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# Development of An Animated Video on the Digestive System That Promotes Healthy Eating Habits to Enhance Elementary School Student's Understanding

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**A B S T R A C T**

This study aimed to develop an animated video about the human digestive system integrated with healthy eating education to improve elementary school students' conceptual understanding and awareness of healthy eating habits. The study employed a Research and Development (R&D) method using the ADDIE model consisting of Analysis, Design, Development, Implementation, and Evaluation stages. The research involved 26 fifth-grade students at SDN Tegallega 2 Bogor. The product was a 6–7 minutes animated video developed using Canva, combining narration, illustrations, animation, and audiovisual elements to explain digestive processes while promoting balanced nutrition and healthy eating habits. Data were collected through observations, interviews, questionnaires, and pretest–posttest assessments and analyzed using descriptive qualitative, percentage, and N-Gain analyses. Media, language, and material expert validations obtained 91%, 100%, and 92%, respectively, while teacher and student responses reached 89% and 90%. The average score increased from 65 to 92 with an N-Gain of 0.79 (high). Student responses indicated better understanding of healthy food choices after using the media. These findings indicate that the animated video effectively improved conceptual understanding while supporting healthy eating awareness.

## 1. Introduction

The development of technology in the field of education has encouraged teachers to create more innovative and interactive learning processes. In elementary schools, learning activities are expected not only to focus on delivering material theoretically, but also to provide meaningful learning experiences that can improve students' understanding of concepts. Learning media plays an important role in helping students understand abstract material more easily and effectively.

According to (Fahmi, 2025) mashuri education is a continuous process aimed at developing students' potential, intelligence, personality, and skills needed in society. In addition, (Rezai et al., 2025) explained that learning should create an active environment that encourages students to actively develop their potential abilities.

However, the implementation of technology-based learning media in elementary schools is still limited. Many teachers continue to rely on lecture methods, textbooks, and worksheets as the primary sources of learning. As a result, students often experience difficulties in understanding abstract science concepts, particularly in digestive system material, because the learning process lacks visualization and interactive explanation. The limited use of digital media, inadequate technological facilities, and insufficient teacher training in educational technology are factors that hinder the implementation of innovative learning media (Nengsih et al., 2024).

The digestive system is one of the science materials that requires students to understand complex processes occurring inside the human body. According to Lestari et al., (2024), the digestive system is a system of organs that processes food into energy needed by the body. Similarly, Anjarwati et al., (2022) explained that the human digestive system functions to process food into nutrients that can be absorbed and utilized by the body. Since the digestive process cannot be directly observed by students, visual learning support is necessary to help them understand the function of each organ and the sequence of digestion processes.

Based on observations and interviews conducted on October 18, 2025, at SDN Tegallega 2 Bogor with fifth-grade teachers and students, it was found that learning activities still used conventional methods dominated by verbal explanation and textbooks. Students stated that they had never used animated video media during science lessons. Many students found it difficult to imagine how food is processed in the digestive organs. Students also reported feeling bored and less enthusiastic during learning because the teaching methods were monotonous. Furthermore, observations revealed that many students frequently consumed unhealthy snacks such as cilok, cilor, fried snacks, and packaged drinks.

Healthy eating habits are closely linked to digestive health. Mafe et al., (2025) emphasized that gut health is strongly influenced by daily dietary quality, where probiotic and prebiotic intake play a critical role in maintaining intestinal microbiome balance, preventing disease, and improving overall well-being. Syafitri et al., (2025) further stated that a healthy and balanced diet is the fundamental foundation of digestive system health, where foods rich in fiber, vitamins, and minerals help maintain optimal digestive function. Saputra & Nurlim, (2025) also found that there is a significant positive correlation between students' understanding of digestive system material and their knowledge of healthy eating behavior. This condition indicates the importance of integrating healthy eating education into digestive system learning materials, particularly for elementary school students who are still developing healthy lifestyle behaviors.

Animated video is considered an effective learning medium because it combines visual, audio, text, and motion elements that can improve students' attention and understanding. (Monica & Kurniawan, 2026) explained that animated videos can visualize abstract concepts more clearly and realistically. (Linda, 2025) also stated that animated learning videos are capable of increasing students' motivation and understanding through audiovisual presentation. Furthermore, Maulani et al., (2022) found that the use of animated learning videos significantly increases students' enthusiasm and participation during the learning process.

Animated video media offers several advantages suitable for elementary school learning. (Khairunnisaa et al., 2023) identified key benefits including its attractive visual display that enhances student enthusiasm, its effectiveness in conveying abstract material concepts, and its efficiency as an alternative teaching aid. Zunaida, (2022) added that animated media is particularly appropriate for elementary school students as it matches their characteristics as learners who are attracted to visual content. Navarrete et al., (2023) further noted that the use of animated video positively impacts students' interest, learning motivation, and conceptual understanding. However, animated videos also have limitations, including technical constraints during production and the fact that not all learning material can be effectively packaged in animated format. Mayer, (2021) found that videos exceeding 10 minutes without segmentation can cause cognitive overload, reducing learning effectiveness. In this study, these limitations were addressed by carefully designing the storyboard with a structured 6-7 minutes core instructional video.

Several previous studies have examined the development of animated video media in elementary school learning. Astuti & Agustini, (2021) reported that animated video media on digestive system material was feasible, practical, and effective in improving students' conceptual understanding. Reza & Tambunan, (2024) found that animated digestive system videos effectively helped elementary school students understand digestive processes through clear visualization. Astuti & Agustini, (2021) explained that animated learning videos can become an alternative medium to support conceptual understanding in elementary school students. Hamdan & Padillah, (2024) also demonstrated that animated video intervention significantly increased students' knowledge and motivation to choose healthy snacks, with mean knowledge scores rising from 8.89 to 9.89, further supporting the effectiveness of animated video as a medium for healthy eating education.

