Volume 13 (2) 2025, 79-87

Jurnal Pelita Pendidikan

Journal of Biology Education

https://jurnal.unimed.ac.id/2012/index.php/pelita/index

eISSN: 2502-3217 pISSN: 2338-3003

DEVELOPMENT OF VIDEO LEARNING MEDIA ON EXCRETION SYSTEM MATERIAL FOR CLASS XI SMA NEGERI 18 MEDAN T.A. 2023/2024

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ARTICLE INFO:

Article History:

Received: April 14th, 2025
Revised: May 22th, 2025
Accepted: June 30th, 2025

Keywords:

Learning videos, learning outcomes, learning media

ABSTRACT

This research aims to develop and test the feasibility of video learning media and test its influence on student learning outcomes in the distribution stage on human excretory system material. Learning media is developed based on the 4D development model which consists of four stages, namely definition, design, development and distribution. Media is validated by media experts and learning experts. Responses from biology teachers and students of class XI MIA 1 SMA Negeri 18 Medan. Research data was obtained through validation instruments, questionnaires and cognitive tests. Data was analyzed qualitatively and quantitatively. The research results showed that the video learning media developed was considered very feasible by material experts (97,94%), media experts (93,66%). Video learning media was rated as very appropriate and very good by biology teachers (96.94%) and students (82.91%). From the t test, the calculated t value = 13,491 and t table = 1.69092 which shows that t calculated > t table. These data show that cognitive test results have increased significantly after using the video learning media developed.

How to Cite:
Sipayung, Y & Sipahutar, H. (2025). Development Of Video Learning Media On Excretion System Material For Class XI SMA Negeri 18 Medan T.A. 2023/2024, 13(2): 79-87.

Introduction

The learning process can take place effectively and efficiently if it is assisted by learning media because this media can overcome the limitations of the senses, space and time in learning (Mellisa, 2022). A teacher's job is to help and facilitate students to achieve learning outcomes in accordance with established competency standards (Okvireslian, 2021). The development of information technology and its use in the world of education can help teachers to teach more easily and can help overcome learning problems faced by teachers and students (Arridho et al., 2023; Mahmudi et al., 2023).

The reality in the field shows that student learning outcomes are still low due to a lack of learning media and this has an impact on low understanding of learning material (Ahmad & Mustika, 2021). The use of media that is still insufficient or learning media that is still lacking in variety causes boredom which leads to low learning outcomes. Interviews conducted with students showed that 83% of students expected the use of video media in learning because 86% of students felt that the use of learning videos could motivate them in learning. An interview with one of the biology teachers at SMA Negeri 18 Medan revealed that the biology learning process still focuses on the teacher and the use of learning media is still less varied. Learning still relies on whiteboards, printed materials in the form of textbooks with certain themes and presentation slides in the form of PowerPoint. Even though the teacher has also tried to use video media for certain material, these videos are not made by the teacher but are videos available on YouTube. As a result video content often does not match, or does not cover all, learning indicators and must be achieved. Therefore, there is a great need for learning videos developed by teachers themselves with learning indicators.

Video media that displays moving images and sound, contains descriptive words or sentences, contains learning messages and conveys various kinds of knowledge (Mahlianurrahman, 2022) has many advantages, such as increasing students' responsiveness, making it easier for students to receive learning material, helping teachers in explains, and can be used as an alternative for teachers who usually use the lecture method (Nurwinda et al., 2022). Video media is very suitable for use in face-to-face learning as well as in distance learning. Video media is superior to non-video media because it can explain the real situation of a process, phenomenon or event, users can repeat certain parts to see a more focused picture, faster and more effective in conveying messages than text media, and able to clearly demonstrate the simulation or procedural steps or methods (Gabriela, 2021; Nurfadhillah et al., 2021).

Excretory system material is one of the materials that is difficult for students to understand because it contains concepts, processes and events with a fairly high level of difficulty. This material contains a series of processes that occur in the human body involving the body's organs. Qumillaila (2020) reported that students often experience errors in understanding concepts when learning biology material, especially the excretory system, because the material is not easy for students to understand, especially material about the kidneys. Therefore, it is very necessary to develop video learning media so that student learning outcomes in biology subjects, especially excretory system material, can be improved.

The general aim of this research is to develop learning videos on excretory system material in order to improve student learning

outcomes. Specifically, the research is aimed at: 1) knowing the feasibility of video learning media according to material and media experts, 2) knowing the responses of teachers and students to video learning media, and 3) knowing student learning outcomes after using video media at the disseminate stage.

Methods

Place and Time of Research

The research was carried out at SMA Negeri 18 Medan which is located on Jalan Wahidin No. 15A Pandau Hulu I, Medan City, Medan City, North Sumatra Province.

