

SONG AND VIDEO ANIMATION ON VIRUS: MULTIMEDIA TO INCREASE STUDENT'S LEARNING ACHIEVEMENT

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ARTICLE INFO:

ABSTRACT

Article History

Submitted December 24th, 2021

Revision January 6th, 2022

Accepted January 7th, 2022

Keywords:

ADDIE, Animation, learning through Songs, learning achievements, Virus

This study aimed to improve student achievement through song-based multimedia and animated videos on viral material. This type of research is (R&D) adapting the ADDIE model. The population is class X SMA IT Baitul Qurro South Tangerang, sampling using non-probability sampling with saturated sampling technique where the entire population is a sample of 45 students. Learning achievement is measured using instruments that have been validated by experts (teachers and biology lecturers) using essays (C1-C6) for cognitive tests, questionnaires for affective tests, and observation sheets for psychomotor tests. The test was conducted before (pretest) and after (posttest) learning. Data analysis used the average score, percentage, and N-gain. The data obtained were analyzed by normality and homogeneity tests. The results obtained indicate that song-based multimedia and animated videos can improve student achievement with an average N-gain, namely: Cognitive domain of 56.8% (quite effective); The affective domain is 57% (quite effective), and the psychomotor domain is 75% (quite effective).

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How to Cite:

Suhadi, A. P., Nihlah, K., Miarsyah, M., & Ristanto, R. H. (2022). Song And Video Animation On Virus: Multimedia To Increase Student's Learning Achievement. *Jurnal Pelita Pendidikan*, 10 (1), 193-202.

INTRODUCTION

Learning achievement is evidence of student success in accepting, refusing, and processing all information and knowledge provided in the learning process, expressed in grades and report cards for each field of study ([Hamdu & Agustina, 2011](#)). Assessment of learning achievement can be done within a certain period, such as during daily tests, one quarter, or even after the end of the semester ([Sirait, 2016](#)). Learning achievement includes three main aspects, namely cognitive, affective, and psychomotor, so the success of learning achievement depends on the ability of students to fulfill these three aspects ([Hamdu & Agustina, 2011](#)). The success of learning achievement is not only determined by students but the participation of teachers as facilitators in conveying, facilitating, educating, supporting, and guiding students so that students' knowledge (cognitive), positive values (affective), and skills (psychomotor) increase and obtain good grades ([Hamid et al., 2020](#)).

In the current digital revolution era, education has prioritized the media as an intermediary of information to achieve exciting and fun learning goals. Teachers are required to reduce the lecture method and replace it with media. One learning media, which includes text, verbal, audio, and visual, is multimedia. Multimedia can be in the form of animated videos, music, or interactive multimedia. Multimedia in learning can facilitate and optimize learning outcomes ([Nurseto, 2012](#)).

Biology learning conveys more theories and concepts ([Laila et al., 2018](#)). Students have difficulty learning different biological materials at each grade level. In grade X, students have difficulty learning about viruses and bacteria ([Firmanshah et al., 2020](#)). The concepts of virus and bacteria material that students consider problematic include understanding the characteristics of viruses, differentiating the body structure of viruses from other creatures, synthesizing how to multiply viruses, the role of viruses, and how to avoid themselves from the dangers of viruses. Viruses such as influenza, AIDS, swine flu, and others (Khan & Read, 2018). Learning difficulties will undoubtedly affect the process and results obtained by students in learning. It is in line with [Diki \(2013\)](#), who argues that students who have difficulty learning biological concepts or materials will impact the enthusiasm and the acquisition of learning outcomes ([Diki, 2013](#)). Difficulties in understanding virus material also occur in class XI SMA IT Baitul Qurro, South Tangerang. Learning outcomes on virus material are 50% below the

KKM obtained through observations and interviews with biology teachers.

One learning media that can be used as an intermediary to make it easier for students to understand the material is animated video media. Animated video media can be used as a learning tool that can be used at any time to convey specific learning objectives ([Rahmayanti & Istianah, 2018](#)). The use of animated videos in the learning process increases the interaction between teachers and students and produces an effective learning process. Students are very interested and enthusiastic, more active, better understand learning using media. By using the publish or perish seven application for 1000 articles about animated videos collaborating with songs, they are not even found on youtube or other social media. Videos only use verbal explanations. It is still rare to find songs with lyrics containing biology subject matter in collaboration with animated videos. The media's novelty is to be developed, namely song-based multimedia and animated videos on viral material.

