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Development of Human Digestive System Teaching Aids with a Social Phenomenology Approach to Improve Learning

Meisa Listiavita
Pendidikan Guru Madrasah Ibtidaiyah, Institut Al Azhar Menganti Gresik
meisalistiavita1319@gmail.com

Nurul Agustin
Pendidikan Guru Madrasah Ibtidaiyah, Institut Al Azhar Menganti Gresik
nurulagustinpgsd07@gmail.com

Rahmat Rudianto
Pendidikan Guru Madrasah Ibtidaiyah, Institut Al Azhar Menganti Gresik
rudiantorahmat1987@gmail.com

Abstract: Education plays an important role in forming a quality generation, one of which is through learning Natural Sciences (IPA) in elementary schools. However, the material on the human digestive system is relatively abstract and difficult for students to understand if it is only delivered through lecture methods. This study aims to develop human digestive system teaching aids with a social phenomenology approach to improve the learning outcomes of fifth grade students of MI Darul Ulum Driyorejo Gresik. The method used is research and development (R&D) with the 4-D model from Thiagarajan which includes the stages of define, design, develop, and disseminate. The development procedure begins with needs analysis, product design using used materials, expert validation, media revision, and limited trials. The results of the study showed that the teaching aids developed received very positive responses from students (83%) and teachers (88%). In addition, there was an increase in learning outcomes from 75% in the pretest to 98% in the posttest. This shows that the developed digestive system teaching aids are effective in helping students' understanding and are suitable for use in the science learning process in elementary schools.

Keywords*: Science Teaching Aids; Social Phenomenology; Learning Outcomes,*

INTRODUCTION

Education is the most important thing in human life, this means that every human being in Indonesia has the right to receive it and is expected to always develop in it, education will never end. Education in general means a life process in developing each individual to be able to live and continue life. So being an educated person is very important. Humans are educated to be useful people for the State, Nation and Country. The first educational environment obtained by every human being is in the family environment (Informal Education), school environment (formal education), and community environment (non-formal education). Various experiences obtained by students in each social interaction. The social phenomenology approach is important as a consideration in making innovations in learning. (Tilaar, 2002)

Schools as formal institutions are tasked with educating. The role of schools is very large as a means of exchanging ideas between students. Teachers must strive to ensure that the lessons given are always sufficient to attract children's interest, because it is not uncommon for children to consider the lessons given by teachers to be useless. The teacher's task which is only to teach is now outside of those rules, teachers must educate, namely to foster students into responsible adults. Only with this can all aspects of the child's personality develop. (Sagala, 2010)

The world of education today has entered the world of media. The teaching and learning process requires the use of lecture methods to be minimized and the use of media to be increased. The way of learning by listening to lectures from educators is a form of interaction, but learning by listening alone is questionable in its effectiveness (Smaldino et al., 2019).

Science subjects are often faced with abstract material and outside the daily experience of students. Combined with the many scientific terms, it makes the subject matter difficult for educators to teach and difficult for students to understand, so that learning is less effective. In learning Natural Sciences, the use of media or teaching aids is very necessary when delivering material. Apart from media or teaching aids, the use of the right method is very necessary so that learning completion is as expected. A social phenomenological approach is very necessary in choosing teaching aids that are appropriate to current events or in other words, message engineering is needed. (Firmansah, 2022)

The use of a phenomenological approach in the development of teaching aids aims to adjust learning media to the demands of the times. The gap that occurs in general is the lack of contextual ideas and concepts in the development of teaching aids, this is a gap in this study. According to previous research, teaching aids are developed according to learning needs for contextual phenomenological thinking, activating student learning activities and others.

Learning outcomes are a person's abilities after following a certain learning process. Based on Bloom's Taxonomy theory, learning outcomes are achieved through three categories of domains, namely cognitive, affective and psychomotor domains. The cognitive domain consists of six aspects, namely the memory domain (C1), understanding domain (C2), application domain (C3), analysis domain (C4), synthesis (C5) and assessment domain (C6)(Cullinane, 2009).

Based on the observation results, the learning process has not been maximized due to the lack of use of teaching aids; teachers still use the lecture method with the help of books and whiteboards, especially in the Human Digestive System material which requires concrete visualization. In fact, science learning like this requires learning media that can provide real representations so that it is easier for students to understand. Therefore, interesting and interactive teaching aids are needed to increase student participation and understanding. Teaching aids, as part of learning media, function to convey information visually, auditorily, or kinesthetically, and are able to clarify abstract concepts, clarify events or incidents, increase learning motivation, and create meaningful learning experiences if selected and used appropriately (Agustin, 2021).

