Interactive Educational Board Media for Animal Food Classification Learning

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Abstract. General Background: Learning media play a crucial role in supporting elementary science education by facilitating student engagement and conceptual understanding. Specific Background: In third-grade classrooms, science topics such as animal food classification are often taught using conventional methods and limited non-digital media, resulting in low student participation and difficulty in distinguishing categories. Knowledge Gap: Previous media development focused primarily on attracting student interest without ensuring active student involvement in the learning process. Aims: This study aims to develop an interactive educational board learning media and assess its feasibility and performance in teaching animal food types to third-grade elementary students. Results: Using a Research and Development approach with the ADDIE model, the developed media achieved 100% validation from media and subject matter experts, while student responses reached 96.67% and teacher responses 97.5%, indicating very high performance. The media facilitated active participation, improved understanding, and created an engaging learning environment. Novelty: The study introduces an educational board integrating magnetic systems and interaction pockets that enable direct student manipulation and classification activities. Implications: The findings suggest that interactive non-digital media aligned with constructivist principles can support active learning, improve conceptual comprehension, and provide practical alternatives to conventional classroom resources in elementary science education.

Keywords: Educational Board, Learning Media, Animal Classification

1 Introduction

Education is one of several important aspects in the development of a nation through its younger generations. Education is the main foundation in building an intelligent and sustainable society and generation[1]. This is especially true in elementary school education, which focuses on student-centered learning. Elementary school education integrates learning through concrete facts or events that occur in the students' surroundings. The realm of basic education is a crucial stage in the cognitive, affective, psychomotor, and social development of children. At the elementary school level, students are introduced to various basic concepts that shape their understanding of the world around them. According to Bloom's taxonomy, elementary school is where students learn the basics of science and develop in the cognitive, affective, and psychomotor domains. Depending on the stage of development of students in elementary school, the foundations they acquire are interrelated. Elementary school

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students not only grow physically, but they also grow academically, personally, socially, and career-wise[2]. In the current era, education is faced with a diversity of learning designs using learning media. The rapid development of education has led teachers to design, develop, and implement education that is more focused on mastering concepts that can support life in society. Considering that education today has implemented a new curriculum, namely from the 2013 curriculum (previous curriculum) to the independent curriculum. This independent curriculum gives freedom to students and makes it easier for educators to manage and implement meaningful learning. In other respects, this curriculum adapts to the needs of students in the learning process and focuses on three aspects, namely cognitive abilities, affective abilities, and psychomotor abilities. Therefore, this aspect of education also requires learning media as supporting facilities[3].

The learning process is inseparable from the use of learning media as a tool to facilitate learning[4]. Learning media is an effective and strategic tool in the implementation of learning, especially at the elementary school level. Learning media is designed with a variety of different variations to help students understand and engage in the learning process. Learning media are useful for teachers to convey the material being taught. Learning media also clarify the learning message and make the material more interesting, creating effective interaction between teachers and students. Thus, the use and utilization of learning media is one way to foster students' desire to learn so that the learning process will be more efficient and effective. According to Molenda and Januszewski (2008), educational media technology refers to the organization of knowledge and the application of science in the field of education to facilitate both individual and group (organizational) learning. The emphasis is on improving and enhancing the quality of learning through the creation, development, use, and management of learning resources and processes[5]. In addition, media includes tools and materials used in conveying information and helping students achieve learning objectives . The scope of media is certainly very broad, so the use of media needs to be relevant to learning problems or learning needs.

Therefore, with the availability of learning media, educators can improve the effectiveness of the learning process so that learning can be useful for students and effective education can be achieved. Indicators of media effectiveness include 1.) student response, which includes student activity during the learning process. 2.) the learning process, which includes communicative media, relevance to the material, and the use of easy-to-use media. 3.) the communication process , which involves the process of conveying information from teachers to students[6]. This learning process enables students to learn easily and enjoyably and achieve the expected learning objectives. The use of learning media is very important in the learning process, especially at the elementary school level. Media greatly helps students understand certain concepts. Learning media can attract students' attention, increase their motivation and enthusiasm for learning, and train their critical thinking skills. Teachers must be able to select appropriate and suitable learning media to achieve the teaching objectives set by the school. In general, learning media are tools used to convey messages or teaching materials that are deliberately created and designed to facilitate teachers in the learning process. The term media comes from the Latin word "medius," which means "middle" and is the plural form of medium. Literally, medium means intermediary or conveyor. The general definition is anything that can convey information and sources of information to the recipient of information[7]. Gagne defines media as a type of component in the student environment that can stimulate

them to study actively. Briggs also defines media as a tool to provide stimulation for students so that the learning process occurs[8].

