

The Feasibility of Developing Learning Videos on the Technique of Bioassay

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Article History:

Received date: June 17 2025

Received in revised from: July 21 2015

Accepted date: July 24 2026

Available online: July 28 2025

Citation:

Panjaitan, R.G.P., Tenriawaru, A.B., Silaen, J., Nikmah, N.A., Ire, F., & Lestari, L.A. 2025. The feasibility of developing learning videos on the technique of bioassay. *Jurnal Pendidikan Sains Indonesia (Indonesian Journal of Science Education)*, 13(3):876-887.

Abstract. The development of information and communication technology has a significant impact on the world of education, particularly in the provision of learning media. Video-based learning media has become an effective alternative for visualizing complex materials, such as in the bioassay technique course. This study aims to develop and assess the feasibility of educational videos as media for the Bioassay technique course, which includes material on testing using animal testing. This study uses the research and development (R&D) method with a modified ADDIE development model consisting of four stages: analysis, design, development, and evaluation. Data collection techniques include validation by experts. The instrument used is a validation sheet with a Likert scale. The aspects assessed include format, content, and language. For the four indicators in the format aspect, a validity score of 1 was obtained. Similarly, for the three indicators in the content aspect, the validity score was also 1, and for the two indicators in the language aspect, the validity score remained at 1. Overall, from these three aspects, an average validation score of 1.00 was achieved, categorized as very high. Therefore, the video is deemed suitable to be used as a learning media in the bioassay technique course.

Keywords: feasibility, learning video, Bioassay technique

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Introduction

With the advancement of time, information and communication technology has developed rapidly and influenced various sectors, including education (Anisa, 2023; Agastya & Sujana, 2023; Andriyani & Suniasih, 2021; Ghory & Ghafory, 2021). Therefore, technology can be utilized to support effective learning and serve as a medium for instruction (Daryanes et al., 2023; Kristiani & Pradnyadewi, 2021; Agastya & Sujana, 2023). Lecturers are also encouraged to use teaching aids in the form of learning media to enhance the learning process (Patras et al., 2023; Agastya & Sujana, 2023; Rosdiana & Ulya, 2021). The 21st-century education revolution is characterized by the use of diverse learning media that help lecturers adapt to technological advancements in line with the era, thereby fostering creativity (Muliana, 2022) and making learning more engaging (Hosaini et al., 2024).

Instructional media is essential for assisting students in facilitating the learning process (Agastya & Sujana, 2023; Prayudha, 2021), and it is often associated with the provision of materials to support learning (Agastya & Sujana, 2023). Instructional media serves as a tool to capture students' attention during the learning process (Priandika et

al., 2022; Rahmatika et al., 2021) and functions as a means of conveying messages (Utami et al., 2023; Anzalna et al., 2022), ideas, or concepts in the form of learning materials (Patras et al., 2023; Dewi & Suniasih, 2021) from educators to learners, therefore it can stimulate students' thinking abilities (Wahida et al., 2023; Priandika et al., 2022). Moreover, instructional media serves as a way to encourage active learning and provide stimuli (Patras et al., 2023; Wahida et al., 2023) to students in an environment where the media can be seen, heard, and practiced (Agastya & Sujana, 2023; Agustin & Riyanti, 2024). The use of media in the learning process offers several significant advantages (Wahida et al., 2023). Firstly, it enhances student interest in learning by making the process more engaging (Sanjaya et al., 2021) and more attention-grabbing for students (Rosdiana & Ulya, 2021). Furthermore, media use enables learning materials to become more meaningful, facilitates better comprehension (Sailendra et al., 2025; Kristiani & Pradnyadewi, 2021), and strengthens students' mastery of the subject matter (Agastya & Sujana, 2023). By accommodating various teaching approaches, media supports diverse learning styles that align with students' needs (Patras et al., 2023; Sanjaya et al., 2021; Hayati et al., 2024). To effectively achieve learning objectives (Sailendra et al., 2025; Repelita et al., 2023), instructional media should help students understand and absorb the material more easily (Kristiani & Pradnyadewi, 2021; Rosdiana & Ulya, 2021; Agustin & Riyanti, 2024). One commonly used type of media that assists lecturers in delivering course content is video-based media (Pertiwi et al., 2023; Prayudha, 2021; Rifanka et al., 2025).

