



BOR Learning Video Development (Based on Obesity Research) to Improve Motivation and Understanding of The Digestive System Concept for High School Students

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Article	Info	Abstract
Article History:		Observation results at MAN 1 Grobogan showed that there were students in grade XI MIPA who had difficulty understanding the digestive system material and had low learning motivation. The learning process tends to be teacher-centered, so that student interest is reduced, even though learning media such as YouTube have been used. However, because the media is not research-based, this causes students to misunderstand the concept of the digestive system. This study aims to analyze the feasibility and test the effectiveness of BOR learning videos for increase motivation to learn and understanding of the concept of the digestive system of high school students. The type of research used is <i>Research and Development</i>. The sample of this study were students of grades XI and XII MAN 1 Grobogan. The data collected were (1) Data on the feasibility of the video which included the validity of the material and media, teacher responses, and student responses. (2) Data on the effectiveness of increasing learning motivation and understanding of the concept. The results of the study showed, 1) The learning video of high school students was declared suitable for use because it met three aspects, namely: a) The results of the material validity of 97% (very valid) and the media validity of 98% (very valid), (b) Teacher responses of 97% (very good), c) Student responses of 87.5% (very good). 2) Learning video effective increase learning motivation with an <i>N-gain</i> value of 0.7 (moderate category). 3) Effective learning videos improve students' conceptual understanding with an <i>N-gain</i> value of 0.5 (moderate category). The conclusion is that the BOR learning video is suitable for use in learning and is able to improve students' learning motivation and conceptual understanding in learning the digestive system material.
Received : June 2025		
Accepted : March 2026		
Published : April 2026		
Keywords:		
	BOR Learning Videos, Motivation, Concept Understanding, Digestive System	

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p-ISSN 2252-6579
e-ISSN 2540-833X

INTRODUCTION

Biology learning includes efforts to systematically find out and understand nature. Therefore, biology learning does not only focus on mastering knowledge in the form of facts and concepts, but also emphasizes the aspect of discovery. It is expected that students can think critically, innovatively, and creatively in accordance with the development of science and technology (Widiya, 2022) . The objectives of biology learning include the cognitive, affective, and psychomotor domains , all three of which are inseparable parts (Noviar & Hastuti, 2015) .

After conducting observations, it was found that students' understanding of the concept of the digestive system was still largely wrong . During the learning process, it was found that students were less enthusiastic because the method used was teacher *-centered* , so that students looked passive and acted as listeners. As a result, student learning achievement is less than optimal. In addition, learning has used media in the form of YouTube, only not based on research. The impact of all of that is a wrong understanding in students regarding the concept of digestion.

To overcome the misconception *and* low learning motivation of class XI MIPA MAN 1 Grobogan students , innovation is needed in the form of learning supported by media . According to Windasari and Syofyan (2019) , the use of learning media can make the learning process more fun and interesting, while increasing students' learning motivation. Media in the form of videos, with a combination of audio and visual elements, is able to present learning materials more interestingly and in-depth than conventional learning models .

The learning video is also designed with a research approach that can arouse curiosity in students , thus encouraging them to conduct in-depth research and analysis. The research will then lead to the child's understanding of the concept. The selection of learning media in the form of videos is in line with the lecturer's research that has been conducted entitled "Analysis of Cholesterol and Triglyceride Levels in Hyperlipidemia Rat Models with Rambutan Skin Extract Treatment". Therefore, the selection of media in the form of learning videos not only contributes to improving the quality of teaching in the field of biology but also supports the integration of digital technology into ongoing research.