Although previous studies have shown the effectiveness of animated videos in science learning, most studies only focused on conceptual understanding without integrating healthy eating education into the learning content. Few studies specifically developed animated videos for digestive system learning by combining science concepts with healthy lifestyle education for elementary school students. Therefore, this study offers novelty by developing animated video media containing digestive system material integrated with healthy eating education to improve students' conceptual understanding using the ADDIE development model.

## 2. Methodology

### *Methods*

This study employed a Research and Development (R&D) method using the ADDIE development model, which consists of five stages: Analysis, Design, Development, Implementation, and Evaluation. R&D is a systematic approach aimed at producing innovative products and testing their effectiveness before widespread use (Waruwu, 2024). The ADDIE model was selected because it provides systematic and structured procedures for developing instructional media products (Hidayat & Nizar 2021). The research was conducted at SDN Tegallega 2 Bogor during the 2025/2026 academic year involving 26 fifth-grade students and one classroom teacher as research subjects.

The ADDIE model was chosen due to its systematic, structured, and logically sequenced stages that ensure quality at each development phase. Martatiyana et al., (2023) stated that the ADDIE model's advantages include: (1) it is simple and systematically structured, making it easy for educators to learn and implement; (2) its five components are interrelated and must be applied sequentially from the first to the fifth stage; and (3) it consistently and reliably addresses cognitive, affective, and psychomotor development of students. Despite these strengths, the ADDIE model requires significant time in the analysis phase for needs analysis and learner performance analysis (Soesilo & Munthe, 2020). These limitations were managed in this study through systematic preliminary observations and structured interviews with teachers and students.

### *Research Procedure*

The development procedures in this study followed the ADDIE model, which consists of five main stages: analysis, design, development, implementation, and evaluation.

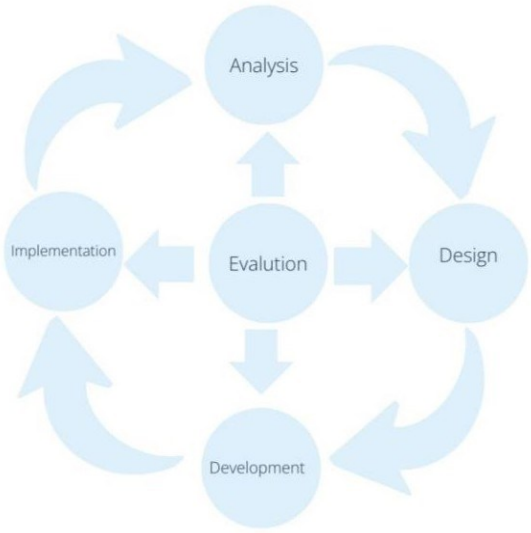


Figure 1. The ADDIE Development Model

At the analysis stage, classroom observations and interviews with teachers were conducted to identify problems in science learning, especially digestive system material. The analysis also focused on students' characteristics, learning needs, and curriculum suitability. The researcher prepared storyboards, learning materials, narration scripts, animations, and validation instruments. The animated video was designed using Canva application software and integrated with healthy eating education content. In development stage, the animated video media was produced and validated by media experts and material experts. The validation process involved three validators consisting of one media expert, one material expert, and one language expert. The media expert was a lecturer in elementary education with expertise in instructional media development and educational technology.

The material expert was a science education lecturer specializing in elementary science curriculum and human digestive system content. The language expert was a lecturer in Indonesian language education with expertise in educational language, readability, and instructional text evaluation. Each validator assessed the product independently using structured validation instruments according to their area of expertise. Suggestions and recommendations from each validator were used as the basis for revising and improving the animated video before classroom implementation. The development process in this study followed the ADDIE model, which consists of five systematic stages: Analysis, Design, Development, Implementation, and Evaluation. The operational activities, stakeholders involved, and expected outputs at each stage are presented in Table 1.

Table 1. Operational Activities of the ADDIE Development Model

| Development Stage | Operational Activities |
|---|---|
| Analysis | Identifying learning problems, conducting observations and interviews, analyzing students' characteristics, and determining learning materials |
| Design | Designing storyboard, narration, animations, and validation instruments |
| Development | Developing animated videos, validating products, and revising media |
| Implementation | Implementing media in classroom learning and conducting pretest-posttest |
| Evaluation | Evaluating feasibility, practicality, and effectiveness of the media |

## *Instrument*

The instruments used in this study included observation sheets, interview guidelines, validation questionnaires, response questionnaires, and pretest-posttest questions. Observation sheets were used to identify classroom learning conditions and students' participation. Interview guidelines were used to obtain information from teachers regarding learning problems and media needs. Validation questionnaires were distributed to media experts, language experts, and material experts to assess the feasibility of the animated video product. Teacher and student response questionnaires were used to determine practicality and user responses toward the developed media.

The pretest and posttest instruments consisted of multiple-choice questions related to digestive system concepts and healthy eating habits, administered before and after implementation. Conceptual understanding in this study refers to students' ability to receive, absorb, and comprehend material through cognitive processes. Based on revised Bloom's Taxonomy (Radmehr & Drake, 2019), conceptual understanding is measured across four cognitive levels: (C1) Remembering students recall digestive organ names and definitions; (C2) Understanding students explain organ functions and the digestion sequence; (C3) Applying students use their knowledge to determine healthy eating habits; and (C4) Analyzing students identify and analyze the relationship between dietary patterns and digestive health or disorders. This comprehensive coverage ensures that the assessment measures deep conceptual understanding rather than mere memorization (Ubaidillah et al., 2025). The conceptual understanding test consisted of 20 multiple-choice items distributed across the four cognitive levels of the revised Bloom's Taxonomy. Specifically, five items measured C1 (Remembering), six items measured C2 (Understanding), five items measured C3 (Applying), and four items measured C4 (Analyzing). This distribution was designed to ensure balanced measurement of all predetermined indicators while emphasizing students' ability to apply and analyze digestive system concepts in the context of healthy eating habits. To evaluate students' conceptual understanding of the digestive system, the researchers developed a test based on the revised Bloom's Taxonomy. The indicators, learning objectives, cognitive levels, and distribution of test items are presented in Table 2.