Video is an audio-visual medium (Wahida et al., 2023; Setiawan et al., 2022) that consists of a series of moving images accompanied by sound (Pertiwi et al., 2023), forming a cohesive narrative designed to convey specific messages (Patras et al., 2023; Priandika et al., 2022) in order to achieve learning objectives (Prayudha, 2021; Rosdiana & Ulya, 2021). Audio-visual media represents a form of modern instructional technology that aligns with the advancement of science and technology (Utami et al., 2023; Razak et al., 2023). It includes media that can be both seen and heard (Dewi & Suniasih, 2021; Priandika et al., 2022; Agastya & Sujana, 2023), making it easier for students to engage in the learning process (Setiawan et al., 2022; Dewi & Suniasih, 2021; Laili et al., 2022). The use of video as a learning medium can assist students who struggle to understand the material (Sudaryanti et al., 2023) by presenting a combination of visual and auditory elements (Dewi & Suniasih, 2021; Priandika et al., 2022; Laili et al., 2022; Rifanka et al., 2025). Videos are also effective in capturing students' attention, thereby motivating them (Sanjaya et al., 2021; Dewi & Suniasih, 2021) and encouraging greater participation and collaboration in the learning process (Prayudha, 2021).

One of the key benefits of using video as an instructional medium is its application in the bioassay techniques course, as it can effectively visualize and represent complex concepts. The course covers topics such as the historical use of plants as medicine across cultures, bioassay techniques, various types of testing using laboratory animals, ethical clearance, and the characteristics of test animals. These topics are not effectively conveyed through verbal explanations alone, as students may struggle to form a clear understanding of how the procedures are actually carried out. Therefore, a learning medium capable of illustrating or visualizing these processes is necessary to help students comprehend and accurately visualize bioassay techniques. According to Kusmaryono & Basir (2024), instructional videos can help address students' limitations in knowledge and understanding, while also serving as a dynamic tool to enhance student interest (in terms of attention and affective engagement) and improve academic performance. In this context, efforts are being made to develop video-based learning media specifically designed for the bioassay techniques course, focusing on experimental testing using laboratory animals.

The aim of this development is to visualize and explain concepts related to testing using laboratory animals, making the content more tangible and easier to understand. In addition, the development of instructional media in the form of video-based learning is also intended to enhance students' learning motivation and create a more meaningful learning experience, as part of efforts to improve the overall quality of education. The instructional

video developed for the bioassay techniques course presents several key topics, including an overview of bioassay techniques, types of testing using laboratory animals, bioassay testing procedures, ethical clearance and animal subjects, administration routes, fasting protocols for test animals, dosage conversion, and various experimental tests involving laboratory animals.

Methods

Research and development (R&D) with the ADDIE model. The stages of the ADDIE development model are analysis, design, development, implementation, and evaluation (Panjaitan et al., 2023). R&D is a research approach used to develop and validate a product. Product development involves updating existing products to make them more practical, effective, and efficient, or creating entirely new products that did not previously exist. Product validation, on the other hand, is the process of testing the validity or effectiveness of a product (Sugiyono, 2021). The type of research used is research and development. Referring to Aldoobie (2015) and Muruganantham (2015), the model used in this study is a modified version of the ADDIE model, involving only four stages: analysis, design, development, and evaluation. The stages of this research include (1) Analysis, which is conducted by collecting information related to problems in the learning process, identifying solutions to overcome these problems, identifying relevant concepts in the bioassay techniques course, and detailing the concepts to be included in the instructional media. The learning process is conducted using lectures accompanied by hands-on practical work, specifically on animal testing, bioassay techniques, ethical clearance and experimental animals, drug administration routes, fasting in experimental animals, and dose conversion. Lectures are not considered concrete enough to assist students in practical work, so learning videos are needed that can demonstrate the processes and visualize the required material. (2) Design, in which the design phase involves planning the scenario of the media to be developed. This stage includes creating a storyboard, beginning with organizing the concept of instructional video media, determining the structure and content of the materials presented, developing illustrations and visualizations, and deciding on the use of audio in the video learning media. The material presented in the video is taken from the teaching materials used and direct practicals. (3) Development, which consists of producing the instructional media based on the video learning design created during the design phase. This includes the actual production of the instructional video according to the predetermined plan and concept. Learning video media is supplemented with musics and images to provide an attractive and informative display, making it easier for students to understand the material. (4) Evaluation, which is the final stage involving revisions to the instructional video based on evaluations by validators as feedback for improvement, using a validation questionnaire. The media is validated and revised according to input and suggestions from the validators. The aspects assessed during the validation phase include three components: format, content, and language. These aspects are explained in detail to facilitate the validation process.