Teaching aids are tools used by teachers in learning and prevent verbalism in students. The main function of teaching aids is to reduce the abstractness of concepts and eliminate verbalism in students, so that students are able to grasp the true meaning of the concept. By seeing, touching, and manipulating objects/teaching aids, students have concrete experiences

in everyday life about the meaning of a concept. The use of teaching aids is very beneficial for the continuity of learning. Teaching aids are used to explain science learning concepts in the form of real objects. With teaching aids, teachers can teach science concepts with real objects so that it is easier for students to understand the material to be taught. One of the abilities that teachers must have is the skill of using teaching aids in the learning process in order to improve the quality of education. To understand abstract concepts, students need concrete or real objects as intermediaries in learning (Agustin et al., 2024).

Teaching aids can be divided into two types, namely ready-made teaching aids and homemade teaching aids. Ready-made teaching aids are teaching aids made by a company that can be purchased by schools, students and teachers just need to use them. Homemade teaching aids are teaching aids made by teachers and students themselves. Because not all schools provide teaching aids because they are expensive. Therefore, it can be overcome by making your own teaching aids, with a little cost, teachers can use teaching aids to deliver material so that the material can be received well by students(Haddar & Azmi, 2020). In addition to being more economical, making your own teaching aids also provides an opportunity for teachers to adjust the tools to the needs of the materials and characteristics of the students. The process of making teaching aids independently can also involve students, thus creating more participatory and contextual learning. Thus, homemade teaching aids are not only a solution to limited facilities, but also a means to foster creativity, collaboration, and a sense of belonging to the ongoing learning process (Agustin & Pratiwi, 2024)

The teaching aids used by researchers include homemade teaching aids, teaching aids made of plastic and hoses assembled to form human digestive organs which are then glued to a plywood board, then given beautiful colors so that they can attract students' attention. These digestive system teaching aids have advantages in teaching, including fostering students' interest in learning because learning is more interesting, clarifying the meaning of teaching materials so that students understand them more easily, teaching methods will be more varied so that students will not get bored easily, making them more active in learning activities such as observing, doing and demonstrating. The use of teaching aids is very appropriate for use in human digestive system material because the human digestive system is divided into several types of organs but it is a little difficult if we want to see directly what the shape of these organs is so that by using this teaching aid media it will make it easier for educators to explain and show the organs in the digestive system (Milawati et al., 2022)

RESEARCH METHODOLOGY

The method used in this study is the research and development method or Research and Development (R&D). Research and Development (R&D) is a research method used to produce certain products and test the effectiveness of the method. In the field of education, research and development or Research and Development (R&D), is a research method used to develop or validate products used in education and learning (Gustiani, 2019).

Research and Development or R&D is a process or steps in developing a new product and perfecting an existing product and can be accounted for by researchers. Sukmadinata argues that the Research and Development research method is a research approach to produce

a new product or perfect an existing product and can be scientifically accounted for (Agus Rustamana et al., 2024).

This research was conducted at MI Darul Ulum, Mojosarirejo Village, Driyorejo Gresik. The reason why the researcher chose this location was because there were a number of problems faced by teachers and students in the learning process, including the use of the lecture method in learning. Based on the results of observations, it is known that the science learning process in grade V still uses the lecture method and only relies on blackboard media. This situation makes the learning outcomes and level of student understanding less than optimal. This is in line with the opinion of (Silitonga & Tinambunan, 2024) who stated that learning that only uses the lecture method tends to be one-way and does not actively involve students in the learning process

The research design used is the research design according to Thiagarajan, namely development with the 4-D model. This 4-D model consists of four stages, namely the Define, Design, Develop, and Disseminate stages. The reason for choosing the 4-D model is because the development stages are divided in detail and systematically, so that in its implementation it can be carried out in a structured manner. This model was developed by Thiagarajan, Semmel, and Semmel (1974) which is very suitable for the development of learning devices effectively and efficiently (Indaryanti et al., 2025)

