

Artistic Transformation of the Motion of the Shadow Puppet Scene “Perang Kembang” into Digital Silhouette Animation

Arik Kurnianto¹, Frans Santoso¹

¹ Animation Program, Visual Communication Design Department, School of Design, Bina Nusantara University, Jakarta, Indonesia

Keywords: artistic, transformation, shadow play, wayang, digital, silhouette, animation.

Abstract: “Perang Kembang” is a battle scene between the knights against the giant in wayang performance. A knight who has soft and gentle movement is in stark contrast to the giant who has a rugged and attractive movement. The two contrasting characters can represent a very interesting and beautiful war scene, so this war scene becomes a scene awaiting by the audience, as well as a scene capable of showing the skill of the Puppeteer in the art of puppet movement. This study aims to transform the beauty of wayang movement in the “Perang Kembang” scene into digital silhouette animation. The results of the artistic identification of different movement patterns found in the wayang movement of the “Perang Kembang” scene became the basis for digitally exploring the silhouette animation. The problem studied is how to transform the beauty of the wayang movement in the “Perang Kembang” scene into the digital silhouette animation. This research was conducted using art-based research methods, by experimenting with the motion of digital animation based on the pattern of movement of the shadow of the “Perang Kembang” scenes. The results of motion experiments show that the artistic transformation of the “Perang Kembang” scene can be digitally performed with two-dimensional puppet-based animation techniques.

1 INTRODUCTION

Wayang kulit (shadow puppet) have long been an inspiration in making animated films. Wayang itself is included as one of the forerunners of animation before the film era. This was confirmed by Dwi Koendoro who looked at wayang as the precursor of modern animation (Koendoro, 1998). Many figures in the history of animation inspired by wayang, including Walter Elias Disney, founder of Disney Studio, were inspired by wayang kulit in their animated careers (Khia K.K, 2009). Wayang animation or better known as shadow or silhouette animation has long developed and become one of the important genres in animation.

Lotte Reiniger (1899-1981) was an animated artist from Germany who became one of the pioneers in silhouette animation. Lotte Reiniger is a female animator who has made more than 38 animated silhouette films throughout her life (Furniss, 2017). Like Walt Disney, an interesting fact is that Lotte Reiniger was inspired to make a silhouette animation as soon as she saw a puppet show from China. But he was more fascinated by the

performances of Javanese shadow puppets which were performed at the International Exhibition of Modern Decorative and Industrial Arts in Paris in the Dutch Pavilion in 1925 (Prakosa, 2004). One of the famous animations made by Lotte Reiniger is an animated silhouette titled "Adventures of Prince Achmed" in 1926. In the present era, one of the award-winning silhouette animation works is titled "Invention of Love" by Andrey Shushkov of Russia in 2010 (Shushkov, 2010). Like the wayang which a shadow performance is, which is the power of this type of animation is in the game of shadows or silhouettes that give the impression of "mystical" and "sacred". The difference is that in the shadow puppet show, shadows are generated from behind the screen (*kelir*) through the play of puppets highlighted by lights (*blencong*). Whereas in silhouette animation, the shadow impression is captured by frame by frame through stop motion techniques or made virtually if using digital animation techniques. But in artistic principles, both are classified as the art of shadow play.

In the puppet show, the scene of "Perang Kembang" (Flower War) is a scene of war between

the knights (*Bambangan*) against the giant (*Buto/Cakil*). The knight who has the character of graceful soft movements that contrasts with the giant character who has a character that is rough and very attractive. However, the two contrasts of the characters are actually able to display a very interesting and beautiful war scene, so that this war scene in the puppet show in the past became a priceless scene and awaited by the puppet audience as well as a scene that was able to show the puppeteers expertise in wayang movements (*sabetan*). Whereas in the human wayang show (*wayang wong*), the scene of the "Perang Kembang" in the wayang kulit was successfully transformed into the form of the *Bambangan-Cakil* dance which was also one of the headliners in *wayang wong*.