The description then the author intends to conduct this research to develop and analyze the feasibility and effectiveness of the BOR (*Based on Obesity Research*) *Learning Video in learning the digestive system. The goal is to determine the extent to which the BOR (Based on Obesity Research) Learning Video can strengthen learning motivation and understanding of the concept of the digestive system of high school students.*

RESEARCH METHOD

The approach in this study uses a quantitative approach. The type of research used in this study is R&D/ *Research and Development* . Research The development model used in this study uses the development model according to Sugiyono . This study is divided into two stages, namely the development of BOR (*Based on Obesity Research*) learning videos and the implementation stage or product trial stage. The development stage of the BOR (*Based on Obesity Research*) learning video was carried out at the Biology Laboratory of Semarang State University. The implementation stage or small-scale and large-scale product trials were carried out at MAN 1 Grobogan. The learning video testing stage consists of two stages, namely validity testing and effectiveness testing. The validity test was carried out by a validator consisting of media and material validators, teacher responses and student responses. After the learning video was declared valid, the video was tested for its effectiveness in an effort to increase students' learning motivation and conceptual understanding. The effectiveness test for increasing learning motivation and conceptual understanding was carried out at MAN 1 Grobogan by students in grades XI.2 and XI.3.

The BOR (*Based on Obesity Research*) learning video is said to be valid if the results of the validity test by material and media experts show a percentage with a valid to very valid category, the results of teacher responses and student responses show a percentage with a good to very good category. Testing the effectiveness of the BOR (*Based on Obesity Research*) learning video in increasing learning motivation and

understanding of the concept of the digestive system using research instruments in the form of a learning motivation questionnaire sheet and concept understanding test questions. The BOR learning video is said to be effective in increasing learning motivation and understanding of the concept of the digestive system if students show an increase in percentage before and after carrying out learning based on the *N-gain value* with a moderate to high category.

RESULTS AND DISCUSSION

media has a significant role in supporting the learning process to be more effective and efficient. The existence of learning media can make it easier for students to understand the material presented by the teacher. In addition, teachers can also use media to help explain concepts that are difficult to explain verbally. According to Mauludin *et al.*, (2017) The material on the human digestive system is difficult to convey directly, most of the processes take place in the body and are not visible to the naked eye . The digestive organs cannot be observed directly, so discussing this material is a challenge for students . Therefore, the use of learning media is needed that can make it easier or help students learn material about the human digestive system more effectively (Putra & Wulandari, 2021) . BOR learning video learning media is a solution in learning including material about the human digestive system.

Based on Obesity Research) Learning Videos

Feasibility refers to the extent to which a product is considered to meet certain requirements, standards, or criteria so that it can be considered suitable for use. This term reflects the level of suitability of the product designed to achieve the desired goals. In the context of the BOR (*Based on Obesity Research*) learning video product, feasibility is measured through three main aspects: the results of expert validation of materials and media, teacher responses, and student responses to the developed learning videos. This learning video is declared feasible in learning the digestive system for class XI SMA if the results of the validity of the material and media, teacher responses, and student responses are in the good or very good category.

Validity of Material

The material expert who became the validator in this study was Prof. Dr. Lisdiana, M.SI. as a lecturer at Semarang State University . This validation aims to determine the material expert's assessment of the BOR learning video that was developed. The validation was carried out on December 5, 2024. There are two aspects in the validated material components, namely (1) the validity of the content aspect, (2) the validity of the audio-visual communication aspect. The assessment results data are presented in Table 4.1.

Table 4.1 Validity of BOR Learning Video Materials

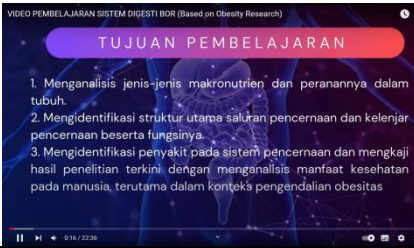
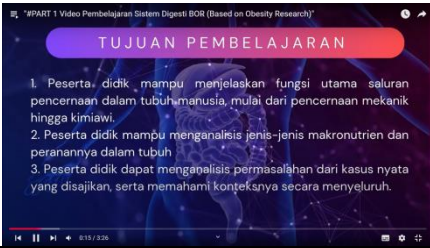
Assessment Indicators	Score Acquisition	Max Score	Percentage	Criteria
Validity of content aspects	16	16	100%	Very valid
Validity of aspects communication audio visual	15	16	94%	Very valid
Final Score	31	32	97%	Very valid

