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LEARNING MEDIA: DEVELOPMENT OF EDUCATIONAL TEACHING AIDS FOR SCIENCE CLASSES FOR ELEMENTARY SCHOOL STUDENTS

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Abstract: This study aims to develop teaching aids for elementary school science learning on animal classification based on food types. This development research used the ADDIE model, consisting of analysis, design, development, implementation, and evaluation stages. The analysis stage was conducted with 15 students of SDN Dabasah 5 Bondowoso to identify their learning media needs. Based on the results, a prototype was designed and developed by preparing the material, user guide, teaching aids made from used materials, validation instruments, and a practicality questionnaire. The implementation stage involved testing the developed teaching aids on 15 students. The evaluation stage assessed the validity and practicality of the media and provided a reference for future improvements by subject teachers. The research data consisted of validation results from subject matter and learning media experts, as well as the practicality assessment. The validity tests showed average scores of 90% from subject matter experts and 94% from media experts, indicating that the teaching aids were highly valid. The practicality test obtained an average score of 92%, which was categorized as highly practical. Therefore, the developed teaching aids are suitable for use in learning because they meet the validity and practicality criteria.

Keywords: Educational Teaching Aids, Elementary School, Learning Media

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INTRODUCTION

The 21st century is known as a century full of openness (Siregar et al., 2020) and the rapid development of information, so that one of the needs of education that is appropriate to the era. Currently, the teaching and learning system still uses a system of information delivery that can only be accommodated by students (teacher-centered) (Fatmawati et al., 2019), students only become a place to accommodate all the material delivered by the teacher, so it is reluctant to improve their potential and creativity. In reality today, the global world has strict demands, such as high-level thinking skills, problem-solving skills, and individual or student creativity to be able to adapt quickly to the development of the times (Huda, et al., 2020a; Huda et al., 2026; Hardini et al., 2026).

The Ministry of Education has actually formulated that the 21st century learning paradigm must focus on learning that makes students actively explore the information needed individually (student-centered) from various learning sources (Zubaidah, 2016), identify problems, make analytical decisions, and solve problems through cooperation and collaboration (Saputri et al., 2019). 21st century learning in general is also designed to improve thinking skills such as communication, collaboration, critical thinking, creativity, innovation and problem solving (Greenstein, 2012), which must be integrated into teaching and learning activities from the elementary level (SD/MI) (Pambudi et al., 2018). One of the subjects that really needs to implement 21st century learning is science in elementary school.

Science is a systematic theory and is compiled by connecting natural phenomena that are material and based on the results of observations through scientific methods such as observation and experimentation (Kurniawati et al., 2023), demanding scientific attitudes such as curiosity, openness, honesty, and so on, and is built based on the scientific process of observation and data classification, and is compiled and verified in quantitative laws involving mathematical reasoning and analysis (Rosidah et al., 2023). The results of these scientific attitudes and processes will emerge science/scientific products in the form of facts, concepts, generalizations, principles, theories, and laws (Nurulsari et al., 2020; Usman et al., 2025; Huda, et al., 2020b).

Science learning in elementary schools according to the 2013 curriculum is learning that uses an integrated thematic approach, namely a learning approach that integrates various competencies from various subjects into various themes (Tila Elisa et al., 2023). Using this approach is expected to enable students to appreciate differences, be able to identify similarities and differences from various perspectives, and work collaboratively (Selamat, 2021). Furthermore, students have the opportunity to express their abilities because teachers encourage students to move in a directed manner to hone their skills (Meilani et al., 2020). However, in

reality, when viewed from the level of effectiveness, most students still find it difficult to identify similarities in thematic lessons, so students are not active in the lesson, but students feel burdened (Munifah et al., 2019; Lestari et al., 2021; Saregar et al., 2025). This is due to the lack of direct student involvement in exploring their own knowledge. One way to increase student involvement is by using teaching materials that are relevant to the material, teaching materials that are close to students, attract students' attention, and are easy to apply (Aleandri & Refrigeri, 2014).

One teaching material that can be used to support science learning using an integrative approach and improve 21st century skills is the use of creative teaching materials in the form of educational props (Aini, 2024). Props are tools to convey theories and concepts so that they are easier for students to understand. They are developed by educators using simple materials tailored to the material being taught, so that final competencies can be achieved better (Pambudi et al., 2018). The use of educational teaching aids in science learning has an impact or influence on students' learning activities, namely students become more interactive, interest and motivation of students grow, and curiosity increases (Huda et al., 2019; Yasin et al., 2020; Putra et al., 2024). Several studies also show that the use of teaching aids can increase the learning motivation of fifth grade elementary school students on the human digestive system material (Stibies et al., 2023) and the effect of the use of teaching aids in improving learning outcomes in elementary school mathematics subjects (Syafitri, 2020).

