

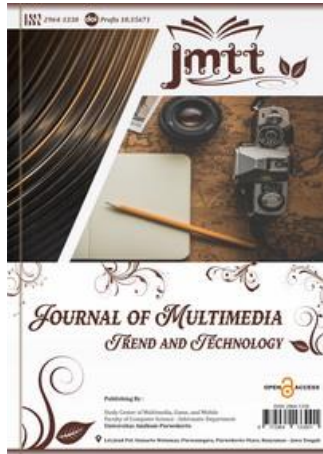
Optimizing Frame Techniques in 2-Dimensional Video Models in a Learning Perspective. Case Study: Movie Clip Entitled "Perjalanan Jenderal Soedirman"

Mohamad Chaerudin¹, Akto Hariawan², Elly Purnawati³

^{1,2,3}Informatic Departement, Faculty of Computer Science, Universitas Amikom Purwokerto, Central Java, Indonesia
Email: heruchaerudin01@gmail.com, akto.85@gmail.com, ellypurnawati@amikompurwokerto.ac.id

ARTICLE INFO

ABSTRACT



As competition for talent increases, electronic media are often used to convey information and influence students' points of view. Animated films are an electronic media that can be used to bridge learning to make it more interesting and provide a new environmental feel for students. According to research results conducted by Computer Technology Research (CRT), people only remember 20% of what they see and 30% of what they hear. Yet people remember 50% of what they see and hear and 80% of what they see, hear and do at the same time. This research aims to evaluate students' level of interest and enthusiasm for learning history through animation media. The research method was created using two-dimensional (2D) animation techniques using frame by frame animation techniques. The data obtained is the result of research from interviews, observations, literature studies and questionnaires conducted at SDN 3 Kutasari which is located in Banyumas Regency. The results of the questionnaire testing used a Likert scale and the average formula for the results of the calculation was 87.9%, so it was included in the agree category or worthy of being shown as a 2D animated short film.

History :

Submit on 16 January 2024
Review on 19 January 2024
Accepted on 26 February 2024

Keyword :

Clip Video,
Animation,
Model Learning,
2D Frame

Copyright © 2024 by Author

The copyright of this article belongs entirely to the author

Corresponding Author:

Mohamad Chaerudin 
Faculty of Computer Science, Informatic Departement, Universitas Amikom Purwokerto
Email : heruchaerudin01@gmail.com

INTRODUCTION

In this century, the development of information and communication technology is increasingly accelerated by demands for speed of transmission of all forms of information [1]. In addition, along with increasing competition for talent, electronic media is often used to convey information and influence people's points of view [2]. Electronic media has an indirect impact on society because it spreads news to the public relatively quickly [3]. Electronic media is widely used in the world of videography not only to convey messages in the form of text or persuasive writing in large quantities, but also to animate text and package it with audio, images, music, animation, video, and the like [4][5]. Film is a very effective means of information and mass communication because it can raise public opinion through various broadcast and presentation formats and convey messages through audio-visual narratives and vivid images and sounds [6].

Short films are a representation of a simple or complex film. Short films usually last less than 60 minutes [7]. Short films that understand storytelling give freedom to creators and audiences to make the final result very diverse [5]. The most important thing in a short film, even if it is short in duration, is the idea and the effectiveness of the means of communication [8]. In several countries, such as Canada, Germany, the United States and Australia, short films are used as experiments and stepping stones for individuals or groups to produce feature films [9]. This type of film is mostly produced by film students or community groups who are interested in the world of cinema and want to practice filmmaking [10].

Animation is one of the multimedia media used as a transmission medium. 2D animation or two-dimensional animation is also called flat animation. A revolutionary development in two-dimensional animation came in the form of animated films, also known as cartoons. These cartoons are no longer only shown in children's entertainment media, but are also often used as presentations in advertising/promotional media. Apart from developing animated learning technology, it is also used to develop educational materials such as animated videos, video tutorials and learning videos.

