



Development of a 3D Animated Short Film ‘Stop Bullying’ Using Cel-Shading Technique

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Abstract

Bullying is still a social issue that negatively affects mental and emotional health, especially among schoolchildren. To convey a moral and educational message about the importance of stopping bullying, a 3D animated short film entitled "Stop Bullying" was made which was presented in the form of storytelling to build emotional closeness with the audience. Cel-shading techniques are applied to produce a 2D cartoon-style visual aesthetic (flat colors and outlines), while maintaining the depth of space and motion dynamics typical of 3D animation. Production is done using Unreal Engine 5 with real-time pipelines, allowing for live visual previews, high-quality visual realizations, and production process efficiency. The Film raises simple yet meaningful stories to illustrate the experiences of victims and raise awareness of the psychological impact of bullying. It is expected to be an effective educational media campaign for school children while increasing public awareness.

Keyword : Animasi 3D, Cel Shading, Edukasi, Bullying

1. Introduction

3-dimensional animated Film (3D) is growing and much in demand by various circles, both children and adults. This development not only focuses on entertainment, but is also used as a medium for delivering social messages, one of which is the issue of bullying or bullying. Bullying is an aggressive act that is carried out repeatedly with the aim of hurting the weaker party, both physically and psychologically. The impact of this behavior is very serious, ranging from low self-confidence, depression, to prolonged trauma. The phenomenon of bullying occurs a lot in the school environment, which should be a safe space for students. Research shows that victims of bullying often experience barriers in social and academic development (3). Therefore, alternative media are needed that can help increase students' awareness of the dangers of bullying while encouraging social empathy. One of the potential media is 3D animation film. Animation with a simple but communicative visual style can convey messages more effectively than verbal delivery. The cel-shading technique was chosen because it is able to bring expressive cartoon visual nuances while maintaining the depth of 3D typical space (4). This technique is considered appropriate to package stories that display the dynamics of bullying to be more easily accepted by the audience.

2. Theoretical Basis

2.1. Bullying

Bullying is a violent behavior that can be physical, verbal, or psychological, carried out by an individual or group to the victim on a recurring basis. At school, bullying can take the form of teasing, exclusion, threats, or physical violence. The effects are not only felt by the victim, but can also affect the overall learning climate.

2.2. 3D animation

3D animation is a technique of producing moving images with dimensions of length, width, and height. With the help of software, animators can create realistic-looking or cartoon-style objects and characters, depending on the visual goal.

2.3. Cel Shading

Cel shading is a non-photorealistic rendering technique that displays 3D objects with flat colors and firm outlines, resembling 2D animation. The advantages are simple visuals that are easy to understand, while the disadvantages are limited lighting details.

2.4. Animation Software

Blender is used for modeling, texturing, rigging, and animation; Unreal Engine 5 for real-time rendering; Mixamo for automated rigging; Ibis Paint and FlipaClip for design and storyboarding. This combination enables an efficient and structured animation production process.

3. Research Methods

This study uses qualitative methods with the following stages :

1. data collection: interviews with teachers and students, as well as literature studies.
2. pre-production: creation of story ideas, scripts, character designs, and storyboards.
3. production: modeling, texturing, rigging, animation, and application of cel shading.
4. post-production: rendering, compositing, adding background music, sound effects, and video finalization.
5. the hardware used is a PC with an Intel Core i5-13400f processor and 16GB of RAM.

4. Research Results

The results of the study related to the creation of 3D Animated Short Film “Stop Bullying” with the application of Cel Shading techniques. In the previous chapter, we have described the process required to create a 3D Animated Short Film. However, in this chapter, attention is paid to the detailed exploration of all the stages that have been made in each stage necessary to create a 3D Animated Short Film with the interesting title “Stop Bullying”. This stage involves a number of steps, namely modeling, texture mapping, rigging, celshading development, character animation, scene composition, and post-production stages. Making a 3D animated short Film titled "Stop Bullying" aims to convey a moral message about the importance of stopping bullying in the school environment. The stages of production that has been done is :

1. Preproduction

The preproduction stage includes :

- a. Story concept: the story is designed to convey a moral message about the importance of stopping Bullying and building empathy.
- b. Script and storyboards: the script describes the storyline in a narrative manner, equipped with storyboards to visualize each scene.
- c. Character and Environment Design: the main character is designed in a semi-cartoon style to match the cel shading technique, creating a visual impression like a 2D image in a 3D space. The environment is designed to resemble a school atmosphere.