Some previous research findings include Android-based science learning media (Prasetyo, 2017), multimedia-based teaching media assisted by Adobe CS6 and Macromedia Flash on animal classification material (I Made Dedy Setiawan et al., 2023). These educational teaching aids were developed with the help of technology, which not all elementary schools, such as SDN Dabasah 5 Bondowoso, have adequate multimedia devices for learning. This research is important so that educators have additional teaching material options that can be adapted to the conditions of the school environment in explaining material, especially the classification of living things, such as the classification of animals based on their food types, so that student learning outcomes can still be improved.

METHOD

This research is a type of development research using the ADDIE development model with the stages of analyze, design, develop, implement, and evaluate (Branch, 2009). The ADDIE development model was chosen because revisions can be made at each stage in **Figure 1**.

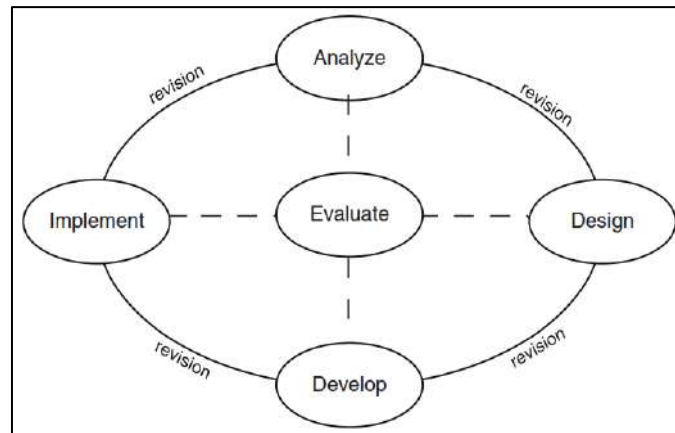


Figure 1. ADDIE Development Model Stages (Branch, 2009)

The analysis phase was conducted to determine the learning media needs for 15 students at SDN Dabasah 5 Bondowoso and their classroom teacher. This was followed by the design of a prototype learning aid. In this phase, researchers compiled materials, collected materials such as used cardboard, toothpicks, and mineral water bottles, painted pictures of animals, drew ecosystem designs, and developed a user guide for the media.

The third phase was development. In this phase, researchers developed a material validation questionnaire, a media validation questionnaire, which would later be used by validators to provide criticism and suggestions on the product, and a practicality questionnaire. The media validation process was conducted with material experts and instructional media experts, namely M. Ikrom Karyodiputro, S.Pd.I., M.Pd.I., and media expert Fatik Lutviana Anggraeni, M.Pd.

Validation was conducted by administering a questionnaire to each validator. The data generated in this study consisted of qualitative and quantitative data. The qualitative data consisted of comments, criticisms, and suggestions from the validators, while the quantitative data consisted of the average validation score, analyzed using the formula below (Akbar, 2013). The calculated results were then compared against the validation criteria presented in **Table 1**.

$$V = \frac{TSe}{TSh} \times 100\% \quad (1)$$

V = Validation Score

TSe = Respondent's answer in one item

TSh = The number of ideal scores in one item

Table 1. Teaching Material and Media Validity Criteria

Percentage	Validity Category	Description
85,01% - 100,00%	Very Valid	Very usable with minor revisions
70,01% - 85,00%	Valid	Can be used with minor revisions
50,01% - 70,00%	Less valid	Can be used with major revisions
01,00% - 50,00%	Not valid	Must not be used

Source: (Akbar, 2013)

The implementation phase was the testing phase for the developed learning aids on 15 students and classroom teachers to determine their practicality. The final stage, namely evaluation, is the stage to assess the learning media whether the media is valid and practical when used, so that it can be used as a reference material for future improvements carried out by subject teachers as assessors of practicality. The research data consists of validation results by subject matter experts and learning media experts, as well as the level of practicality of the teaching aids.