The aspect of content suitability consists of 4 indicator points, including videos used with appropriate material weight , learning objectives are relevant to learning outcomes, learning objectives in the video are formulated clearly and the content of the material in the video is in accordance with learning objectives. Learning sources or references play an important role in designing quality materials that meet established standards. (Prasaja *et al.* , 2022) . Good learning is certainly based on a theory that is in accordance with the characteristics of the materials and media used by educators. Currently, the availability of learning resources as information is not only in the form of books. According to (Sidebang, Napitupulu & Simaremare, 2021) materials made in the form of videos are a solution to overcome difficulties in the learning process because they can be accessed by students at any time . Learning objectives are the basis for planning all learning

activities, from the selection of materials, methods and strategies, to assessment.

In the aspect of audio-visual communication, there are 4 indicator points, including videos made according to learning outcomes, the delivery of material in the video is sequential, logical and systematic, the description in the video is clear and the video can provide a detailed picture of the digestive system material. There is a revision from the material validator so that learning objectives are adjusted in each part of the video, this is done so that students can more easily focus on specific material and facilitate the preparation of material systematically. According to Hernawan & Novi (2017), delivering material in a sequential and systematic manner allows students to master all competencies as a whole. The suitability of material aspects is very important to avoid misunderstandings that occur in students. Therefore, there is a revision to the use of scientific language that can reduce the potential for misunderstandings or different interpretations of biological phenomena. In addition, the material expert validator also revises the title of the learning video to be adjusted in each part of the video, the aim is to provide clear guidance on what will be learned in that section. The video that is made is expected to provide a real picture of the material being taught, namely the human digestive system material.

Table 4.2 Material Expert Suggestions for BOR Learning Videos

No	Description Suggestion
1.	The title of the learning video is adjusted for each part. Before  After 
2.	Change spelling using scientific language Before  After 
3.	Changing the title of the research step Before  After 
4.	Learning objectives are adjusted in each part Before  After 

The results of the percentage of material validity obtained a final score of 97% with very valid criteria. The results of this valid category indicate that this material has been compiled based on learning

objectives relevant to learning achievements, learning objectives in the video are formulated clearly and the content of the material in the video is in accordance with learning objectives. In addition, the delivery of material in the video is sequential, logical and systematic, the description in the video is clear and the video can provide a detailed picture of the digestive system material.

In line with the statement of Taufik *et al.*, (2022) that material that is compiled by taking accuracy into account can reduce misconceptions and reduce multiple interpretations for students. The material presented in the learning video is that students can explain the digestive system and its relationship to obesity, explain the main functions of the digestive system and macronutrients. Sasmita (2023) The use of video media is designed to make the material more comprehensive and effective by selecting topics that suit students' interests. In addition, This media can increase student motivation, make it easier for teachers in the teaching process, and make it easier for students to understand related activities and ideas.

Validity of Material

The media expert who became the validator in this study was Dr. Sigit Saptono, M. Pd as a lecturer at Semarang State University with expertise in the field of learning media. This validation aims to determine the media expert's assessment of the BOR learning video that was developed. The validation was carried out on December 5, 2024. There are three aspects in the media components that are validated, namely (1) software validation, (2) audio-visual communication validation, (3) educational design validation. The assessment results data are presented in the following table:

Table 4.3. Results of Validation of BOR Learning Video Media

Assessment Indicators	Score Acquisition	Max Score	Percentage	Criteria
Software validation	12	12	100%	Very valid
Audio visual communication validation	20	20	100%	Very valid
Validation of educational design	15	16	94%	Very valid
Final Score	47	48	98%	Very valid