Animated films are a learning tool that can make learning more interesting and provide students with a new understanding of the environment [11]. The importance of the presence of media in learning provides opportunities for students to produce new stimuli, activities, skills, and find easy forms of application in learning [1][12].

Animation is one of the developments and advances in the film industry [13]. Animation is basically an adaptation of the English word "animation" or "to animate", which means "to bring to life". In other words, animation is the process or act of animating and moving inanimate objects. Inanimate objects are given power, emotion, or excitement so that they become animate, move, or simply appear alive [14].

Based on data obtained through observations of research objects in 5 elementary schools in the Kutasari Banyumas area, it was revealed that currently there are no traditions or activities similar to short stories or art projects involving grade 5 students in these schools. The principal said that the main obstacles in learning history were the lack of current books and an inadequate library. Meanwhile, the homeroom teacher faces challenges in increasing students' interest in reading historical short stories. Responding to the proposal to make a 2D animated short film about history, the principal welcomed it and was ready to support it, while the homeroom teacher agreed and hoped that the film could become part of ongoing learning. Even though schools are supportive, there are constraints related to budget and IT infrastructure that need to be considered. With this interview, it can be understood that there is a need and support from the school for innovative development in history learning, especially through animation media.

According to research results conducted by Computer Technology Research (CRT), people only remember 20% of what they see and 30% of what they hear [15]. Yet people

remember 50% of what they see and hear and 80% of what they see, hear and do at the same time [10].

METHOD

Based on the background that has been defined, and the research methods that will be used, a framework for researchers is prepared as in the picture below:

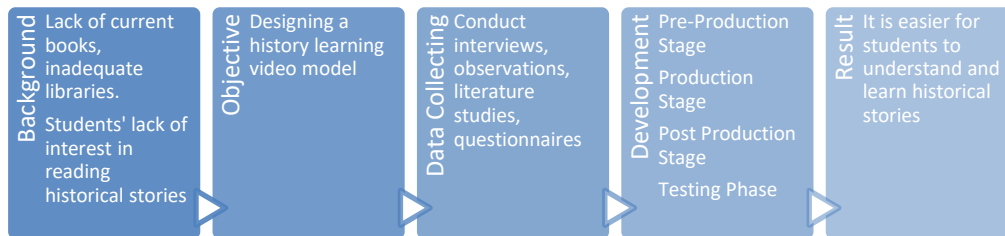


Figure 1, Flow of research carried out.

The method used for system development in this research is the multimedia system development method. This system development method was chosen because it is easy to implement, all system requirements can be defined in full. Using the multimedia system development method, all the steps in making this animation are very systematic and sequential, so that if an error occurs it can be resolved quickly. Below are parts of the system development method as shown in the image below:

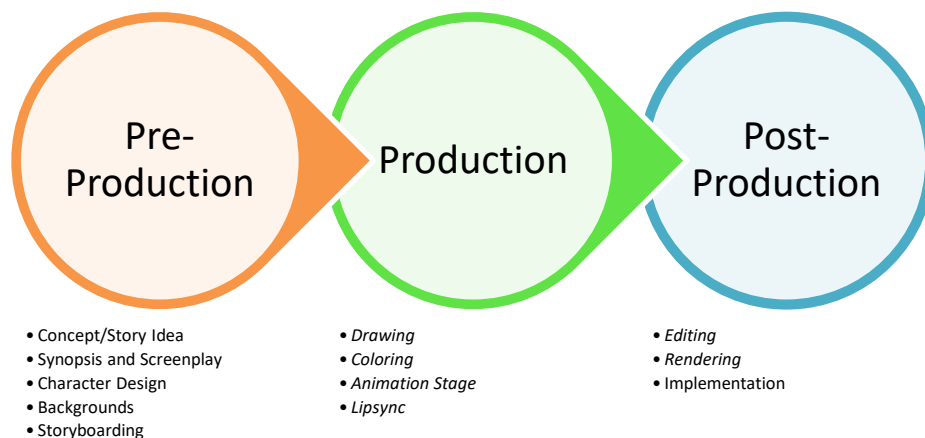


Figure 2, Development Flow Process.