Table 2. Practicality Criteria for Teaching Media

Percentage	Practicality Category	Description
85,01% -100,00%	Very Practical	Very usable with minor revisions
70,01% - 85,00%	Practical	Can be used with minor revisions
50,01% - 70,00%	Less Practical	Can be used with major revisions
01,00% - 50,00%	Not Practical	Must not be used

Source: (Akbar, 2013)

FINDING AND DISCUSSION

The development of learning media in the form of educational props for Elementary School Science subjects on animal classification based on their food types was carried out because of the need for alternative learning media in schools that do not yet have digital learning devices or inadequate infrastructure. As in SDN Dabasah 5 Bondowoso, East Java which is the location of this research, based on the results of interviews with the classroom teachers, namely Rahmat Ponco Mulyono, S.Pd.Gr., he said that educational props really help students in understanding abstract materials, one of which is the classification of living things.

According to Rahmat Ponco Mulyono, S.Pd.Gr., educational teaching aids will also encourage students to be more active, critical, and creative because they are directly involved in the learning process. Furthermore, it is recommended that educational teaching aids be developed using locally available materials or reusable items, as this will also teach students to be more creative.

Based on the results of the analysis stage, the researchers chose to develop learning media in the form of a 2-dimensional educational demonstration tool that displays an ecosystem along with several images of animal species representing carnivorous, herbivorous, and omnivorous groups. In the design stage, the researchers began creating a prototype of the demonstration tool (Figure 2) and compiling materials and a guide for using the educational demonstration tool (Figure 3). This educational demonstration tool was developed using 80% recycled materials such as used cardboard, toothpicks, used Styrofoam, and used paper. The use of recycled materials, in addition to reducing waste, can also encourage students to think creatively and provide more meaning to students (Kharismawati & Dessty, 2021).



Figure 2. Initial Design/Prototype of Educational Teaching Aids

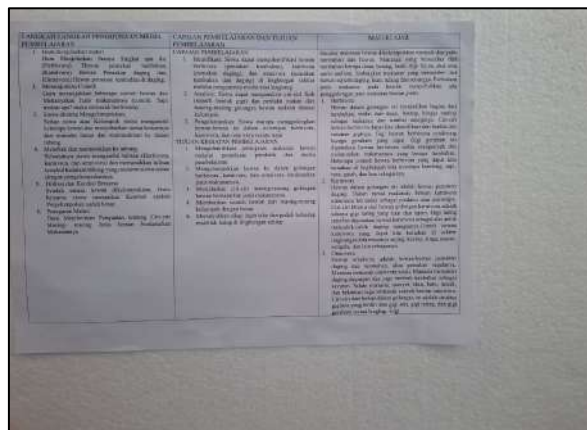


Figure 3. Content and Instructional Guidelines for Using Educational Teaching Aids

These educational teaching aids have benefits for both educators and students, including making educators more confident in teaching, facilitating interaction with students, making students more enthusiastic in learning, stimulating students to think analytically, and displaying objects that look real, and making learning more meaningful (Arief, 2022). After the educational aids were developed (Figure 4), they were validated by media and content experts.

This validation aimed to determine whether the developed aids were valid and practical for implementation.



Figure 4. Educational Teaching Aids

The validation results, based on assessments by content experts, included an average score of 90%, which falls into the very valid category according to the validity criteria developed by Akbar (2013). The validation results can be seen in **Table 3**.

Table 3. Validation results by material experts

No	Component Items	Score	Maximal Score	Percentage (%)	Category
1	The material aligns with the core competencies that must be achieved	5	5	100	Very Valid
2	The material aligns with the learning indicators.	4	5	80	Valid
3	The material aligns with the science learning objectives in elementary schools	4	5	80	Valid
4	The concept of classifying living things based on their diet (herbivores, carnivores, omnivores) is presented appropriately	5	5	100	Very Valid
5	The examples of living things used are correct and relevant.	5	5	100	Very Valid
6	There are no conceptual or terminological errors in the material.	5	5	100	Very Valid
7	The material has a depth appropriate to the developmental level of elementary school students.	4	5	80	Valid
8	The material covers sufficient scope (neither too narrow nor too broad).	5	5	100	Very Valid
9	The material supports the achievement of basic science concepts.	4	5	80	Valid

10	The language used is simple, communicative, and easy for elementary school students to understand.	5	5	100	Very Valid
11	There is sufficient explanation between the text, images, and teaching aids	4	5	80	Valid
12	The material can help students understand the classification of living things based on their diet	4	5	80	Valid
13	The material encourages students to be active in the learning process	5	5	100	Very Valid
14	The material supports critical thinking skills and students' curiosity	4	5	80	Valid
Average Validity				90	Very Valid

The assessment of media validity by learning media experts resulted in an average score of 94%, which falls into the very valid category according to the validity criteria developed by (Akbar, 2013). The results of this validation can be seen in **Table 4**.

