HASIL CEK_Ariska Eka Saputri, Much Fuad Saifuddin_Pengembangan media belajar; Kladogram; Motion Graphic; Four D

by Ariska Eka Saputri, Much Fuad Saifuddin Development Of Motion Graphic Animation

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Development of motion graphic animation videos on the material for compiling cladograms for class X

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Article Information	Abstract

A cladogram is a matter of the presence or absence of kinship living things in a group. Cladograms are often found in everyday life, but the teacher cannot provide maximum examples to students due to limited time and teaching materials in classroom learning. This study aimed to find motion graphic animation video media for the odd semester X MIPA cladogram material. This research and development research with a 4-D development model (four D) define, design, develop, and disseminate. The data collection technique used a questionnaire with a Likert scale. Validation was carried out by media experts, material experts, and small and large group assessments and trials on students. The study results said that the validation of media experts obtained a percentage of 86.67%. Material expert validation obtained a proportion of 66.67%. The teacher's assessment obtained a percentage of 95%. The response of 10 students of class X MIPA 2 in the small group trial obtained 83.19%. Meanwhile, in the large group trial with a response of 30 students of class X MIPA 1, the proportion was 84.55%. So, the motion graphic animation video of the cladogram material is declared suitable for use in learning.

Abstrak

Kladogram merupakan materi ada atau tidaknya hubungan kekerabatan makhluk hidup di dalam suatu kelompok. Kladogram banyak dijumpai dalam kehidupan sehari-hari, namun karena adanya keterbatasan waktu dan bahan ajar dalam pembelajaran di kelas guru belum dapat memberikan contoh yang maksimal kepada siswa. Tujuan penelitian ini untuk menguji kelayakan media video animasi *motion graphic* materi kladogram X MIPA semester ganjil. Penelitian ini merupakan penelitian pengembangan (*Research and Development*) dengan model pengembangan 4-D (*four D*), yaitu *define* (pendefinisian), *design* (perancangan), *develop* (pengembangan), dan *disseminate* (penyebaran). Teknik pengumpulan data menggunakan angket dengan skala Likert. Validasi dilakukan oleh ahli media, ahli materi, dan penilaian pendidik serta uji coba kelompok kecil dan besar pada siswa. Hasil penilaian validasi dari ahli media 86,67%, ahli materi 66,67%, dan guru 95%. Respon dari 10 siswa kelas X MIPA 2 pada uji coba kelompok kecil memperoleh persentase 83,19%. Sedangkan, pada uji coba kelompok besar dengan respon 30 siswa kelas X MIPA 1 memperoleh persentase 84,55%. Maka, video animasi *motion graphic* materi kladogram dinyatakan layak digunakan untuk pembelajaran.

A. Introduction

Learning media is one of the necessary factors that play a role in the learning process. Learning media can encourage the effectiveness and efficiency of learning activities (Batubara & Batubara, 2020). An effective learning media for today is multimedia-based learning media because, according to Munir (2012), people can only remember 20% of what they see and 30% of what they hear. Nevertheless, people can remember 50% of what they see and hear and 80% of what they see, hear and do simultaneously.

Learning media can help overcome time constraints in the learning process. Learning media can be used to distribute learning materials to stimulate students' attention, interests, thoughts, and feelings in learning activities to achieve learning goals (Adinugraha, 2017). According to Wahyuni et al. (2019), learning media has uses in clarifying the presentation of messages so that they are not too verbalized, overcoming the limitations of space, time, and senses.

Learning media has benefits as learning aids for teachers or students; according to Sanaky (2013) research where the benefits of learning media are that it attracts the attention of students, students become easier to understand the material; also students can have many learning activities because there are other activities. Such as observing, doing, demonstrating, and so on. However, there are also drawbacks to the use of learning media by Wahyuni et al. (2019) requires special equipment for presentation. The type of learning media itself depends on learning at school. The learning media that can be used, according to Emda (2011), namely original media, imitation media, visual media, board-shaped media, highlighted media or viewing tools, listening media (audio), listening viewing media (audio visual), and print media. According to research by Indasah et al. (2021), the existence of learning media that is less varied causes many students to feel that Biology is complicated, especially in the classification of living things, because it contains comprehensive material. According to the research of Khairani et al. (2019), the Biology learning process is often faced with material that cannot be visualized directly, making it difficult for students to understand.