The massive use of media in biology can increase student achievement ([Luh & Ekayani, 2021](#)). For example, the use of computer-based multimedia can improve student learning achievement ([Prastika et al., 2015](#)), student learning outcomes increase significantly after using animated videos in learning ([Ponza et al., 2018](#)). Student learning achievement is the result achieved by students, including the cognitive, affective, and psychomotor domains. Learning achievement can be measured using tests or relevant instruments ([Rosyid et al., 2019](#)). The development of multimedia-based songs and animated videos is expected to improve student achievement. For the above reasons, this research aims to develop multimedia based on songs and animated videos on viral material to improve student achievement.

METHOD

The type of research used is development research (R&D) with the ADDIE model adapted from Dick and Carey (1999). The population of this study was students of class X SMA IT Baitul Qurro, South Tangerang City, for the academic year 2021/2022. Sampling using non-probability sampling with saturated sampling technique. Saturated sampling determines the sample if all members of the population are used as samples. It is often used in research with a relatively small population ([Sugiyono, 2016](#)) so that the entire population is a sample of 45 students.

The instrument used to validate multimedia by experts (lecturers) and students using a Likert

scale questionnaire that focuses on four aspects, namely material, illustrations, display quality, and attractiveness. Learning achievement is measured using several instruments that have gone through the validation stage to experts (teachers and lecturers of Biology) first with the conclusion that the questions are valid and feasible to use but with several revisions so that it is obtained that the cognitive domain uses essay tests as many as 20 items that adopt cognitive theory by Bloom and Anderson consisting of C1 - C6 the indicators are remembering, understanding, applying, analyzing, evaluating, and creating. The affective domain uses a questionnaire of 7 items consisting of 4 dimensions: acceptance, welcome, appreciation, and internalization. Moreover, the psychomotor domain uses an observation sheet consisting of two dimensions: movement skills and verbal & nonverbal skills).

The steps of development research based on the ADDIE model are as follows: (1) Analyze: The analysis phase begins with firstly observing the class to find problems where students' low achievement in learning biology material on viruses is found, secondly formulating multimedia to improve learning achievement, after that make song lyrics based on KD, the goal, and viral material indicators. The third chose the Adobe premiere pro 2020 editing application, and the fourth was an analysis of learning achievement indicators related to viral material in class X MIA. (2) Design: The design stage consists of two aspects: media and instruments. First, the media recorded viral songs and designed an animated video display design based on KD, goals, and indicators. Second, the instrument makes a lattice of expert and student validation instruments and learning achievement instruments. (3) Development: The development stage begins with completing the editing process using Adobe Premiere Pro 2020, then after the media is finished, the song lyrics and animation video validation process is carried out, which is assessed by two experts (biology lecturers). Biology lecturers carried out media validation as media and material experts, and 22 students of class XI (small class) were tested as test subjects to determine the validity/validity of the product. Furthermore, the last process is to revise the media according to the suggestions given by the two experts. (4) Implement: The implementation

stage is the process of installing a project in a real-world context, namely by providing multimedia-assisted learning on viral material in class X, but previously a pretest was carried out to determine students' initial cognitive, affective, and psychomotor skills with previously made instruments. (5) Evaluate: After being presented with multimedia in the next lesson, students are given a posttest in the cognitive, affective, and psychomotor domains. The evaluation stage determines the adequacy of learning (Yusuf et al., 2017). At this stage, an analysis of the influence of multimedia in improving student achievement is carried out.

Data analysis

The data analysis technique in the expert validation test and the small class test on students uses the average value and percentage, interpreted in the classification table (Arikunto, 2008). The data analysis technique on learning achievement in the cognitive domain uses the highest and lowest scores on the pretest and posttest, N-gain. The data analysis technique in the affective and psychomotor domains uses the average and percentage values interpreted in the classification table. The data obtained were analyzed using a prerequisite test consisting of a normality test using the Kolmogorov-Smirnov test and an F test's homogeneity test.