Types of Research

The type of research carried out is development research. Learning videos. Developed following the 4D development model which consists of 4 stages, namely define, design, develop and disseminate. The results of the development were tested at the research school involving 36 class XI students.

Research Procedures

The definition stage is carried out by distributing questionnaires to students with the aim of determining and defining needs in the learning process, then continuing with media analysis and formulating learning objectives. The design stage is aimed at obtaining an initial design that is developed, called the initial draft (draft I), which is carried out by preparing material for the human excretory system, selecting the MP4 file format, creating a story board and preparing feasibility test instruments and test instruments that will be used to measure the effect. media on learning outcomes. The development stage was carried out to develop the initial draft into a video learning medium which was validated by material expert validators and media experts. Validation is carried out based on a validation questionnaire sheet in the form of an assessment scale which also contains a column for criticism and suggestions for improving the video. After revisions were made based on input from the validator, the media draft was then distributed to biology teachers along with a teacher response questionnaire to see teacher responses. Then it was distributed to students to see student responses using a student response questionnaire as media users. After the final product, the video learning media has been developed. The dissemination stage was carried out to test the influence of the media on students using test instruments. Video learning media products were distributed to 36 students of class XI MIA 1 SMA Negeri 18 Medan.

The video media is designed by combining two software applications, namely Capcut and Power Point 2013. The video content is equipped with full images related to the learning material. The distribution of video learning media products is carried out in the school environment via soft files in the form of Google Drive which are handed over to biology subject teachers.

The use of media is carried out during the learning process during two meetings with a time allocation of 2 x 40 minutes. The first meeting was held using the first video learning media which was broadcast via Infocus and provided a video link to students with the aim that students could repeat the video when needed. Next, at the second meeting, the second video was used for students in the learning process. Before using video learning media at the first meeting, students are first given a pre-test (20 minutes) to assess students' initial abilities. After using the video, students were given a post-test (20 minutes) to see the effect of using video learning media on learning outcomes.

The validity and feasibility of the learning videos developed (both according to material experts and media experts), teacher and student responses were measured using a questionnaire instrument. Student learning outcomes are measured with a multiple choice test instrument, consisting of 20 questions distributed in questions C1 to C6. Questions were developed from indicators contained in the syllabus (Kherysuryawan, 2019).

Data Analysis

Media eligibility. The media suitability score is calculated using the following formula: Xi = x 100, where Xi = suitability value for each questionnaire, Σs = total score, and Σmax = maximum score (Damayanti, 2018). Media eligibility criteria are determined according to criteria shown in Table1

Table 1. Scores and eligibility criteria for media products being developed (Wulandari et al., 2017).

Presentation	Criteria
85% - 100%	Very Worthy
65% - 84%	Worthy
45% - 64%	Decent Enough
0% - 44%	Not Feasible

Teacher and student responses. The score (%) of teacher and student responses is calculated using the formula: %NRP :X 100%, where %NRP = teacher or student response score (%), Σ NRS = total teacher or student response score, and NRS Max = maximum response score teacher or student. The teacher or student response scores can be converted into criteria as in Table 2.

Table 2. Scores and criteria for teacher and student responses to the media products developed (Ristanti et al., 2019)

Presentation	Criteria
81,25% <NRS ≤ 100%	Very Good
62,5%<NRS ≤81,25	Good
43,75% <NRS ≤ 62,5	Pretty Good
25%<NRS ≤43,75%	Not Good

Learning outcomes. The effect of using learning videos on learning outcomes was analyzed using the t test at $p < 0.05$ with SPSS 24.

RESULTS AND DISCUSSION

Research Result

a. Development Product (Learning Videos)

The product of this development research is MP4 format video learning media on human excretory system material for biology subjects for high school class XI. The video (size 800 MB) is 28 minutes 47 seconds long, divided into 4 parts, namely opening, introduction, body and closing. The opening part of the video consists of a welcome greeting, the Unimed logo and an introduction to the narrator's identity. The introductory part consists of learning objectives and apperception. The third part, namely the content part, is a description of material about the excretory system in humans. This third part consists of 2 videos, the first video (duration 14 minutes 9 seconds) contains an understanding of the human excretory system, function, structure and mechanism of the skin, lungs and liver as a means of human excretion. The second video (duration 14 minutes 38 seconds) contains material on the function, structure of the kidney organ as a means of human excretion, the process of forming urine, factors that influence urine, disorders and technology in the human excretory system. The closing section contains conclusions. In each sub-material there are questions.

b. Video Eligibility According To Material Experts

The feasibility of the video according to the material expert validator is 97.94% with a very feasible category (Table 3)

Table 3. Feasibility of product development learning videos according to material experts.