Table 2. Indicators of Conceptual Understanding Test

| No | Indicator | Description of Ability | Bloom Level | Number of Item |
|---|---|---|---|---|
| 1 | Understanding digestive system concepts | Students recall the definition of digestion and name digestive organs | C1 (Remembering) | 3 |
| 2 | Explaining functions of digestive organs | Students explain organ functions and the correct sequence of food digestion | C2 (Understanding) | 7 |
| 3 | Applying healthy eating habits in daily life | Students use knowledge of the digestive system to determine healthy eating habits | C3 (Applying) | 5 |
| 4 | Analyzing the relationship between healthy eating and digestive health | Students identify and analyze the relationship between diet and digestive system health or disorders | C4 (Analyzing) | 5 |
| | | **Total** | | 20 items |

### *Data Collection*

Data collection techniques used in this study included observation, interviews, questionnaires, and tests. Observation and interviews were conducted during the

analysis stage to identify learning problems and media needs. Validation questionnaires were administered during the development stage, while teacher and student response questionnaires were distributed during the implementation stage. Pretest and posttest assessments were conducted before and after learning activities using animated video media to measure students' conceptual understanding improvement.

### *Data Analysis*

Qualitative data obtained from observations, interviews, and validator suggestions were analyzed descriptively through data reduction, data presentation, and conclusion drawing. Quantitative data obtained from questionnaires and test results were analyzed using percentage scores and N-Gain analysis. The percentage formula used in this study was:

$$\text{Percentage Score} = (\text{Total Score Obtained} / \text{Maximum Score}) \times 100\%$$

The feasibility of the developed learning media was determined using predefined interpretation criteria based on the percentage scores obtained from expert validation. The feasibility categories used in this study are presented in Table 3.

Table 3. Feasibility Interpretation Criteria

| Percentage (%) | Category |
|---|---|
| 81-100% | Very Feasible |
| 61-80% | Feasible |
| 41-60% | Fairly Feasible |
| 21-40% | Not Feasible |
| 0-20% | Very Infeasible |

To determine the effectiveness of the developed animated video in improving students' conceptual understanding, the normalized gain (N-Gain) score was calculated and interpreted using the criteria presented in Table 4.

$$\text{N-Gain} = (\text{Posttest Score} - \text{Pretest Score}) / (\text{Maximum Score} - \text{Pretest Score})$$

Table 4. N-Gain Interpretation Criteria

| N-Gain Score | Category |
|---|---|
| N-Gain <= 0.30 | Low |
| 0.30 < N-Gain < 0.70 | Medium |
| N-Gain >= 0.70 | High |

### *Instrument Calibration*

Instrument calibration was conducted through validity and reliability testing prior to data collection. The validity test used the point-biserial correlation formula (r-pbis) to determine the validity level of each test item. Items with r-pbis values meeting the minimum threshold were retained, while those below were revised or replaced. The reliability test used the Kuder Richardson-20 (KR-20) formula, with instruments having reliability coefficients greater than 0.70 considered reliable and suitable for data collection (Setyaedhi, 2024). This calibration process ensured that the pretest and posttest instruments measured conceptual understanding accurately and consistently.

## 3. Results and Discussion

### *Analysis Stage*

The analysis stage was conducted through interviews with teachers and fifth-grade students at SDN Tegallega 2 Bogor on October 18, 2025. Based on the interview results, it was found that science learning, particularly digestive system material, still relied on lecture methods and textbooks without utilizing animated video media. Consequently, the learning process was less interactive, students were less enthusiastic, and they experienced difficulties understanding abstract concepts related to the digestive system. Students stated that they had never used animated video media during science learning, that textbook images were static and unhelpful, and that monotonous methods caused boredom and loss of focus. Furthermore, observations revealed that many students frequently consumed unhealthy snacks, highlighting the need to integrate healthy eating education into the learning material.

These findings indicate that the lack of visual learning media remains one of the factors contributing to students' difficulties in understanding abstract science concepts. Since digestive processes occur internally and cannot be directly observed, students require visual representations to understand the sequence of digestion and the functions of digestive organs. This finding supports Nengsih et al., (2024), who reported that limited utilization of instructional media hinders students' understanding of digestive system concepts. The findings also demonstrate the importance of integrating healthy eating education into science learning because students' eating habits are closely related to digestive health. Therefore, the development of animated video media integrated with healthy eating education was considered an appropriate solution to address both conceptual and behavioral learning needs.

The analysis stage generated several outputs that served as the basis for media development. First, the needs analysis revealed that teachers predominantly used lectures and textbooks, while animated learning media had never been implemented in science lessons. Second, learner analysis indicated that fifth-grade students preferred visual and interactive learning activities but experienced difficulties

understanding abstract digestive processes. Third, curriculum analysis confirmed that the developed media aligned with the Grade V science learning outcomes concerning the human digestive system and healthy living. Finally, content analysis identified the need to integrate healthy eating education into digestive system instruction because classroom observations showed that many students frequently consumed unhealthy snacks. These findings became the foundation for determining the learning objectives, media content, instructional strategies, and storyboard design.

### *Design Stage*

At the design stage, the researcher designed the animated video media using the Canva application. The video material focused on the human digestive system integrated with healthy eating education. The design process included selecting backgrounds, animated characters, illustrations, narration scripts, transitions, and supporting audio. The storyboard was designed to ensure that all learning materials were presented systematically and aligned with the learning objectives. The animated video consisted of three main sections: introduction, core material, and closing activities. The introduction section presented learning objectives and character introductions. The core section explained digestive organs, digestive processes, and healthy eating habits. The closing section provided summaries and motivational messages regarding healthy lifestyles.

