

Development and Validation of a Hemostatic Activity-Based Learning Video on the Circulatory System for High School Biology Education

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Abstract

The rapid advancement of technology enables the development of technology-based learning media that can visualize concepts clearly, such as learning videos. These videos can be developed based on various sources, including research findings. Therefore, this study aims to develop a learning video on the topic of the circulatory system for high school students in the eleventh grade, based on the hemostatic activity test of sungkai leaves extract (*Peronema canescens* Jack.). The development process follows the *Research and Development* (R&D) approach, which includes analyzing potential issues, gathering information, designing the product, validating the design, making improvements, and producing the final product. The video contains nine learning objectives organized into five sessions. The validity of the learning video is assessed based on four aspects: format, content, linguistic, and presentation. According to the validation results from the validators, all aspects received a very valid rating, with average scores of 0.96 for format, 0.95 for content, 0.93 for linguistic, and 0.95 for presentation. Overall, the average score for all four aspects is 0.95, indicating a very valid rating. This suggests that the developed video is suitable for use as a learning media.

Keywords: advancement of technology, circulatory system, learning media, learning outcomes, learning styles, learning videos, technology on education

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1. Introduction

The effects of Information Communication and Technology on education cannot be over emphasized (Awaludin et al., 2022; Fuadi et al., 2021; Onojah et al., 2021). At this point, technological advancements in the realm of education wield considerable influence, especially on student (Bhosale et al., 2020; Yudha et al., 2020). Students in primary, middle, and high schools today are part of Generation Z, a cohort highly adept with technology. Gen Z students demonstrate

proficiency in utilizing the internet, such as for knowledge-seeking and exploration (Basuki, 2020; Bucăța, 2023). Their close affinity with technology imbues Gen Z students with distinct learning styles (Iftode, 2020; Yusuf, 2016). Understanding students learning styles is crucial as it can enhance the effectiveness of the learning process and determine students' success (Magdalena & Afifah, 2020; Sofian & Rahmat, 2023). When educators understand how students absorb and process information based on their learning styles, the learning and

communication processes become easier and more enjoyable. This motivates students and makes the learning process more effective (Munir et al., 2022). Hence, educators must be capable of devising suitable learning processes for Gen Z students (Reza & Tinggogoy, 2022; Yalcin-Incik & Tolga-Incik, 2022). Appropriate learning processes aid students in effectively absorbing information, optimizing their learning outcomes, thereby enhancing their academic success (Isnanto & Hamu, 2022).

Teachers need to utilize technology in creating learning media (Saputri et al., 2020; Sulistyanto et al., 2022). The utilization of technology in the use of learning media can be an option for teachers; for instance, learning videos (Ilesanmi, 2023; Salsabila & Agustian, 2021). Learning videos are audio-visual media that project moving images, used to convey messages and stimulate the minds, feelings, attention, and willingness of students in the learning process (Kristanto, 2016). Learning videos serve several functions, including the attention function, which can attract students' attention and direct their focus on the material, the affective function, which can evoke students' emotions and attitudes, and the cognitive function, which can accelerate the achievement of learning objectives (Nurwahidah et al., 2021; Setiawan et al., 2022). The use of video as a learning media can assist students who have difficulty understanding the material by presenting a combination of images and sound

(Fitri & Ardipal, 2021). Learning videos can also provide visualization of abstract concepts that students may have difficulty imagining concretely (Atika et al., 2018). In line with this, the results of Popova et al. (2014) research indicate that with visualization and audio explanations,

students can more easily understand, grasp, and remember the material being studied.

The topic of the circulatory system in the Merdeka Curriculum is one part of the Biology subject that encompasses many concepts with high complexity and abstract study objects (Anggraini et al., 2016). The circulation system material involves the interaction among organs such as the heart, lungs, blood vessels, and blood cells, as well as intricate mechanisms like the heart pump, blood circulation, and substance exchange within the body. This complexity makes it challenging for students to grasp the circulatory system material (Khairaty et al., 2018). Additionally, the concepts in circulatory system material are abstract because they encompass microscopic objects and processes that cannot be directly observed (Fajar, 2016). The circulatory system material is a focal point in Biology education due to its crucial role in ensuring the survival of organisms (Handayani, 2021). Furthermore, the circulatory system also covers aspects related to daily life, such as the cessation of bleeding, which is associated with the concept of blood clotting (Arofah & Raharjo, 2017). So far, various learning media have been applied in Biology teaching, particularly for the circulatory system topic, including learning videos (Wangkanusa et al., 2023), interactive multimedia (Anggraini et al., 2019), interactive simulations (Aswadin et al., 2021), 3D models (Munafiah, 2023), and mobile applications (Devega et al., 2022).