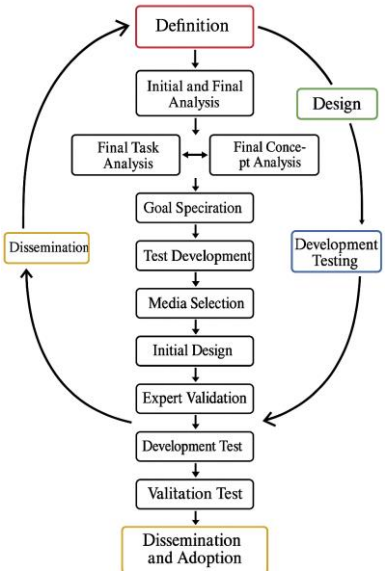


Figure 1 Research Design using 4D Development Stages

The define stage is the stage to determine and define the requirements needed in the development of learning. Determination of the required requirements is done by considering and adjusting the learning needs. The define stage includes five main steps, namely initial analysis (front-end analysis), learner analysis, concept analysis, task analysis, and formulation of learning objectives (specifying instructional objectives). Stated that the define stage aims to determine and formulate problems and needs that are the basis for developing learning devices.

At the definition stage, it contains activities to analyze or collect learning needs related to the product to be developed. In determining learning needs, it is necessary to pay attention to the curriculum, student conditions, and problems that arise in schools. In line with that,

(Susanti et al., 2024) emphasized that the initial stage in research and development is to identify needs and gaps in the learning process in the field.

The initial step that must be taken before designing a human digestive system learning aid using used materials is done by analyzing real conditions. Based on the results of initial observations in Class V MI Darul Ulum Driyorejo Gresik, it is known that learning is still dominated by the lecture method. According to (Salsabilla Salsabilla et al., 2024) the use of monotonous learning media causes low learning motivation for students, so that more interesting and interactive learning media innovations are needed.

The human digestive system material is one of the science materials that is considered difficult because it is abstract and cannot be observed directly. This is reinforced by the opinion of (Arsyad, 2024) who stated that visual learning media can help bridge students' understanding of abstract material because it presents a real representation of the concepts being studied. This stage also includes an analysis of the characteristics of students who will be the subjects of the trial. These characteristics include cognitive aspects, learning experiences, and student learning motivation. As stated by (Utami, 2017)understanding student characteristics is important so that the learning media developed can be optimally adjusted to the needs and abilities of students.

Material analysis aims to select appropriate teaching materials to be used as a basis for media development. In line with that, according to (Bohalima, 2022) the selection of appropriate materials greatly determines the success of using learning media, especially in abstract materials such as the human digestive system. The design stage aims to prepare the design of learning products, such as media selection, format, and preparation of evaluation instruments. As explained by (Archi Maulyda et al., 2021) the design stage is an initial effort in designing a media prototype based on the results of the previous needs analysis.

The initial design of the media using plywood and plastic bottles was made to resemble the human digestive system organs so that students get a concrete picture. According to (Marlina et al., 2022) learning media that resemble real objects can increase students' interest and understanding of the material presented. The development stage aims to produce the final form of learning media through revisions based on input from experts. (Putri & Wardoyo, 2018) explain that this stage is important to ensure that the media developed is in accordance with learning objectives and is feasible to implement

The Dissemination stage aims to disseminate the developed product so that it can be widely utilized. (Rizka et al., 2024) explained that the dissemination stage includes final validation, product packaging, and dissemination so that the product can be adopted by other users in the learning environment. The data collection techniques used consist of interviews, observations, expert validation, learning outcome tests, questionnaires, and documentation. According to (Creswell & Creswell, 2013) the use of mixed methods in data collection aims to obtain comprehensive and valid data so that it can describe the development process and results in full.

RESULTS AND DISCUSSION

MI Darul Ulum Driyorejo Gresik was established in 1968 thanks to the initiative and struggle of community leaders of Mojosarirejo Village, such as KH Umar, KH Kholil, and KH Hamid. Initially, the teaching and learning process was carried out in residents' homes because there was no school building yet. The land where the school building currently stands was originally a spring, well, and grass which was then agreed upon by residents to be used as an educational land independently. Now, MI Darul Ulum is an MI level educational institution under the auspices of the Ministry of Religion, which continues to develop as a place of learning for the younger generation. The enthusiasm of the community in building this educational institution reflects the importance of community participation in supporting basic education, as conveyed by (Raihani Raihani, 2006), that the community has a strategic role in creating relevant and contextual education.