The design of the animated video was adjusted to the characteristics of elementary school students who generally prefer visual, colorful, and interactive learning media. According to Zunaida, (2022), animated media is suitable for elementary school students because it corresponds to their developmental characteristics and learning preferences. In addition, segmenting the video into several sections was intended to reduce cognitive overload and maintain students' attention throughout the learning process.

The outputs of the design stage included a detailed storyboard, narration script, visual layout, animation sequence, learning objectives, validation instruments, and conceptual understanding test items. The storyboard consisted of three learning segments: (1) introduction and learning objectives, (2) explanation of digestive organs and digestive processes integrated with healthy eating education, and (3) conclusion accompanied by motivational messages encouraging healthy dietary habits. The video duration was designed to be approximately 6–7 minutes to minimize cognitive overload while maintaining students' attention throughout the learning process.

### *Development Stage*

The development stage focused on producing and validating the animated video media. The media was developed using Canva and integrated visual, audio, text, and animation elements to facilitate students' understanding of digestive system concepts and healthy eating habits. The development stage produced the first prototype of the animated video, which was subsequently evaluated through expert

validation. Revisions were carried out based on comments from media, language, and material experts before the product proceeded to classroom implementation. This iterative revision process ensured that the instructional media met quality standards in terms of content accuracy, language appropriateness, visual appearance, and technical functionality. Several representative scenes from the developed animated video are presented in Figure 2.

| Before | After | Notes |
|---|---|---|
| | | 1. Replace/ adjust the avatar and the voice over to ensure suitability. |
| | | 2. Add a white background to the illustrative image used in the explanation. |

Figure 2. Display of the Developed Animated Video Media

Figure 2 presents several scenes from the developed animated video, including the introduction section, explanation of digestive organs, digestive processes, and healthy eating education content. The developed media was designed to provide an engaging and meaningful learning experience for elementary school students.

### *Media Expert Validation*

Media validation assessed visual appearance, layout, animation, navigation, audio quality, and media suitability for elementary school students. Table 5 demonstrates that improvements occurred across all assessed aspects following expert recommendations. The largest improvements were observed in visual appearance and audio quality after replacing the avatar, improving narration clarity, and refining several illustrations. These revisions enhanced the overall instructional quality of the animated video while maintaining consistency with elementary school students' learning characteristics. The results of the media expert validation for each assessment aspect are presented in Table 5.

Table 5. Media Expert Validation Results by Assessment Aspect

| Assessment Aspect | Indicators | First Validation | Second Validation | Improvement |
|---|---|---|---|---|
| Visual appearance | Attractiveness of visual display | 3 | 3 | – |

| | | | | |
|---|---|---|---|---|
| Text and illustrations | Clarity of text and images | 2 | 3 | +1 |
| Color and animation | Suitability of colors and animations | 4 | 4 | – |
| Layout | Arrangement of media elements | 2 | 3 | +1 |
| Design consistency | Consistency between scenes | 4 | 4 | – |
| Ease of use | Ease of operating the media | 4 | 4 | – |
| Navigation | Clarity of navigation and media flow | 3 | 4 | +1 |
| Audio quality | Smoothness of video and audio | 4 | 4 | – |
| Suitability for learners | Compatibility with elementary students' characteristics | 4 | 4 | – |
| Learning objectives | Support for learning objectives | 4 | 4 | – |
| Learning motivation | Ability to increase students' motivation | 3 | 3 | – |
| **Total Score** | | **37/44** | **40/44** | **+3** |
| **Percentage** | | **87%** | **91%** | **+4%** |

The first validation obtained a score of 87%, categorized as very feasible. After revisions were made according to the validator's suggestions, the score increased to 91%. The increase indicates that revisions successfully improved the visual quality and usability of the media. This finding is consistent with Mashuri & Budiyono, (2020), who explained that animated learning videos are effective in visualizing abstract concepts clearly and realistically.

### *Language Expert Validation*

Language validation evaluated grammar suitability, readability, punctuation, sentence effectiveness, and language appropriateness for elementary school students. The revisions focused primarily on simplifying several technical terms, improving sentence structure, and adjusting language style to suit elementary school students' cognitive development. Consequently, the second validation achieved the maximum feasibility score. The detailed validation results for each language aspect are presented in Table 6.

Table 6. Language Expert Validation Results by Assessment Aspect

| Assessment Aspect | Indicators | First Validation | Second Validation | Improvement |
|---|---|---|---|---|
| Readability | Language is easy to understand | 4 | 4 | – |
| Student appropriateness | Appropriate for students' age | 4 | 4 | – |
| Terminology | Appropriate and consistent terminology | 4 | 4 | – |
| Sentence structure | Logical and effective sentences | 4 | 4 | – |
| Clarity | Concise and clear sentences | 3 | 4 | +1 |

| | | | | |
|---|---|---|---|---|
| Grammar | Correct spelling and punctuation | 3 | 4 | +1 |
| Educational language | Polite and educational language | 4 | 4 | – |
| **Total Score** | | **26/28** | **28/28** | **+2** |
| **Percentage** | | **93%** | **100%** | **+7%** |

The first validation obtained a score of 93%, while the second validation reached 100% after revisions. The results indicate that the language used in the animated video was clear, communicative, and appropriate for elementary school students. Proper language use is essential because it supports students' comprehension and minimizes misconceptions during learning.

### *Material Expert Validation*

Material validation focused on the suitability of the material with learning objectives, concept accuracy, presentation sequence, and clarity of explanations. The most substantial revisions involved improving the scientific accuracy of digestive system explanations, reorganizing the sequence of concepts, and strengthening the integration of healthy eating education with digestive system content. These revisions substantially increased the overall quality and curriculum alignment of the instructional media. The validation results are summarized in Table 7.

