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Expert Validation of Learning Videos About Plant Tissue for Class XI

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ABSTRACT
The modern era today is characterized by a revolutionary technological transformation, which fundamentally changes the paradigm of human life, including in the context of education and the teaching process. The integration of technology in the context of education can be done through the use of technological resources as innovative learning media, one of which is audio-visual media. The purpose of this study is to describe the feasibility of audio-visual media developed based on the assessment of material experts and learning media experts. The type of research used in this study is Research and Development. The method used is development research which refers to the ADDIE model. The analysis stage is carried out in the form of analyzing the needs for the development of audio-visual media. The design stage is in the form of designing a developed media storyboard. The development stage is in the form of media development followed by validation activities of material experts and learning media experts. The results of the study show that the feasibility of the developed audio-visual media is assessed through expert assessment, which includes material experts and media experts. The feasibility results of the plant tissue material obtained the results of a feasibility test by material experts of 85.71% with the criterion of "Very Valid", the feasibility test by media experts was 89.47% with the criterion of "Very Valid"

***Keywords**: Audio-Visual Media; Learners; Plant Tissue Material*

INTRODUCTION
Education is a fundamental means of shaping future generations who are intelligent, competent, and adaptive to the dynamics of the development of science and technology. The next generation of the nation is prepared through the educational process to have in-depth knowledge and practical skills that allow them to contribute optimally to society. The modern era today is characterized by a revolutionary technological transformation, which fundamentally changes the paradigm of human life, including in the context of education and the teaching process. Along with the rapid development of technology, educators are required to master technical knowledge, especially in the operation of computer hardware and the ability to integrate appropriate technology applications in the classroom learning environment (Arwudarachman, 2015).

The integration of technology in the context of education can be done through the use of technological resources as innovative learning media. Learning media is a learning resource that can help teachers in enriching students' insights (Nurrita, 2018). The progress of the times has also made it easier to use technology through various available platforms. This can be seen from the growth and development of students which goes hand in hand with technological developments so that technology can be used as a means of support in learning activities (Wangkanusa et al., 2023). Learning media is a fundamental component that has a strategic role in the architecture of the educational process. Learning media as a multifunctional learning resource makes a significant contribution to educators in expanding the scope of students' knowledge. The use of learning media can significantly make it easier for students to understand complex material while optimizing the effectiveness and efficiency of the knowledge transfer process (Mediana et al., 2024).

The diversity of media types used by teachers has the potential to be an effective instrument in transforming and communicating scientific content to students (Nurrita, 2018). Learning media consists of several forms, one of which is audio-visual media. Audio-visual media is defined as a multidimensional educational means that integrates sound and visual elements simultaneously, encompassing formats such as video recordings, films, and other multimedia variations that allow for multisensory learning experiences (Yuliana et al., 2024). The advantage of audio-visual media lies in its ability to arouse students' intrinsic motivation, optimize time efficiency through precise concept delivery, and consolidate students' focus in the process of understanding the subject matter. This media has the potential to create more dynamic and interactive academic engagement (Sitanggang et al, 2024).

Biology subjects require real learning, not just theoretical understanding (Wangkanusa et al., 2023). Biology learning is a process that involves a systematic search and understanding of nature. Therefore, biology learning not only focuses on mastering facts and concepts but also emphasizes the process of discovery. This requires students to be able to think critically. To encourage change, hone thinking skills, and satisfy students' curiosity, innovative and effective learning strategies are needed (Arine Ellen Rose et al., 2024).

Based on an interview that the researcher has conducted in Islamic Senior High School (MA) Ghozaliyah Sumbermulyo Jogoroto with one of the biology teachers, Mr. Muhammad Nasrulloh, stated that the teaching method that takes place still mostly still relies on lectures and questions and answers, with a high dependence on textbooks as the only source of learning. The resource person also revealed that student involvement is still low, during the learning process students are often found who seem bored and lack enthusiasm for the subject matter presented. However, teachers also invite students to do simple practicum activities for certain materials. Teachers also sometimes provide printed pictures as an alternative learning medium to make it easier for students to understand concepts that do not have visualizations in their textbooks. Biology is one of the subjects that requires learning media (Antonio, 2020). One of the biology materials that teachers consider difficult for students is the structure and function of plant tissues (Istighfarin, 2015).