Based on observations and interviews conducted with third-grade teachers and students at SDN Panderejo on July 23-24, 2025, information was obtained regarding the problems at SDN Panderejo, including: a) Students were not actively involved during learning because of a lack of innovation in the application and use of non-digital learning media. b) The non-digital learning media that teachers often use when teaching are mostly printed books and worksheets. c) The learning methods used by teachers in the learning process are lectures, *direct learning*, and assignments. These obstacles and problems reveal that students need updates in the learning process in order to achieve educational goals for students and teachers. One of the subjects that needs to be updated is Natural Sciences, which is related to biology, ecosystems, and biodiversity. A good understanding of the material in this science subject can help students develop their activeness, curiosity, and concern for the environment. Science learning actively develops students' psychomotor and thinking skills. Learning in Natural Sciences is not only about mastering cognitive abilities, but also an innovation process that stimulates students to actively participate in it[9].

Learning media is a supporting factor in improving the quality of learning. This factor exists because developments in the field of education demand effectiveness and efficiency in learning activities. Sasonohardjo (2002) revealed that each person's sensory absorption capacity is different and has its own characteristics in absorbing learning. In the learning process, many individuals use their sense of sight around 82%, sense of hearing around 11%, sense of touch around 3.5%, sense of taste around 2.5%, and sense of smell around 1%. According to Smaldino, Russel, Heinich, & Molenda (2008), media, which is the plural form of the word medium, refers to a means of communication. The Latin term medium refers to anything that can convey information between the sender or source and the receiver of information. One of the main categories of media includes text, replicas (objects), and humans[10]. According to G. Salomon (1997) in Ambar's (2018) work, it refers to the concept of learning media where each medium has characteristics and the ability to convey understanding through certain interactions, and the effectiveness of a medium depends on student needs, content, and tasks[11]. Based on research conducted by Isnaini Wahyuningrum, Septi Adelia Putri, 2023[12], it is stated that learning media is a teaching aid for teachers to convey or deliver teaching materials, and a tool for students to increase their creativity and attention in the learning process. Meanwhile, research conducted by Yosiva et al., 2021[13] reveals that learning media is a supporting tool used by teachers to facilitate the delivery of information and make it easier for students to receive information. Media is designed to guide students in understanding the material better, providing them with learning experiences as they use it, and making the learning process more effective.

Based on the problems at the elementary school, there is a need for solutions to develop new innovations in educational and innovative learning media to attract students' motivation, enthusiasm, and attention and make the learning process more enjoyable and a new experience for students using learning media in learning. Various learning media have been developed ranging from digital to physical (non-digital) media. One of the new innovations in the development of learning media is the Educational Board Media. Educational board media has the advantage of providing concrete visualizations that are easy for students to understand, helping students to focus more on the material being taught because the media display is not monotonous

like textbooks. The advantages of educational board media include the ability to develop cognitive and motor skills because this media provides activities such as moving pictures and writing, thereby training students' fine motor skills and stimulating their thinking. Previous development research conducted by Pujianto, Ilmawati Fahmi Imron [14] successfully developed a flannel board media using pictures and cards that proved to be valid, effective, and practical in teaching animal food types to help students understand the material and attract their interest in learning. However, the focus of this research was limited to attracting students' interest in learning without direct involvement in the use of the media. This is a gap that needs to be addressed, as student involvement in the learning process is very important in building a deeper and more meaningful understanding, especially of animal food types, as this material is biological and ecological in nature. Based on this, this study aims to develop non-digital learning media that provides opportunities for students to be actively involved in the use of learning media.

Therefore, the media developed in this study differs from the media used by previous researchers. Typically, the board media used is only a flat board covered with flannel and containing only writing and pictures. The novelty of this research lies in the integration of educational board media with a magnetic system and interaction pockets that allow students to play an active role physically and cognitively in the classification process during learning. In addition, the media developed is called educational board media, which is designed using magnets in the section for grouping animals based on their type of food (herbivores, carnivores, and carnivores) so that students are actively involved in its use. It is designed with bold font visuals with an attractive background and pictures of various animals that are manually colored to give a unique impression, as well as the use of bright colors on the interaction pockets to add a fun and exciting impression. In addition, this media is designed with the addition of curtain accents on the outside to add a mysterious impression that stimulates students' curiosity. This educational board media is durable because the various writings (materials) and animal pictures are coated with laminating paper so that they will not tear or wrinkle easily. This media is also designed in such a way that it is safe for students to use. This educational board is a visual and interactive learning medium in the form of a board designed to make it easier for students to understand material concepts through hands-on activities or student involvement. Through educational boards as interactive learning media, students can have a different learning experience. This medium allows students to interact directly with the material being studied, thereby increasing their understanding and interest in learning. In the context of animal food types, educational boards can be used to introduce various types of animal food in an interesting and easy-to-understand way. A good understanding of animal food types can help students understand ecosystems and food chains. This educational board media is specially designed with an innovative approach, presenting material information visually and integrating interactive elements.