Table 7. Results of Material Expert Validation

| Assessment Aspect | Indicators | First Validation | Second Validation | Improvement |
|---|---|---|---|---|
| Curriculum alignment | Compatibility with curriculum competencies | 2 | 4 | +2 |
| Learning objectives | Compatibility with learning objectives | 2 | 4 | +2 |
| Student characteristics | Suitability for elementary students | 2 | 4 | +2 |
| Concept accuracy | Accuracy of concepts and facts | 2 | 4 | +2 |
| Terminology | Accuracy of terms and definitions | 2 | 4 | +2 |
| Content depth | Sufficiency and depth of material | 3 | 3 | – |
| Presentation sequence | Logical sequence of material | 3 | 4 | +1 |
| Clarity of explanation | Clarity of explanations | 3 | 4 | +1 |
| Integration among subtopics | Relationship among subtopics | 2 | 4 | +2 |
| **Total Score** | | **21/36** | **33/36** | **+12** |
| **Percentage** | | **59%** | **92%** | **+33%** |

The first validation obtained a score of 59%, categorized as fairly feasible. After revisions, the score increased significantly to 92%, categorized as very feasible. This improvement demonstrates that the revised media fulfilled curriculum requirements and concept accuracy standards. The finding support Adawiyah et al.,

(2024), who stated that audiovisual media improve students' understanding because materials are delivered systematically and interactively. Based on the overall validation results, the animated video media was declared highly feasible for classroom implementation.

### *Implementation Stage*

The implementation stage was conducted on May 13, 2026, involving 26 fifth-grade students at SDN Tegallega 2 Bogor. Students completed pretest assessments before learning activities and posttest assessments after using the animated video media. The implementation activities involved students watching the animated video, participating in classroom discussions, and completing evaluation activities. Students showed enthusiasm and actively participated during the learning process. Following the implementation of the developed learning media, students completed pretest and posttest assessments to measure changes in conceptual understanding. The individual learning outcomes and N-Gain scores of the 26 participants are presented in Table 8.

Table 8. Individual Pretest, Posttest, and N-Gain Results of 26 Students

| No | Code | Pretest | Posttest | N-Gain | Category |
|---|---|---|---|---|---|
| 1 | MDDP | 71 | 100 | 1.00 | High |
| 2 | MG | 67 | 96 | 0.88 | High |
| 3 | JA | 75 | 100 | 1.00 | High |
| 4 | ZNS | 59 | 84 | 0.61 | Medium |
| 5 | AH | 59 | 87 | 0.68 | Medium |
| 6 | FFP | 71 | 96 | 0.86 | High |
| 7 | VA | 63 | 83 | 0.54 | Medium |
| 8 | SA | 67 | 100 | 1.00 | High |
| 9 | IA | 75 | 100 | 1.00 | High |
| 10 | AS | 79 | 100 | 1.00 | High |
| 11 | MFA | 55 | 83 | 0.62 | Medium |
| 12 | LC | 67 | 92 | 0.76 | High |
| 13 | TA | 50 | 87 | 0.74 | High |
| 14 | MAN | 79 | 100 | 1.00 | High |
| 15 | HR | 63 | 87 | 0.65 | Medium |
| 16 | MFA | 55 | 92 | 0.82 | High |
| 17 | MA | 50 | 83 | 0.66 | Medium |
| 18 | DP | 59 | 92 | 0.80 | High |
| 19 | DRP | 55 | 87 | 0.71 | High |
| 20 | MYZ | 58 | 92 | 0.81 | High |
| 21 | HRA | 46 | 87 | 0.76 | High |
| 22 | MA | 59 | 92 | 0.80 | High |
| 23 | SAK | 63 | 83 | 0.54 | Medium |
| 24 | KAP | 75 | 96 | 0.84 | High |
| 25 | AH | 84 | 96 | 0.75 | High |
| 26 | TA | 87 | 96 | 0.69 | Medium |
| Average | 65 | 92 | 0.79 | High | |

The average pretest score was 65, while the average posttest score increased to 92. The resulting N-Gain score was 0.79, categorized as high. Based on individual student data, 18 students (69.2%) achieved high N-Gain scores, while 8 students (30.8%) achieved medium N-Gain scores. No students obtained low N-Gain scores.

The increase in posttest scores indicates that the animated video media effectively improved students' conceptual understanding of digestive system material. The effectiveness of the media can be explained through the integration of visual, audio, text, and motion elements that facilitated concept acquisition. Animated representations helped students visualize digestive processes that cannot be directly observed.

Furthermore, Mayer's Cognitive Theory of Multimedia Learning explains that students learn more effectively when information is presented through both verbal and visual channels simultaneously. The combination of narration, illustrations, animation, and healthy eating examples enabled students to process information meaningfully and connect scientific concepts with everyday experiences. Consequently, students not only understood digestive system concepts but also developed awareness of healthy eating habits.

A distinctive contribution of this study is the integration of healthy eating education into digestive system learning. Unlike previous studies that primarily focused on conceptual understanding, the developed media connected scientific concepts with practical health behaviors. This finding supports (Saputra & Nurlim, 2025), who found a significant relationship between students' understanding of digestive system concepts and healthy eating behavior. Similarly, Hamdan & Padillah, (2024) demonstrated that animated video interventions can improve students' knowledge and motivation regarding healthy food choices.

### *Evaluation Stage*

To provide an overall evaluation of the developed animated video, the results of expert validation together with teacher and student responses were summarized. The overall findings are presented in Table 9.

Table 9. Summary of Validation and Response Results

| Evaluator | Percentage | Category |
|---|---|---|
| Media Expert | 91% | Very Feasible |
| Language Expert | 100% | Very Feasible |
| Material Expert | 92% | Very Feasible |
| Teacher Response | 89% | Very Feasible |
| Student Response | 90% | Very Feasible |

Teacher responses obtained a score of 89%, while student responses reached 90%, both categorized as very feasible. These findings indicate that the animated video media was practical, attractive, and easy to use during classroom learning activities. In this research, reported that the media helped explain digestive system concepts more effectively and increased students' participation during learning activities. Students also stated that the animated video was more interesting and easier to understand than conventional learning methods using textbooks and verbal explanations.