Based on these problems, there needs to be a solution for improvements in the learning process, in order to allow for an improvement in the learning process of students at Islamic Senior High School Ghozaliyah Jogoroto Jombang. One of the efforts that can be made is for researchers to develop audio-visual learning media about plant tissue material to make it easier for students to understand the concept of learning plant tissue material so that it is expected to overcome these problems. The purpose of this study is to determine the validity of audio-visual-based learning media that has been designed by researchers.

METHOD

The development model used as a reference in this study is the ADDIE model which consists of five stages, namely Analyze, Design, Develop, Implement, and evaluate (Figure 1). The research and development of the ADDIE model is a method used in this study which aims to produce products in the form of audio-visual-based learning videos on plant tissue materials.

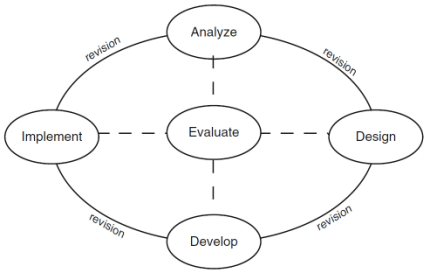


Figure 1. Stages in the Model ADDIE (Branch, 2009)

This research was carried out at Islamic Senior High School Al-Ghozaliyah Jogoroto Jombang. The subjects of this study are material experts, media experts, biology teachers, and 14 students of class XI science. The data collected in this study is in the form of qualitative data and quantitative data. Data from descriptive analysis

Qualitative is used to describe information related to the development of video learning products, namely suggestions, criticisms, and inputs from material experts and media experts in the validation process while the data from quantitative analysis is obtained through the calculation of the percentage of assessment questionnaires by material experts and media experts. The score data of each validator will be calculated on average using formula (1) and then interpreted based on the eligibility criteria in Table 1.

$$V = \frac{TSe}{TSh} \times 100$$

Information:
V = Average expert validation results
Tse = total score from expert validators
TSh = total expected maximum score
(Mellisa & Fitri, 2022)

Table 1. Eligibility Criteria Based on Validation Results

No.	Average Validation Results	Criterion	Information
1.	85,01 – 100	Highly Valid	Suitable for use with minor revisions
2.	70,01 – 85,00	Valid	Suitable for use with moderate revision
3.	50,01 – 70,00	Less Valid	Not suitable for use as it needs major revisions
4.	1,00 – 50,00	Invalid	Not suitable for use

(Saputri et al., 2023)

Analysis

The first step is an analysis where the researcher analyzes the need for the development of audio-visual-based learning media on plant tissue materials. The researcher conducted an interview with a biology teacher at Islamic Senior High School Ghozaliyah. The results of the interviews were analyzed descriptively to prepare the design of the audio-visual media.

Design

The second step is to design or design audio-visual-based learning media on plant tissue materials. The approved storyboard is then developed in prototype form.

Development

The third step is to develop or develop audio-visual media to overcome students' misconceptions about plant tissue material. The researcher developed a prototype of audio-visual media based on a storyboard. The prototype is then assessed by material experts and learning media experts. The results of the assessment of material experts and learning media experts are used to determine the feasibility of the developed audio-visual media. Suggestions and comments from material experts and learning media experts are used as material for improving the developed audio-visual media. The results of the validation of the material and media by the experts are from statements that will determine the suitability of the procedures that have been developed by the researcher.

RESULT AND DISCUSSION

The result of this research and development is an audio-visual learning medium on plant tissue materials. This research and development was carried out to determine the feasibility of audio-visual learning media, students' responses to the developed learning media, and the effectiveness of these media in overcoming students' misconceptions about plant tissue materials. The following is a description of the results of the research that has been obtained.