The content of this educational board learning media covers Natural Sciences (IPA) with material on animal food types in the third grade of elementary school. This material on animal food types classifies animals based on their food types. The classification is divided into three categories: herbivores, carnivores, and omnivores. In this classification activity, animals that are classified as plant eaters are called herbivores, animals that are classified as meat eaters are called carnivores, and animals that are classified as omnivores are called omnivores[15]. The material on animal food types is one of the materials that is quite difficult for students to understand because the

classifications are almost the same, which often causes students to forget and make mistakes in classifying them. If the learning process tends to be passive and monotonous, learning becomes less effective, so the use of educational boards as learning media can be effective for students. Based on this, constructivist theory (Jean Piaget and Jerome Bruner) asserts that knowledge will be constructed by students themselves through real experiences. Piaget states that elementary school students are in the concrete operational stage, which requires concrete visualization or real objects for learning to be more effective. According to Piaget, the concrete operational stage is between the ages of 7 and 11, and the most effective learning is through real objects. Therefore, media in the form of educational boards that provide direct visualization and physical interaction with the material are very suitable for supporting the learning process. This is also supported by Bruner, who states that students acquire knowledge by exploring (learning through direct action). In the context of educational board media, this involves active engagement in the use of appropriate educational board media through activities such as grouping animals on magnetic media and interaction bags or *hands-on* activities[16]. Referring to this constructivist theory, learning media needs to be designed to support and facilitate active student engagement, provide space for students to explore, and stimulate students to form their own understanding. The function of developing learning media is to support interactive and active learning, where this media differs from passive books or videos. This educational board makes children active users of the media, thereby making them more active[17]. By paying attention to the theory in the learning process, students are expected to achieve overall learning effectiveness. In creating these objectives, teachers need to design and manage the learning process activities well so that the learning objectives are achieved to the maximum extent possible[18]. Therefore, the development of educational board media for animal food material is expected to be effective for students in the learning process in the third grade of elementary school.

Based on this, the purpose of developing this media in science subjects, especially in the material on classifying animals based on their food types, is expected to provide significant benefits and contributions to the learning process and prove the potential advantages of this educational board media in meeting students' needs. By demonstrating the effectiveness of this media for students, they are expected to achieve efficient improvement and positive experiences in this subject matter. By identifying students' learning needs, it is hoped that this educational board can meet expectations and help increase student activity, learning engagement, motivation, and interest in learning. In addition, the development of this media also aims to contribute to improving the quality of learning in third grade elementary school, particularly in the subject of animal food types, to make learning more effective and innovative.

2 Methods

This study uses the *Research and Development (R&D)* research method using the ADDIE model. Referring to the book "Quantitative, Qualitative, and R&D Research Methods," the *Research and Development* method is a method used to produce certain products and test the effectiveness of those products. *Research and Development* is a method and process used to validate and develop products and improve existing products that can be accounted for[19]. *Research* involves gathering information to understand the needs and potential of the media to be developed. *Development* involves

the development or design of media based on the results of information gathering (*research*). *Research and Development* allows researchers to produce products that can be used in a learning context. The focus of this development is educational board learning media designed specifically for science subjects. The research on the development of educational board learning media aims to produce products that are suitable for learning needs and effective for students. This research develops educational board-based learning media with material on animal food types.

The development of this educational board learning media uses the stages in the ADDIE model. According to Robert Maribe Branch, the ADDIE model consists of five phases for developing a learning system, namely *analyze, design, develop, implement, and evaluate.* The ADDIE model is often used for instructional development[20]. The ADDIE model has systematic and simple stages or steps. The ADDIE model has five stages or steps, including *Analyze,* Design*,* Develop*, Implement,* and Evaluate. The ADDIE model is a structured research model that outlines several steps used in designing a product[21]. The stages of the ADDIE model research can be seen in Figure 1.