In the development of learning videos, the content can be sourced from various materials such as textbooks (Gazali & Nahdatain, 2019), direct experiences (Irawan et al., 2017), and research findings (Wangkanusa et al., 2023). The use of learning videos for the circulatory system is highly recommended to facilitate students'

understanding of the material, as it can provide clear visualizations (Safitri et al., 2021). Learning videos not only aid visualization but also cater to visual, auditory, and kinesthetic learning styles (Urba et al., 2024). Research conducted by Syuaib et al. (2018) and Irawan et al. (2017) indicates that the use of learning videos in Biology subjects is a practical and effective solution to implement.

Based on the description above, this study will develop learning videos for the circulatory system subject in grade XI based on the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack). This development aims to explain the concepts within the circulatory system material, visualize objects in detail and interactively, provide concrete examples to students regarding the mechanism of bleeding cessation, and meet the learning needs of Gen Z students based on their learning styles.

2. Method

This research uses the Research and Development (R&D) approach. R&D is a research approach used to develop and validate products. Developing products involves updating existing products to make them more practical, effective, and efficient, or creating entirely new products that did not previously exist. Validating products, on the other hand, is the process of testing the validity or effectiveness of a product. (Sugiyono, 2021).

Referring to Sugiyono (2021), the steps in R&D research consist of 11 stages: (a) analysis of potential and problems, analyzing capabilities and discrepancies between expected outcomes and actual occurrences, (b) gathering information, the process of gathering information that can be

used as material for planning a specific product intended to address previously analyzed problems, (c) product design, creating a product design, (d) Product validation, the process of assessing whether a product will be effective or not, (e) design revision, the process of improvement, (f) product creation, the process of manufacturing the product, (g) product testing, the process of testing the product on a limited sample, (h) product revision 1, the process of improving the product, (i) usage testing, the process of implementing the product in real-world conditions on a broad scale, (j) product revision 2, the process of product refinement if deficiencies are found during real-world use, and (k) mass production, is the process of mass production if the tested product is deemed effective. However, this research only goes up to the stage of product creation.

a. Potential and Problem Analysis

In this stage, interviews with biology teachers of grade XI are conducted to understand aspects related to the learning process, the use of learning media, and the difficulties encountered by students in the learning process at school.

b. Information Gathering

In this stage, testing of the external bleeding cessation activity using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.) is conducted. The results will be included in the learning video, along with an analysis of the sequence of learning stages in the circulatory system material.

c. Product Design

The development of learning video is planned using the Canva application. This stage involves the analysis of learning objectives, creation of storyboards, scenario

development, and completion of video production.

$$V = \frac{\Sigma S}{n(C - 1)}$$

d. Product Validation

An assessment is conducted to determine the feasibility and validity of the learning video developed using the content validity coefficient method.

e. Design Revision

In this stage, revisions are made to the learning video based on the discussions with validators.

f. Product Creation

The last stage, which is product creation, the learning video is produced based on the previously validated design by validators.

The instruments used in this research are teacher interview sheets for the analysis of media development needs, instrument validation sheets, and learning media validation sheets. The media validation sheets used have been previously validated by validators using instrument validation sheets.

The data collected in this study comprises qualitative and quantitative data. Qualitative data is derived from interview findings and instrument validation outcomes, while quantitative data is sourced from learning media validation results. The qualitative data from interviews and instrument validation, including comments, suggestions, and inputs, are summarized and selected based on their relevance to the research objectives. The analysis of learning media validation data utilizes the Content-validity Coefficient (Aiken's V) method as per Aiken (1985). The Aiken V index is a measure of rater agreement on the appropriateness of items to measure the intended indicators (Retnawati, 2016). The formula utilized is as follows:

Description:

V = validation score

S = r- Lo

r = the score given by the assessor

Lo = the lowest assessment score

C = the highest assessment score

n = the number of assessors

The final result of the calculation of Aiken's V coefficient will determine the feasibility and validity of the learning video. The interpretation of the Aiken validity index used refers to Nabil et al. (2022), as presented in Table 1.

