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Development of Powtoon-based Animated Video Learning Media on Measurement Material Class X Phase E SMA

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ABSTRACT

The independent curriculum is designed to foster a learning environment where students can engage in self-directed and enjoyable learning. Its success relies significantly on how effectively it is implemented in practice. As technology in education continues to evolve, the development of learning media has also progressed, offering more dynamic and engaging ways to support the educational process. Learning media acts as an intermediary in conveying information between teachers and students. The facts obtained in the field of technological developments are not utilized properly so that the media used are still limited to printed media. This article is made with the aim of producing learning media with powtoon animated videos on measurement material. This research uses the R&D method. The model used is the 4-D model through the definition, design and development stages. The results of the analysis of the validity of learning media show a high category, namely 0.93 for the learning media feasibility component, 0.97 for the media component and 0.93 for the learning media structure component. So, the conclusion is that the use of powtoon animated video learning media on measurement material is used as a learning tool and can be tested in the next phase.

INTRODUCTION

The independent curriculum was designed as a foundational framework aimed at optimizing curriculum effectiveness by emphasizing essential content while fostering students' character development and competency enhancement (Susanty, 2020). The independent curriculum introduces a variety of learning methods designed to achieve optimal educational outcomes. Its application in the current education system seeks to foster a self-directed and enjoyable learning process for students, emphasizing flexibility and engagement (Susanty, 2020). The success of the independent curriculum in education largely depends on its effective implementation within the learning process (Sari et al., 2023). An effective learning process significantly contributes to the successful achievement of

curriculum objectives. By utilizing technological developments the learning process can be carried out better.

Technological developments require humans to have equal abilities between insights, abilities, behaviors and values contained in the life process (Chalkiadaki, 2018; Schleicher, 2018; Wang et al., 2018). Technological developments in education can expand access to knowledge. Technology plays an important role in overcoming educational challenges in this modern era (Sumarni & Kumala, 2024). Research results in various countries show that the learning process supported by technology can increase students' knowledge (Zamora et al., 2021). With current technological developments, students can prepare to achieve success in the future (Jayadi et al., 2020). Technological developments also encourage the creation of electronic-based learning media to support changing times.

Learning media is an integral component of the educational system (Anwar, 2022). Learning media plays a vital role in shaping effective learning strategies and serves as a key tool for delivering information (Magdalena et al., 2020; Maulida, 2022; Nuryasana & Desiningrum, 2020) In addition, the media also acts as an intermediary to convey learning materials in an effective and efficient way in the process (Anita & Kardena, 2021; Herman et al., 2023). Learning media can be divided into three main categories, namely a) sound media (audio), its application uses elements of sound by utilizing hearing, for example sound recordings, music, radio and vinyl records, b) image media (visual), its application uses elements of vision, for example image media, graphics and graphic displays, and c) sound and image media (audio visual), its application combines elements of sound and images simultaneously, for example films, videos and television (Marsa & Desnita, 2020; Suprianti, 2020). The effective selection of learning media ensures the fulfillment of educational needs and positively influences the overall learning process. Based on these three media groups, one of the interesting media to be utilized is audio-visual media.

Audio-visual media, for instance, can include animated videos, which are characterized by their unique features and natural ability to captivate audiences. Animated video is a learning media that consists of a series of movements from one frame to another, with a varied sequence, according to a predetermined time (Pangestuti et al., 2022). Animation video combines audio media and visual media together so that it becomes a more interesting media (Sanchez & Weber, 2019; Zhang et al., 2020). The animated video utilized effectively captures students' attention, enabling them to stay focused on the teacher's delivery of the material (Endres et al., 2020; Kühl, 2021). Animated videos that are displayed dynamically can have a positive effect on the learning process (Dönmez Usta & Ültay, 2022; Krebs et al., 2024; Liu & Elms, 2019). Well-packaged media will make the learning process fun (Brom et al., 2018; Hanif, 2020; Koning et al., 2019). Animated video media presents learning materials in a detailed manner while offering an engaging appeal that helps students better grasp and understand the content (Garsinia et al., 2020). One example of animated video media that can be used is Powtoon.