Wayang kulit (shadow puppet) and *wayang wong* are two different types of performing arts, in which wayang kulit uses wayang puppets with the puppeteer (*dalang*) as the driver and director, at the *wayang wong*, it is precisely the people who become "puppets" and no puppeteer or *dalang* who controls the puppets. If viewed from the aspect of motion, puppet dolls made of leather certainly have differences in movement when compared to *wayang wong* by real people. But the movement of *Bambangan-Cakil* dance can transform the beauty of motion or "*sabet*" in the scene of "Perang Kembang" which is the reference. Of course, the process of transformation of this movement requires the sensitivity and expertise of the artists to be able to produce a transformation of puppet movements into the movements of *wayang wong* dance who are different medium but still artistic and beautiful. The successful transformation of the *wayang kulit* movement in the "Perang Kembang" scene into the *Bambangan-Cakil* dance inspired the writer to carry out the artistic transformation of the wayang scene "Perang Kembang" movement to a more cinematic animation medium.

With the background above, this study focuses on how the shadow motion of the puppet scene "Perang Kembang" is transformed into an animated silhouette motion. The results of this study were in the form of experimentation on the motion of animation based on shadow motion of wayang in the scene of "Perang Kembang" in the form of animated two-dimensional silhouettes with digital techniques.

2 LITERATURE REVIEW

2.1 Wayang Motion Scene "Perang Kembang"

One of the attractions in shadow puppet shows is the movement or "*sabet*" wayang. What is meant by puppet motion includes, among others: worship, walking, running, dancing, flying, and war. The wayang movement is principled on social status, age, classification, and "*wanda*" puppet characters (Darmoko, 2004). Among the various forms of wayang movement, the most popular of wayang movement is a war scene. And among various types of war, the most popular is the "*sabet*" wayang scene "Perang Kembang". Because of its popularity, this scene was used as a reference in the *Bambangan-Cakil* dance in *wayang wong* performances. Almost all of the movements in the *Bambangan-Cakil* dance were developed or created based on the scene of the "Perang Kembang".

"Perang Kembang" is one scene as part of a puppet show (*pakeliran*). In the eyes of past Javanese people, puppet shows are loaded with cultural symbols. As one of the spectacles, the scene of "Perang Kembang" has extraordinary charm. Because, in this scene there has been a physical conflict between two very contrasting camps, namely a fight between subtle, graceful figures against dynamic and attractive figures. (Isharyanto, 2016). The "Perang Kembang" scene is usually presented in the middle of an all-night show, when the audience has begun to get bored, tired and sleepy. In the past, this war scene could be said to be a flagship scene, which was almost always awaited by most shadow puppet viewers. Perhaps because this war scene is very interesting, where in the tradition of the performance of the Surakarta style is then called the scene of "Perang Kembang". In the context of spectacle, the term "Perang Kembang" can be interpreted as a "*èdèn-èdèn*" (decoration) war, superior war, or prima donna war from an intact puppet show (Isharyanto, 2016).

Wayang movements in war scenes require "big space" (walking, running, kicking, rolling, hitting, entering the earth and into the water, and flying). Puppet movements at the time of war are based on *wewaton* (norm). There are several types of war, namely: "*ampyak* war", a war of a group of soldiers or *ampyak* (together) jointly clearing obstacles or damaged roads; *Perang gagal* or "Failed war", war of two groups of soldiers, one of them strayed; "Perang Kembang", a war between *bambangan* or *ksatria* with *Butho Cakil* or giant which requires

developmental techniques or variations in motion; and "brubuh war", a battle between two groups that went berserk. The norms of motion used in each war are different (Darmoko, 2004). The composition of the war is based on the sequence of events, namely the beginning ("Perang Ampyak" and "Perang gagal"), middle (Perang Kembang) and the end (*brubuh war*).