The learning media in this study include the visual and auditory media in the form of animated motion graphics videos with material compiling cladograms based on the principles of classification of living things for class X students. Motion graphics combine images, text, and audio to have a strong appeal (Brandao, 2015); the combination of images, text, and audio is suitable for cladogram material. In addition, the results of a questionnaire from 23 students chose to learn media in animated videos so that they were not dull, and as many as eleven students thought the cladogram material was complex. Interviews with class X SMA teachers to strengthen the reasons for choosing media and materials, there are difficulties in giving examples to students because of limited learning time and no effective learning media, so the media in the form of animated motion graphics videos of cladogram material can be a means of student learning.

Various forms of motion have been developed as media in biology learning; Mufidah et al. (2020) developed a stop motion with characteristics in the form of research photos equipped with dubbing, sound effects, and back sound and can be accessed online. Adinugraha (2017) developed an ecopreneurship-based learning media virus material that has the advantage of being in a 3-dimensional form that makes students understand the structure of the virus body better than two-dimensional media. However, the cladogram material cannot be presented in this way.

Classification of living things includes complex material, and most teachers also have difficulty mastering core competencies, especially the competence in cladogram preparation (Ansori, 2021). According to Kartini et al. (2020), Cladogram is a material that is considered difficult because students need to re-explain cladogram preparation. In addition, learning with cladogram material has low learning outcomes because the material is complex.

The development of motion graphic animation videos is one alternative learning media related to cladograms, intending to know the feasibility level of learning media in the form of animated motion graphics videos for cladogram material for class X high school students.

B. Material and Method

The research used is research and development using the 4-D development model according to Thiagarajan et al. (1976). The choice of this development model follows the objectives of the research, namely to produce learning media in the form of animated motion graphics videos of cladogram material.

The stages carried out include: **Define**, researchers seek to explore product needs required by teachers (interviews) and students (questionnaires); **Design**, researchers Prepare the initial design of the animated motion graphic video by mapping the material presented; **Develop**,

finalize the product developed in MP4 format for feasibility assessment/validation; **Disseminate**, conduct product feasibility testing to experts, students to produce a final product that is disseminated.

The research instrument used was a questionnaire to obtain product validation and find student responses regarding the developed product. Product validation is carried out by media experts, material experts, teacher assessments, and student assessments. After getting the results, researchers used the suggestions obtained as product improvements. Aspects assessed by media experts include aspects of the function and benefits of media, attractiveness of animated videos, and characteristics of animated videos.

Material expert assessment includes aspects of the suitability of learning materials and language. Furthermore, the teacher's assessment includes aspects of the media's function and benefits, the material's suitability, and the animated video's characteristics. Moreover lastly, the student assessment includes aspects of interest in animated video media, the convenience and practicality of animated video media, characteristics of animated videos, and the quality of learning materials conducted by 40 students of class X. After obtaining the results of the validation and assessment, data analysis was carried out using a Likert scale of 1 to 4. The formula 1 used is according to Widoyoko (2012).

$$Index\ value\ (\%) = \frac{Total\ score}{Ideal\ score} \times 100\% \quad\ldots\ldots\ldots\ldots Formula\ 1$$

The percentage index value obtained is interpreted by referring to Table 1.

Table 1 Criteria of validation results

Percentage	Category
75 % - 100 %	Very valid or can be used without revision
50 % - 74 %	Valid or usable but need a little revision
24 % - 49 %	Invalid or need revision
0 % - 25 %	Invalid or should not be used

(Primiani et al., 2020)

C. Results and Discussion

In the define stage, the researchers distributed questionnaires to 40 students and interviewed the class X Biology teacher. Based on the results, it was found that KD 4.3 material in compiling cladograms was difficult for them to learn, while teacher interviews were only learning media from books. Then based on the questionnaire that has been distributed to students, the second result is obtained, which is then analyzed to obtain information on whether students and teachers are interested or not in motion graphic animation videos. It is hoped that the media created can help students and teachers learn in the classroom. According to Khairani et al. (2019), learning video media can make time, space, and messages more efficient so that students can be invited to communicate the learning materials that are delivered appropriately.