Table 1. Interpretation of the Aiken Validity Index

Score	Category
< 0,4	Less valid
0,4 – 0,8	Valid
> 0,8	Very Valid

3. Result and Discussion

a. Potential and Problem Analysis

External bleeding occurs when the body's surface is injured and blood is released (Sidrotullah, 2021). The cessation of bleeding is usually done by administering chemical hemostatic drugs such as tranexamic acid, but long-term and repeated administration can cause side effects (Purwoko et al., 2022). The use of medicinal plants can be an alternative to replace the use of chemical drugs because besides having fewer side effects, medicinal plants are easily obtainable and more affordable (Kumontoy et al., 2023).

Indonesian society has long utilized natural resources for survival, including for stopping external bleeding (Sidrotullah, 2021; Sutopo et al., 2016). The sungkai plant is one of the plant species utilized in

traditional medicine or healthcare. Based on phytochemical test results, sungkai leaf extract contains flavonoid compounds, saponins, and tannins that have the potential as hemostatic agents because they can shorten bleeding time (Emilia et al., 2023).

The cessation of bleeding is related to blood clotting, which is studied in the circulatory system material for grade XI high school students. According to research conducted by Wahyuni (2020), the circulatory system material is one of the subjects that are difficult for students to understand because it involves many abstract concepts and is closely related to daily life. One way to overcome this issue is by using learning media that can visualize the material and provide concrete examples, making it easier to understand, such as learning videos (Mashuri & Budiyo, 2020).

The development of learning videos on the circulatory system material for grade XI high school students based on the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.) can be carried out to assist students in understanding the material. In addition to visualizing the material, learning videos on the circulatory system material incorporating research findings have not been developed previously.

b. Information Gathering

The information gathered in this study is sourced from the results of the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.) and the analysis of the learning objectives flow in the circulatory system material. The test results indicate that the ethanolic extract of sungkai leaves has

proven to have external bleeding cessation activity, characterized by a shorter bleeding time compared to the other groups. These test results are then included in the learning video which is linked to the discussion on blood clotting.

The hemostatic activity of ethanolic extract from *sungkai* leaves is caused by the presence of flavonoids, tannins, and saponins. Flavonoids function to increase platelet count and have vasoconstrictive effects that accelerate platelet aggregation, where platelets adhere to the vessel wall and form a plug, thereby expediting the hemostasis process. Tannins function to accelerate the release of fibrinogen proteins, which are transformed into fibrin threads from cells and deposited on the cell's surface. The faster fibrin threads form, the quicker the wound is sealed, stopping the blood flow. Similar to flavonoids and tannins, saponins induce vasoconstrictive effects and accelerate protein deposition. This relates to the blood clotting process: when there is a wound and blood flows out, platelets come into contact with the rough wound surface and rupture, releasing thrombokinase. Thrombokinase, along with calcium ions (Ca^{2+}) and vitamin K, converts prothrombin into thrombin. Thrombin then transforms fibrinogen into fibrin threads that obstruct the flow of blood cells, leading to blood clot formation.

In the analysis of the learning objectives flow stage, information is gathered regarding achievements, objectives, and learning material content. Based on the analysis results, the learning achievements consist of two elements: understanding biology and process skills. Furthermore, there are nine learning objectives for the learning material content, which include blood, organs of the circulatory system,

mechanisms of circulation, blood types, blood transfusion, lymphatic system, the role of the circulatory system in the transport and exchange of substances, and circulatory system disorders.

c. Product Design

After collecting information, the next step is to design the learning video using the

Canva application. The learning video contains material on the circulatory system and the results of the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.), which is linked to the discussion on blood clotting. At the beginning of the video, there is a cover section shown in Figure 1 and the learning objectives shown in Figure 2.



Figure 1. The Cover of the Learning Video Consists of the Title and the Creator's Identity

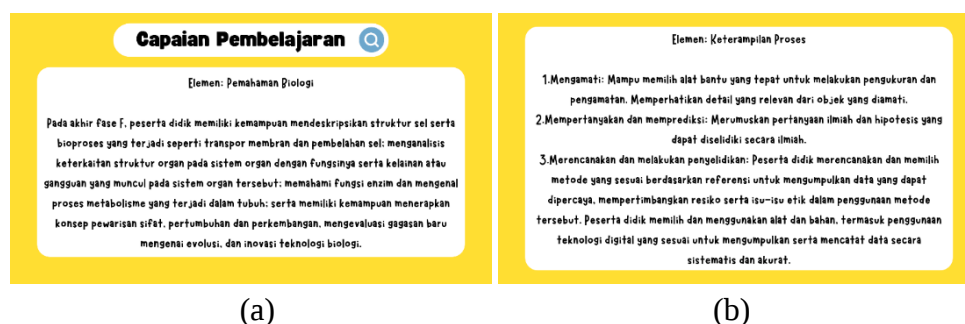


Figure 2. Learning Objectives Comprising Two Learning Elements: (a) Understanding Biology and (b) Process Skills

Figure 1 illustrates that the cover page features the title of the learning video, "Circulatory System," targeted for use in Biology instruction for 11th-grade senior high school students or equivalent. It also includes the creator's identity, comprising the full name and institution, as well as information regarding the completeness of the video's content, specifically highlighting the results of testing related to external bleeding cessation activities.