RESULTS AND DISCUSSION

At the analysis stage, several problems were obtained. The low student achievement is seen from the student's UTS score. The student's enthusiasm for learning was low. Then the results of the analysis of the biology teacher on the lesson plan obtained indicators of virus material, namely identifying the characteristics of the virus, explaining the structure of the virus, analyzing viral replication, explaining the role and losses of viruses in life.

At the design stage, song lyrics are generated and display designs, transitions, effects, audio, selection, and cutting of animated videos are available sourced from youtube channels and google (Neuron, Mas Iki, Servier Medical Art, Armando Hasudungan, and Amhaus) with the Adobe premiere pro-2020, shown in Figure 1.

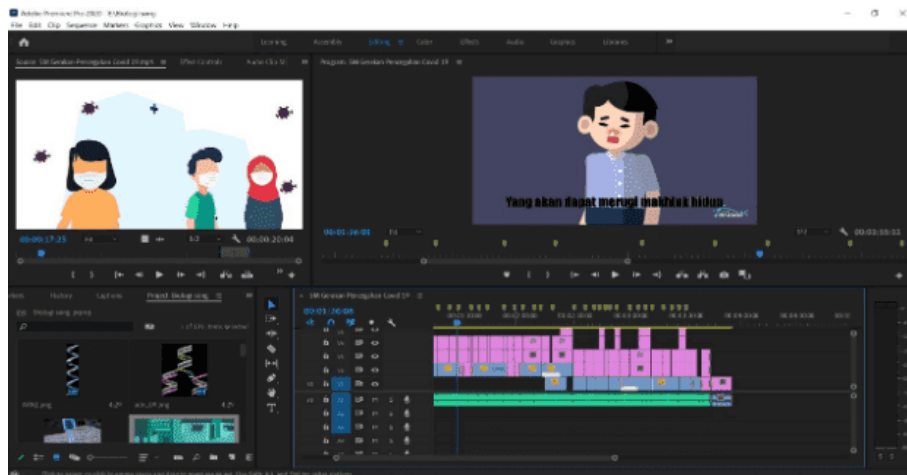


Figure 1. Editing process of Adobe Premiere Pro 2020

Virus song lyrics are as follows:

Virus

*Virus itu partikel kecil
 Virus sifatnya parasite obligat
 Yang hanya dapat hidup pada sel, pada sel inangnya makhluk hidup
 Virus dapat dikristalkan
 Itulah alasan virus disebut
 Disebut sebagai benda mati, karena tak bisa hidup tanpa sel
 Ohh tapi virus juga dapat bereproduksi
 Itulah alasan disebut makhluk hidup
 Alasan lain karena virus punya DNA, atau RNA
 Ohh virus punya keuntungan bagi manusia
 Virus itu berguna untuk membuat
 Sebuah vaksin dan anti toksin untuk system immune manusia
 Oh, tapi virus juga punya banyak kerugian
 Yang akan dapat merugi makhluk hidup
 Pada manusia, hewan, dan juga pada tumbuh-tumbuhan
 Virus menyerang manusia
 Banyak menyebabkan macam penyakit
 Seperti menyebabkan polio, hepatitis, ebola dan covid
 Oh, virus juga punya berbagai macam bentuk
 Ada filamen, batang, oval dan banyak lagi
 Dan juga struktur virus hanya ada kapsid, dan asam nukleat
 Reproduksi virus terdiri dari dua siklus
 Yaitu siklus litik dan lisogenik
 Litik hancur
 Lisogenik membentuk profage
 Siklusnya terdiri dari adsorpsi, penetrasi
 Sintesis, perakitan dan inang lisis
 Hanya saja lisogenik gabung dan membelah*

At the development stage, validation results were obtained by two media and materials experts. The validation sheet is given in stages, starting with validation on song lyrics and then an animated video. After receiving revisions in the form of several criticisms, suggestions, and inputs, including 1) distinguishing song improvisation between applying it to students and using social media (youtube) so that students are easy to follow; 2) the selection of videos for the song lyrics "lysogenic forms a prophage" is still not correct and 3) the display of song lyrics must be

consistently at the bottom of the screen. After that, the multimedia went through the editing stage again by revising the input mentioned above, then the multimedia (animated songs and videos) was tested. The trial was carried out in class XI as many as 22 students, this was due to the relatively small population, and all class X will be used as samples for this study and to distinguish the assessment of the trial class (small class) from the large class, the selection of class XI allows it to be used as a testing class. The

validation results by two expert validators are shown in Table 1.