These findings suggest that the developed media not only fulfilled feasibility requirements but also met practicality requirements for classroom implementation. The high response scores demonstrate that the media was positively accepted by users and has potential for broader implementation in elementary science learning. Despite its strengths, several limitations were identified. The implementation of the media requires supporting devices such as laptops, projectors, and speakers, making its application dependent on school facilities. In addition, the media remains relatively one-directional because students primarily receive information from the video without direct interaction. Future studies are therefore recommended to develop more interactive media incorporating quizzes, educational games, or digital evaluation systems to increase students' active participation.

### *Analysis of Pretest-Posttest Based on Bloom's Cognitive Indicators (C1-C4)*

To obtain a more comprehensive description of students' conceptual understanding, pretest and posttest scores were further analyzed according to the cognitive indicators adopted from the revised Bloom's Taxonomy, namely remembering (C1), understanding (C2), applying (C3), and analyzing (C4). The analysis aimed to identify which cognitive dimensions experienced the greatest improvement after students learned using the developed animated video. The detailed improvement in students' conceptual understanding based on these cognitive indicators is presented in Table 10.

Table 10. Improvement of Student's Conceptual Understanding Based on Cognitive Indicators

| Cognitive Indicator | Number of Items | Pretest Mean (%) | Posttest Mean (%) | Improvement (%) | Category |
|---|---|---|---|---|---|
| C1 Remembering | 3 | 67.95 | 96.15 | 28.20 | High |
| C2 Understanding | 7 | 56.59 | 91.21 | 34.62 | High |
| C3 Applying | 5 | 48.46 | 84.62 | 36.16 | High |
| C4 Analyzing | 5 | 37.69 | 76.92 | 39.23 | High |

The results indicate that improvement occurred across all cognitive levels (C1–C4), although the magnitude of improvement differed among indicators. The smallest increase was observed in the remembering (C1) indicator because most students were already able to recall the names of digestive organs before the intervention. Consequently, the opportunity for improvement at this level was relatively limited. A greater increase was found in the understanding (C2) indicator. This finding suggests that the animated video successfully facilitated students in explaining digestive processes, identifying organ functions, and interpreting relationships among concepts. Dynamic visualization enabled students to transform abstract information into meaningful conceptual understanding rather than simple memorization.

The applying (C3) indicator also demonstrated considerable improvement. Students became more capable of applying knowledge about healthy eating habits to real-life situations after observing contextual examples presented in the animated video.

The integration of scientific concepts with everyday experiences allowed students to transfer their understanding into practical decision-making regarding healthy food choices. The highest improvement occurred in the analyzing (C4) indicator. Students showed better ability to analyze relationships between unhealthy eating patterns and digestive disorders, distinguish appropriate and inappropriate eating behaviors, and explain the consequences of dietary habits on digestive health. This finding indicates that the developed learning media did not merely improve factual knowledge but also promoted higher-order thinking skills.

***Discussion***

The findings indicate that the developed animated video effectively improved elementary school students' conceptual understanding of the digestive system while simultaneously introducing healthy eating education in a meaningful learning context. This improvement can be explained through Mayer's Cognitive Theory of Multimedia Learning (CTML), which states that meaningful learning occurs when learners actively select, organize, and integrate information received through dual channels, namely visual and auditory processing. The combination of narration, illustrations, animations, text, and audio in the developed media reduced cognitive load and enabled students to construct more coherent mental representations of digestive processes that are difficult to observe directly. Consequently, students were able not only to remember the names of digestive organs but also to understand their functions, analyze digestive mechanisms, and relate them to healthy eating practices (Angelika et al., 2025; Zakirman et al., 2022).

Each multimedia component contributed differently to students' learning. Animated illustrations visualized abstract digestive processes that cannot be directly observed, while narration guided students' attention toward essential concepts without overloading working memory. Supporting text highlighted key scientific terms, and synchronized audio reinforced concept retention through dual-channel processing. According to CTML, well-integrated multimedia promotes active cognitive processing because learners organize verbal and pictorial information simultaneously before integrating both into long-term memory. This instructional design explains why students showed substantial improvement in conceptual understanding after using the animated video (Angelika et al., 2025; Zakirman et al., 2022).

The present findings are consistent with previous studies demonstrating that animated video enhances elementary students' science learning outcomes. Zakirman et al., (2022) reported that e-animation significantly improved science learning outcomes because animation helps students understand concepts that are difficult to explain using conventional instruction. Likewise, Angelika et al., (2025) found that animated videos increased students' understanding of science concepts by providing dynamic visualization and maintaining learners' attention throughout the learning process.

However, the present study differs from most previous research in an important aspect. Earlier studies primarily focused on improving cognitive achievement in

science learning, whereas the developed media in this study deliberately integrated healthy eating education into digestive system instruction. Rather than presenting anatomy and physiology alone, the animation connected scientific concepts with students' daily eating behaviors through contextual examples, balanced nutrition messages, and healthy food selection. Consequently, students learned not only how the digestive system functions but also why healthy dietary habits are essential for maintaining digestive health. This contextual integration extends the instructional value of the media beyond conceptual understanding toward health literacy development (Kurniawati et al., 2026; Malinda et al., 2023). The integration of healthy eating education represents the primary novelty of this research. Most animated science learning media focus exclusively on improving subject knowledge, whereas this study combines science content with preventive health education within a single instructional resource. The integration enables students to connect biological concepts with authentic daily experiences, thereby strengthening conceptual understanding while fostering awareness of healthy eating habits. Such integration is particularly relevant for elementary school students because dietary habits established during childhood influence long-term health outcomes (Kurniawati et al., 2026; Malinda et al., 2023).