In the "Perang Kembang", a knight figure who bowed his head (a *bambangan* figure), refined to fight against Cakil, he was calm when he did "*gendiran*" (beating). Before the knight carried out the beating, did "*prapatan*", "*jeblos*" and "*ngantem*". On the motion "*prapatan*", finally Cakil held his head and hair and slammed it to the ground. *Gendiran* is the knocking of a knight against Cakil using a hood, a handle to move the hand made of horn or bamboo). The Cakil movement is "*nggero*" (scary, frightening), "*nyawur*" (throwing sand) and turning upside down (rolling). Whereas the position of knight when facing Cakil is on standby (Isharyanto, 2016).

2.2 Aesthetics of Puppet Motion and the Principles of Motion in Animation

The art of motion or aesthetic motion in a puppet show is often referred to as "*sabetan*". In the art of wayang movement there are rules, norms or "*wewaton*" which are conventions that are adopted and referred to by mastermind artists when moving puppets. One of the conventions of the art of motion in puppet shows is "*Udanagara*". *Udanegara* is a way of speaking, behaving, and behaving in a character in a puppet show, which contains ethics and aesthetics. What is meant by puppet motion includes, among others: worship, walking, running, dancing, flying, and war. Wayang movements are principled or guided by social status, young people (age), classification, and the character of puppet figures. In the art of wayang motion also pay attention to the principle "*wiraga*" (true and precisely action in motion), "*wirasa*" (true and precisely appreciation in motion), and "*wirama*" (true and precisely rhythm in motion) (Darmoko, 2004).

Ismurdyahwati (2007) has carried out research specifically related to "*sabet*" or motion in purwa shadow puppets using the visual language approach. He divided the motion into three different types of motion. Where the various types of puppet movements determine the character type and personality of the puppet characters. Grouped in three important parts: gesture (body language),

transition (one movement to the next movement) and war (war scene). Furthermore, specifically for the war scene, based on the scenario made by the *pedhalangan Habirandha* school, there were thirty-two Yogyakarta puppet-style war movements. Body movements include movements, attacks, throws, stabbing, killing and falling movements, which are common in wars. Movements are grouped in general groupings, namely attacking movements, dodging movements and falling movements, and this applies to all characters or all individuals (Ismurdyahwati, 2007). Her research comprehensively also succeeded in finding 40 types of 'motion language' of shadow puppets, namely the *wayang kulit* visual language in a 'silent' position or embedded in 'the universe of wayang' and found the visual language of *wayang kulit* in a moving position or in the form of "*sabetan*". Whereas in the research conducted by Darmoko (2004) concluded that puppet motion consists of two senses, "broad" (totality of movement of characters) and "narrow" (war); puppet movements are limited by conventions (norms) agreed upon by puppeteer (*udanegara*); the principle of puppet motion refers to social status, age (young-old), classification, and *wanda* of puppet figures; the movement of puppets today has a lot of cultivation, dynamic. The development of the puppet motion is in line with the mindset of an increasingly advanced, critical and dynamic society.

More specifically, the so-called "*sabetan*" (puppet motion) comes from the word "*sabet*", which means a messenger, *sebat*; *disabet* means embellished, insulated, framed; '*Disabeti*' means to be broken; "*Nyabet*" means dropping a card, "doing" shadow puppets; and "*sabet*" in *krama inggil* means sword. Understanding "*sabetan*", *nyabet* that is referred to is "doing" the shadow puppets moving, running, playing the puppet puppets. Puppet movements involve how characters speak, behave, and act in their relationships with other characters. In a puppet movement there is a change or change in the body or a small part of the body of puppets.

Whereas in animation, motion aesthetics in many animations refer to twelve principles of animation developed by Walt Disney Studios in the 1930s. The principles were outlined in detail in the book *The Illusion of Life: Disney Animation* (1981). The twelve principles also helped to transform animation from a novelty into an art form and become the artists' standard for traditional animation. By applying them to their work, these pioneering animators produced many of the earliest animated feature films that are now considered timeless classics such as *Snow White* (1937), *Pinocchio* and

Fantasia (1940), Dumbo (1941) and Bambi (Ghani & Ishak, 2012). Although the principles were developed for traditional hand-drawn animation, they also apply to both two-dimensional (2D) and three dimensional (3D) computer-based animation. John Lasseter (1995) still uses twelve traditional Disney animation principles when making the first feature length 3D computer animation "Toy Story" in 1995 (Lasseter, 1987).