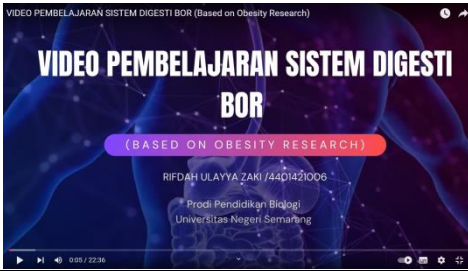
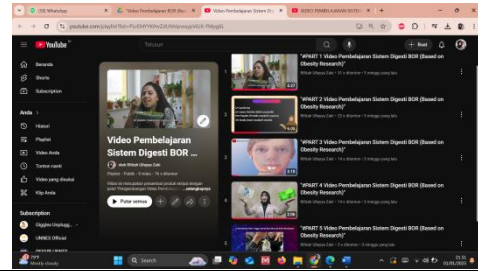
Based on the results of the validation data analysis by media experts, the average media validity score was 98% with very valid criteria. A media is said to be valid if the validity score is >50%. However, minor revisions are still needed based on suggestions and input from the validator to improve this media. The suggestions from media experts for the BOR learning video developed are as follows.

The software validation aspect consists of 3 indicator points, including easy-to-use and simple-to-operate videos, videos can be installed on various existing electronic devices, and videos can be viewed repeatedly at any time. This is in line with Putri's opinion (2017) that good learning is ideally easy to operate, so that students can easily use the media to help them understand the learning material. The learning videos created must be safe from viruses so that they can be used repeatedly, without experiencing any damage or technical disruption. The ability to re-watch this material is very helpful for students when they have not understood the contents of the lesson, so that it can facilitate the speed of student learning. In addition, teachers can also use this video media as an evaluation tool, to see how far the students' understanding of the material that has been delivered has increased. (Murningsih, 2019).

audio-visual communication validation consist of 5 points, including communicative videos or do not cause double interpretations, the material in this video uses illustrations that are appropriate to the material, the appearance of this video is simple and able to attract attention, the sound is clear, the narration is in accordance with the text/images presented, *sound effects*, and *background*. According to Puspitasari (2017) a communicative learning video, where the language used is not convoluted and must continue directly to the *point*. Presenting material using illustrations in the form of animations and real illustrations that can improve students' understanding and presenting questions that can increase students' curiosity (Primasari, Suparmanto & Imansyah, 2019; Purwadhi, 2019).

The validation aspect of educational design consists of 4 points, including the presentation of interesting and easy-to-follow videos for students, the video procedure steps are sequential, students can learn independently, and the material presented in the video is systematic. Overall, the indicators get the maximum score, but only 1 item gets a score of 3 on the indicator of material presented in the systematic video. There are learning videos that are not in accordance with the clear and sequential flow of material. This is because there is a revision from the media validator, namely the video is separated based on the presentation part. The title that is adjusted to each part of the video helps break down more complex material into pieces that are easier to understand. The appearance of the video in this digestive system learning must be varied, simple to attract students' attention, make them more focused and interested in the learning process. Each part has its own identity and is not mixed with other materials.

Table 4.4 Media Expert Suggestions regarding BOR Learning Videos

No	Description Suggestion
1	The learning video is made into several parts Before  After 

The results of the media validity percentage got a final score of 98% with very valid criteria. The results of this valid category show that this video is easy to use and simple in its operation, and the video can be installed on various existing electronic devices. In addition, communicative videos or do not cause double interpretations, the material in this video uses illustrations that are appropriate to the material. In line with the opinion of Astuti, Panjaitan & Titin (2021) that the use of sound and images in video displays can help information enter through the ears/eyes, and by using video media students feel as if they are involved in it so that they can improve student understanding.

Teachers' Responses to BOR Learning Videos

The teacher response questionnaire was used to determine the teacher's response to the developed BOR learning video. The response questionnaire consists of 5 aspects, namely software aspects, *audio-visual communication*, educational design, content and presentation contained in 19 statement items. The following is the conversion of the assessment on the teacher response questionnaire related to the developed BOR learning video.