The data collection techniques used in this development include validation sheets. The validation sheets were completed by expert validators using a Likert scale ranging from 1 to 4, where 4 = very good, 3 = good, 2 = fair, and 1 = poor. The media was validated and assessed by the validators.

The calculation of content validity used construct validity as described by Gregory (2013) in Panjaitan et al. (2023), using the following formula:

$$V_c = \frac{D}{A+B+C+D}$$

Information:

V_c : Content Validity

A : low relevance of minor experts 1 and 2

B : high relevance from expert 1 and low from expert 2

C : low relevance from expert 1 and high from expert 2

D : high relevance of minor experts 1 and 2

Construct validity criteria

0.80 – 1.00 : Very high construct validity

0.60 – 0.79 : High construct validity

0.40 – 0.59 : Moderate construct validity

0.20 – 0.39 : Low construct validity

0.00 – 0.19 : Very low construct validity

Results and Discussion

The results of this study consist of the validation outcomes provided by the validators. Validation was conducted to assess the quality of the developed product, based on several relevant aspects. In addition, the validation process also generated suggestions and feedback from the validators, which served as the basis for revising and improving the product (Dewi & Suniasih, 2021).

The purpose of the validation in this study is to evaluate the feasibility and validity level of the instructional video, with the expectation that the resulting media can be used effectively in the learning process particularly in the bioassay techniques course. The validation results from the validators are presented in Table 1.

Table 1. Validator assessment of the developed instructional video media

Aspect	Indicator	Average score	Description
Format	1. Appropriate font style and size.	1.00	Very high
	2. Suitability of visuals, colors, images, and text.		
	3. Balance in text layout		
	4. The video is organized systematically.		

Content	5. Completeness of information presented on bioassay techniques	1.00	Very high
	6. The material presented in the video aligns with the learning objectives.		
	7. Ease of understanding the presented material.		
Language	8. The language used is easy to understand	1.00	Very high
	9. Sentence structure and information are complete and meet students' needs.		
Total		1.00	Very high

Format Aspect

The format aspect consists of four evaluation indicators. Based on the validation results for these four indicators, an average score of 1.00 was obtained, which falls into the very high category. The first indicator is the appropriateness of font style and usage. According to the validators' assessment, the instructional video developed presents information using a font that is easy to read and an appropriate font size. Larger and bold fonts are used for titles to provide emphasis, while smaller fonts are used for the content to ensure readability (Figure 1). According to Rifanka et al. (2025) and Rosdiana & Ulya (2021), selecting the right type and size of font plays an important role in creating a cleaner, clearer, and more legible video display, as fonts that are too small or too large can hinder learners' comprehension of the instructional content.

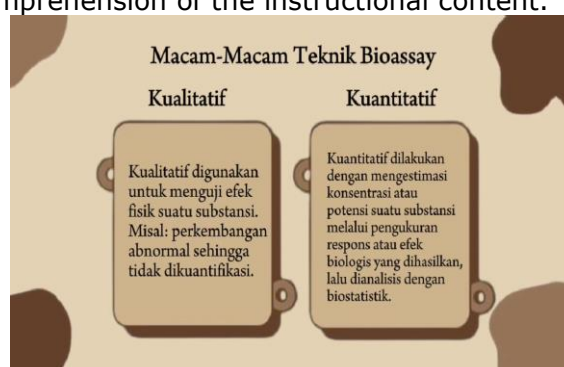


Figure 1. Using a simple font, with a large font size for the title and a medium font size for the content.