Powtoon is used as an online animated video presentation application founded by Ilya Spitalnik (Yuliani et al., 2021) Powtoon can be used as a presentation media with animation editing features, cartoons and interesting transition effects and time sequences that are easy to understand (Anggita, 2020). Powtoon also presents sound editing, music, handwriting and attractive colors that can be designed as learning media for students (Dewi & Handayani, 2021; Riska & Sarwono, 2024; Sutarsih & Hermanto, 2021). Powtoon can be used as an animated presentation media with a display like in PowerPoint when used with the display of each slide (Fajriana et al., 2021; Laksmi et al., 2021). The use of powtoon can produce animations more effectively, efficiently and more clearly than ordinary videos (Kafahulloh &

Farisi, 2024). Media like Powtoon can be leveraged to enhance the learning experience in physics. By using such engaging animated tools, educators can make complex concepts more accessible and captivating for students, potentially increasing their interest and focus on the subject matter.

According to the observations and interviews conducted with physics teachers and students at SMAN 1 V Koto Kampung Dalam, it was found that students still face challenges in understanding physics, particularly in the material related to measurement. This difficulty highlights the need for effective teaching strategies and learning aids to improve students' comprehension of the subject. Though measurement is often done in daily activities. The limited use of learning media, mainly relying on printed materials and PowerPoint presentations, has led to a lack of student involvement in the learning process. This lack of interest can lead to lower levels of student participation, ultimately impacting the assessment of their learning outcomes. Exploring alternative, more engaging media formats could help improve student involvement and academic performance. Results of research conducted by Ayani et al. obtained the results that the use of printed teaching materials is still widely used by teachers who are deliberately printed and distributed to students as physics learning guidelines (Ayani et al., 2023). So that learning media is needed with powtoon-based animated video displays that can be used as a solution to these problems.

Previous research conducted by Pilendia indicated that the use of Powtoon as a learning tool in physics is effective and can enhance students' learning outcomes. The study highlighted that Powtoon not only serves as an engaging medium for delivering content but also contributes to improving student performance and understanding of the materia (Pilendia, 2022). Then, research conducted by Pangestuti et al. related to how the effect of applying media with animated videos in physics learning with measurement material on the value of student learning outcomes in high school obtained the results that the application of learning media with animated videos was able to increase the value of student learning outcomes (Pangestuti et al., 2022). It can be concluded that the inclusion of animated video learning media greatly supports students during the learning process, providing them with an engaging and efficient method to comprehend the material.

Based on the previous explanation, it can be concluded that there is a definite need for animated video learning media to enhance the educational process and provide valuable support for student engagement and understanding. As a result, the researcher aims to develop a Powtoon based animated video learning tool specifically for the material on measurement. The product will undergo a validity test to determine whether it meets the necessary criteria to be considered a valid and effective learning media for use in the classroom. This research aims to provide learning media that can attract students to follow the learning process.

METHODS

This study adopts the Research and Development (R&D) methodology as its approach, which is commonly applied in educational research. This method focuses on the creation and validation of products designed to enhance the learning process (Hanafi, 2017). It allows for systematic testing and refinement of learning tools to ensure they meet the necessary standards before being used in educational settings. The model used is the 4-D model (define, designed, develop and desseminated) from Thiagarajan. This research focuses on the development phase, including the product validation stage. The subject of the study is learning media using Powtoon-based animated videos for measurement material in class X

Phase E of high school. It is anticipated that the animated video learning media being developed will fulfill the necessary criteria for a valid product.