In the design stage (design), the initial part of the motion graphic animation video is produced, and the presentation of the material, the competency map, is included in the video. The material's content starts from core competencies (KI) and fundamental competencies (KD), the cladogram's definition, the cladogram's purpose, and the last step and example of preparation. After determining the material's content, the next step is to determine the product format where the resulting product is an animated motion graphic video with MP4 format to be used on all types of gadgets and laptops or computers.

In the development stage, the learning media produced is in the form of animated motion graphic videos containing openings, concentration tests, concept maps, KI and KD, understanding of cladograms, objectives of cladograms, steps and examples of cladogram preparation, and biographies of researchers made using the application "Adobe after effect."

In the dissemination stage, the researcher validates the product to media experts, material experts, teacher assessments, and student assessments in small groups with ten students and large groups with 30 students. Then, if the input is obtained, the researcher improves the products. Based on the validation that has been carried out, the results obtained by the percentage of validation by media experts are 86.67% with a very suitable category for use without the need for revision, material experts 66.67% with a suitable category for use with little revision, and a teacher assessment of 95% with a very suitable category for use. Without the need for revision, as seen in Table 2 and Figure 1.

Based on the validation results, assessments from material experts have the lowest average because the material used in the video has a limited scope; besides that, the cladogram is a sub-material of the classification of living things following KD 4.3 compiling a cladogram based on the principles of classification of living things. One of the fundamental competencies listed in the 2013 curriculum is compiling a cladogram based on the principles of classification of living things. Pratiwi et al. (2021), despite the importance of cladograms, students at all levels have difficulty understanding

cladograms due to some factors, one of which is an abstraction that requires rules to be learned and interpreted correctly. Assessment by material experts has the lowest average because researchers do not use language that is too standard so that students easily understand videos. Permatasari et al. (2019) state learning videos with illustrated images have simple explanatory sentences and describe the events systematically so students can easily understand.

The media expert's assessment shows the highest percentage on the attractiveness aspect of motion graphic animation videos (Table 2) which has an impact on being comfortable to use for students because it has a low storage size, do not require an application to be installed and has sound, music, and video motion that are in harmony in clarifying the material. Irawan et al. (2017) state video media have the advantages,

namely providing messages that can be received more evenly by students, very good for explaining a process, overcoming the limitations of space and time, more realistic, can be repeated and stopped as needed, and gives a deep impression that can influence student attitudes.

The material expert's assessment showed the highest percentage results in the suitability aspect of learning materials (Table 2) which impacted students' understanding of the concept of cladogram material. Pratiwi et al. (2021) state the minimum standard of competences in the form of compiling a cladogram using the principle of classification of living things. The minimum standard of KD is regarding the cladogram concept, one of which is the achievement of fundamental competencies in adjusting video content and competencies according to the 2013 curriculum.

Table 2 Product assessment-based aspect

| Aspect	Percentage (%)	Average (%)	Category
Media expert			
Media functions and usefulness	90		
Product appeal	91.67	86.67	Very valid or can be used without revision
Product characteristics	85		
Relevance	75		
Material expert			
Suitability of learning materials	67.5	66.67	Valid or usable but need a little revision
Language	65		
Teacher			
Media functions and usefulness	93.75		
Suitability of learning materials	95	95	Very valid or can be used without revision
Product characteristics	93.75		
Media selection criteria	100		
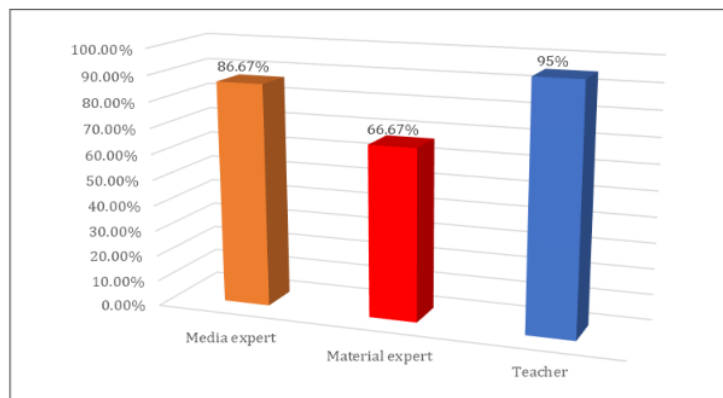
Figure 1 Validation result