Table 4.5 Teacher Responses to BOR Learning Videos

Assessment Indicators	Score (%)	Criteria
Software Aspects	100%	Very good
<i>Audio Visual</i> Communication Aspects	96%	Very good
Educational Design Aspects	92%	Very good
Content Aspect	100%	Very good
Presentation Aspects	100%	Very good
Average	97%	Very good

The results of the percentage of teacher responses got a final score of 97%, so that the teacher's response to the BOR learning video developed in the very good category. The results of this very good category indicate that the BOR learning video can be controlled by users and is easily accessible by users and the *audio-visual communication aspects* used are good in terms of clear sound, narration according to the text/images presented, *sound effects*, and *backgrounds* do not interfere with student understanding. In addition, the presentation of the video is interesting and easy for students to follow, the video procedure steps are sequential and the content or content of the material presented is good, the material presented is in accordance with the objectives and weight of learning.

In addition to scoring, teachers also provide suggestions in the form of teacher animations used in the introduction of the material to further improve its quality. This input is considered as revision material for the initial product. Based on the assessment of teacher responses, it can be concluded that the BOR learning video can be tested at the next stage, namely a large-scale trial. In line with the opinion expressed by Puryono (2020) that animated video media can help teachers in delivering learning materials to students so that students can easily understand the material delivered by the teacher.

Student Responses to BOR Learning Videos

The student response questionnaire was given to find out students' responses to the BOR learning video that was developed. The questionnaire consists of 5 aspects, namely software aspects, *audio-visual communication*, educational design, content and presentation contained in 19 statement items. The response

questionnaire was distributed to 15 students of class XII MAN 1 Grobogan.

Table 4.6 Student Responses to BOR Learning Videos

Assessment Indicators	Score (%)	Criteria
Software Aspects	88.3%	Very good
Audio Visual Communication Aspects	86.1%	Very good
Educational Design Aspects	86.7%	Very good
Content Aspect	88.8%	Very good
Presentation Aspects	88.3%	Very good
Average	87.5%	Very good

The results of the percentage of student responses got a final score of 87.5%, so that the student response to the BOR learning video developed was in the "Very Good" category. The results of this very good category indicate that the BOR learning video can be controlled by users and is easily accessible by users and the *audio-visual communication aspects* used are good in terms of clear sound, narration according to the text/images presented, *sound effects*, and *the background* does not interfere with student understanding. In addition, the presentation of the video is interesting and easy for students to follow, the video procedure steps are sequential and the content or content of the material presented is good, the material presented is in accordance with the objectives and weight of learning

Limited trials with student response instruments aim to obtain the level of student response to the development of BOR learning videos that are made whether the BOR learning videos receive positive or negative responses, so that students can understand the content in the video and use it as input into the final product. In line with the statement of Nugraha *et al.*, (2019) that it is expected that feedback in the form of comments, ideas and criticism for product development will also be provided as part of a limited test through a student response questionnaire, which is carried out to determine the value of the product produced.

Effectiveness of BOR (Based on Obesity Research) Learning Videos

One way to encourage students' enthusiasm for learning and learning outcomes is through the use of BOR learning video media. In this learning, students not only listen and receive material from the teacher, but also need media as a teaching aid to increase activity and change student behavior and thinking. The assistance of BOR learning video media is expected to help students better understand the material about the human digestive system, and enable students to achieve maximum learning outcomes . BOR learning videos have a major impact on learning because they have been proven to increase potential, attract attention, and visualize the concept of imagination, objects, and their relationships (Puspita, 2017) .