Administratively, MI Darul Ulum Driyorejo Gresik is located at Jl. Raya Mojosarirejo RT 09 RW 03, Mojosarirejo Village, Driyorejo District, Gresik Regency, East Java Province with a postal code of 61177. This school has a NPSN of 60718972 and is private. The vision of this school is to create people who are faithful, have noble character, and achieve. Its mission includes instilling faith, forming noble character, optimizing active learning, and fostering achievements in the fields of science, language, sports, and culture according to the potential of students. This vision and mission are in line with the goals of national education as stated in Law Number 20 of 2003 concerning the National Education System, which emphasizes the importance of developing the potential of students to become faithful, pious, and noble people.

The condition of educators and education personnel at MI Darul Ulum Driyorejo Gresik is quite adequate, consisting of 10 teachers and staff. The teachers have educational backgrounds that are in accordance with their fields, including the Head of Madrasah, homeroom teachers from grades 1 to 6, and subject teachers. In addition, there is one administrative staff to support school operational activities. For grade V students, the number of students recorded was 23 people, consisting of 14 males and 9 females, which reflects the need for adjustments to learning methods and media according to their needs. This is in line with the opinion of who stated that student characteristics are an important consideration in choosing the right learning approach and media to achieve learning effectiveness.

In terms of facilities and infrastructure, MI Darul Ulum has an area of 2,500 m² with a two-story building and 10 study groups. All classrooms are in good condition and can accommodate up to 30 students per class. The total number of students is 148, consisting of 86 male students and 62 female students. With the available facilities and competent educators, MI Darul Ulum Driyorejo Gresik continues to strive to improve the quality of education and create a learning environment that supports the academic and character development of students. According to (Arini et al., 2023), a good learning environment is an important factor in creating a conducive learning atmosphere for students.

This study produced learning media in the form of "Human Digestive System Teaching Aids" which aims to improve the learning outcomes of grade V students of MI Darul Ulum Driyorejo Gresik. This media was developed based on the identification of science learning needs, especially digestive system material, which shows the need for visual support to clarify concepts. This is in accordance with (Arsyad, 2024) which states that visual media greatly helps

students in understanding abstract concepts that are difficult to explain verbally. In the development process, researchers followed systematic steps including preliminary studies, media design, expert validation, limited trials, product revisions, and field trials. This study is in line with other studies that also developed human digestive system teaching aids as learning media, such as that conducted by (Parata & Zawawi, 2018) which used interactive 3D visual models to help elementary school students understand the concept of the digestive system. Both studies showed that visual media can improve student learning outcomes, especially on abstract material. However, research at MI Darul Ulum Driyorejo Gresik emphasizes the learning needs in the madrasah environment and the development of teaching aids that are adapted to the characteristics of MI students, while Wulandari's research focuses more on the interactive digital technology aspect. Although the approaches are different, both follow systematic media development procedures and expert validation to ensure the effectiveness of the media in improving students' understanding of the digestive system material. This research flow explains the process of developing learning media which is carried out in stages to ensure the appropriateness of the content, appearance, and its effectiveness in supporting the teaching and learning process in the classroom. The development model used refers to the 4-D approach (Define, Design, Develop, Disseminate) as stated by Indaryanti et al. (2025). This model provides a systematic structure for developers to produce media that is interesting and in accordance with the needs of students. By following these stages, media development becomes more focused and allows for a comprehensive evaluation of effectiveness before being disseminated.

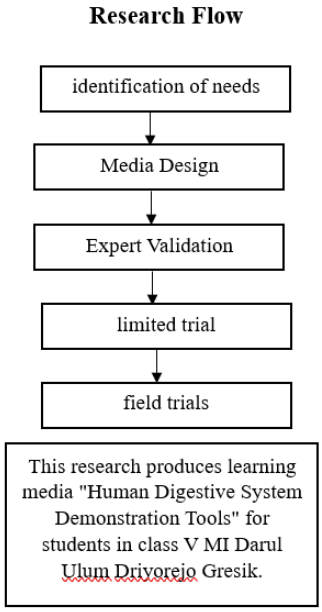


Figure 2. Research Flow

Formulating learning objectives based on material analysis, this stage aims to determine the limitations in research specifically on learning objectives. Formulation of learning objectives is based on basic competencies and indicators, where basic competencies in the digestive system material consist of several of them KD 3.3 explains the digestive organs and their functions in animals and humans and how to maintain the health of human digestive

organs. Based on these KDs, learning indicators are compiled, namely: 1) Identifying animal and human digestive organs, 2) Analyzing the digestive process in animals and humans, 3) Determining the function of animal and human digestive organs, 4) Examining how to maintain the health of human digestive organs.