The teacher's assessment obtained the highest results regarding media selection criteria. The impact is because video media for students is more enjoyable to use in the learning process than other media, where students will more easily remember the concept of the material. According to

Pratiwi et al. (2021), the application of learning video media affect students' motivation and learning outcomes.

Then the student assessment with small group trials has a percentage result of 83.19% with a very suitable category for use without revision,

and large group trials with a percentage of 84.55% with a very suitable category for use without revision can be seen in Figure 2.

The small group trial phase on the characteristic aspect of motion graphic animation video media obtained the highest score, averaging 85%. Meanwhile, the lowest aspect is the ease and practicality of motion graphic animation video media, which gets an average of 80%. Then the large-group trial phase has the highest aspect of ease and practicality of motion graphic animation video media, obtaining an average percentage of 87.22%. Meanwhile, the lowest aspect is the characteristics of motion graphic animation videos which get an average of 82.50%.

Based on small-group trials and large-groups in overcoming characteristics of motion graphic animation video, it has an average of 83.75%. The

aspect of convenience and practicality has an average of 83.61%, so the highest aspect is the characteristic aspect of motion graphic animation video media. Oktavia et al. (2020) that learning videos with good resolution standards are media that can increase the achievement of higher learning outcomes than other learning media. At the same time, the lowest aspect is the aspect of convenience and practicality of motion graphic animation video media. Hidayat et al. (2017) students can use the internet as a substitute for textbooks by downloading the provided learning media. However, the tendency of low scores on the aspects of convenience and practicality of motion graphic animation video media is because students do not have adequate internet access, so students do not use the media in the form of animated motion graphic videos properly.
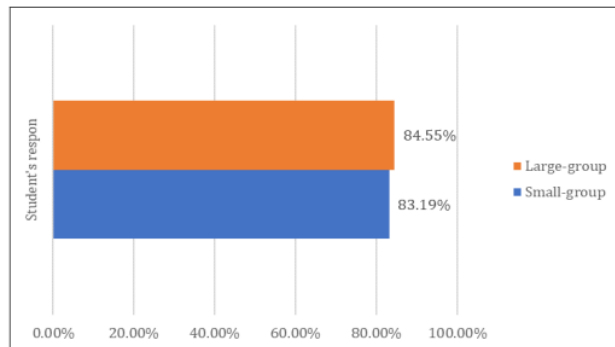

Figure 2 Students' response the product

Figure 3 Steps to creating cladogram on media developed using Indonesian

Animated motion graphic video cladogram includes understanding, objectives, steps, and examples of cladogram preparation. The information presented in the step of compiling the cladogram is to determine the species made into the cladogram, then determine the general characteristics of the specific features in the characteristic table, then make a Venn diagram by looking at the results from the characteristic table where the deeper, the farther the kinship, and lastly converting a Venn diagram into a cladogram with an arrow shape (Figure 3). According to Taurista (2018), cladograms can be arranged in 3 stages: determining the species, making a Venn diagram, and converting the Venn diagram into a cladogram. In addition to providing examples of cladogram preparation, the motion graphic animation video also contains examples of the results of cladogram preparation, as presented in Figure 4.

Figure 4 Sample of cladogram using Indonesian

D. Conclusion

This research produces media in the form of animated motion graphics videos on the material to compose a cladogram based on the principle of classification of living things. The media in the form of animated motion graphics videos is declared very suitable for use without the need for revision with a percentage of 86.67% by media experts. The media in the form of animated motion graphics videos was declared suitable for use with a slight revision with a percentage of 66.67% by material experts. The media in the form of animated motion graphics videos is declared very suitable for use without the need for revision, with a percentage of 95% by the teacher's assessment. The media in the form of animated motion graphics videos is declared very suitable for use without the need for revision, with a percentage of 84.55% by student assessments.

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