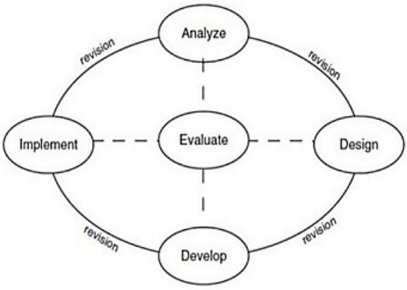

Fig. 1. ADDIE Model Research Stages

The first stage of the ADDIE model is Analyze, which involves analyzing learning needs, target audiences, learning objectives, and available resources. The second stage is Design, which involves the design of specific media[22]. The third stage is Develop, which involves developing product plans in terms of both material and media. The fourth stage is *Implement*, which involves applying the media to students. The final stage is *Evaluate*, which is carried out to measure the feasibility and effectiveness of the media.

The stages of media development research were carried out in stages in accordance with the five steps in the ADDIE model; 1) *Analyze* stage, this analysis stage was carried out through observation and interviews with third grade teachers and 21 third grade students at SDN Panderejo to identify needs and problems in the classroom learning process. After conducting observations and interviews, the information obtained was that there was a lack of innovation in the use of non-digital learning media, which resulted in students not being actively involved. In addition, the subjects and learning materials used in the development of learning media were also analyzed. In this stage, the researchers also studied the characteristics of students through classroom observations during the learning process. The analysis of student characteristics aimed to determine the students' developmental stages in order to select language that was easy to understand. 2) The design stage involved the researcher designing the learning media, namely educational boards, starting from the visual form, materials used, characteristics of the media, to how the media would be used. In addition, this design stage also determines the learning objectives and learning

materials used in the learning media, as well as compiling assessment instruments, namely media experts and material experts, for the media design to determine the feasibility and suitability of the media. This design also specifies the style of writing, images, appearance, colors, and requirements and materials used for the educational board media. The external appearance of the media design used is a curtain with a cheerful design because the users of this media are lower grade students. 3) The development stage, in which the researcher develops the media based on the analysis in stage 1 and the planning in stage 2 and then refines the design, which is then realized. This realization refers to developing the educational board media plan into media that is ready to be validated by media experts and subject matter experts. The purpose of this validation test is to determine the feasibility and validity of the educational board media. Media expert validation is carried out with the aim of determining the effectiveness and feasibility of the developed media. Subject matter expert validation is carried out with the aim of determining and assessing the suitability of this media development with the existing material. The feasibility of this educational board media is tested by giving questionnaires to media experts and subject matter experts. 4) The implementation stage, in this stage, the researcher implements the educational board media or tests this educational board media on students to test the effectiveness of the media. 5) The final stage is the evaluation stage. At this stage, the researcher evaluates the educational board media based on the assessment results obtained from media experts and subject matter experts. The evaluation results consist of responses, input, and suggestions provided by the validators. This stage also assesses the overall effectiveness and relevance of the media to the students' needs.

The technique used in testing the feasibility of this educational board learning medium uses data analysis techniques with the following formula[23]:

$$P = \frac{\sum X}{\sum Xi} x100 \quad (1)$$

Explanation:

P : Percentage of research
Σx : Total score obtained
$\sum x_i$: Maximum score

This learning media development research used instruments to collect assessment results from media experts, subject matter experts, and lesson plans, as well as to determine the feasibility of this educational board learning media. The product validation score criteria were obtained from the validator's assessment, whereby the product criteria were considered "valid" if the percentage achieved was in the valid category. The validation assessment criteria are shown in Table 1.

Table 1. Validity Criteria

Validity Percentage	Criteria
81% - 100%	Highly Valid
61% - 80	Valid
41% - 60	Fairly Valid
21% - 40	Less Valid
0% - 20	Not Valid

The instrument used was a questionnaire with several7 indicators using a Likert scale measurement, including: Very Good (4), Good (3). Fair (2), Poor (1). The aspects of

media validation assessment by media experts include media presentation, language, writing, and appearance. The aspects of learning implementation plan validation assessment include identification, learning design, and learning experience. Meanwhile, the aspects of material validation assessment by material experts include content aspects as shown in Table 2, Table 3, and Table 4 [24].