Table 1. Media Assessment by Expert Validators

Assessment	Results	
	Percentage	Description
Content		
Media suitability for Virus topic	85 %	Very Valid
The suitability of the media to the learning objectives	90 %	Very Valid
Media suitability for Basic Competencies (KD)	80 %	Valid
No misunderstanding	80 %	Valid
Illustration		
The illustration depicts the actual situation	80 %	Valid
Conformity of song lyrics and viral visualization	85 %	Very Valid
Appearance		
Animation quality, music and song lyrics	75 %	Valid
Video quality (transitions, effects, resolution)	80 %	Valid
Audio quality (sound editing)	85 %	Valid
Attractiveness		
Learning becomes interesting and fun	100 %	Valid
Make it easier to repeat viral material	100 %	Valid
Reduce student boredom	100 %	Valid

The assessment on the material aspect consists of four indicators: the first, the suitability of the media with viral material, obtaining a percentage of 85% (Very Valid). It means that multimedia songs and animated videos contain viral material taught to class X high school students. Second, the suitability of multimedia to the learning objectives obtained a percentage of 90% (very valid). It shows that the song lyrics consist of learning objectives which consist of identifying the characteristics of the virus, replication, the role of losses caused by the virus. Third, the suitability of the media to basic competencies (KD) obtained a percentage of 80% (quite valid), which means that the song lyrics and animated videos are in accordance with the established KD, namely analyzing the structure, replication, and role of viruses in life. Fourth, it does not cause misunderstandings to get a percentage of 80% (quite valid) which means that immediately after seeing and hearing animated songs and videos, they understand and do not cause confusion or misunderstanding of concepts in viral material. The assessment on the illustration aspect consists of two indicators, namely the first illustration can describe the actual situation obtaining a percentage of 80% (quite valid) which means that the animated video can provide a visual description of the characteristics of the virus, the viral replication process, the forms of the virus, the role and losses caused by the virus correctly and following the theories and facts found. The second indicator is the suitability of the song lyrics, with the animated video getting a

percentage of 85% (very valid) which means that the animated video displayed is following the lyrics of the song being sung, for example, when the song lyrics "lysogenic forms a prophage" then the video displayed is an animated video about the process of lysogenic.

The assessment on the display aspect consists of three indicators, namely the quality of animation, music, and song lyrics, obtaining 75% (quite valid). Video quality (transitions, effects, and resolution) is 80% (quite valid). Animated video is a compilation of several videos, such as 3D animation, images, and infographic videos included in audio-visual media ([Hariati et al., 2020](#)). The transition in the video is a brief description of the song's lyrics. Furthermore, animated videos have positive implications for students' learning motivation in learning activities ([Widiyasanti et al., 2018](#)), especially in this case on viral material. Audio quality (sound and tone editing) obtained a percentage of 85 %. The tone used in the song results from the adoption of a young singer named Jazz with the title song "Dari Mata." Selecting popular songs that are identical among teenagers can make it easier for students to follow the strains of tones and music videos on learning media. In general, music is entertainment and can also increase student motivation and learning quality and is relevant to students' hobbies ([Juwita & Nasution, 2018](#); [Roffiq et al., 2017](#)). The singer's voice in the animated video has a good and melodious voice; the clarity of the voice and the music also get a valid category.

The assessment of the attractiveness aspect consists of three indicators, namely, first, learning becomes exciting and fun, obtaining a percentage of 100% (very valid), second, making it easier for students to repeat viral material that can be accessed and played anywhere and anytime, obtaining a percentage of 100% (very valid), and the third attraction is to reduce student saturation by a percentage of 100% (very valid).