Effectiveness of Learning Motivation

To determine the effectiveness of BOR (Based on Obesity Research) learning videos to strengthen students' learning motivation. conducted by giving a questionnaire to 72 students of class XI.2 and XI.3 MAN 1 Grobogan. *The pretest* was used to measure learning motivation before conducting learning using BOR learning videos , while *the posttest* was used to measure learning motivation after conducting learning using BOR learning videos . The results of *the pretest* and *posttest* of learning motivation are explained in the following table:

Table 4.10 Learning Motivation

Variables	Mark	
	<i>Pretest</i>	<i>Posttest</i>
Lowest value	40	49
The highest score	84	99

Based on the results of the learning motivation ability test conducted in 2 classes, namely class XI.2 and XI.3 MAN 1 Grobogan with a total of 72 students, the average pre-test score was 66.43 and the average post-test score was 88.50 with a maximum score that could be obtained, namely 99. The results of *the pre-test* and *post-test* showed an increase in the *post-test* score after the use of the BOR learning video. Although the *post-test results* increased, it did not mean that it increased students' learning motivation, so a normality gain test (*N-gain*) was calculated to determine whether or not there was an increase in each student's learning motivation. The results of the *N-gain measurement* are presented in table 4.10 below.

Table 4.11 Recapitulation of *N-Gain* Test Results

<i>N-Gain</i>	Category	Motivation to learn	
		Amount	Percentage
$g \geq 0.7$	Tall	52	72.2%
$0.3 < g < 0.7$	Currently	15	20.8%
$g \leq 0.3$	Low	5	7%
Average		0.7	
Criteria		Tall	

Referring to the results of the *N-gain* test, it shows that 15 people obtained *N-gain* with medium criteria while 52 people obtained *N-gain* with high criteria. This shows that 93% of the total students experienced an increase in learning motivation. The average *N-gain* value obtained was 0.7 or in the high criteria. Therefore, the BOR learning video that was developed is effectively used as a learning medium to increase student learning motivation.

learning motivation that are integrated and measured in the use of BOR learning videos, namely: 1) Attention, 2) Relevance, 3) Confidence, 4) Satisfaction. (Setyowati, Qadar & Efwinda, 2022). The results of the recapitulation of the measurement of students' learning motivation abilities are presented in table 4.9 below.

Table 4.12 Recapitulation of Percentage of Learning Motivation Indicators

No	Learning Motivation Ability Indicators	Percentage e Pretest	Percentage Posttest
1.	Attention (Attention)	65.4%	89.3%
2.	Relevance (Relevance)	65.4%	87.3%
3.	Confidence (Self Confidence)	67.1%	88.2%
4.	Satisfaction	67.5%	88.3%
Total		66.3%	88.2%

Based on the data obtained from the recapitulation of the value of the student learning motivation indicator, it shows a difference in the percentage results before learning using BOR learning videos and after BOR learning. The percentage results after learning using BOR learning videos show that students in grades XI 2 and XI 3 MAN 1 Grobogan in completing the learning motivation questionnaire obtained a percentage of 88.2% (high category). Learning motivation with a high category shows satisfactory achievement. This is because the learning video is more innovative so that it can improve the quality of learning and increase students' interest in learning.

Learning videos the developed BOR can build students' interest in learning and must be adjusted to the needs of students which can later be used as learning media in schools (Isnaini, Firman & Desyandari, 2023). The products that will be produced using the help of the *Capcut* application, Adobe After Effects CC, Adobe Audition and *Adobe Illustrator* with a series equipped with a collection of storylines, images visualized with animation, movements to create the illusion of movement, effects, text, and sound, as well as good graphic quality, it can make it easier for students to receive material information and can provide a feeling of pleasure to students so as to provide maximum understanding.