The second evaluation indicator is the suitability of visuals, colors, images, and text. Based on the validators' assessment, the instructional video is considered to have a well-balanced color combination and a harmonious layout of images and text. The color scheme used provides sufficient contrast, making the text easy to read without causing eye strain. Additionally, the text is neatly arranged, centered with justified alignment, while the images are placed close to the text to clarify the information being conveyed to students (Figure 2). This aligns with Astuti et al. (2021), who stated that harmony between visuals, colors, images, and text not only helps to clarify the content of the video but also influences learners' interest in engaging with the material.



Figure 2. The colors used provide good contrast, the text layout is harmonious, and the images are clear.

The third indicator is the balance of text layout. Based on the validators' assessment, the instructional video features a well-organized text layout, with uniformly centered alignment. The font size is also used to distinguish between content hierarchies, where the title uses a larger font than the body text (Figure 3a). According to Astuti et al. (2021), a balanced text layout helps readers easily understand the intended message of the video creator, whereas an unstructured layout may cause confusion for students in grasping the meaning of the text. The fourth indicator is the systematic organization of the video. Based on validator evaluations, the video presents content in a well-structured manner, aligned with the flow of the learning activities, and delivers material from general concepts to specific details. In the video, the topics are arranged sequentially in accordance with the subject of the bioassay techniques course, starting from the definition of assays, types of assays, to their implementation methods (Figure 3b). This is consistent with Fitriyani et al. (2024) and Rifanka et al. (2025), who stated that presenting information systematically with a logical and coherent flow can help viewers grasp the material progressively, from fundamental concepts to technical details.

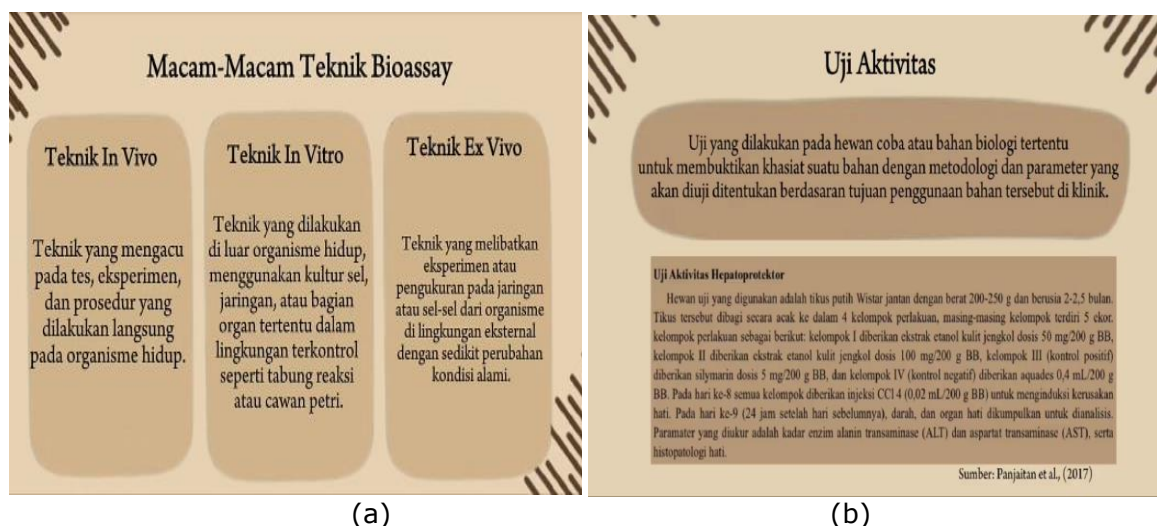


Figure 3. (a) Balance in text layout (b) Systematically structured video

Content Aspect

The content aspect consists of three assessment indicators. Based on the validation results of these three indicators, an average score of 1.00 was obtained, which falls into

the very high category. The first indicator is the completeness of the information presentation related to bioassay techniques. According to the validators' assessment, the information presented in the instructional video is considered complete because it comprehensively covers material on bioassay techniques as well as the results of practical trials (Figure 4), ranging from definitions to various test types such as activity tests, diuretic, anthelmintic, anti-inflammatory, and antidiabetic tests. Bioassay technique is a course with complex material that is interrelated from one topic to another, making comprehensive information presentation critically important. According to Patras et al. (2023), information that is not delivered thoroughly can cause confusion and hinder viewers' understanding of the instructional video content. Conversely, Fitriyani et al. (2023) stated that a well-organized video structure can enhance the direction and effectiveness of the learning process.