Table 4. Validation results by media experts

No	Component Items	Score	Maximal Score	Percentage (%)	Category
1	Appropriateness to the developmental level of students	5	5	100	Very Valid
2	Ability to broaden students' horizons	5	5	100	Very Valid
3	Provide opportunities for students to thoroughly study the material	4	5	80	Valid
4	Appropriateness of teaching aids to the material	5	5	100	Very Valid
5	Effectiveness of teaching aids to the teaching material	5	5	100	Very Valid
6	Practicality of teaching aids in their use	5	5	100	Very Valid
7	Benefits of teaching aids as learning media	4	5	80	Valid
8	Attractive forms of teaching aids to students	5	5	100	Very Valid
9	Color selection of teaching aids	5	5	100	Very Valid
10	Display a clear and good center point	5	5	100	Very Valid
11	Independent of other teaching materials and media, or not necessarily used simultaneously	4	5	80	Valid
12	In keeping with developments in science and technology	4	5	80	Valid

13	In keeping with developments in learning that encourage active and student-centered involvement	5	5	100	Very Valid
Average Validity				94	Very Valid

The results of the material and media validation showed that the developed learning media was valid (Tables 3 and 4). The next step was the implementation stage. This implementation stage involved a practicality test on a small group in SDN Dabasah 5 Bondowoso to determine whether the learning media could be used in learning activities. The results of the practicality test showed an average score of 92% (Table 5), which falls into the very practical category according to the practicality criteria developed by (Akbar, 2013).

Table 5. Media practicality test results

No	Component Items	Score	Maximal Score	Percentage (%)	Category
1	The material in the educational aids aligns with the Core Competencies (KI) and Core Competencies (KD).	5	5	100	Very Practical
2	The material in the educational aids aligns with the indicators and learning objectives.	5	5	100	Practical
3	The material presented is complete and accurate.	4	5	80	Practical
4	The material presented is systematic and easy to understand.	5	5	100	Very Practical
5	The images of animal species are easy to understand/not abstract.	5	5	100	Very Practical
6	The educational aids have an attractive appearance.	4	5	80	Very Practical
7	The educational aids are appropriate for the students' cognitive level.	4	5	80	Practical
8	The color combination in the educational aids attracts students' attention.	5	5	100	Very Practical
9	The educational aids are easy to use	5	5	100	Practical
10	The instructions are provided	5	5	100	Very Practical
11	The aids are not limited by time, place, or circumstances	4	5	80	Practical
12	Students find it easy to use the educational aids	4	5	80	Practical
13	The educational aids demonstrate interactive media	5	5	100	Very Practical
Average Practicality				92	Very Practical

After conducting several tests on this educational teaching aid, the results showed that it was valid and practical. Based on these results, this learning medium, in the form of an educational teaching aid, is suitable for use in further research, both to measure students' cognitive abilities and other 21st century skills (Herditiya et al., 2020). Educational teaching aids are widely used by elementary school educators due to their significant impact on students, such as increasing learning interest (Aini, 2024), reducing student boredom (Latukau, 2023), and improving student learning outcomes (Hutauruk & Simbolon, 2018) (Ma'sum, 2023). Student motivation and interest in learning have a positive correlation with academic achievement, so educators need to continuously pay attention to and improve student motivation (Rosidah et al., 2023).

CONCLUSION

Based on the results of the ADDIE development process, the educational teaching aids for classifying animals according to their food types were successfully developed and met the criteria for use in elementary school science learning. The material expert validation score of 90%, media expert validation score of 94%, and practicality score of 92% indicate that the product is highly valid and highly practical. The teaching aids, which were produced using approximately 80% recycled materials, provide an affordable and accessible alternative for schools with limited digital learning facilities while also supporting active, concrete, and meaningful learning experiences. Therefore, the developed media can be used to help students understand the classification of herbivorous, carnivorous, and omnivorous animals. However, this study was limited to a small-scale trial involving 15 students and focused on validity and practicality rather than learning effectiveness. Further research should involve larger and more diverse samples and examine the effects of the teaching aids on learning outcomes, motivation, critical thinking, creativity, and other 21st century skills.

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