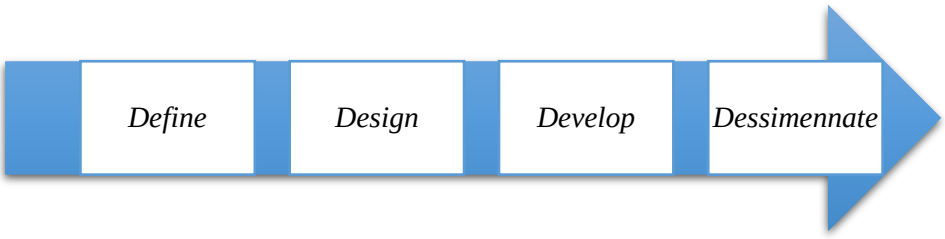

Figure 1. 4-D Development Model

The research process begins with the defining stage, which involves analyzing the research needs. This includes an initial analysis through observation, interviews, and questionnaires distributed to physics teachers and students. The next stage is design, which is to select the media, select the format and initial design of the media. The next procedure is the development stage. The development stage will involve validating the assessment through three experts, specifically physics lecturers from UNP, who will complete a validation instrument questionnaire. The validation criteria will include the feasibility of the learning media, the media itself, and the structure of the learning media. Following the validation process, the product will be revised based on the suggestions and feedback provided by the validators.

In determining whether the product is valid or not, the stage of analyzing the data that has been obtained using the Aiken V equation will be carried out. Aiken V explains using equations (1) and (2) as indicators of item validity (Aiken, 1985).

$$V = \frac{\Sigma\, s}{n\,(c-1)} \quad (1)$$

$$s = r - l_o \quad (2)$$

Description:
V = the index agreed upon by the rater regarding the validity item
s = the validator's score minus the lowest score used
r = category score selected by the validator
l_o = the lowest score in the assessment
n = the number of validators involved
c = the number of score categories selected by the validator

Table 1. Aiken's Coefficient V

Range	Category
V < 0.92	Invalid
V > 0.92	Valid

(Aiken, 1985)

RESULTS AND DISCUSSION

Results

At the defining stage, the results from observations and interviews revealed the need for a learning media that can capture students' interest, ensuring an effective learning process.

It was observed that students are more engaged when the learning process involves media such as videos or animations. Thus, it can be concluded that at this stage, the focus of developing the learning media will be on integrating captivating animated videos to improve the overall learning experience.

At the design stage, the decision was made to use video animation as a learning medium, specifically through the powtoon application. Powtoon was chosen because it has advantages with editing features such as animated characters, sound and music editing, and color variations that can be used as learning media. The design produced is expected to effectively meet students' needs and support teachers in delivering the learning material in an efficient manner.

In the development stage, the validation results were gathered using a recognized analysis method and reviewed by three experts, specifically physics lecturers from UNP. The validation component consists of three components, namely, the feasibility of learning media, media and learning media structure.

The validation results, which were based on the assessment of the learning media's feasibility component, are presented in the following Table 2.

Table 2. Results of Validation of Learning Media Feasibility

Learning Media Feasibility	V	Category
Media Display	0.93	Valid
Programing Aspect	0.94	Valid
Learning Aspect	0.92	Valid
Content Aspect	0.92	Valid
Average	**0.93**	**Valid**

Based on the data in the table above, there are 4 assessment indicators on the feasibility component of learning media. Of the four indicators, the programming aspect indicator gets the highest score with a value of 0.94. The four indicators have a value of >92 so that the four indicators are said to be valid with an average value of 0.93. The conclusion obtained is that the feasibility component of the learning media being developed is valid for use.

The validation results obtained based on the assessment of the media component are contained in the following Table 3.

Table 3. Media Component Validation Results

Media	V	Category
Simplicity	0.92	Valid
Cohesiveness	0.96	Valid
Language	1.00	Valid
Emphasis	0.92	Valid
Balance	1.00	Valid
Form	1.00	Valid
Average	**0.97**	**Valid**

Based on the data in the Table 3, there are 6 assessment indicators on the media component. Of the six indicators, the indicators of language, balance and shape aspects get the highest value with a value of 1.00. The six indicators have a value of> 92 so that the six indicators are

said to be valid with an average value of 0.97. The conclusion obtained is that the media components developed are valid for use.

The validation outcomes, derived from the evaluation of the learning media structure component, are shown in the following Table 4.