In conjunction with wayang, Ghani and Ishak (2012) in their study concluded that there was a very close relationship between the 12 animated principles of Disney and *wayang kulit*. Even stated that "it is strongly believed that Walt Disney studied and adapted the 12 principles of animation from *wayang kulit*" (Ghani & Ishak, 2012). The twelve principles of animation are: squash and stretch, anticipation, staging, straight ahead action and pose to pose, follow through and overlapping action, Slow in and slow out, arc, secondary action, timing, exaggeration, solid drawing, and appeal (Frank Thomas, 1981).

3 RESEARCH METHODS

This study will use an experimental art approach or art-based research. In the context of art research, art-based research or practice-based research requires the involvement of researchers directly with the object under study (the researcher is involved intensely with the artwork that he is about to create). Intense involvement in the process of creating artwork requires artistic ability and experience as the creator of the work. This position in the view of Carole Gray and Julian Malins (2004) places artists / designers as reflective researchers. (Gray & Malins, 2004). The stages to be carried out in this study include: puppet motion observation of the "Perang Kembang" scene to classify the pattern of puppet motion, followed by exploration and experimentation of digitally animated puppet movements, then applying the results of experimental motion into 2D digital animation.

4 RESULTS AND DISCUSSION

4.1 Classification of Character Movements and Puppet Motion Scenes "Perang Kembang"

The character of the puppet figure (body shape) greatly determines the main movement and character of the character. Apart from body shape also: eye

gaze, how to stand, nose shape, hair style, and equipment attributes that are worn. The types of puppet characters are classified into seven main characters that determine the personal identity of each character (Heru S Sudjarwo, 2010).

- *Alus* or *alusan* (refined, courteous, courteous), who has a whole character (has a personality with a careful and polite attitude) with a marked on the body shape of a standing position with a downward gaze. Examples of these characters are Arjuna, Pandu, Rama, etc.
- *Lanyap*, having a person like loneliness is only more aggressive, with a marked on the body shape of the standing position with the eyes gazing forward. Examples of these characters are Krishna and Karna.
- *Gagah*, or Stout, has a muscular body shape with round eyes (*thelengan*) Examples of such characters include Bima, Gatotkaca, Baladewa, etc.
- *Gusen*, has a muscular body shape and visible gums on its molars. This character is more aggressive and inconsistent. Examples of these characters include Cakil, Durmogati, etc.
- *Danawa*, giants with large and fat bodies, for example Dasamuka, Rahwana, etc.
- *Wanara*, monkeys like Hanoman, Subali, Anila, etc.
- *Dhagelan* or comedian, including Semar, Gareng, Petruk, Bagong, Cangik, Limbuk, etc.

In the wayang both *wayang kulit* and *wayang wong*, the embodiment of the figure of the mosaic is usually "luruh" meaning that it is bent (not looking up) with a slim and small body (*mbambang*). *Bambangan* is a symbol of a handsome-looking knight figure who is all-smooth in everything, including: behaviour, ways of speaking, content of speech, and mindfulness of his character. Knight figures that included mining included Sumantri, Rama, Laksmna, Palasara, Pandu, Arjuna, Abimanyu, Irawan, and Priyambada. *Gagah (gagahan)* puppet figures such as: Gandamana, Salya, Bima, Gathutkaca, Antareja, Kakrasana, and the like are not commonly referred to as *bambangan*, even though they are classified as knights. Apart from *gagahan* figures, related to the "Perang Kembang" or *Bambangan-Cakil*, handsome figures who are small and slim but look up (*lanyapan*) are also not commonly referred to as *bambangan*. So that the warrior figures such as: Karna, Nakula, Sadewa, Truthajumena, Narasoma, Kresna, Wisanggeni, and Samba, for example, are not included in the figures of *Bambangan* because their face features look up.