Table 2. Media Expert Validation Indicators

Evaluation Aspect	Indicators
Media Presentation	1. Media suitability for the material 2. Media suitability for learning outcomes 3. Appropriateness of media for learning objectives 4. Ease of use of media 5. Accuracy of image layout on media 6. The ability of media to engage students 7. Safety in media use
Media efficiency	1. Ease of storage 2. Media implementation does not require special treatment 3. Media can be used for the long term
Writing	1. Clarity of text on the media 2. Compatibility of text size with media size
Appearance	1. 8 ndic color selection on media 2. Attractiveness of media display 3. Accuracy of background selection

Table 3. Material Expert Validation Indicators

Assessment Aspect	Indicators
Content	1. Appropriateness of material to learning outcomes 2. Alignment of material with learning objectives 3. Ease of material with grade level 4. Alignment of material with media used 5. Content suitability

Table 4. Learning Implementation Plan Validation Indicators

Assessment Aspect	Indicators
Identification	1. Suitability of students in terms of prior knowledge, learning interests, learning needs 2. Suitability of material on media 3. There is a graduate profile dimension
Learning Design	1. There are learning outcomes 2. There is interdisciplinary learning 3. There are learning objectives 4. There are pedagogical practices 5. There are learning partnerships 6. There is a learning environment that includes physical space, virtual space, and learning culture 7. There is digital utilization 8. There are facilities and infrastructure
Learning experiences	1. There are preliminary activities 2. There are core activities 3. There are closing activities

The instruments used to calculate product effectiveness are student and teacher response questionnaires. The instruments used are questionnaires with several indicators using the Guttman scale measurement. The Guttman scale is one in which respondents or students only give answers of "Yes" with a score of 1 and "No" with a score of 0. The criteria for product effectiveness scores are obtained from questionnaire assessments, where a product is said to be "effective" if the percentage achieved is in the effective category. The percentage criteria for assessing effectiveness as shown on Tabel 5 and Table 6 [25].

Table 5. Effectiveness Criteria

Validity Percentage	Criteria
81% - 100%	Very Effective
61% - 80%	Effective
41% - 60%	ly Effective
21% - 40	Less effective
0% - 20%	Not Effective

Table 6. Student Response Questionnaire Indicators

No	Assessment Indicators
1.	Educational boards help me understand the material
2.	In my opinion, educational boards attract my attention
3.	I think educational boards make learning more enjoyable
4.	Educational boards make me active in learning
5.	I think educational boards are easy to use
6.	I think the images, text, and colors on educational boards are clear
7.	The content on the educational board media is clear and easy for me to understand
8.	I think the writing on educational boards is easy to understand
9.	The educational board is safe when I use it.
10.	In my opinion, the educational board media is very attractive in appearance.

3 Results and Discussion

Educational boards are visual and interactive learning media in the form of boards designed to test the effectiveness of this media at the third grade elementary school level in order to make it easier for students to understand material concepts through hands-on activities or student involvement. Educational boards as interactive learning media can provide a different learning experience for students. This medium allows students to interact directly with the material being studied, thereby developing student effectiveness, understanding, and interest in learning. In the context of animal food types, educational boards can be used to introduce various types of animal food in an interesting and easy-to-understand way. The results of this research development produced an educational board media product that has passed the validation stage by media experts and subject matter experts. The development process and research procedures were carried out in stages according to the ADDIE model used. The development process was carried out through the following stages:

3.1 Analyze Stage (Analysis)

The results of this analysis stage were conducted on third-grade students and third-grade teachers at SDN Panderejo to identify needs and problems in the classroom learning process. The information obtained through observation and interviews revealed a need for media, as there was a lack of innovation in the use of non-digital learning media, which resulted in students not being actively involved. In addition, this stage also analyzed the subjects and learning materials used to ensure they were relevant to the development of learning media. In this stage, the researcher also studied student characteristics through classroom observation during the learning process. The analysis of student characteristics aimed to determine the stage of student development in order to select easy-to-understand language and suitable visualizations for learning media. From the results of this analysis, it was found that the learning process requires effective learning media that supports the learning process.

3.2 Design Stage

The results of the research in the design stage were obtained from the analysis of student needs, which required interesting and engaging learning materials. Therefore, in this stage, the researchers developed learning media in the form of educational boards and designed educational board media for science learning, starting from the visual form, materials used, media characteristics, to how to use the media. In addition, this design stage also determined the learning objectives and learning materials, particularly in terms of the content of animal food used in the learning media. This design also specified the text, images, appearance, colors, requirements, and materials used for the educational board media. The exterior design of the media used curtains with a cheerful design because the users of this media were lower grade students. Furthermore, at this stage, a student and teacher response questionnaire is also compiled to measure the effectiveness of the media after it is used in learning. The results of the design stage produce media and learning that help students become more actively involved and more effective in receiving the material.