The pre-production stage is the initial stage that must be taken before carrying out the production process and functions as the main guideline for making video footage, such as story ideas, story themes and character formation are determined in this stage.

This is the stage in which the process of making an animated film begins. This stage must be carried out regularly because this stage is the core of the process of making an animated film.

This stage is the final stage of film making, where all the materials that the author has worked on and put together. In this process, the film is tidied up in the editing process, then to be ready to be shown, the film is rendered before being converted.

RESULT

1. Concept.

In this initial stage, the first thing the author does is find a story idea for the 2D animated short film that will be made. The choice of the film "General Soedirman's Brave Journey in Banyumas" in animated form was because animation is an effective and interesting form of multimedia. A story needs to be guided and spoiled by characters. The form doesn't matter, the most important thing is that the character must be standard because with character, we won't be able to tell a story. Analysis of the hardware or software requirements needed to support the process of making this 2D animated short film, whether the device meets the needs and can be used or not.

The system development method used in this research is the Multimedia Development Life Cycle method. The design for making a 2D animated short film that the author uses to make a 2D animated film has 3 stages, namely pre-production, production and post-production, where these 3 stages have different tasks. The author uses these 3 stages because they are easy to implement. Because the design stages are very structured, the project being carried out can run well.

2. Design.

The formation of the character must be in accordance with the nature and role of the character in a film. The characters in animated films are created in the Character Sheet when the storyboard creation process has been completed.



Figure 3, Design on storyboard.

The production stage is the stage after pre-production. At this stage the author creates 2-dimensional objects from character designs to storyboards which have been created to be used as reference material for making 2D animated short films.

3. Material Collecting.

In collecting materials, the author collects several materials to be used in the design process to design the animation. The following is a table of materials needed to design the animated video:

Table 1, Material Collecting

Material	Type	Description
Logo	.PNG	Design on logo for animated video.
Actor Character	Vector Image .CDR	Vector design for models to simplify the animation process.
Background	.JPG .PNG	Background image to support animated videos.
Sound Illustration	.WAV .MPG	Supporting sound in animated videos.

4. Assembly.

At the stage of the process of making a 2D animated short film using frame by frame animation techniques. In order to display an image in quick succession, one image, and another image are different, as in Figure 4.

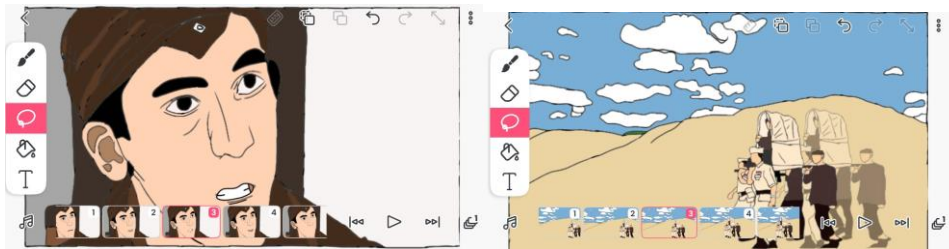


Figure 4, First Stage Animation

The next stage is the audio processing process for providing sound for making a 2D animated short film using audio from several characters' voices in the General Soedirman film. The sound editing process, in this process uses the Inshot application as a tool to edit the sounds of all the 2D animated short film characters created.

Next is the post-production stage which is the final stage in animation. At this stage, it is used to produce a better animated film so that it is worth watching. In post-production, there are 3 processes including (1) Editing is the process of moving and arranging the recorded video images into a new and pleasing recorded image. In general, editing work is related to post-production, such as providing effects or transitions, correction. (2) The rendering stage is the process of producing images of characters, lighting and animation of 2-dimensional objects. This process will produce a number of images in sequence and become an animated movement.

The format and resolution quality of the InShot application is good enough for general needs. This application provides three resolution options, namely 720p, 1080p, and 4k. 720p resolution is good enough for social media needs, such as Instagram, TikTok and YouTube. 1080p resolution is even better for presentations or videos that will be shared on websites. Meanwhile, 4k resolution is the highest resolution available in the InShot application. This resolution is suitable for professional needs, such as making films or advertising videos.