The figure of bambangan in the "Perang Kembang" in this study is Arjuna who has the character "alusan" or "luruh" who opposes Cakil who is classified as a "gusen" character whose behavior is very attractive. The contrast between the two characters eventually became an attraction in the "Perang Kembang" scene which was adopted into the *Bambangan-Cakil* dance.



Figure 1. The Arjuna figure (left) which is classified as an *alusan/luruh* and Cakil character (right) is classified as a "gusen" character.

Motion analysis in this study was carried out based on the category or classification of motion carried out by Ismoerdijahwati based on the results of his dissertation entitled "The shadow performance of wayang kulit purwa in the study of "motion" visual language (Yogyakarta Style Parta Krama)" in 2007. Ismurdyahwati (2007) classifies the types of puppets in three important parts: gesture (body language), transition (one movement to the next) and war (war scene). Ismoerdijahwati describes the classification of puppet movements in descriptive form. In order to facilitate the analysis of the motion of the "Perang Kembang" scene and the *Cambangan Bambangan* dance, the classification of motion is shown in the table below.

Table 1: Classification of shadow puppet movements.

Movement type	Name of movement
Silence is stuck (Gesture)	<i>Angapurancang, Methenteng, Malang kadhak, Malangkerik, Makidhupuh, Kinkin</i>
<i>Sembah</i> or worship (Gesture)	<i>Sembah ratu, Sembah karna, Sembah jaya, Sembah suwunan, Sembah biasa</i>
Dialogue (Gesture)	Hands moving slowly, hands moving medium, hands moving high and fast
Walk (transition movement)	<i>Lampahan dhodokh</i> , walk slowly/smoothly, walk medium, walk fast/rough

Dancing (Transition Movement)	Turn around, up and down
Flying (transition movement)	Fly high, fly low
Attack and resist attacks (War)	<i>Nyepeng</i> (hold hand), Hold the head, or hands, body (<i>nyikep</i>), <i>Njunjung</i> (lift your opponent into the air), <i>Mbanting</i> (drop hard on the ground), <i>Mbucal</i> (throwing), <i>Mbanting binanting</i> (charging many times), <i>Cangklet cengkah</i> (loud jolt), <i>Nglarak</i> (smashing face into the ground / knee), <i>Ngantem</i> (hitting up hard), <i>Nyaut</i> (freeing the forearm), Clapping (freeing both arms), <i>Nubruk</i> (bumping into opponents), <i>Jeblosan</i> (storming together), <i>Binten</i> (kick with knees), <i>Nendhang</i> (kick melee), <i>Ndugang</i> (kicking high), Accusation war, <i>Nempiling</i> (slapping face), <i>Napuk</i> (slapping face for woman)
Evade (War)	<i>Nangkis</i> (parrying), <i>Endho</i> aside (dodging sideways), <i>Endho</i> backing (dodging backwards), <i>Endho</i> advancing (dodging forward), <i>Nyolot</i> (jumping)
Fall (War)	<i>Jungkir</i> (forward salto), <i>Koprol</i> (back to back), <i>Jlungup</i> (fall to face), <i>Nggeblag</i> (falling backwards)

4.2 Wayang Motion Scene "Perang Kembang"

The analysis of the puppet motion in the war scene begins with analysing the puppet motion, which is divided into three main parts, among others;

- 1) The meeting between Arjuna and the Cakil in the middle of the forest or road, where the Cakil intends to block the road or the goal of the knight, followed by a scene of dialogue mutually challenging between the two.
- 2) The occurrence of a war that began with scenes of *gendiran* or dance to attack each other. This round of war can be divided into three main parts, namely; early war, *tuding* war, and weapons war.
- 3) Climax scene where the Cakil is killed by his own weapon. By using the puppet motion classification as described previously, an analysis of the puppet motion from the beginning to the end is carried out. To clarify the analysis of the motion of the "Perang Kembang", the data from the analysis are tabulated based on the table in the following.