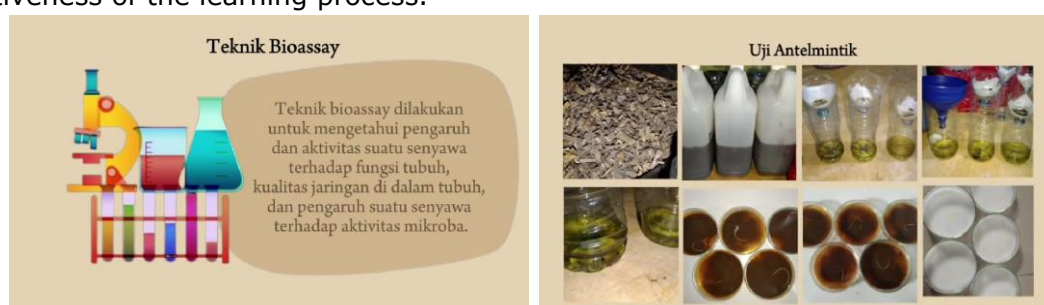


Figure 4. Completeness of bioassay technique information presentation

The second indicator is the explanation of the video material according to the learning objectives. Based on the results of the validators' assessments, the material presented in the video is in accordance with the predetermined learning objectives. At the beginning of the video, the learning objectives are also presented, which include: explaining a general overview of bioassay techniques, distinguishing various types of testing using experimental animals, explaining the testing of bioassay techniques, explaining ethical clearance and experimental animals, explaining the administration routes of preparations, fasting in experimental animals, dose conversion, and skills in conducting testing using experimental animals (Figure 5). The alignment of the video structure with the learning objectives is very important, because inconsistencies between the material and the learning objectives can negatively impact the achievement of student learning outcomes (Panjaitan et al., 2021). This opinion is also in line with Agastya & Sujana (2023) who emphasize that in the development of learning media, the alignment between the material content and the intended objectives is a crucial aspect because the material serves as the core of the teaching and learning process by containing messages designed to support learning activities effectively. The third indicator is the ease of understanding the material presented. Based on the results of the validators' assessments, the learning video in this indicator has met the established criteria, including: the parts in the video are easy to understand, the material is delivered clearly, and the practical results and processes are presented sequentially and are easily understood by viewers (Figure 6). This is in line with the opinion of Adawiyah et al. (2021) that ease of understanding the material is an important aspect in the development of learning media because engaging media such as learning videos are able to deliver information clearly and effectively, thus helping students understand the material more easily and meeting the feasibility criteria as an aid in the learning process.

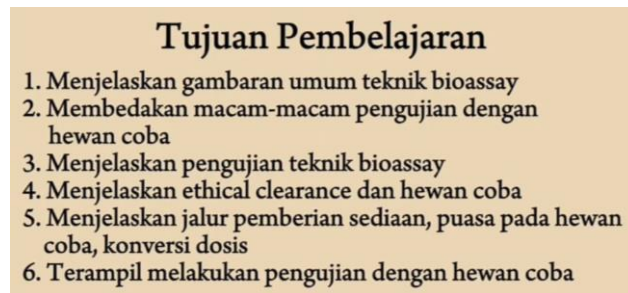


Figure 5 Learning objectives



Figure 6 Treatment to the animals

Language aspect

The content aspect consists of 2 assessment indicators. Based on the validation results for both indicators, an average score of 1.00 was obtained, which falls into the very high category. The first indicator is the ease of understanding the language used. According to the validators' assessments, this instructional video has met the established criteria, such as the use of words with clear meaning, free from confusion, and not leading to misunderstandings (Figure 7). In line with this, aligning the material with the students' developmental level and language comprehension ability is crucial to avoid misinterpretation and prevent ambiguity, as the use of easily understood language helps learners to effectively grasp the information conveyed through the instructional video (Fitriyani et al., 2024). The importance of using appropriate language is also emphasized by Panjaitan & Titin (2021), who state that accurate language usage supports the understanding of meaning and the intended message of each word presented in educational media.