Figure 5, Rendering Process.

5. Testing.

The testing or testing stage is carried out when the stage has been completed. Test by running the animation that has been completed and seeing whether there are

errors or not. By going through 2 stages, namely alpha test and beta test. Alpha test is a test by creating animation. After passing the alpha test. then a beta test will be carried out involving end users (audience).

The alpha test is matching what was planned in the system design and the output results in two-dimensional animation, with almost perfect results.

The Beta testing stage is carried out when the application is fully functional by testing it with a wider user group or end users. Testing was carried out on fifth grade students of SDN 3 KUTASARI.

Research on responses from respondents used a Likert scale according to . The Likert scale is a scale that is generally used in questionnaires and is widely used in research in the form of surveys. This scale is also used to measure the opinions, perceptions and attitudes of a person or group regarding an event or social phenomenon.

The number of respondents was 19 respondents. With a total of 8 questions to respondents. From the results of the questionnaire, the following research summary can be obtained:

Table 2, Number of participants who rated.

Aspects to	Number of Research					Number of Respondents
	SA	A	E	D	SD	
1	10	9	0	0	0	19
2	8	11	0	0	0	19
3	9	7	3	0	0	19
4	8	8	3	0	0	19
5	11	8	0	0	0	19
6	8	8	3	0	0	19
7	9	10	0	0	0	19
8	7	12	0	0	0	19

SA: Strongly Agree, A: Agree, E: Enough, D: Disagree, SD: Strongly Disagree

From the results of the test scores showing the final results of testing by students on "2D animated short film General Soedirman's brave journey in Banyumas" the average index formula can be taken as follows:

$$(90,5\% + 88,4\% + 86,3\% + 85,2\% + 91,5\% + 85,2\% + 89,4\% + 87,3\%) / 8 = 703,8 / 8 = 87,9\%$$

So the average index formula for respondents is 87.9% so it is included in the agree category.

6. Distribution.

After the design and testing process is complete, the author then distributes the results of the animated video project in the form of DVD and .MP4 Video Streaming. The aim is to hand it over to respondents so that it can be used as teaching material in class. Then respondents can also view it using streaming media such as YouTube so that it can be viewed online. In this way, the process of providing teaching materials can be provided openly both by students as a means of learning and the general public.

CONCLUTIONS

Based on the discussion above, the conclusions of this research are, (1) The 2D animated short film "General Soedirman's Brave Journey in Banyumas" has been successfully made using the frame by frame technique with a duration of 06 minutes 21

seconds. (2) This 2D animated short film will be used for an introduction to historical material in grade 5 science subjects. (4) The results of the questionnaire test use a Likert scale and the average formula for the calculation results is 87.9% so it is included in the agree or worthy of being shown as a 2D animated short film to preserve the historical story "General Soedirman's Brave Journey in Banyumas".

In making this thesis, it was not free from various shortcomings, therefore there are several suggestions that the author would like to convey to readers who have the desire to carry out further research. Suggestions from the author are, Firstly, for further development of this 2D animated short film, an animated film should be developed in 3D version so that the appearance is more realistic. Second, for work on or making animation, it is best to form a team and divide tasks such as drawing characters and creating settings, animating so that you focus more on each part of the film so that you get a good animated film.

Acknowledgement

The author would like to thank for the assistance from Amikom Purwokerto University which has provided the opportunity to use the multimedia laboratory, and to all lecturers who have guided in building this learning platform.