Table 4. Learning Media Structure Validation Results

Learning Media Structure	V	Category
Title	1.00	Valid
Learning Intsructions	0.92	Valid
Competencies Achieved	0.92	Valid
Supporting Information	0.92	Valid
Tasks	0.92	Valid
Quiz	0.92	Valid
Average	**0.93**	**Valid**

Based on the data in the Table 4, there are 6 assessment indicators on the media component. Of the six indicators, the title aspect indicator gets the highest score with a value of 1.00. The six indicators have a value of> 92 so that the six indicators are said to be valid with an average value of 0.93. It can be concluded that the component of the learning media structure is valid for use. Based on the validation results in the table above, The animated video learning media created is deemed suitable for use in the learning process.

The next result is the average score obtained from the three components in the following table 5.

Table 5. Average Component Validation Results

Komponen Validitas	V	Category
Feasibility Of Learning Media	0.93	Valid
Media	0.97	Valid
Learning Media Structure	0.93	Valid
Average	**0.94**	**Valid**

Based on the data in the Table 5, there are 3 assessment components of the developed media. Of the three components, the media component gets the highest score with a value of 0.97. The three components have a value of> 92 so that the three components are said to be valid with an average value of 0.94. It can be concluded that all three components of the learning media are valid for use. Based on the validation results shown in the table above, the animated video-based learning media is considered valid for use in the educational process.

Discussion

Based on the explanation above, it is evident that utilizing Powtoon as a medium for animated videos is expected to enhance student engagement in the learning process, making it more interactive and effective. The choice of Powtoon is reinforced by research from Destiasa et al., which emphasizes that animated videos created with Powtoon can boost student engagement and foster more active involvement in the learning process (Destiasa et al., 2023). Another study conducted by Zulfa et al. stated that the use of powtoon as a learning

media is able to provide an attractive visual display so as to increase the desire to learn from students, one of which is in physics material (Zulfa et al., 2023). Therefore, it can be concluded that choosing Powtoon as a learning medium through animated videos is an appropriate decision.

Based on validity results test for Powtoon-based Animated Video Learning Media on Class X Phase E High School measurement material indicate that it is both effective and valid, with an average score of 0.94 across the three components. This suggests that the Powtoon-based animated video learning media falls into the high validity category. These results align with prior research by Yoshua et al., titled Development of Powtoon-Based Physics Animation Learning Videos on Global Warming Material, which demonstrated the effectiveness of Powtoon-based animated videos in the educational context, which also concludes that Powtoon-assisted learning media is suitable for development (Yoshua Ricky et al., 2022). In conclusion, the creation of learning media in the form of animated videos using Powtoon has been shown to be both effective and appropriate for enhancing the learning process.

The use of Powtoon as a learning media comes with both benefits and drawbacks. One of the main disadvantages is the need for reliable technological support during the video editing process, which can be a challenge if the software or hardware isn't properly equipped to handle the tasks efficiently. Then, it takes someone who will indeed understand the use of powtoon when operated so that the technical challenges and time needed to master applications such as Powtoon become a challenge in itself. Rahmawati explained that Powtoon offers the advantage of being an engaging learning media that can capture students' interest. However, she also pointed out that Powtoon requires adequate technological infrastructure, particularly internet access, to create animated videos. Additionally, Rahmawati emphasized that professional human resources are necessary to effectively operate Powtoon as a learning tool (Rahmawati, 2022).

CONCLUSION

Based on the validation results and the preceding discussion, it is evident that the use of animated video learning media, created with the Powtoon application for measurement material, is deemed appropriate for use, as the validation results fall within the valid category. From the validation results obtained data on three validation components. The first component is the feasibility of learning media with a value of 0.93 valid category. The second component is the media with a value of 0.97 valid category. The third component is the structure of learning media with a value of 0.93 valid category. Based on the data, it can be concluded that the Powtoon-based animated video learning media for measurement material meets the necessary validity criteria and is appropriate for use in the educational process.

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