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Development of Learning Media Using Powtoon in Arthropoda Sub Materials for Senior High School

Maretha Ayu Angel Lestari[1], Afreni Hamidah[1*], M. Erick Sanjaya[1]

[1]Biology Education, Faculty Of Teacher Training and Education, Universitas Jambi, Indonesia

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Corresponding Author:
Afreni Hamidah
afreni_hamidah@unja.ac.id

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Abstract: Learning Media made using Powtoon Software is an educational product in the form of animated videos covering the Arthropoda sub-material for Class X SMAN. The purpose of this study was to develop biology learning media using Powtoon in the Arthropoda sub-material and to see the feasibility of the learning media which was validated by material experts and media experts. This type of research is development research (R & D) and the research model used is the ADDIE model consisting of five stages, namely: analysis, design, development, implementation, and evaluation. The research instruments used were observation sheets, questionnaires, assessment sheets, and documentation. The subjects of this study were students of class X IPA SMAN 8 Jambi City. The trial was conducted on 6 students (small group) and 31 students (large group). The results of material validation were obtained with a score of 56 and a percentage of 93% in the "very good" category and the results of media validation were obtained with a score of 56 and a percentage of 93% in the "very good" category. The test results in the small group were obtained with a score of 220 and a percentage of 91.6% in the "very good" category and the test results in the large group obtained a score of 1.103 and a percentage of 81.1% in the "very good" category, and the results of the teacher's perception were obtained. a score of 34 and a percentage of 85% in the "perfect" category. Based on data analysis, it can be concluded that the learning media using Powtoon in the Arthropoda sub-material for class X SMA is feasible to use in learning.

Keywords: ADDIE; Arhtropoda; Powtoon

Introduction

In the current era of the 21st century, the development of information and communication technology is growing rapidly and rapidly. This makes humans feel like they are not separated by distance and space and time. The development of increasingly advanced technology, allows humans to use various kinds of equipment for assistive devices in carrying out various activities as a means of supporting productivity. The use of technology has a function to provide services to the community in a more comfortable, consumer-oriented, cost-effective way, and overall is a better way than before. The existence of this technological development certainly brings various impacts on the community (Kiki et al., 2018; Pangondian et al., 2019).

The need for education in the era of the 21st century is now increasing (Malik, 2018). Technology facilities in learning are growing rapidly and sophisticated (Ghavifekr et al., 2015). According to Sa'ud (2013), we must realize that the development of information technology has entered various aspects of life, including the world of education. According to Nurrita (2018) with the development of technology, especially in the field of education, learning media innovations are currently very diverse, ranging from visual, audio, and audiovisual based ones that can make students not only hear all information but can also see it directly as interesting material. According to Nasution (2011), learning media is a tool that can help the teaching and learning process so that the meaning of the message conveyed becomes clearer and the goals of education or learning can be achieved effectively and efficiently.

Based on observations made at Senior High School (SMAN) 8 Jambi City in class X Science (IPA), there is a material that is quite difficult to understand in biology subjects, both through online and face-to-face learning, namely Kingdom Animalia. The results of observations

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made through the distribution of questionnaires in class X science showed that as many as 41.2% of students felt that biology was a difficult subject and 8.8% felt that it was very difficult to learn, especially in the arthropod sub-material. According to Alawiyah et al. (2016) learning difficulties in kingdom Animalia material cause low student learning outcomes so deeper research is needed to find solutions so that students do not experience learning difficulties as before. Based on the results of interviews conducted with the class X biology subject teacher, there were several problems and learning constraints identified, namely, most students became less active and responsive in the current new normal conditions. The learning media used by teachers are only PPT and student worksheet (LKPD). However, teachers rarely use learning videos because they have difficulty finding appropriate and effective learning videos with the material being studied.

According to Sarah et al. (2014), the potential for local excellence that is integrated with learning makes students motivated to learn it, so that learning becomes meaningful. One example of an animal that has the potential for local advantages because it has an important ecological and economic role is the Horseshoe Crab which is a member of the phylum Arthropoda, subphylum Chelicerata, class Merostomata, subclass Xiphosura, order Xiphosurida, and family Limulidae (Anggraini et al., 2017). In general, horseshoe crabs have an important ecological and economic role. Ecologically, horseshoe crabs act as bioturbators and control benthic animals. In addition, the horseshoe crab has a role as a balancer in the food chain and as a source of protein for several species of shorebirds (Beekey et al., 2013). According to Rubiyanto (2012), Kuala Tungkal waters is a unique habitat because it has two types of horseshoe crabs, namely T. gigas and C. rotundicauda, but the existence of horseshoe crabs has not been noticed due to a lack of information and knowledge so that some people only use Mimi as bait. to catch fish (Euristhmus microceps), which is considered a pest because it damages fishing nets and is also consumed by mangrove monkeys (Macaca fascicularis), it is proven that there are many Mimi shells scattered in the mangrove forest around Kuala Tungkal waters.