Figure 2 illustrates the learning outcomes for 11th-grade senior high school students according to the Merdeka Curriculum, categorized under Phase F. The

learning outcomes consist of two elements: biological understanding and process skills.

Learning outcomes in the element of biological understanding at the end of phase F are that students have the ability to describe cell structures and bioprocesses such as membrane transport and cell division; analyze the relationship between organ structures in organ systems and their functions, as well as disorders or abnormalities that occur in these organ systems; understand enzyme functions and recognize metabolic processes that occur in the body; and have the ability to apply concepts of inheritance, growth and

development, evaluate new ideas about evolution, and biological technology innovations.

The learning outcomes in the element of process skills consist of: 1) Observing, which involves the ability to select appropriate tools for measurement and observation, and to pay attention to relevant details of the observed object; 2) Questioning and predicting, which involves formulating scientific questions and hypotheses that can be investigated scientifically; 3) Planning and conducting investigations, where students plan and select appropriate methods based on references to collect reliable data, considering risks and ethical issues in the use of these methods. Students select and use tools and materials, including the use of appropriate digital technology to systematically and accurately collect and record data.

The content section of the developed learning video consists of five sessions. The first session covers the topic of blood, the second session discusses the organs of the circulatory system and the mechanism of circulation, the third session covers blood types and blood transfusions, the fourth session addresses the mechanism of blood clotting and the lymphatic system, and the fifth session discusses the role of the circulatory system in substance transport and circulatory system disorders. Each session is taught within a two-hour class period. Each session is distinguished by a divider, followed by learning objectives, learning materials, and the results of the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.). The content section of the learning video is shown in Figure 3.

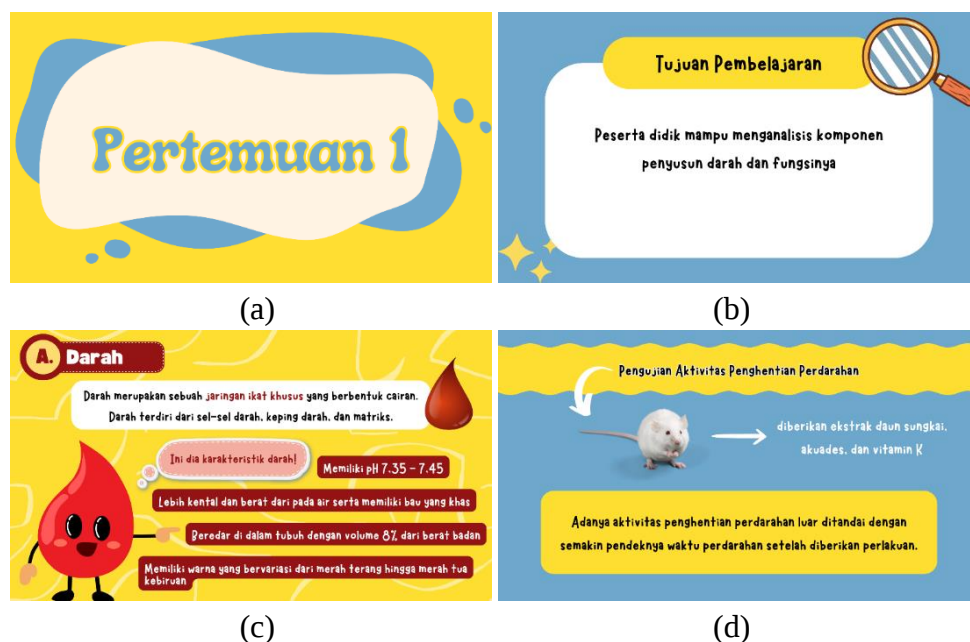


Figure 3. The Content Section of the Learning Video Consists of (a) Inter-Session Dividers, (b) Learning Objectives, (c) Learning Materials, and (d) Test Results

Figure 3 illustrates the content structure of the learning video, which includes sections delineating the divisions between meetings labeled “Meeting 1”, differentiating

between the first through fifth sessions. It outlines the learning objectives corresponding to the material covered in each session, for example students are able to

analyze the components that make up blood and their functions. The learning video presents varied instructional content for each meeting for example material about blood that discusses the meaning of blood and blood characteristics. The learning video also includes the results of activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack).