3.3 Develop Stage

In this development stage, researchers developed media from the results of analysis in stage 1 and planning in stage 2, and refined the design which was then realized. In the process of developing the educational board media, it began with making a board frame as the basis for the media using melamine plywood and coated with manila paper, then making a title box for the material from styrofoam and scotch tape. The next step is to create the content of the media, starting with various types of animal food, classification of animals based on their food types, and pictures of animals made with their own designs, which are then printed and laminated. The final step is to install interaction pockets, make fences, and place pictures of the animals, followed by the finishing touch of installing curtains as the outer display, as shown in Figure 2.

Fig. 2. Exterior View of Educational Board Media

Fig. 3. Educational Board Media

The contents of the Educational Board Media include: 1.) Main Board (Background Board), The main board measures approximately 75 cm x 55 cm, a standard size that can be carried and displayed when used in the classroom. The background or base of the media is covered with cream-colored manila paper with a bright yellow hue to make it look less boring and more cheerful. At the top is the title of the material, made of yellow styrofoam with thick black lettering that reads "TYPES OF ANIMAL FOOD". The title is given a slight embossed effect to make the writing more visible. 2.) Curtains: A pair of pink satin curtains hang on the left and right sides of the board, each measuring 65 cm long and 23 cm wide. These curtains can be opened and closed manually, creating a mysterious effect before they are opened. At the top of the curtains, there are pink flannel wave decorations as an addition to give the impression of real curtains. 3.) Main Material Card Labels: Three cards with large writing placed at the top with the words "Plant-eating animals, Meat-eating animals, Omnivorous animals" and below them are cards from each place written "Herbivores, Carnivores, Omnivores". The cards are custom-designed and laminated for durability, and equipped with magnets so they can be removed or moved as needed. 4.) Interaction Pockets: In each category, there are three orange interaction pockets shaped like bowls and made of flannel fabric. The design of these interaction pockets provides an interactive feel when grouping animal pictures according to their location. 5.) Bottom Decoration: This section is decorated with elements that resemble a mini zoo with accents of fences, trees, and grass. The green grass is made of serrated buffalo, two trees on the right and left, and a yellow triangular fence made of popsicle sticks. 6.) Animal Picture Cards: These animal pictures consist of various animal images designed with sticks as handles. Each animal picture card is medium-sized, hand-colored with cute details, and placed on the grass. 7.) Additional accessories, wall hooks so that the educational board can be mounted on the wall without damaging the color. Several black arrows point from each material

card label at the top to the category below to clarify the classification flow, as shown in Figure 3.

Then, a validation test was conducted by media experts and subject matter experts with a percentage score based on Table 1. The purpose of this validation test was to determine the feasibility and validity of the educational board media. The results of the validation test by media experts, subject matter experts, and the Learning Implementation Plan (RPP) validation are shown in the Table 7, Table 8, and Table 9.

Table 7. Results of Media Expert Validity Test

Assessment Indicators	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Score obtained	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total	60														
Percentage obtained	100														
Criteria	**Highly Valid**														

Table 8. Results of Expert Material Validity Test

Indicator Number	**1**	**2**	**3**	**4**	**5**
Score obtained	4	4	4	4	4
Total	20				
Percentage obtained	100				
Criteria	**Highly Valid**				

Table 9. Results of the RPP Validity Test

Indicator Number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**
Score obtained	4	4	4	4	4	4	4	4	4	4	4	4	4	4
Total	56													
Percentage obtained	100													
Criteria	**Highly Valid**													

Based on Tables 7, 8, and 9, The results of media expert validation with a score of 4 and a total of 15 indicators yielded a total score of 60 and a maximum score of 60, resulting in a percentage of 100% from material expert validation with the conclusion "Suitable for use without revision" categorized under the assessment criteria "Highly Valid". The results of material expert validation with 5 indicator items and a score of 4 resulted in a total score of 20 out of a maximum score of 20, yielding a percentage of 100% from material validation with the conclusion "Suitable for use without revision" categorized under the assessment criteria "Highly Valid". The results of the validation of the Learning Implementation Plan ( ) obtained an assessment score of 4 with a total of 14 indicator items, resulting in a total score of 56 and a maximum score of 56, so

that the percentage obtained from the material expert validation was 100% with the conclusion "Suitable for use without revision" categorized in the "Highly Valid" assessment criteria.