Based on these problems, it is necessary to develop innovative learning media about these protected animals. Learning media can be understood as anything that can convey or distribute messages from a source in a planned manner so that a conducive learning environment occurs where the recipient can carry out the learning process efficiently and effectively. Researchers assume that animated videos using Powtoon can be developed as innovative learning media. This is supported by Maruf et al. (2022) that state virtual Learning-based is one of the benchmarks that can be used as a parameter for the success of learning in the digital and society 5.0 era.

Method

Research Design

The type of research carried out is research and development with the ADDIE stage. This research was conducted to develop learning media using Powtoon on the arthropod sub-material for class X SMA. The first ADDIE stage is the analysis stage. The stages of analysis carried out are needs analysis, material analysis, analysis of objectives, and analysis of educational technology. Needs analysis is done to find out what students need in the learning process. Based on the needs analysis, learning media is needed that can improve student learning responses so that the learning process becomes more effective and responsive. Furthermore, the analysis of the material is carried out to find out the material that has obstacles so that it is necessary to develop learning media. Objective analysis carried out to adjust learning objectives and learning competencies in accordance with the applicable curriculum at the school. Finally, an analysis of learning technology was conducted to determine whether the school has facilities and infrastructure that support the learning and research process. The next ADDIE stage is the design stage (Aldoobie, 2015).

Development which contains formulating learning objectives, and designing media in which there is a design using flowcharts and storyboards. According to Darmawan (2012), storyboard shows activities that must be carried out by students during the learning process with the multimedia learning model that is being used. The next stage is Development, according to Hasyim (2016), Development is a process of realizing a design into reality, then, one of the important steps in development is testing before it is implemented. The implementation stage is continued, where at this stage, it is carried out to determine the feasibility of the media developed by the researcher while the data obtained at this stage is used to perfect the product developed (Wibawa et al., 2017).

Population and Samples

The test subjects in this study consisted of material expert test validators, media design expert test validators, teacher questionnaire validation, and student questionnaires and also the target users of this development product were students of class X SMAN 8 Jambi City which was carried out with two types, namely small group test, consisting of 6 people and a large group test consisting of 31 students who have studied Invertebrate material and have various academic abilities.

Instrument

The instrument used in this research is a questionnaire. The following is a grid of material expert validation assessment instruments which can be seen in the Table 1.

Table 1. Material Expert Design Validation Instrument

Variable	Assessment Aspects	Indicator
Learning Media uses PowToon on the Arthropoda submaterial	Theory	Material suitability
		Concept suitability
		The material concept is easy to understand
	Language	Language Clarity
	Media Presentation	Presentation of material
		Ease of use for students
		Ability to increase independence
		The ability to increase motivation
		Ability to increase knowledge

Expert validation aims to obtain the validity of a product that will later be developed. Then analyzed descriptively by examining the results of research by experts on learning devices and media. The results that have been reviewed will be used to revise the product or learning device that is being developed. The grid of media expert validation assessment instruments can be seen in Table 2.

Table 2. Media Expert Design Validation Instrument

Variable	Assessment Aspects	Indicator
Learning Media uses PowToon on the Arthropoda submaterial	Media Quality	Animated video preview
		Sentence selection accuracy
		Program presentation
		The animated video component has emphasis
	Full View	Text suitability
		Image fit
		Interesting video display
		Appropriate font
		Gradation suitability
		Match the color of the text and background

Procedure

Basically, this section describes the way the research was done. The main materials must be written here: (1) research design; (2) population and samples; (3) instrument; (4) procedure; (5) data analysis techniques. The specification and type of tools and materials must be written in case the researches have been conducted by using them. The qualitative research, such as classroom action research, case studies, and so forth, need to mention the researcher attendance, research subject, and participated informants, as well as the methods used to explore the data, research location, research duration, and the description of research results validation. It is suggested that the authors avoid organizing the article content into the smaller parts than second subheading in this section. However, in the case of unavoidable factors, the writing style must follow the "Results and Discussion" section.

Data Analysis Techniques

The data analysis technique was carried out by descriptive analysis (Sudjana, 2005). The data analyzed included quantitative data on the assessment scores of material experts and media design experts, and student and teacher questionnaires using a Likert scale. The questions on the material expert and media expert validation sheet totaled 15 questions with 1 respondent each. The value scale used is 4 (very good), 3 (good), 2 (not good), and 1 (very bad). The calculation analysis is shown in Table 3.