The design stage is the stage that aims to prepare all designs of learning devices. This stage includes several steps, namely: preparation of test standards (criterion-test construction) which aims to determine the initial abilities of students, media selection (Media Selection) which is determining media that is suitable for the characteristics of the material and learning objectives, format selection (Format selection) which is intended to design or plan learning content, and the initial design is the design of all learning devices that must be worked on before the trial is carried out.4 In this design stage, researchers have made an initial product (prototype) or product design. Before the product design is continued to the next stage, the product design needs to be validated. Validation of the product design is carried out by a media expert.

At this stage, the size, shape and color of the props are determined. The initial product design of the human digestive system media using plywood and plastic bottles is made to resemble the original shape of the human digestive organs from the mouth to the anus. The materials to be used are selected by looking at their shape and size, the materials used are materials that resemble the original shape of the digestive system organs so that the media looks more real. In order to look more attractive, the researcher made the props in a 3-dimensional shape accompanied by a description. The result of this stage is the initial product design that will be developed by the research.

The development of human digestive system teaching aids requires several aspects, namely tools and materials. The tools and materials used in making the teaching aids are saws for cutting plywood, scissors for cutting plastic hoses, paper, styrofoam, small nails, plastic hoses, dyes, brushes for applying dyes to the teaching aids, and rulers for measuring plywood. Fox glue and Korean glue, tape, double type for gluing paper to plywood.

Table 1. Validator's suggestions and input

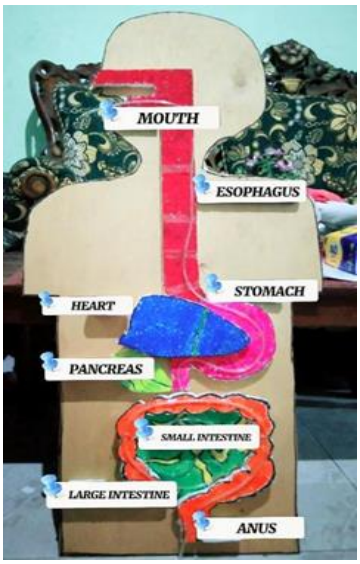
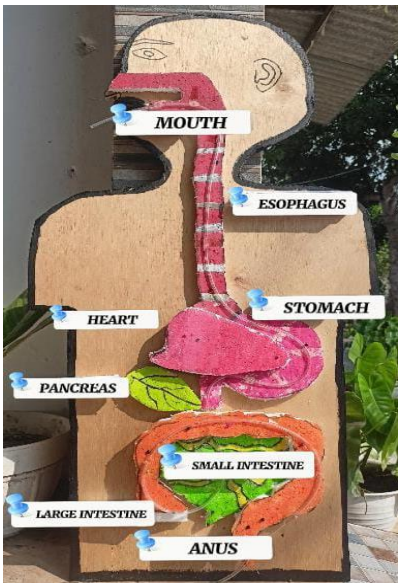
Before revision	***After revision***
1. The esophagus is shaped like the original and colored gray, resembling the trachea.	*The esophagus section has been shaped to resemble the original and has been given a gray color to resemble the trachea according to the validator's instructions.*
2. On the head, draw eyes and ears.	*The head section has been given a picture according to the validator's instructions.*
3. Change the color of the heart to match the original concept.	*The color of the heart has been changed according to the original concept.*

4. In the description section, it would be better if it could be installed and removed so that students can practice.	*The description section is in accordance with the validator's instructions.*
5. Paint the edges of the image so that the board is not visible and is neat.	*The edges of the image have been painted*

Validation and suggestions from the validators are used as important references in revising the human digestive system teaching aid media that has been developed. This validation process is carried out carefully to ensure that the media used is truly effective and in accordance with the needs of students. Every input from the validators is examined and analyzed to determine which parts of the media need to be improved. After the revision process was carried out, prototype 2 was born as a result of the improvement of prototype 1. With prototype 2, it is hoped that the quality of learning media will be better and more targeted in supporting the teaching and learning process.