Media expert validation is carried out with the aim of determining the effectiveness and suitability of the media developed. Materials and lesson plan expert validation was conducted to determine and assess the suitability of this media development with existing materials. The validation results, which showed a percentage of 100% from media experts, materials experts, and lesson plan experts, indicated that the educational board media developed had met the overall feasibility criteria in terms of appearance, ease of use, safety, and suitability of the material content on the media. The high validation results cannot be separated from the systematic media development process based on the ADDIE model stages, so that each development stage has undergone needs analysis and design refinement before validation. In addition, the validators involved are experts who have competence and experience in the field of learning media and elementary school science material, so that the assessments given are based on relevant academic and practical standards.

3.4 Implementation Stage

In this implementation stage, the product was tested in elementary schools with third-grade students at SDN Panderejo, totaling 21 students. This trial was conducted on a limited basis, with researchers focusing on testing the effectiveness of educational boards in learning activities. To measure the effectiveness of the media, the researchers distributed response questionnaires to teachers and students as users. Effectiveness was measured using product effectiveness criteria scores based on Table 5. After learning using the educational board media, students were asked to fill out response questionnaires as a form of assessment of their response to the use of the educational board media, as shown in Figure 4.

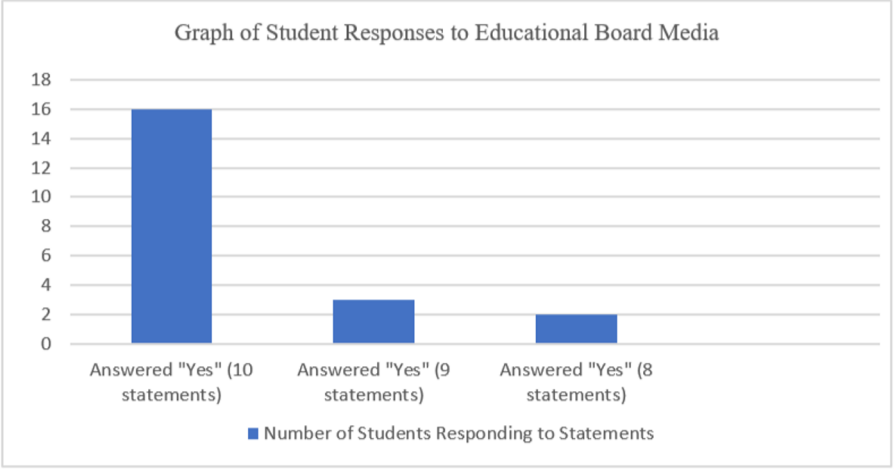

Fig. 4. Student Response to Educational Board Media

Based on Figure 1. the results obtained from the questionnaire show that 16 students answered "Yes" to all 10 statements in the student response questionnaire, 3 students answered "Yes" to 9 statements and answered "No" to 1 statement, and 2 students answered "Yes" to 8 statements and answered "No" to 2 statements in the student response questionnaire. Thus, the overall score obtained from the questionnaire results was 203 out of($16\ siswa\ x\ 10\ skor = 160\ dan\ 3\ siswa\ x\ 9\ skor = 27\ dan\ 2\ siswa\ x\ 8\ skor = 16$) with a maximum score (total student response questionnaire score) of 210 out of($jumlah\ siswa\ x\ jumlah\ skor = 21\ siswa\ x\ 10\ skor$) . The percentage of media effectiveness was obtained as follows:

$$P = \frac{203}{210} x100\% = 96{,}67\%$$

Based on the percentage of media effectiveness, the results of field tests conducted by third-grade students at SDN Panderejo with 21 student respondents obtained an effectiveness score of 96.67%. From the calculation of the results obtained, the Educational Board Media based on Table 5 Effectiveness Criteria is classified as "Very Effective".

The effectiveness test results, which obtained a percentage of 96.67%, show that the educational board media is very effective in teaching science material on animal food types. The high positive response from students shows that this media is able to create more interesting and enjoyable learning and encourage active student participation. The activity of grouping animals using magnetic media and interaction bags allows students to learn through direct experience (learning by doing), thereby helping students understand concepts more concretely. This development is in line with Piaget's constructivism theory, which states that elementary school students are in the concrete operational stage and need visual and manipulative learning media. In addition, Bruner also emphasized that learning will be more meaningful when students are directly involved in the exploration process. Thus, the effectiveness of this educational board media is not only demonstrated through quantitative data, but also supported by relevant theoretical foundations. These findings show that active student involvement through the manipulation of concrete objects has a significant impact on conceptual understanding, which distinguishes this educational board media from conventional board media in previous studies.