2. Production

At the production stage, the creation of 3D models, rigging, animation, as well as the application of cel shading are carried out

- a. Modeling: objects such as characters, benches, whiteboards, and school environments are modeled using Blender software.
- b. Rigging and animation: characters are rigged to facilitate the animation process. Gestures are designed to depict the characters' emotional expressions, such as fear, anger, and regret.
- c. Cel Shading: the cel shading technique is applied by using special shaders to give a 2D cartoon-style visual effect. Outline and flat shading are used to accentuate this style.

3. Post-production

- a. Rendering: the rendering process uses customized settings to keep it lightweight while still maintaining visual quality.
- b. Compositing and Editing: combining animation with background music, character voices, and sound effects.
- c. Final Output: the short Film titled "Stop Bullying" is saved in MP4 format with HD resolution (1080p).

Stage 1: The Results Of The Preparation Of Stage I STORY Report



Fig. 1: Scene I rendering results

Stage 2: The Results Of The Preparation Of Stage II STORY Report



Fig. 2: Scene II rendering results

Stage 3: The Results Of The Preparation Of Stage III STORY Report



Fig. 3: Scene III rendering results

Stage 4: The Results Of The Preparation Of Stage IV STORY Report



Fig. 4: Scene IV rendering results

Stage 5: The Results Of The Preparation Of Stage V STORY Report

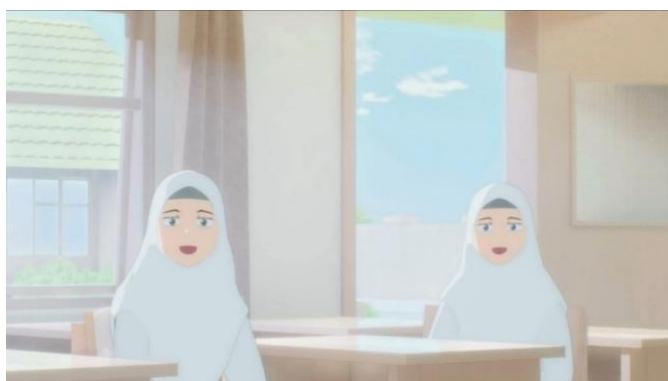
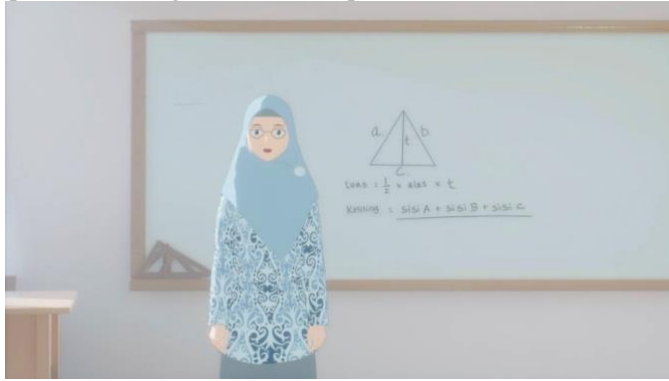
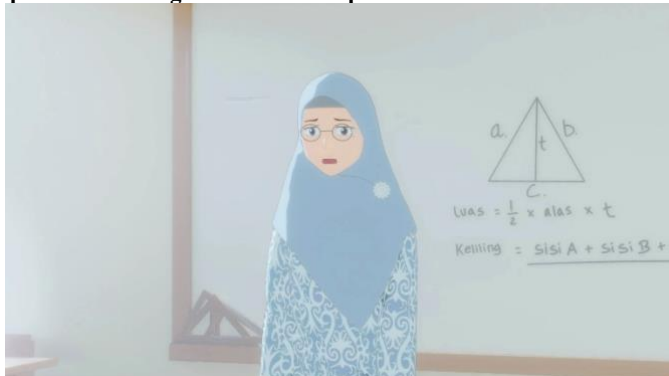


