of the media are engaging and encourage students to use them. Validation by subject matter experts ensures that the content presented is in accordance with the curriculum and is able to improve understanding of science concepts. Question validation ensures that the questions given are easy for students to understand and are able to improve students' critical thinking skills. Meanwhile, validation by teachers as practitioners ensures that this 3D motion diorama media is practical and effective to use in the context of learning. Thus, this 3D motion diorama media is not only valid academically but also practical and interesting for students, so it can be relied on to improve the quality of science learning in grade VI of elementary school.

This research has significant implications in the development of 3D motion diorama learning media to improve students' critical thinking skills. By using this learning medium, students can more easily understand complex concepts and develop their critical thinking skills. The results of this research can also be used as a reference for the development of other learning media that are more effective and efficient. In addition, this research can also help teachers and teachers in developing more innovative and fun learning strategies for students. For future research, it is recommended to conduct more comprehensive and in-depth follow-up research. In addition, it is also recommended to develop this research to the high school or university level to see the effectiveness of 3D motion diorama learning media in improving students' critical thinking skills at a higher level.

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