REFERENCE

- [1] P. R. Simamora, S. A. Zega, and S. St, "Perancangan 3D Modeling Dan Vfx Water Simulation Dalam Animasi 3D Berjudul 'Blue & Flash,'" *J. Appl. Multimed. Netw.*, vol. 3, no. 2, pp. 2548–6853, 2019, [Online]. Available: <http://jurnal.polibatam.ac.id/index.php/JAMN>
- [2] E. K. Hadi, "Perancangan Animasi 3D 'Remember' dengan Metode Pose to Pose," *Nuansa Inform.*, vol. 15, no. 2, pp. 14–20, 2021, doi: 10.25134/nuansa.v15i2.4260.
- [3] S. A. Rahmadianto and M. Melany, "Perancangan Multimedia Interaktif Pengenalan Dkv Ma Chung sebagai Upaya Meningkatkan Brand Equity," *ANDHARUPA J. Desain Komun. Vis. Multimed.*, vol. 4, no. 02, pp. 130–142, 2018, doi: 10.33633/andharupa.v4i02.1623.
- [4] S. D. Riskiono, T. Susanto, and K. Kristianto, "Augmented reality sebagai Media Pembelajaran Hewan Purbakala," *Krea-TIF*, vol. 8, no. 1, p. 8, 2020, doi: 10.32832/kreatif.v8i1.3369.
- [5] G. Liu, "Influence of Digital Media Technology on Animation Design," *J. Phys. Conf. Ser.*, vol. 1533, no. 4, 2020, doi: 10.1088/1742-6596/1533/4/042032.
- [6] L. A. Priyono, P. P. Purwacandra, S. G. Gunanto, and K. Widhiyanti, "Penerapan Prinsip Animasi dalam Penciptaan Animasi 3D 'Kepiting,'" *J. Animat. Games Stud.*, vol. 6, no. 1, pp. 51–66, 2020, doi: 10.24821/jags.v6i1.3854.
- [7] B. Fachri, "Perancangan Sistem Informasi Iklan Produk Halal Mui Berbasis Mobile Web Menggunakan Multimedia Interaktif," *Jurasik (Jurnal Ris. Sist. Inf. dan Tek. Inform.)*, vol. 3, no. 3, p. 98, 2018, doi: 10.30645/jurasik.v3i0.69.
- [8] J. Nari, V. Tulenan, S. Sentinuwo, Y. Rindengan, and O. Lantang, "Perancangan Studio Musik Bambu Dengan Perspektif Animasi 3D," *J. Tek. Inform.*, vol. 4, no. 2, pp. 1–7, 2015, doi: 10.35793/jti.4.2.2014.6988.
- [9] D. Siegle, "Technology: Student Animation Projects: An Avenue to Promote

- Creativity and Learning," *Gift. Child Today*, vol. 37, no. 3, pp. 194–199, 2014, doi: 10.1177/1076217514532276.
- [10] A. Aruna, L. Inayah, M. F. A. Roziqin, and A. R. Prasetyo, "Rancang desain media pembelajaran berbasis game sejarah perjalanan jendral Soedirman dalam perang gerilya Kabupaten Pacitan," *J. Basicedu*, vol. 5, no. 5, pp. 3866–3882, 2021.
- [11] A. Faris and A. F. Lestari, "Rancangan Animasi Pembelajaran Interaktif Alfabet Pada Pendidikan Anak Usia Dini," *J. Tek. Komput. AMIK BSI*, vol. II, no. 1, pp. 59–67, 2016, [Online]. Available: <https://ejournal.bsi.ac.id/ejurnal/index.php/jtk/article/download/363/272>
- [12] Binanto, "Multimedia Digital, Dasar Teori dan Pengembangannya," Andi Publishing, 2010, p. 150.
- [13] A. Munazdar and M. Nur, "2D Animation Video of IoT-Based Agricultural Monitoring Using Onion Skinning Technique," *J. Multimed. Trend Technol.*, vol. 2, no. 1, pp. 36–46, 2023.
- [14] F. Yahya and C. Wilma, "Cinematography and Motion Tracking Techniques in Making a Video Profile for " Genteng Pancasan " Information," *J. Multimed. Trend Technol.*, vol. 1, no. 3, pp. 16–24, 2022.
- [15] D. Utami, "Efektifitas Animasi Dalam Pembelajaran," *Maj. Ilm. Pembelajaran*, vol. 7, no. 1, pp. 44–52, 2011.