The findings also align with recent educational studies emphasizing that multimedia learning is more effective when scientific concepts are contextualized within real-life situations. Recent research has shown that animated learning media improve not only cognitive achievement but also students' motivation, engagement, and ability to apply knowledge in authentic contexts. Therefore, integrating multimedia-based science learning with healthy eating education provides broader educational benefits by simultaneously supporting conceptual understanding, health awareness, and meaningful learning experiences (Maulana et al., 2025; Reva et al., 2026).

## 4. Conclusion

This study successfully developed an animated video on the human digestive system integrated with healthy eating education using the ADDIE development model. The developed media was demonstrated to be highly feasible for classroom use, as indicated by the expert validation results from media, material, and language experts, as well as positive responses from teachers and students. These findings confirm that the product meets the quality criteria in terms of content, design, language, and usability. The effectiveness test showed that the animated video significantly improved students' conceptual understanding of the digestive system, as reflected by the increase in posttest scores and the high N-Gain category. The integration of visual animations, narration, text, and contextual examples facilitated students in understanding abstract scientific concepts while maintaining their engagement throughout the learning process. A major contribution of this study is the integration of healthy eating education into science learning. Unlike conventional instructional media that primarily emphasize conceptual knowledge, the developed animated video connects digestive system concepts with healthy eating practices, enabling students to understand the relationship between scientific concepts and their daily lives. Therefore, this media can serve as an alternative

instructional resource for elementary science learning to improve conceptual understanding while simultaneously promoting awareness of healthy eating habits and supporting the development of healthy lifestyles among students.

## References

Adawiyah, T. R., Hanifah, N., & Syahid, A. A. (2024). The effect of animated video media on student learning outcomes in economic activities material at elementary school. *Tarbiyah Wa Ta'lim: Jurnal Penelitian Pendidikan Dan Pembelajaran*, *11*(3), 331–340. https://doi.org/10.21093/twt.v11i3.8985

Angelika, M., Junaidi, J., & Yasinta Mahendra. (2025). Using animated videos in science learning on learning outcomes of primary school students: A systematic literature review. *International Journal of Elementary Education*, *9*(3), 381–390. https://doi.org/10.23887/ijee.v9i3.92957

Anjarwati, A., Festawanti, E. D., Wulandari, Y., Rahmadhini, F., & Muthmainnah. (2022). Pemahaman tentang sistem pencernaan manusia dan hewan siswa SDN Sukabumi 6 Probolinggo. *Jurnal Pendidikan, Sains Dan Teknologi*, *1*(2), 250–251. https://doi.org/10.47233/jpst.v1i2.354

Astuti, D. A. D., Agustini, F., & Rofian, R. (2021). Pengembangan media pembelajaran video animasi stop motion materi sistem organ pencernaan manusia siswa kelas V SDN Palebon 03 Semarang. *DIKDAS MATAPPA: Jurnal Ilmu Pendidikan Dasar*, *4*(3), 385–392. https://doi.org/10.31100/dikdas.v4i3.1262

Fahmi, F. (2025). The role of education in building student character. *Global Education Journal, 3*(1), 487–497. https://doi.org/10.59525/gej.v3i1.1192

Hidayat, F., & Nizar, M. N. (2021). Model ADDIE (Analysis, Design, Development, Implementation and Evaluation) dalam pembelajaran Pendidikan Agama Islam. *Jurnal Inovasi Pendidikan Agama Islam*, *1*(1), 28–38. https://doi.org/10.15575/jipai.v1i1.11042

Hamdan, D. F., & Padillah, N. (2024). The effect of learning media about healthy snacks on students' knowledge and attitudes at SDN 38 Bora, Palopo City in 2024. *International Journal of Health and Medicine*, *2*(1), 139–151. https://doi.org/10.62951/ijhm.v2i1.219

Khairunnisaa, S., Kartono, & Salimi, A. (2023). Pengembangan media pembelajaran berbasis video animasi pada pembelajaran tematik muatan Bahasa Indonesia kelas III SD. *AS-SABIQUN*, *5*(4), 1087–1101. https://doi.org/10.36088/assabiqun.v5i4.3642

Kurniawati, K., Badrin, S., Miradwiyana, B., & Tambun, Y. M. (2026). The effect of animated videos on knowledge and attitudes of elementary school students. *Media Keperawatan Indonesia*, *9*(1), 1-8. https://doi.org/10.26714/mki.9.1.2026.1-8

Lestari, L., Rini, C. P., & Gumilar, A. (2024). Analisis pemahaman konsep dalam pembelajaran IPA pada siswa kelas IV SD. *Journal of Education Research*, *5*(4), 4533–4538. https://doi.org/10.37985/jer.v5i4.1590

Linda, N. (2024). Development of animated video media for civic education learning in elementary schools. *Cendekiawan: Jurnal Pendidikan dan Studi Keislaman*, *3*(4), 632–636. https://doi.org/10.61253/cendekiawan.v3i4.436

Mafe, A. N., Edo, G. I., Majeed, O. S., Gaaz, T. S., Akpoghelie, P. O., Isoje, E. F., Igbuku, U. A., Owheruo, J. O., Opiti, R. A., Garba, Y., Essaghah, A. E. A., Ahmed, D. S., & Umar, H. (2025). A review on probiotics and dietary bioactives: Insights on metabolic well-being, gut microbiota, and inflammatory responses. *Food Chemistry Advances*, *6*, 100919. https://doi.org/10.1016/j.focha.2025.100919

Malinda, J., Jalandri, I., & Agusanty, S. F. (2023). The role of education through animation media on knowledge and attitudes towards balanced nutrition in elementary school students. *MEDICA (International Medical Scientific Journal)*, *5*(2). https://doi.org/10.53770/medica.v5i2.500

Martatiyana, D. R., Usman, H., & Lestari, H. D. (2023). Application of the ADDIE model in designing digital teaching materials. *Jurnal Pendidikan dan Pengajaran Guru Sekolah Dasar (JPPGuseda)*, *6*(1), 105–109. https://doi.org/10.55215/jppguseda.v6i1.7525

Mashuri, D. K., & Budiyono. (2020). Pengembangan media pembelajaran video animasi materi volume bangun ruang untuk SD kelas V. *Jurnal Penelitian Pendidikan Guru Sekolah Dasar*, *08*(5), 893–903.