The results of the teacher response questionnaire with the assessment scores obtained were 9 statements receiving a score of 4 and 1 statement receiving a score of 3 with a total of 10 indicator items, resulting in a total score of 39 and a maximum score of 40, so that the percentage obtained from the teacher response questionnaire was 97.5% from the following percentage calculation:

$$P = \frac{39}{40} x100\% = 97{,}5\ \%$$

This percentage indicates that the media is "Very Effective." In this response questionnaire, teachers also provided comments and suggestions that this media is very creative and effective when used by students. The results of the teacher response questionnaire regarding the educational board media tested in third grade are presented in Figure 5.

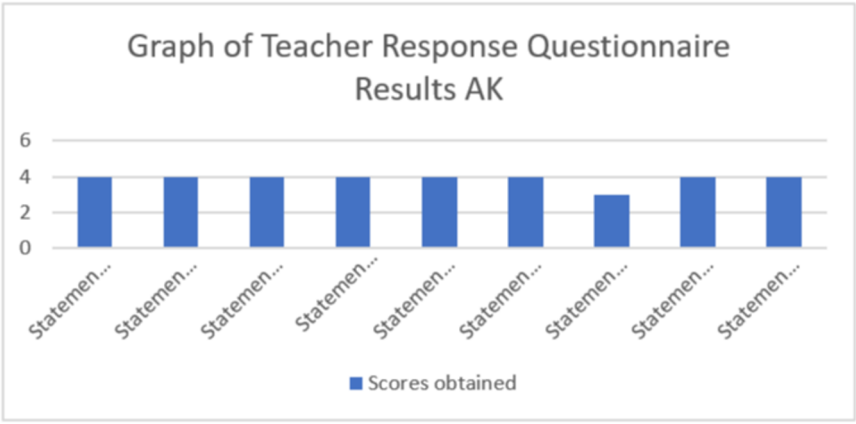

Fig. 5. Results of Teacher Response Questionnaire

3.5 Evaluate Stage (Evaluation)

At this evaluation stage, the quality of the educational board media product for animal feed that has passed the analysis, design, development, and implementation stages is assessed. The evaluation process of the educational board media is carried out by researchers based on the assessment results from media and material experts as well as the assessment of the results of student and teacher response questionnaires. The high percentage of effectiveness shows that the educational board media is not only visually appealing but also effective when used in the learning process. These results assess the overall effectiveness of the media's relevance to student needs, even though this study still has limitations in terms of the number of subjects and the scope of the trial.

The results of this study indicate that the use of educational boards is effective and has been proven effective in teaching third-grade students about animal food types. This is demonstrated by the percentage results obtained and the assessment criteria achieved. These findings are in line with Piaget's theory, which states that elementary school students are in the concrete operational stage, which requires visualization in learning. The educational board media in this study is effective and also emphasizes student activity and direct involvement through magnetic-based hands-on activities. This study is in line with previous research conducted by (Pujianto, Ilmawati Fahmi Imron, 2023), which states that flannel board media is effective and suitable for use. Research on the development of educational board media on animal food types also shows positive responses from students to the use of interactive media. The media developed in this study has the advantage of a simpler, safer interaction design that is suitable for the characteristics of third-grade elementary school students. Thus, the use of educational board media development proves that this media can be applied well in the classroom and is proven to be effective in its use in the learning process. This educational board learning media is an alternative media to support science learning, especially animal food types material. The resulting media can be used as innovative learning media that is suitable for third-grade elementary school students.

4 Conclusion

Based on the results of research and development that has been carried out, it can be concluded that the development of educational board media on animal food types for third-grade elementary school students using the ADDIE model has been successfully developed in a systematic and structured manner through the stages of analysis, design, development, implementation, and evaluation. The results of the media expert and subject matter expert validation tests show that the educational board media obtained a percentage of 100% with the criteria of being highly valid and suitable for use without revision. This shows that the developed media has met the feasibility aspects in terms of appearance, language, safety, ease of use, and suitability of content with the achievements and objectives of third-grade elementary school science learning.

The educational board media in the field trial results for third-grade students at SDN Panderejo showed that this media had an effectiveness rate of 96.67%**,** which falls into the "Very Effective**"** category**.** This media is able to develop student activity, facilitate understanding of the material, attract attention, and create a more enjoyable learning atmosphere through interactive and hands-on activities. In addition, the results of the teacher response questionnaire also show a percentage of 97.5% in the effective and suitable for use category, so this media is considered practical and suitable for classroom learning needs. Thus, this media can support more innovative and meaningful learning that is in line with the developmental characteristics of elementary school students, while also providing a solution to the lack of use of interactive non-digital learning media in schools.

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