The improved prototype 2 was then tested in the field through limited distribution only to class V MI Darul Ulum. This trial aims to determine the effectiveness of the media after improvements were made based on the validator's suggestions. The results of the trial showed positive changes compared to the previous prototype. Comparison of the results between prototype 1 and prototype 2 is evidence that the suggestions and input from the validator have a significant impact on the quality of the media. Thus, this teaching aid media is expected to be able to improve students' understanding of the human digestive system material more optimally.

Table 2 Validation results of the Digestion Teaching Aids

PROTOTYPE 1 (BEFORE VALIDATION)	PROTOTYPE 2 (AFTER VALIDATION)
	

According to Aisyah Student response is the response and reaction of students given during learning. Student response will be low if students feel less interested. To find out student response, a questionnaire can be used. According to (Ridwan & Andayani, 2021) Student response is said to be very strong if the results of the response questionnaire range from 81% - 100%, strong range from 61% - 80%, sufficient range from 41% - 60%, weak range from 21% - 40%, and very weak range from 0% - 20%.

Based on the questionnaire that has been given to students, it shows a very good response to the development of human digestive system teaching aids. From the data processing on the response, the percentage of responses obtained for the criteria "strongly agree" is 83%, and the category "agree" is 17%. The results show that the development of human digestive system teaching aids is feasible and can be used in learning human digestive system material in grade 5 of elementary school / MI.

The teacher response questionnaire is an instrument used to assess teacher responses to the learning devices that have been developed. Class teachers can fill out the teacher response questionnaire by giving a check mark (√) in the appropriate column. Opinions, suggestions, assessments, and criticisms given by teachers will be used as researcher evaluations in developing learning devices. According to Solichah, the results of the teacher response questionnaire are declared successful if the percentage of scores obtained is 81 - 100% with a very good category.

The results of the responses from the questionnaire that has been given to teachers showed a very good response to the development of human digestive system teaching aids. From the data processing on the response, the percentage obtained was 88%. The results show that the development of human digestive system teaching aids is feasible and can be used in learning human digestive system material in grade 5 of elementary school/MI.

According to Magdalena, a pretest is a test used when the delivery of material is taking place with the aim of finding out to what extent the material or material to be taught has been

mastered by students. The test material given must be related to the material to be taught. While the posttest is a test carried out at the end of the learning process of a material with the aim of finding out to what extent students understand the material and the main points of the material being studied. This test material is related to the material that has been taught to students previously. If more than 70% of students have completed the material, the teacher will continue with the next learning material. But conversely, if less than 70% of students have completed the material, the learning or material that students do not understand will be repeated.

Based on the implementation of the use of human digestive system teaching aids for class V, the results of the pretest before using the human digestive system teaching aids were 75% with 23 students who did not complete 9 students and 14 students who completed. From the results of the posttest using the human digestive system teaching aids, there was an increase of 98%, from 23 students who did not complete only 1 student and 22 students were said to have completed. From the posttest data obtained, it shows that the human digestive system teaching aids are able to improve the learning outcomes of class V students at MI Darul Ulum Driyorejo

CONCLUSION

Based on the results of the research on the development of human digestive system teaching aid media to improve the learning outcomes of grade V students of MI Darul Ulum Driyorejo, it can be concluded that this media is suitable for use in the learning process. The results of the feasibility test by media expert 1 showed a percentage of 69% with the criteria of being suitable and requiring slight revision, while the results of the validation by media expert 2 showed a percentage of 100% with the criteria of being very suitable. In addition, validation from material experts also produced a percentage of 95% which indicated a very suitable category. Thus, this teaching aid media has met the feasibility standards in terms of content, appearance, and functionality, and can be applied effectively in learning human digestive system material. These findings indicate that the involvement of experts in the validation process makes a significant contribution to the quality of the media developed. In terms of student responses, the results of the questionnaire showed a percentage of 83% which is included in the very positive category. This reflects that students feel interested and helped in understanding the material after using the human digestive system teaching aid media. In addition, there was a significant increase in learning outcomes, as seen from the pretest value of 75% before using the media and the posttest value of 98% after using the media. The difference in results shows that the media developed is able to improve students' understanding and learning achievement significantly. Therefore, the human digestive system teaching aid media is considered effective as a learning innovation that supports the achievement of educational goals.

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