The results of the small class trial for class XI students were 22 students who had carried out learning about virus material when they were in class X before. Student responses focused on the assessment of media-assisted learning, the influence or effect of the application of multimedia in learning viral material, and finally on students' assessment of the quality of the media. The test results are shown in Table 2.

Table 2. Small group trial results

Assessment	Results	
	Percentage	Description
Learning	85%	good
Influence	82 %	good
Media quality	81 %	good

Student responses to learning by using multimedia songs and animated videos got 85% (Good). Students said that learning with multimedia was more fun, engaging, and not dull. Research conducted by [Hardiyan and Ismi \(2017\)](#) also shows that interactive multimedia-based animation can improve the quality of learning ([Hardiyan & Fajriyah, 2017](#)). It is in line with research that says that learning using audio (biology songs) is effectively applied in biology learning ([Prayitno & Hidayati, 2017](#)).

Student responses to giving multimedia in learning get 82% (Good). Multimedia provides benefits and helps students remember and understand the content easily and can be accessed and repeated anytime and anywhere. The use of multimedia (audio-visual) media can improve students' memory ([Hastuti, 2019](#)), so that it is relevant to the findings in this study. Assessment of the quality of the media obtained a percentage of 81% (Good). Students stated that the viral song's video and audio display resolution was good, the sound and music were clear, and the video visualization was easy to understand.

The implementation stage is applying multimedia-assisted learning based on songs and animated videos in class X MIA SMA IT Baitul Qurro. There were four meetings on viral material with time allocation (1 x 45 minutes). The first meeting was started by conducting a pretest to

determine the students' initial abilities. The second meeting was introduced to multimedia learning, the third meeting was learning by imitating the songs contained in the animated video directly, and the fourth meeting was carrying out a learning evaluation. The multimedia prototype developed is shown in Figure 2.



Figure 2. (top) opening view; (middle) current display of song chorus; (bottom) final look at viral animation songs and videos. Multimedia can be viewed on the following page <https://youtu.be/WzwHdt001il>

At the final stage, students are given some tests, the first is a cognitive test with 20 essay questions on virus material, but previously they were given a pretest at the initial meeting of virus material. The cognitive pretest and posttest results can be seen in Table 3. Based on the results of the effectiveness of the N-gain set by Hake in 1999, if the N-gain percentage is at 56% - 75%, it is declared quite effective ([Sinuraya & Mihardi, 2019](#)). In the results of cognitive research, students obtained an average N-gain of 56.8%, which means that song-based multimedia and animated videos are quite effective in increasing learning achievement. It is relevant to the findings made by [Suyitno \(2016\)](#), who reported that the implementation of multimedia could improve student learning outcomes ([Suyitno, 2016](#)).

Therefore, song-based multimedia and animated videos can improve student achievement, especially in class X SMA IT Baitul Qurro South Tangerang. The use of multimedia is a bridge to channel information, knowledge, and resources to

students so that teachers do not only explain in words but are visualized in such a way with a variety of multimedia so that it is expected to be able to improve students' cognitive abilities in learning biology (Satria & Egok, 2020).

Table 3 results of students' cognitive pretest and posttest

Results	Average				Category
	Pre-test	Post-test	N-gain	Percentage	
Highest	80	94	0,844	84 %	High
Lowest	55	78	0,2	20 %	Low
Average	65,8	85,6	0,5	56,8 %	Effective

Animated videos packaged using songs make it easier for students to understand the material. Abstract material can be visualized using animated videos to easily understand the characteristics, the process of virus development, and the role and losses of viruses in life. It is in line with research that says that animated videos can make it easier for students to understand biological material that cannot be explained in words and cannot be seen by the eye in virtual form.

This research is based on the theory put forward by Piaget on cognitive learning theory, which says that the initial information enters the short-term memory in the left brain through the senses of the ears and eyes. Then, from short-term

memory, the information will be processed into symbols stored in long-term memory. Therefore, to reach students' cognitive, it is necessary to provide information through audio and visuals such as animated videos (Noviyanto et al., 2015).