In accordance with the objectives of developing the learning video, the objects

displayed are chosen to provide a realistic visualization according to their original form. The selection of objects used in the learning video is shown in Figure 4. Additionally, the learning video also presents concrete examples based on research findings, namely the cessation of external bleeding associated with the discussion of blood clotting, as shown in Figure 5.

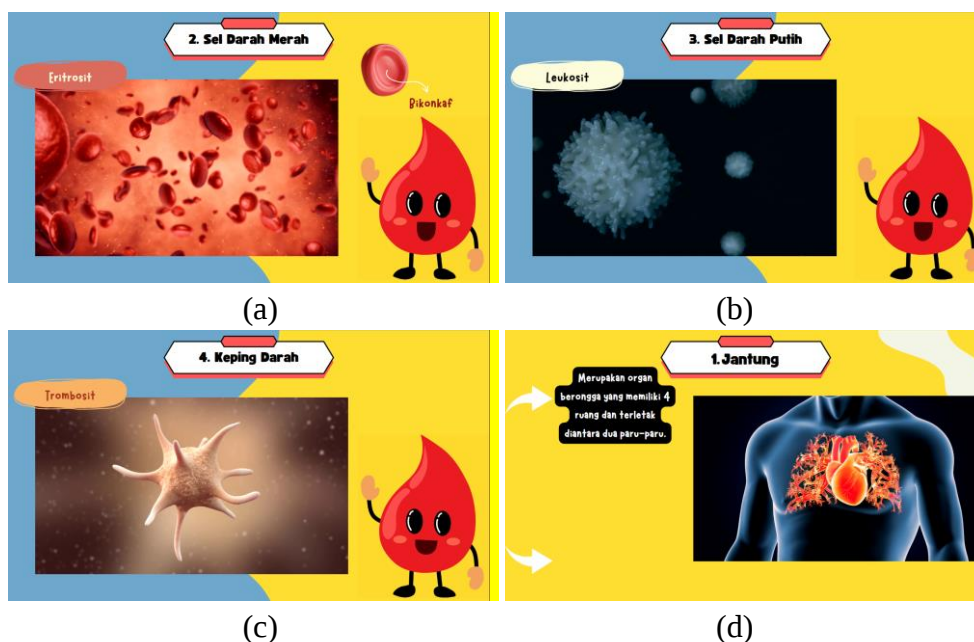
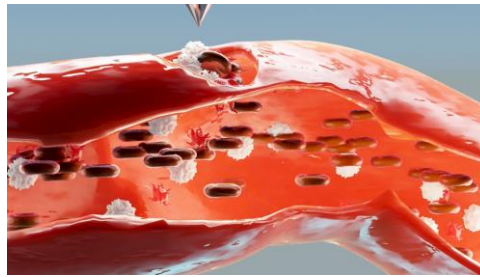


Figure 4. The Selection of Objects Aims to Visualize the Material, Including: (a) The Shape of Red Blood Cells (Erythrocytes), (b) The Shape of White Blood Cells (Leukocytes), (c) The Shape of Blood Platelets (Thrombocytes), and (d) The Location of The Heart Inside the Body





(c)

Figure 5. Concrete Examples Based on Research Findings Include: (a) Occurrence of External Bleeding, (b) Cessation of External Bleeding, (c) Discussion on Blood Clotting

Figure 4 demonstrates that the objects used in the learning video provide a realistic visualization consistent with their actual forms. For instance, red blood cells (erythrocytes) are depicted as concave or biconcave in shape, white blood cells (leukocytes) appear irregular and lighter in color, platelets (thrombocytes) are shown as irregularly shaped and colorless, and the heart is accurately represented within the body, positioned centrally in the chest, specifically on the left side of the torso.

Figure 5 presents a concrete example of research findings on the cessation of external bleeding using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.). The study involved severing the tail of a rat that had previously been treated with the extract. The results illustrate the progression of external bleeding and its subsequent cessation, influenced by the components within the ethanolic extract of *Sungkai* leaves. These findings are then correlated with the blood coagulation process studied in the circulatory system module.

d. Product Validation

The developed product was initially validated to determine its suitability as an learning media (Matsun et al., 2019). The validation process involves 5 validators. Learning media is validated using a validation sheet created beforehand. The validation sheet consists of four aspects: format aspect with two indicators, content aspect with three indicators, language aspect with three indicators, and presentation aspect with three indicators. The validation results are then analyzed using the Aiken V content validity coefficient method. The validation results of the learning video on the circulatory system material for grade XI high school students based on the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.) indicated a very high validity, as demonstrated by a validation score of 0.95. The validation results are shown in Table 2.