No	Rated Aspect	Validator			Average (%)	Criteria
		1	2	3		
1.	Suitability of learning objectives	91,67	83,33	100	91,67	Very Worth It
2.	Current material (*up to date)*	97,71	96,42	100	98,04	Very Worth It
3.	Suitability of material with media	100	100	100	100	Very Worth It
4.	Coverage and systematicity of material in the media	100	100	100	100	Very Worth It
5.	Overall suitability of the materia	100	100	100	100	Very Worth It
Average		97,87	95,95	100	97,94	Very Worth It

c. Video Eligibiliti According To Media Experts

As can be seen in Table 4, the average feasibility of learning media according to learning experts is 93.66% in the very feasible category

Table 4. Feasibility of product development learning videos according to learning media experts.

No	Rated aspect	Validator			Average (%)	Criteria
		1	2	3		
1.	Clarity of media with the purpose of the material content	100	100	100	100	Very Worth It
2.	Quality of sound effects, images, design and media display	85,00	85,00	85,00	85,00	Very Worth It
3.	Suitability of language and media communication	87,50	100	87,50	91,67	Very Worth It
4.	Accuracy of media use on student and teacher learning styles	95,83	100	91,67	95,83	Very Worth It
5.	The accuracy and attractiveness of the video medium as a whole	87,50	100	100	95,83	Very Worth It
Average		91,16	97	92,83	93,66	Very Worth It

d. Teacher and Student Responses To The Video

The biology teacher's response data to the learning video that was developed can be seen in Table 5. The teacher gave a score of 96.94% (very good category) to the video that was developed.

Table 5. Responses (opinions) of biology teachers to the learning videos developed.

No	Assessment Aspect	Teacher …			Average (%)	Criteria
		1	2	3		
1.	Conformity with the goals to be achieved	100	100	87,50	95,83	Very good
2.	Media quality	100	91,66	100	97,22	Very good
3.	Ease of use	100	87,50	100	95,83	Very good
4.	uitability of learning media packaging	100	100	100	100	Very good
5.	Overall suitability of learning medi	100	100	87,50	95,83	Very good
Average		100	95,83	95	96,94	Very good

Student gave an average score of 82.91% or the very good category to the learning video developed (Table 6)

Table 6. Percentage of Student Response Results to Learning Media

No	Statement	Average skor	%	Categori
1	Suitability of material convenience	3,47	86,80	Very good
2	Appropriateness of attractiveness by students	3,30	82,63	Very good
3	Suitability of ease in the learning process	3,38	84,72	Very good
4	Suitability to limited study space and time	3,22	80,55	Good
5	Conformity of ease in understanding media information	3,19	79,86	Good
6	Suitability for biology learning according to topic	3,36	84,02	Very good
7	Conformity to the effect of student enthusiasm for learning	3,33	83,33	Very good
8	Appropriateness of the function of independent learning by students	3,25	81,25	Good
9	Suitability of ease of conveying the message	3,38	84,72	Very good
10	Suitability of clarity in message delivery	3,3	82,63	Very good
11	Compliance with media image quality	3,11	77,77	Good

12	Compatibility of interest in material and image	3,33	83,33	Very good
13	Appropriate text size in the media	3,3	82,63	Very good
14	Suitability for understanding texts in the media	3,3	82,63	Very good
15	Suitability of media use in other materials	3,47	86,80	Very good
Average		3,32	82,91	Very good

e. Student Learning Outcomes After Using Learning Videos

The influence of learning video media on student learning outcomes at the disseminate stage was analyzed by comparing pretest and posttest scores (Figure 1). The average value (± SD) of student learning outcomes before using video media (pretest) was 51.25 (±11.91) which increased significantly (t-test, $p < 0.05$) to 83.19 (± 8.29) after using the media (posttest).

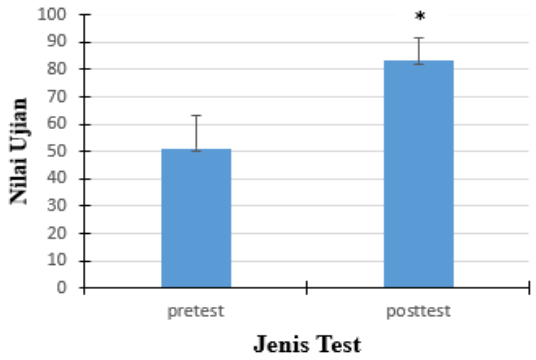

Figure 1. Student learning outcomes (mean ± SD) at the disseminate stage. Students' posttest scores (after using video media) increased significantly (t-test, $p < 0.05$) compared to pretest scores.