Table 3. Category Level of Validation Value Material Expert and Media Expert

Value Scale	Range Percentage (%)	Validation Level
4	81.25 – 100	Very Good
3	62.5 - 81.23	Good
2	43.75 – 62.48	Bad
1	25 - 43.74	Very bad

Assessment questionnaires were given to subject teachers as an assessment of whether the product being developed was good and worth trying. The Table 4 below is an analysis of teacher assessment calculations.

Table 4. Classification Table Based on the Average Teacher Response Score

Value Scale	Range Percentage (%)	Validation Level
4	81.25 – 100	Very Good
3	62.5 - 81.22	Good
2	43.75 – 62.47	Bad
1	25 - 43.74	Very bad

The descriptors given to respondents in the small group trial were 10 statements, with the number of respondents being 6 while the large group trial was 31 respondents so that theoretically the student response questionnaire would get the maximum and minimum scores. Student assessment questionnaires can be calculated using the Formula 1:

$$\% = \frac{F}{N} \text{ x } 100\% \quad (1)$$

Description:
% = Percentage of sub-variables
F = Total value of each sub-variable
N = Maximum number of scores

The development stage is complete, proceed to the implementation stage, where at this stage, it is carried

out to determine the feasibility of the media developed by the researcher while the data obtained at this stage is used to perfect the product being developed. The evaluation phase carried out is a summative evaluation. Summative evaluation is an evaluation that is carried out after a set of lesson programs has been given after all lesson units have been taught (Sudijono, 2004).

Result and Discussion

Based on the results of research conducted at SMA Negeri 8 Jambi City, the results of development research were obtained in the form of biology learning media using Powtoon. The developed learning media is in the form of an animated video which was developed using the Powtoon application and contains arthropod sub-material for class X SMA. In addition, this learning video is equipped with personal documentation images during research, sound, music, and subject matter adapted to curriculum needs. The results of the development of learning media are shown in Figure 1.

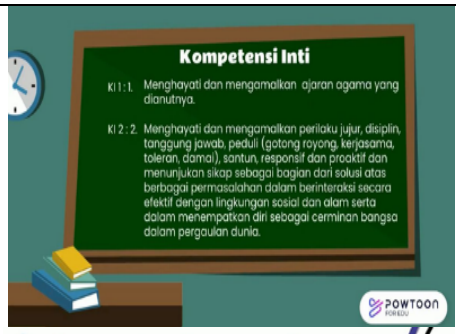
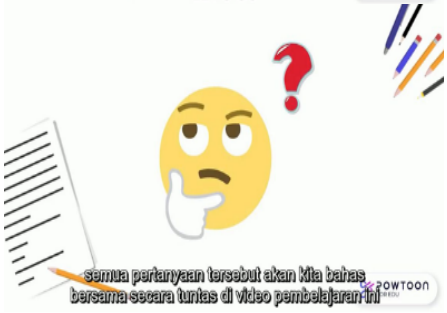
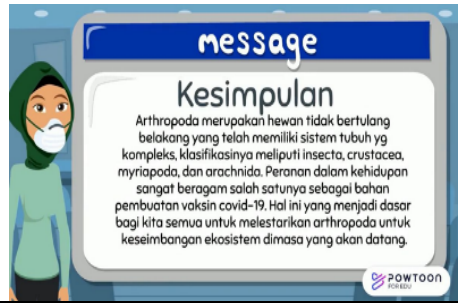
Material validation was carried out by the material validator 3 times with improvements to obtain products that were suitable for use in the learning process. Based on the results of the material validation in the first stage, the percentage of product quality was obtained, namely 58%, improvements were made based on suggestions and input from material experts on the display of animated videos that were not feasible. Then revisions are made to improve the product. Then the second validation stage was carried out and the percentage of product quality was obtained at 66%, based on the suggestions and input of material experts, the product still needs improvement and the addition of more complete material. After the repairs were made, the product was validated for its feasibility and got a product quality percentage of 93% which was categorized as feasible to be tested without revision. Based on the three stages of product feasibility validation, it can be concluded that at each stage of material validation there is an increase in improvement and quality. The results of material validation can be seen in Table 5.