Maulana, A., Yuliyanto, A., & Amanaturrakhmah, I. (2025). The influence of animated video media on elementary school students' motivation and learning outcomes in science learning. *Indonesian Journal of Elementary Education (IJEE)*, *7*(2). https://doi.org/10.24235/ijee.v7i2.21792

Maulani, S., Nuraisyah, N., Zarina, D., Velinda, I., & Aeni, A. N. (2022). Analisis penggunaan video sebagai media pembelajaran terpadu terhadap motivasi belajar siswa. *Jurnal Pendidikan Dan Teknologi Indonesia*, *2*(1), 539–546. https://doi.org/10.52436/1.jpti.134

Mayer, R. E. (2021). Evidence-based principles for how to design effective instructional videos. *Journal of Applied Research in Memory and Cognition*, *10*(2), 229–240. https://doi.org/10.1016/j.jarmac.2021.03.007

Monica, D. A., & Kurniawan. (2026). Cooperative learning method with role playing in improving students' understanding of concepts and communication skills. *Journal of Facilitating Learning and Improving Performance, 1*(1), 1–10.

Navarrete, E., Nehring, A., Schanze, S., Ewerth, R., & Hoppe, A. (2023). A *closer look into recent video-based learning research: A comprehensive review of video characteristics, tools, technologies, and learning effectiveness* (Version 2) [Preprint]. arXiv. https://doi.org/10.48550/arXiv.2301.13617

Nengsih, S., Haryanti, Y. D., & Yonanda, D. A. (2024). Optimalisasi penggunaan media pembelajaran untuk memahami sistem pencernaan manusia pada tingkat sekolah dasar. *Sekolah Dasar: Kajian Teori Dan Praktik Pendidikan*, *33*(1), 49–58. https://doi.org/10.17977/um009v33i12024p49-58

Radmehr, F., & Drake, M. (2019). Revised Bloom's taxonomy and major theories and frameworks that influence the teaching, learning, and assessment of mathematics: A comparison. *International Journal of Mathematical Education in Science and Technology*, *50*(6), 895–920. https://doi.org/10.1080/0020739X.2018.1549336

Reva, R., Rahman, A., Nuraini, N., Nashrullah, N., & Purbarani, D. A. (2026). The effectiveness of animated videos and Quizizz on learning outcomes in

natural and social sciences among fourth-grade elementary students. *Journal of Innovation and Research in Primary Education*, *5*(1), 1739–1749. https://doi.org/10.56916/jirpe.v5i1.3218

Reza, M., & Tambunan, E. P. S. (2024). Development of animated video on human digestive system material based on Animaker application. *Bioedukasi*, *22*(2), 278-288. https://doi.org/10.19184/bioedu.v22i2.48863

Rezai, A., Ahmadi, R., Ashkani, P., & Hosseini, G. H. (2025). Implementing active learning approach to promote motivation, reduce anxiety, and shape positive attitudes: A case study of EFL learners. *Acta Psychologica*, *253*, 104704. https://doi.org/10.1016/j.actpsy.2025.104704

Saputra, M. I. E., & Nurlim, R. (2025). Korelasi pemahaman materi sistem pencernaan dan pengetahuan gizi dengan perilaku menjaga pola makan sehat siswa kelas XI SMA. *Jurnal Ilmiah Nusantara (JINU), 2*(3). https://doi.org/10.61722/jinu.v2i3.4427

Setyaedhi, H. S. (2024). Comparative test of Cronbach's alpha reliability coefficient, KR-20, KR-21, and split-half method. *Journal of Education Research and Evaluation*, *8*(1), 47–57. https://doi.org/10.23887/jere.v8i1.68164

Soesilo, A., & Munthe, A. P. (2020). P Pengembangan buku teks matematika kelas 8 dengan model ADDIE. *Scholaria: Jurnal Pendidikan Dan Kebudayaan*, *10*(3), 231–243. https://doi.org/10.24246/j.js.2020.v10.i3.p231-243

Syafitri, A. R., Novriyanti, E., & Nasril, S. (2025). Pengaruh stres dan pola makan terhadap gangguan pencernaan. *Jurnal Pendidikan Kesehatan*, *14*(1), 26–33. https://doi.org/10.31290/jpk.v14i1.4588

Ubaidillah, A., Faridah, L., & Aini, K. N. (2025). *An*alysis junior high school students' conceptual understanding of flat-sided space structures based on Bloom's taxonomy. *Riemann: Research of Mathematics and Mathematics Education, 7*(2), 168–176. https://doi.org/10.38114/reimann.v7i2.108

Waruwu, M. (2024). Metode penelitian dan pengembangan (R&D): Konsep, jenis, tahapan dan kelebihan. *Jurnal Ilmiah Profesi Pendidikan*, *9*(2), 1220–1230. https://doi.org/10.29303/jipp.v9i2.2141

Zakirman, Z., Rahayu, C., & Gusta, W. (2022). E-animation media to improve the understanding of elementary school science learning. *Jurnal Basicedu*, *6*(3), 3411–3419. https://doi.org/10.31004/basicedu.v6i3.2595

Zunaida, D. A. (2022). *Pengaruh Media Pembelajaran Video Animasi Interaktif terhadap Minat Belajar Siswa pada Mata Pelajaran Matematika Kelas II SD Negeri Menanggal 601 Surabaya*. Universitas PGRI Adi Buana Surabaya.

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