Fig. 5: Scene V rendering results

Stage 6: The Results Of The Preparation Of Stage VI STORY Report**Fig. 6:** Scene VI rendering results**Stage 7: The Results Of The Preparation Of Stage VII STORY Report****Fig. 7:** Scene VII rendering results**Stage 8: The Results Of The Preparation Of Stage VIII STORY Report****Fig. 8:** Scene VIII rendering results**Stage 9: The Results Of The Preparation Of Stage IX STORY Report****Fig. 9:** Scene IX rendering results

Stage 10: The Results Of The Preparation Of Stage X STORY Report



Fig.10: Scene X rendering results

Stage 11: The Results Of The Preparation Of Stage XI STORY Report



Fig. 11: Scene XI rendering results

Stage 12: The Results Of The Preparation Of Stage XII STORY Report



Fig. 12: Scene XII rendering results

Stage 13: The Results Of The Preparation Of Stage XIII STORY Report



Fig. 13: Scene XIII rendering results

Stage 14: The Results Of The Preparation Of Stage XIV STORY Report

Fig. 14: Scene XIV rendering results

Stage 15: The Results Of The Preparation Of Stage XV STORY Report

Fig. 15: Scene XV rendering results

Stage 16: The Results Of The Preparation Of Stage XVI STORY Report

Fig. 16: Scene XVI rendering results

Stage 17: The Results Of The Preparation Of Stage XVII STORY Report

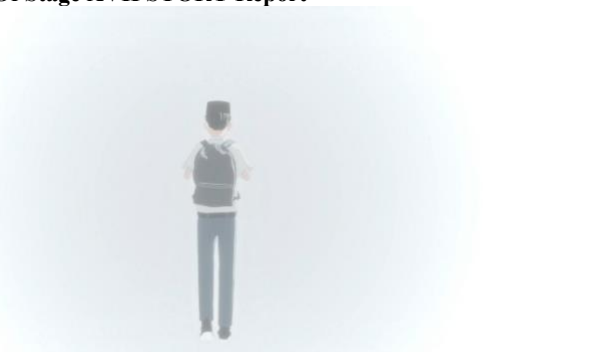


Fig. 17: Scene XVII rendering results

5. Conclusion

Based on the creation process and the final result of the 3D animated short film “Stop Bullying”, the following can be concluded :

1. The application of cel shading technique successfully gives a visual feel that resembles 2D animation in 3D, which strengthens the impression of a cartoon and makes the animation look more expressive and communicative.
2. A simple but meaningful storyline can effectively convey a moral message about the importance of stopping bullying and fostering empathy among students.
3. The animation production process, from modeling, rigging, animation, to rendering, went well despite some technical limitations such as limited time and character motion capabilities.
4. The Film has received positive feedback from the audience, especially from students and students, who stated that the visuals and messages conveyed can be clearly understood and have an emotional impact.
- 5.

The results of this visualization also overall managed to convey a strong moral message. Through the expression and interaction of the characters, this animation is able to build an atmosphere of empathy for the victim and encourage the audience to reflect. Some important points that can be observed from this visualization include:

1. Visual effectiveness is simple: using cel shading techniques and black and white lines, greater emphasis is placed on the emotional expression and mood of the characters.
2. Strong character building: Dio is portrayed as quiet and passive, reflecting the many real-world victims of bullying who choose silence out of fear or shame.
3. Impactful educational message: this visualization can be used as a medium of character and ethics learning, especially in building empathy in the school environment.

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