(a) (b)

(c) (d)

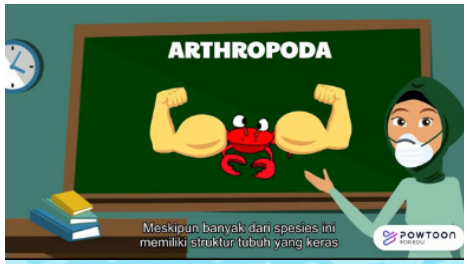
Figure 1. The results of the development of learning videos using powtoon on arthropod material for class X SMA. (a) Learning video covers, (b) Learning competency, (c) Display of learning materials, (d) Evaluation section view

Table 5. Material Validation Results

Improvement Suggestions	Before Revision	After Revision
Adding learning competencies at the beginning of the animated video, thereby adding to the impression of the feasibility of the media to be used in the learning process.		
Addition of introductory material with critical questions about examples of the relationship between teaching materials and the surrounding environment.		
Addition of material regarding types of reproduction of arthropods in general to increase students' knowledge		
Adding a conclusion at the end of the video as the final closing of the animated video and makes it easier for students to understand the material briefly.		

Based on table 5 above, it is known that the validation results were carried out starting from the 1st validation to the 3rd validation, it was found that the validation assessment underwent a more complete and better change after being revised by the material validator. Then, the validation results from the media validator, it was found that in the first stage of validation the percentage of product eligibility was 60% so improvements were made based on suggestions and comments from media experts on overlapping animation improvements. Then the second validation stage was carried out to obtain a quality percentage of 75%, improvements were made to the addition of animation variations. After repairs were made, the product was validated in the third stage and obtained a percentage of product quality of 93% and was feasible to be tested in the field. Based on the analysis of the three stages of product feasibility validation, it was concluded that at each stage of material validation there was an increase in the improvement and good quality. So that the product is feasible to be tested in the field. Then, the validation results from the media validator can be seen in Table 6.

Table 6. Media Validation Results

Improvement Suggestions	Before Revision	After Revision
Revision fixes the location of the logo so it doesn't overlap with other animations.		
Improvement of some emphasis on sentences and animation which are keywords so that students more easily understand the material in animated videos		
Adding sound text to the animated video so that students not only see and hear, but also read while learning using this animated video.		
Adding more varied animations to increase the attractiveness and feasibility of animated videos.		

Based on table 6 above, it is known that the validation results were carried out starting from the 1st validation to the 3rd validation, the results of the validation assessment increased after being revised by the media validator. after the validation is completed and the product. Development is declared feasible to continue with the assessment of subject teacher perceptions, small group and large group perception assessments.

Table 7. Perceptions of Teacher Assessment, Perceptions of Small Group Student Assessments and Perceptions of Large Group Student Assessments

Assessment Aspects	Teacher Perception	Small group Perception	Large group Perception
Score	34	220	1,103
Percentage (%)	85.00	91.60	81.10
Criteria	Very good	Very good	Good

The results of the teacher's perception questionnaire on the product got an eligibility percentage of 85% and were included in the "very good" category. The results of the small group student perception questionnaire on the product obtained a percentage of 91.6% and were included in the "very good" category. The results of the questionnaire on the perceptions of large group students towards the product get a percentage of 81.1% and are included in the "very good" category. Based on the results of perceptions, it can be concluded that biology learning media using powtoon on arthropod material is appropriate for use as a learning medium, because it is very interesting and motivating students and increases students' knowledge of arthropod material. Yusantika et al. (2018) stated that through video one can learn independently and be active in ongoing activities and learning using the media has optimized the role of the teacher as a learning motivator. Interesting things can also be seen from the advantages of using learning videos according to Wahidin in Gultom (2010) states that learning video media is media that relies on the senses of sight and hearing so that it has better effectiveness.

The implementation stage is carried out to determine the feasibility of the media developed by the researcher while the data obtained at this stage is used to perfect the product being developed. This stage was carried out, but only until the process of introducing learning media to students due to time constraints.The evaluation phase carried out is a summative evaluation. Summative evaluation is an evaluation that is carried out after a set of lesson programs has been given after all lesson units have been taught (Sudijono, 2004). The main purpose of this summative evaluation is to determine the success of the stages of developing learning media after they have gone through all the stages of ADDIE which are carried out within a predetermined period of time. Based on the evaluation results of the ADDIE stages that have been carried out, it is known that all stages have been carried out in accordance with the research method.

Conclusion

Based on the results of research data analysis Development regarding learning media using Powtoon in the arthropod sub-material for class X SMA, it was concluded that biology learning media using Powtoon in Arthropoda material for class X was developed with the ADDIE stage through five stages, namely the analysis stage, the design stage, the development, implementation phase, and evaluation phase. The assessment was carried out by a team of material expert validators and a team of media expert validators after 3 revisions, the final results were in very good categories. Perceptions of small group ratings and perceptions of large group ratings as a whole were obtained with an average percentage of 89.23% in the very good category. So, it can be concluded in general that the learning media developed using Powtoon on arthropod material is suitable for use in learning.

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