Table 2. Validation Results of the Learning Video

Aspect	Number	Indicator	Average Score	Description
Format	1	Systematic presentation system	1	Very Valid
	2	Ease of understanding the entire content of the learning video	0.93	Very Valid
Content	3	Relevance of the presented material to the learning objectives and achievements	1	Very Valid
	4	Clarity of the presented concepts	0.93	Very Valid
	5	Completeness of the presented material	0.93	Very Valid

Aspect	Number	Indicator	Average Score	Description
Linguistic	6	Conformity to the General Guidelines of Indonesian Spelling	0.8	Valid
	7	Ease of understanding the sentences used	1	Very Valid
	8	Flexibility from dual meanings in the language used	1	Very Valid
Design	9	Compatibility of colors, text, and images used	1	Very Valid
	10	The font style and size used	0.87	Very Valid
	11	Clarity of the narration conveyed in the learning video	1	Very Valid
			0.95	Very Valid

Table 2 presents the results of the learning video validation, which achieved an average score of 0.95, categorized as "very valid". This evaluation is based on four aspects: format, which includes two indicators; content, with three indicators; language, comprising three indicators; and presentation, containing three indicators. The discussion of the validation results for each aspect is presented as follows.

1) Format Aspect

The format aspect consists of two indicators: systematic presentation and ease of understanding the overall content of the learning video. The first indicator, systematic presentation, obtained an average score of 1 with a category of very valid. This indicates that the content of the learning video is well-organized, aligns with the learning activities, and presents the material from general to specific. This is in line with the findings of Harefa et al. (2023) and Zulfariyanti et al. (2022), who suggest that learning videos should be systematically structured and present the material sequentially to facilitate understanding by students. Similarly, according to Luzyawati & Lissa (2020), the material should be presented from general concepts to more specific ones to facilitate students in understanding the essence of the material.

The second indicator, which is the ease of understanding the overall content of the learning video, obtained an average score of 0.93 with a category of very valid. This is because the segments of the learning video, the conveyed material, and the presentation of research findings are easily understood. However, the learning video does not yet include the division of material for each session, so this aspect was added during the design revision. According to Wangkanusa et al. (2023) and Zulfariyanti et al. (2022), learning videos should be easy to use and understand by anyone, especially students.

2) Content Aspect

The content aspect consists of three indicators: alignment of the presented material with the learning outcomes and objectives, clarity of the conveyed concepts, and completeness of the presented material. The first indicator, alignment of the presented material with the learning outcomes and objectives, obtained an average score of 1, indicating a very valid category. This suggests that the material presented aligns with the nine learning objectives. Effective learning videos are structured according to the learning outcomes and objectives, facilitating focused learning (Zulfariyanti et al., 2022). Furthermore, they provide comprehensive

material to aid students in directed learning (Gustinasari et al., 2017).

The second indicator, clarity of the conveyed concepts, received an average score of 0.93, indicating a very valid category. Overall, the concepts presented in the learning video are conveyed clearly. However, there is one topic in the video, the lymphatic system, which was considered unclear. Therefore, the explanation of this concept was improved during the design revision. According to Gustinasari et al. (2019), clarity of concepts is crucial for enabling independent learning among students. Additionally, Harefa et al. (2023) state that suitable learning media exhibit clear concepts, whether in written or graphical form.

The third indicator, completeness of the presented material, obtained an average score of 0.93, also falling under the very valid category. Although very valid, the score obtained for this indicator is not perfect, indicating that some material was not included in the learning video. Initially, the material covered included blood, the organs of the circulatory system, circulation mechanisms, blood types, blood transfusions, the lymphatic system, and circulatory system disorders. However, in alignment with the Merdeka Curriculum content, additional discussions on the role of the circulatory system in transport and exchange of substances were added. Material presented in learning media should be comprehensive to enable students to study directionally (Gustinasari et al., 2017) and to achieve the established learning objectives (Harefa et al., 2023; Hasni et al., 2022).