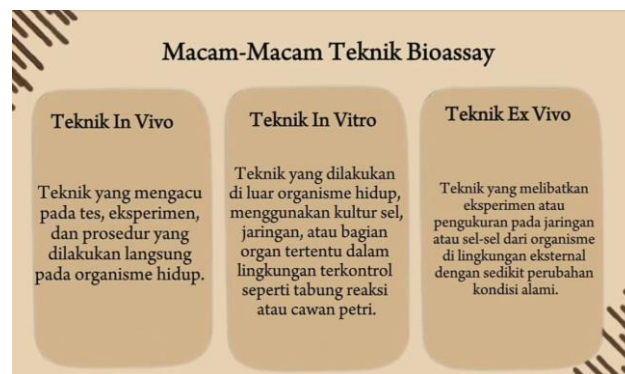


Figure 7. Ease in understanding the language used

The second indicator is the completeness of sentences and information required by students. Based on the results of the validators' assessment, this video-based learning media has met the criteria for using communicative language, with complete sentence structures and appropriate word choices that make the conveyed information easy to understand (Figure 8). Sentence structure and the completeness of information in learning media play an important role in helping students understand the material comprehensively. As stated by Panjaitan et al. (2023), sentences and words used in learning media must be structured in a simple, clear, concise, and easily understood manner.

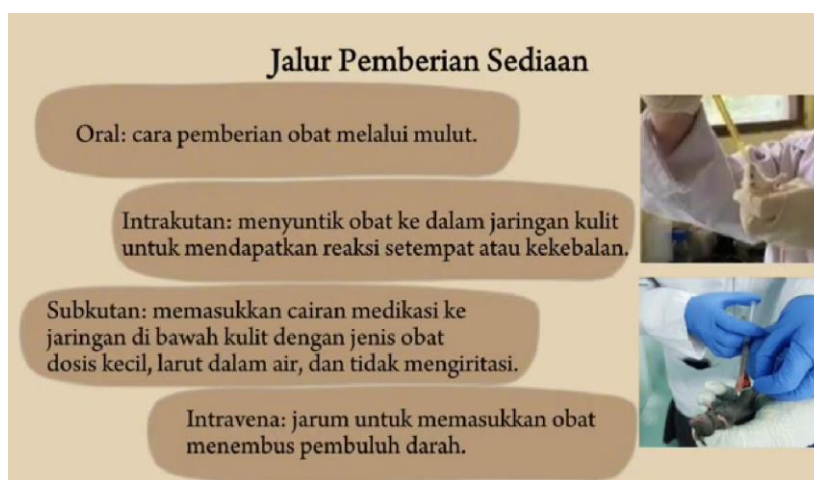


Figure 8. Completeness of sentences and information needed by students

Overall, the validation results from the validators for the instructional video show an average score of 1.00, which falls into the very high category. This result indicates that the instructional video developed has met the established quality criteria and is deemed suitable for use as a learning medium to support the teaching and learning process.

Conclusion

The instructional video is deemed suitable for use as a learning medium in the Bioassay Techniques course, as it has been proven valid based on assessments from the validators. The evaluation shows that the format, content, and language aspects each received a score of 1.00, which falls into the very high category. This indicates that the video meets the required quality standards to effectively support the learning process. This learning video can visualize and explain aspects related to animal testing, making it more realistic and easier to understand. Furthermore, developing learning media using learning videos is also intended to increase learning motivation and create a more meaningful learning environment, as an effort to improve the quality of learning.

Acknowledgement

This research was carried out with funding from the DIPA of the Faculty of Teacher Training and Education in the 2025 fiscal year. Therefore, we extend our gratitude to the faculty leadership. We also express our sincere thanks to the validators who have provided valuable suggestions for the improvement of this instructional video.

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