Learning achievement is the amount of student test scores on the mastery of cognitive knowledge and skills. Students' cognitive knowledge can be mastered more deeply if trained and often repeated. The study results (Prayogo, 2012) said that the use of multimedia in learning would make it easier for students to repeat the subject matter, especially in the current era of the digital revolution. All information can be accessed easily on the internet.

Table 4. results of students' affective pretest and posttest

Results	Average				Category
	Pre-test	Post-test	Pre-test	Percentage	
Highest	82	100	1	100 %	High
Lowest	60	80	0,49	49 %	Low
Average	71	88	0,57	57 %	Effective

The second test at the evaluation stage is affective (attitude). The pretest was given at the initial meeting of the virus learning, and the posttest was carried out after the entire series of multimedia-assisted learning was completed. The results of the affective test are presented in Table 4. In the affective domain, the average N-gain was 57% (quite effective), with the lowest score at pretest being 60 and the highest being 82, while the lowest posttest score was 80 and the highest was 100. It means that students show the attitude of accepting material during learning, being active in learning, considering it necessary and valuable to study biology, accepting the opinions of others, generating scientific attitudes such as showing curiosity, being enthusiastic about learning, and connecting the material with phenomena in everyday life such as efforts to prevent the spread

of the virus era pandemic. Multimedia can stimulate students' scientific attitudes such as curiosity and thoroughness, and students show enthusiasm in learning accompanied by singing and yelling (Rahmawanto, 2018).

In the psychomotor domain, the N-gain is 75%, presented in Table 5. It means that multimedia is quite effective in improving students' psychomotor skills. According to Chandra and Sugeng (2019), the development of multimedia products positively contributes to students' psychomotor aspects. In this finding, the psychomotor aspect is viewed from verbal skills because students actively sing along to the strains of the songs that have been given, then this multimedia attracts students' attention and focuses on learning.

Table 5 students' psychomotor pretest and posttest results

Results	Average				Category
	Pre-test	Post-test	Pre-test	Percentage	
Highest	78	100	1	100 %	High
Lowest	44	67	0,40	49 %	Low
Average	58	90	0,75	75 %	Effective

Table 6 results of data prerequisites (normality test and homogeneity test)

	Test	α	Decision	Description
Pretest	Normality	0,05	0,116 < 0,19842	Normal
	Homogeneity	0,05	1,180 < 1,651	Homogen
Posttest	Normality	0,05	0,151 < 0,19842	Normal
	Homogeneity	0,05	1,180 < 1,651	Homogen

The data obtained at this evaluation stage passes the prerequisite test first, using the Kolmogorov-Smirnov normality test and the F test's homogeneity test. In the normality test, the critical value of $N = 45$ and $\alpha = 0.05$ is 0.19842 then if the value of $D_{max} > 0.19842$ data is normally distributed. In the pretest data obtained, the decision obtained is the D_{max} value of $0.116 < 0.19842$, then the data is normally distributed. While the posttest data obtained a decision that the value of D_{max} obtained was $0.151 < 0.19842$, the posttest data were normally distributed. In the homogeneity test $F_{Count} = 1.280$ and F_{table} with $\alpha = 0.05$ with $DF_1 = 44$ and $DF_2 = 44$ so the condition is that if the calculated F value < 1.651 then the data is homogeneous. The decision obtained is that the pretest and posttest data are homogeneous data where $F_{count} < 1.651$ or $1.180 < 1.651$.

CONCLUSION

Based on research on the development of the ADDIE model on song-based multimedia and video animation, viral material is quite effective in increasing student achievement with the following details: The cognitive domain obtained an average N-gain of 56.8%. The affective domain gets an average of 57% (effective), and the psychomotor domain gets a percentage of 75% (effective).

ACKNOWLEDGEMENT

Thank you to the two validators who helped validate this song and video animation-based multimedia, namely 1) Mr. Wasis Wuyung Wisnu Brata, M.Pd as a biology lecturer at the State University of Medan, and 2) Ms. Dina Rahma Fadlillah, M.Si as a biology lecturer. At Syarif Hidayatullah State Islamic University Jakarta and

all X grade, IT Baitul Qurro High School have responded to this research.

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