3) Linguistic Aspect

The linguistic aspect encompasses three indicators: adherence to the General Spelling Guidelines of the Indonesian Language,

clarity of sentence structures, and avoidance of linguistic ambiguity. The first indicator, compliance with grammar rules, received an average score of 0.8, indicating it falls within the valid category, as there were some errors in capitalization and italicization in the learning video. However, the video used standard terms, appropriate punctuation, and communicative language. These errors were later rectified during the design improvement phase. Effective learning media should adhere to proper linguistic conventions to aid students' comprehension (Panjaitan et al., 2022; Salamah et al., 2020).

The second indicator, clarity of sentence structures, achieved an average score of 1, signifying it falls within the very valid category. This suggests that the sentences employed are effective, with complete sentence components and suitable vocabulary choices. Language utilized in learning media is considered proficient if it is straightforward, transparent (Panjaitan et al., 2022), and apt for explaining concepts and illustrations (Juniawati & Trimulyono, 2016).

The third indicator, avoidance of linguistic ambiguity, attained an average score of 1, also categorized as very valid. This indicates that the words utilized possess unambiguous meanings, and the language employed is devoid of confusion, minimizing the likelihood of misunderstanding. According to Gustinasari et al. (2017) and Panjaitan et al. (2021), appropriate media are those wherein sentence usage lacks linguistic ambiguity, thereby facilitating effortless comprehension by students.

4) Design Aspect

The design aspect encompasses three key indicators: color, text, and image compatibility; font type and size selection;

and the clarity of the narrative within the learning video. The first indicator, color, text, and image compatibility, scored an average of 1, indicating it falls within the very valid category. This suggests that the chosen colors contrast well, and the arrangement of text and images is harmonious, as depicted in Figure 6. The second indicator, font type and size selection, attained an average score of 0.87, also

classified as very valid. This indicates that the chosen font types are visually appealing, although in some instances, legibility might be compromised. This aligns with the findings of Dewi et al. (2024) and Harefa et al. (2023), emphasizing the importance of selecting appropriate font styles and sizes for readability, incorporating attractive colors, and integrating relevant and well-designed graphics and illustrations.

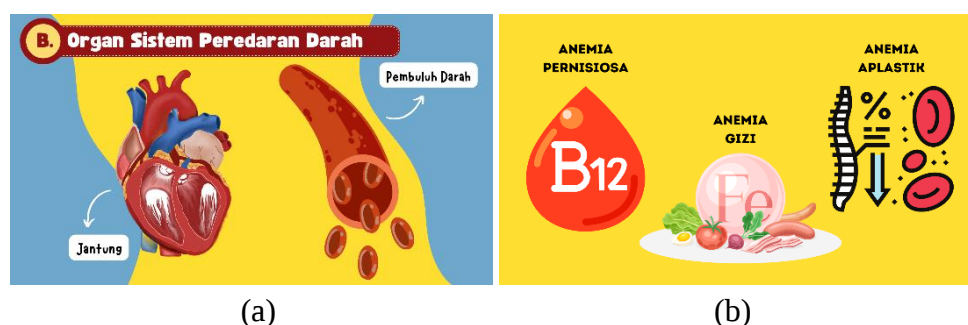


Figure 6. The Aspect of Learning Video Presentation (a) Involves the Selection of Contrasting Colors and (b) The Arrangement of Images and Text In a Harmonious Layout

Figure 6 illustrates the selection of contrasting colors between the background and the objects presented, ensuring clear visibility of the objects. The learning video's background predominantly features yellow and blue colors. Additionally, figure 6 demonstrates that the layout of images and text is well-coordinated, which aids in material delivery and enhances the visual appeal of the learning video. The material presented in figure 6 is the organs of the circulatory system which shows images of the heart and blood vessels, as well as the types of anemia, namely pernicious anemia, nutritional anemia, and aplastic anemia.

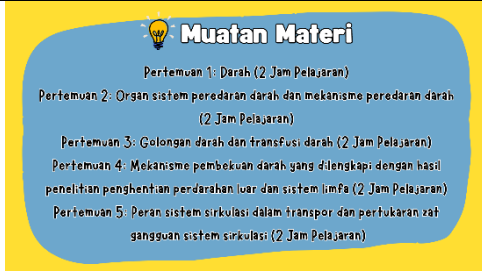
The third indicator, clarity of the narration in the learning video, attained an average score of 1, falling into the very valid category. This indicates that the narrator's voice is clear, with engaging intonation and suitable pacing, and that the narrator's voice

and background music are well-balanced. This aligns with Hakim (2017) and Indrayani et al. (2021) assertion that a suitable learning video features clear narration, facilitating students' understanding of the presented material.

e. Design Revision

After the learning video was validated, the next step involved making improvements based on the discussion with the validator to address any errors and deficiencies in the initial product design. Suggestions and feedback received were used as guidance to enhance the learning video on the circulatory system topic for 11th-grade high school students, aiming to create a better product. The revisions are shown in Table 3.