1. Material Expert Validation Results

Validation of material experts aims to determine the quality of the feasibility of the content, feasibility, and presentation of the developed product. The validation sheet was filled out by a material expert, Mrs. Fatikhatun Nikmatus Sholihah, S.Pd., M.Pd. Lecturer of the biology education study program, Faculty of Education, KH. A. Wahab Hasbullah. The validation results that have been filled in by the subject matter experts are presented in Table 2.

Table 2. Material Expert Validation Results

No.	Statement	Score				
		5	4	3	2	1
1.	Learning objectives are clearly displayed in the learning video animation.	√				
2.	Learning objectives in accordance with the material delivered	√				
3.	The material presented includes material contained in the Basic Competency (KD) (3.3 Analyze the relationship between cell structure in plant tissues and organ function in plants.)	√				
4.	The material was delivered in a series of		√			
5.	The delivery of information in the media is carried out in simple language and is easy for students to understand, as well as explaining concepts that are often misunderstood.		√			
6.	Between the title and the discussion of the content of the material is appropriate.	√				
7.	The presentation of material can attract students' interest in learning.		√			
8.	Learning videos makes it easier for students to learn in the material.		√			
9.	The introduction in the learning video is correct.		√			
10.	Visual elements (animations) are used effectively to clarify the differences and functions of different types of plant tissues.		√			
11.	Media includes interactive elements that encourage learners to actively participate, thereby increasing their understanding and engagement.			√		
12.	The delivery of material is carried out in a clear, structured, and interesting manner for students.		√			
13.	The material text does not contain misconceptions.		√			
14.	Network images do not contain misconceptions.	√				
Total		25	32	3	0	0
Total Score		60				
Average		85,71				
Criteria for Selection		Highly Valid				

Based on the validation results from the validators of material experts, several aspects need further attention. The material expert validator provided the following suggestions and comments, namely:

- The image is clear, but the explanation (writing) does not show the image description (e.g. in the basic tissue the description does not describe the image, and the space between cells and large vacuoles should be given an arrow on the parenchymal tissue, in the polyhedron cell image needs to be added a polyhedron image)
- It is more effective if the video is filled with animated images/videos, not explanatory writing.
- Haven't found this audio-visual video with any other learning videos.
- Audio (voice actor) reads more text on video.

2. Material Expert Validation Results

Media expert validation aims to determine the attractiveness of the content, feasibility, and presentation of the developed product. The validation sheet was filled out by a media expert, namely Mrs. Rossanita Truelovin Hadi Putri, M.Pd. who is a lecturer in the biology education study program, Faculty of Education, KH. A. Wahab Hasbullah. The validation results that have been filled in by media experts are presented in Table 3.

Table 3. Validation Results of Learning Media Experts

No.	Statement	Score				
		5	4	3	2	1
1.	The presentation of learning objectives in learning media is clear.	√				
2.	The presentation of learning objectives is already relevant to the curriculum.		√			
3.	The video contains stimuli for students to respond to the video (preparing stationery, listening to material, answering questions)		√			
4.	The material presented is in accordance with the subject matter.	√				
5.	Delivery of learning media increases the learning attractiveness of students.		√			
6.	The scope of the content of the material is in accordance with the learning objectives.		√			
7.	Compatibility of the illustrations presented with the material	√				
8.	The language used is in accordance with the rules of the Indonesian language and is easy to understand (communicative)	√				
9.	The content presented is relevant to overcome common misconceptions among students related to plant tissues, with clear and in-depth explanations.		√			
10.	The design elements (graphics, text, and animations) are well-structured and support the understanding of the material.		√			
11.	The duration of the video is appropriate and the tempo of the material delivery is effective to maintain the attention of students.		√			
12.	Animated display in interesting learning media	√				
13.	The *suitability of dubbing* and visualization is just right.	√				
14.	The dubbing *intonation* sounds clear.	√				
15.	The typeface used is easy to read.		√			
16.	Combination of text colors with *appropriate background*		√			
17.	Foster students' interest in learning		√			
18.	The image quality of the video is appropriate.	√				
19.	Videos are easily accessible and compatible with a wide range of devices.	√				
Total		45	40			
Total Score		85				
Average		89,47				
Assessment Criteria		Highly Valid				

Based on the validation results from the validators of material experts, there are several aspects that need further attention. Media expert validators provide suggestions and comments as follows.