DISCUSSION

Video learning media on human excretory system material that students use as a learning resource in studying human excretory system material. To produce a viable product, learning video media has been developed through special stages and the process is validated by validators who have the competence to assess the media products being developed (Sugiyono, 2016). Validated aspects include material aspects and learning media aspects. Based on the assessment of material experts by assessing what aspects are discussed in the learning video in accordance with the learning objectives contained in the human excretory system lesson plan. So the results obtained by material experts are said to be very suitable for use with an average score of 97.94% and several suggestions for improvement. There are three indicators of appropriateness of content that must be considered, namely the suitability of the material description with the competency standards (SK) and Basic Competencies (KD) contained in the subject concerned, the accuracy of the material and learning support materials. From these three indicators, we can assess the appropriateness level of the material content in a teaching material. So you can find out the advantages and disadvantages of learning video media which is used as a reference in learning (Kinanti, 2017). In line with research conducted by Wahyuni & Hidayati (2021), the results of the material expert's assessment with a presentation of 83% were in the very good category. The material expert's assessment consisted of material content, material language and clarity of material sentences. This shows that the biology learning video material on the excretory system in This human being has good qualification values in terms of material. In this way, the content of the learning video material can be scientifically justified, correct and in accordance with the learning objectives.

Based on the expert assessment results, video learning media is said to be very feasible with an average score of 93.66%. Aspects assessed by media experts regarding video learning media include writing, writing color, font size, audio, and suitability of the writing to the background. This is in line with the opinion of (Wisada et al., 2019) that in making videos, there are several aspects that need to be considered, namely content, form of video media, color users, music, illustrations, presenters, language users, and assignments via video. Apart from that, the advantage of video lies in the size of the video display, its flexibility and ability to be adapted to user needs. Video is also a valuable source of

information and entertainment because it can be accessed directly or via various digital media such as TV, computers and cellphones (Nurfadhillah, 2021) .

After product validation, it was found that the learning video product developed had a very suitable category from the six experts. Apart from validation by experts, teacher responses as learning practitioners are also needed to improve the quality of the video learning media being developed. The required teacher response is related to aspects of material content and learning aspects. The teacher's response to biology learning media, material on the excretory system in humans, obtained a score of 96.94%, which is in the very good category. This is in line with research results (Sari, 2019) stating that the use of appropriate learning media can maximize student learning outcomes and facilitate a higher quality learning process. Effective learning media really helps students in their learning process. With learning media, it can help teachers provide explanations about the material being taught (Wulandari, 2023).

Student response tests were carried out to see student responses to the videos being developed. According to the results of student assessments at SMA Negeri 18 Medan from student response trials with a total of 36 students. The percentage result obtained was 82.91% according to the very good criteria. The aspects assessed in this student trial include everything including suitability of the material to the learning objectives, image quality, language presented and length of viewing time. In line with research conducted by Ali and Sukanto (2012), the research results obtained an average score of 84% and were included in the very interesting category.

Next, to determine the effect of using video learning media on student learning outcomes, a media comprehension test was carried out using Bloom's taxonomy cognitive level with a percentage at pretest of 51.25% (Low) and at posttest of 83.19% (High). Next, a paired sample t-test was carried out using SPSS version 24. From the t test, the calculated t value = 13,491 and t table = 2.03224, which shows that t calculated > t table. The video learning media test results obtained a significance value (2-tailed) of 0.000 where the sig value was smaller than 0.05. Based on the hypothesis test, it is known that there is an average difference between students' pretest and posttest learning outcomes, which shows that the use of video learning media has an influence on student learning outcomes in the human excretory system material. In line with research conducted by Tegeh et al. (2019), the video development that was developed was effective in improving learning outcomes (t = 11.368 > t table = 2.042 at a significance level of 5%.

This is influenced by students' interest in learning by using learning media independently as well as the time limit given during the learning media understanding test. This learning media can be used as an interesting reference learning resource for in studying material on the human students excretory system. It is hoped that this video learning media can foster interest and motivate students to learn independently and be active in learning. In carrying out their assignments, learning media increases students' curiosity to carry out further exploration of the topics they are studying (Wahyuni, 2021). In line with research conducted by Pamungkas & Koeswanti (2021), learning through video media provides positive results. Learning with video media has the potential to increase student motivation and enthusiasm. Apart from that, the learning process becomes more fun, exciting and productive. This type of learning video can help students understand the material in more depth.

CONCLUSION

Based on the results of the research and discussion, it can be concluded that according to both material experts and media experts, the learning videos developed are categorized as very feasible. Based on the responses of teachers and students, it is included in the very good category for use as a learning resource for students in learning. The learning videos developed have a significant influence on improving student learning outcomes on excretory system material in class XI MIA.

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