Effectiveness of Concept Understanding

To determine the effectiveness of the BOR (*Based on Obesity Research*) learning video in strengthening understanding of the concept of the digestive system. conducted by giving pretest and posttest to 72 students of class XI.2 and XI.3 MAN 1 Grobogan. *The pretest* was used to measure the understanding of the concept of digestion before learning using the BOR learning video, while *the posttest* was used to measure the understanding of the concept of digestion after learning using the BOR learning video. The results of *the pretest* and *posttest* of understanding the concept of the digestive system are explained in the following table:

Table 4.7 Conceptual Understanding

Information	Mark	
	Pretest	Posttest
Lowest value	30	60
The highest score	100	100

Based on the results of the conceptual understanding ability test conducted on 2 classes, namely class XI.2 and XI.3 MAN 1 Grobogan with a total of 72 students, the average *pre-test* score was 67.08 and the average *post-test* score was 85.14 with a maximum score that can be obtained is 100. The results of the *pre-test* and *post-test* showed an increase in the *post-test* score after the use of the BOR learning video. Although the *post-test* results increased, it did not mean that students' conceptual understanding increased, so a normality gain test (*N-gain*) was calculated to determine whether there was an increase in each student's conceptual understanding ability. The results of the *N-gain* measurement are presented in table 4.8 below.

Table 4.8 Recapitulation of *N-Gain* Test Results

<i>N-Gain</i>	Category	Understanding the Concept of Digestion	
		Amount	Percentage
$g \geq 0.7$	Tall	28	38.9%
$0.3 < g < 0.7$	Currently	25	34.7%
$g \leq 0.3$	Low	19	26.4%
Average		0.5	
Criteria		Currently	

Referring to the results of the *N-gain* test , it shows that 25 people obtained *N-gain* with moderate criteria while 28 people obtained *N-gain* with high criteria. This shows that 73.6% of the total students experienced an increase in their conceptual understanding ability. The average *N-gain* value obtained was 0.5 or in moderate criteria. Therefore, the BOR learning video developed is effectively used as a learning medium to improve students' conceptual understanding ability.

the use of BOR learning videos, namely: 1) Interpreting , 2) Giving examples , 3) Classifying , 4) Summarizing , 5) Drawing inferences , 6) Comparing , 7) Explaining . (Widodo *et al.* , 2016) . The results of the recapitulation of the measurement of students' conceptual understanding abilities are presented in table 4.8 below.

Table 4.9 Recapitulation of Percentage of Concept Understanding Ability Indicators

No	Concept Understanding Indicator	Pretest Percentage	Percentage Posttest
1.	Interpreting	65.3%	90.3%
2.	Giving examples	56.4%	79.1%
3.	Classifying	60.4%	82%
4.	Summarizing	66%	87.5%
5.	Drawing inferences	66.2%	86.1%
6.	Comparing	74%	85%
7.	Explaining	69.4%	91%
Total		58%	86%

Based on the data obtained from the recapitulation of the indicator values of students' conceptual understanding abilities, it shows a difference in the percentage results before learning using BOR learning videos and after BOR learning. The percentage results show that students in grades XI 2 and XI 3 MAN 1 Grobogan in solving digestive system problems obtained a conceptual understanding percentage of 86% in the high category. Concept understanding with a high category shows satisfactory achievement. This is because most students have mastered the concepts and science in the material about the digestive system.

Effective learning videos can improve understanding of digestive system concepts by providing clear visualizations of internal body processes , structured and gradual delivery of materials . In addition, difficult materials can be simplified with easy-to-understand language and supported by interesting illustrations. Videos also allow repetition of materials according to student needs, providing an opportunity to better understand concepts that have not been mastered. Therefore , learning videos can create a more interactive, interesting, and effective learning experience in understanding the digestive system.

CONCLUSION

Based on the discussion of the research results that have been conducted, it can be concluded that 1) High school student learning videos are declared suitable for use because they meet three aspects, namely: a) The results of the material validity of 97% (very valid) and the media validity of 98% (very valid), (b) Teacher responses of 97% (very good), c) Student responses of 87.5% (very good). 2) Learning videos effective increase learning motivation with an *N-gain value* of 0.7 (moderate category). 3) Effective learning videos improve students' conceptual understanding with an *N-gain value* of 0.5 (moderate category). This shows that the BOR learning video is suitable for use in learning and is able to improve students' learning motivation and conceptual understanding in learning the digestive system material.

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