- The function reading in adult tissue (minute 3:49) was only read the function.
- Minutes (5:37) of writing is adjusted to the background, if the background is bright, the writing must be dark, and vice versa.
- Minute (7:39) the elaboration of the function can be enlarged because there is still space underneath.
- Minute (9:00) on the sponge parenchyma, it was mentioned that there was chlorophyll there.
- Minute (12:56) should be explained the 3 types of networks and then given an example.
- Sample questions at least 3.
- In the end, it is also necessary to convey "analysis" because the delivery of several networks makes students have to understand differences based on functions that are seen through their characteristics.

Discussion

Assessment by material experts needs to be carried out to determine the feasibility of the learning media developed regarding the quality of the learning materials presented so that it can be used to support The learning process (Saski & Sudarwanto, 2021). Media validation is a stage of assessment of product design carried out by experts who have experience in their fields (Hapsari & Zulherman, 2021). The purpose of this process is to assess the feasibility of learning media and identify various shortcomings that may exist (Mustaqimah, 2022). The learning media developed in this study has met the criteria of being very valid with information suitable for use with small revisions so the average validation results by subject matter experts were obtained at 85.71%. These results show that the material presented in the audio-visual learning media developed in this study is suitable to be delivered to students in the learning process.

Material expert validators provide assessments through a validation questionnaire consisting of 14 statements. A total of five statements scored 5, eight statements scored 4, and one statement scored 3. A score of 5 is the maximum score that a validator can give, while a score of 1 is the minimum score that a validator can give. Statements that scored 5 include statements number 1, 2, 3, 6, and 14. A score of 4 was given by the validator on statements number 4, 5, 7, 8, 9, 10, 12, and 13. Statement number 11 received a score of 3 from the material expert validator.

The audio-visual learning media developed displays learning objectives that are in accordance with the material presented in the media so that the material expert validator gives a score of 5 on statements number 1 and 2. Learning objectives need to be conveyed to students so that students understand their goals for participating in these learning activities (Evaristiayu, 2023). The learning media developed in this study has displayed learning objectives so that students can understand the objectives of the learning process carried out.

Learning materials are materials that are systematically and specifically arranged to achieve certain competencies from certain goals (Djumingin et al., 2022). The material presented in the developed learning media is in accordance with the scope of the underlying Basic Competency (KD), namely KD 3.3 for class XI according to the 2013 Curriculum, with the formulation: analyzing the relationship between cell structure in plant tissue and organ function in plants. The title of the material listed in the developed learning media is plant tissue, where the title is in accordance with the presentation of the material. Therefore, the material expert validator gave a score of 5 on statements numbers 3 and 6.

The presentation of material in the developed audio-visual learning media contains anatomical images of plant tissue to clarify the description. The images of plant tissues are referenced from scientific sources and consulted with the supervisor before being presented to a media developed to avoid misconceptions. This is what causes the material expert validator to give a score of 5 on statement number 14. Images that do not contain misconceptions have complete, representative, and consistent criteria with applicable scientific theories (Ariandini et al., 2013).

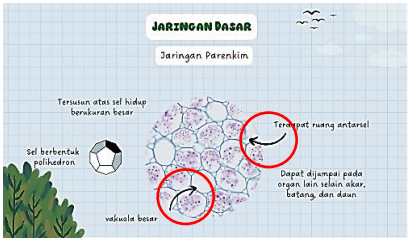
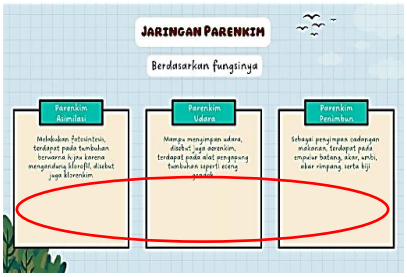
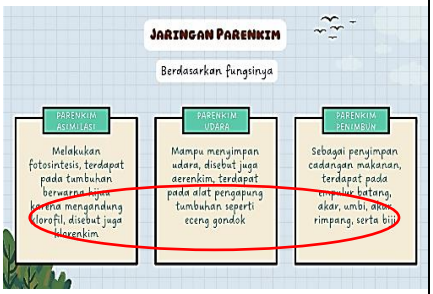
Media experts provide an evaluation of the developed media by filling out a learning media validation questionnaire. This assessment covers several aspects, including the design of the initial appearance of the learning video, the appearance of audio-visual media, the attractiveness of the learning video media, and the quality of the content presented in the media.