Table 3. Learning Video Revisions

Before Revision	After Revision	Information
This part was not present in the previous product design.		Adding content division for each session.
This part was not present in the previous product design.	(a)  (b)  (c)  (d) 	Incorporating discussions on the role of the circulatory system in substance transport and exchange of substances. (a) Introduction. (b) Overview. (c) Role in nutrient absorption. (d) Role in gas exchange. (e) Role in excretion of metabolic wastes.

Before Revision	After Revision	Information
	Pada ginjal, zat sisa metabolisme yang diangkut aliran darah akan dipertukarkan dengan dikeluarkan dari kapiler menuju nefron ginjal hingga akhirnya dikeluarkan dari tubuh bersama urin.  (e)	
		Correcting the spelling of the chemical names.
		Refining the use of italicization.
Cairan interstitial dari jaringan masuk ke kapiler limfa dan mengalir ke saluran penampung. Kemudian menuju pembuluh limfa yang lebih besar dan bergabung membentuk trunkus limfa utama. (Interstitial fluid from the tissues enters the lymphatic capillaries and flows into the collecting ducts. It then moves to larger lymphatic vessels and merges to form the main lymphatic trunks).	Cairan interstitial dari jaringan masuk ke kapiler limfa. Cairan interstitial yang sudah berada di dalam kapiler limfa mengalir dari kapiler limfa ke saluran penampung. Kemudian menuju pembuluh limfa yang lebih besar dan bergabung membentuk trunkus atau batang saluran limfa utama. (Interstitial fluid from the tissues enters the lymphatic capillaries. The interstitial fluid that is already in the lymphatic capillaries flows from the lymphatic capillaries to the collecting ducts. It then moves to larger lymphatic vessels and merges to form the main lymphatic trunks).	Enhancing the explanation of material concepts in the lymphatic system section.

Table 3 shown that the revision made to the learning video includes adding sections that were previously absent and improving existing content. Additions include adding content divisions for each session and including discussions on the role of the circulatory system in transport and exchange of substances. Additionally, improvements were made in the use of capital letters in

spelling chemical names and italicized words in writing scientific names, as well as clarifying concepts in the discussion of the lymphatic system.

f. Product Creation

The validated design is then transformed into a product in the form of an learning video. The learning video developed has a

duration of 46 minutes and 34 seconds. It is designed for instruction over five sessions, covering nine content areas: blood, the circulatory system organs, the blood circulation mechanism, blood types, blood transfusion, the blood coagulation mechanism, the lymphatic system, the role of the circulatory system in substance transport, and circulatory system disorders. The video is equipped with learning objectives and goals for each content area. In addition to the instructional material, the video includes results from activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.), which is connected to the discussion on blood coagulation.

The video features text and images that support the instructional content. Overall, the video is primarily unidirectional; however, it includes one segment where students are prompted to answer questions related to blood typing.

4. Conclusion

This research produced a learning media in the form of a video on the circulatory system for grade XI high school students. The learning video was developed based on the activity test of external bleeding cessation using ethanolic extract of sungkai leaves (*Peronema canescens* Jack.). Therefore, the learning video not only presents learning materials but also provides concrete examples of external bleeding cessation related to discussions on blood clotting. Additionally, the developed learning video includes visualizations of abstract objects in the content to provide students with a clearer understanding and enhance the effectiveness of learning.

The learning video on the circulatory system developed based on activity test of external bleeding cessation using ethanolic

extract of sungkai leaves (*Peronema canescens* Jack.) is deemed very valid for learning purposes, scoring an average of 0.95. This indicates that the developed learning video has a coherent presentation, its content is easily comprehensible, the material presented aligns with the learning objectives, the concepts conveyed are clear, the material presented is comprehensive, the language adheres to the General Guidelines for Indonesian Spelling, the sentences used are easily understandable, the language used is free from ambiguity, the colors, text, and images used are harmonious, the font types and sizes used are appealing and legible, and the narration in the video is clear.

The validation results of the product indicate that the developed learning video has been deemed valid for use as a learning media. However, since this research only progressed up to the product creation stage, further studies are needed to ascertain the effectiveness of the developed learning video for educational purposes.

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