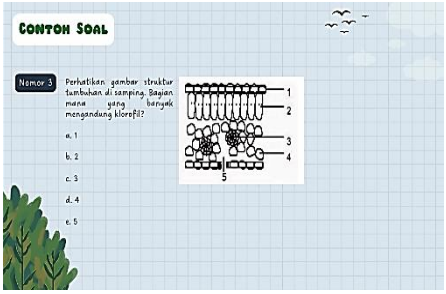
Validation by media experts is carried out to assess the feasibility of learning media developed based on designs prepared by researchers so that they are suitable for use (Elvina & Dewi, 2020). The audio-visual learning media developed in this study received an average rating of 89.47% "Very Valid" with the criteria of suitability for use with minor revisions according to media expert validators. Media expert validators conducted assessments using a validation questionnaire consisting of 19 statements, with the maximum score that could be given was 5 and the minimum score was 1. A total of nine statements scored 5 and ten statements scored 4. Statements that scored 5 included statements number 1, 4, 7, 8, 12, 13, 14, 18, and 19. Statements that scored 4 included statements number 2, 3, 5, 6, 9, 10, 11, 15, 16, and 17.

Before revision, there are several things in the learning video that need to be improved based on input from media experts. Some of them are changing the color of the text from white to black, adjusting the background darker, and adding questions at the end of the development video display. The development of audio-visual-based learning media has gone through two revisions in accordance with the validator's suggestions until it reaches a very valid category. Product revisions are carried out so that the products that have been made are suitable for use in learning. The product revision was carried out by the

material expert Mrs. Fatikhatun Nikmatus Sholihah, S.Pd., M.Pd., and the media expert Mrs. Rossanita Truelovin Hadi Putri, M.Pd. The results of the product revision developed can be seen in Table 4.

Table 4. Product Revision by Subject Matter Experts and Media Experts

No	Before Revision	After Revision
Revision Based on the Advice of Subject Matter Expert Validators		
1	 There is no arrow to the network in question	 Have been given an arrow to the network in question
Revision Based on the Advice of Media Expert Validators		
5 2	 Learning objectives only mention two been no mention of chlorophyll	 The learning objective was given an additional point 3, namely to analyze the relationship between cell structure in organ tissue and its function
3	 Variations in background colors and text are not appropriate	 Variations of background colors and writing are appropriate
4	 There is still a blank space below the network explanation	 The network explanation has been enlarged so that it fills the empty space

6	There are only two practice questions after the video	 Addition of the third question

CONCLUSIONS

Based on the results of the research on the development of audio-visual media-based learning media on plant tissue materials, it can be concluded that the feasibility of the developed audio-visual media is assessed through expert assessment, which includes material experts and media experts. The feasibility results of the plant tissue material obtained the results of a feasibility test by a material expert of 85.71%, "Very Valid" with the description of the criteria of Suitable for use with a small revision, a feasibility test by a media expert which is 89.47%, "Very Valid" with the description of the criteria Suitable for use with a small revision.

Based on the results of the research and the limitations of the research that have been discussed previously, the researcher suggests the following things:

- Audio-visual media on plant tissue material will be better if it is developed into a more interactive media, both in terms of the concept of synchronization and video display.
- There is a need for re-testing related to the effectiveness of the media in overcoming misconceptions about plant tissue material with a larger sample number than this study.

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