Table 2: Tabulation of puppet movements "Perang Kembang"

Motion of Arjuna	Motion of Cakil
<ul style="list-style-type: none"> - Plugged in, hands danced slowly. - Hands move slowly 	<ul style="list-style-type: none"> - Dance, move right and left, up and down with medium to fast tempo movements.
<ul style="list-style-type: none"> - Silence is stuck with an honest hand position. - Fend off by hitting (<i>ngantem</i>) with one hand. - Arjuna shot off the screen chasing Cakil. - The body turns back in an unfortunate position of the pebble. - Holds Cakil's head, turns back and is knocked into <i>gunungan (njeblos)</i>. - Catch the head from behind and bang it on the ground (<i>njeblos</i>). 	<ul style="list-style-type: none"> - Shot off the screen. - Return to the screen with the sad position of <i>Kadhak</i> and attack Arjuna with a crash. - After that fall backward (<i>nggeblag</i>) at Arjuna. - Move to attack by biting Arjuna's head, kicking (<i>ndugang</i>) hard and <i>ngantem</i>. - Biting Arjuna's neck and back. - Back to bite Arjuna's head and thighs. - Attack with a prophecy - The head fell and the body fell down - Shot off the screen.
<ul style="list-style-type: none"> - Hit with a cover from the front and back with the body position like floating. - <i>Njeblos</i> with accusations - <i>Mbanting</i> right and left - <i>Ndugang</i> hard 	<ul style="list-style-type: none"> - Attacking from the front and back with variations of <i>mubruk, ngantem, nendang</i> and <i>ndugang</i>. - Falling Salto because at Arjuna. - Crawl fast after falling and return to the poor position of the <i>kadhak</i>. - Attacking from the front and back with variations of <i>nubruk, ngantem, nendang</i> and <i>ndugang</i>. - Falling and crawling in pain
<ul style="list-style-type: none"> - Standing with the poor position of the <i>kadhak</i>. - Avoiding aside from the attack of the Cakil keris. - Hold the dagger by hand and push it forward. 	<ul style="list-style-type: none"> - Silence is stuck - Pulling the <i>keris</i> and swiping it in your hand - Turn the <i>keris</i> around - Throw the <i>keris</i> up and be held with the head. - Dancing while walking away from the screen. - Enter the screen quickly while stabbing Arjuna with the <i>keris</i> in the hand. - Repeatedly attack with a dagger with fast movements. - Falling <i>behind (nggeblag)</i> because of Arjuna's encouragement.
<ul style="list-style-type: none"> - Detain and hold 	<ul style="list-style-type: none"> - Do a final stab or attack.

<ul style="list-style-type: none"> - Cakil's hand. - Stab the <i>keris</i> to the Cakil body. - Silence is stuck with an honest position 	<ul style="list-style-type: none"> - Fall with the <i>keris</i> piercing the stomach / chest. - Dying to embrace Arjuna's body - Slowly backward. - Cakil was killed
---	--

4.3 Puppet Motion Experimentation

The experimentation of motion was carried out using adobe animate 2018 software. The step of the motion experiment began with:

- 1) Create a silhouette model of Arjuna's character and Cakil character. To get detailed silhouette character modelling is done in Adobe Illustrator. In Adobe Illustrator the parts of the model are also separated.
- 2) Gives bone to character. This process is quite complex, and the researcher must make several attempts to determine the appropriate connection so that when the character is moved it is easy to control while being based on the motion of the puppet which is more dependent on hand movements. However, in this study bone or armature/rigging vector is not only in the hands of puppets. To produce more animatic motion, joints are also carried out on the head, waist and legs.
- 3) Conduct experiments on various puppet scenes in the "Perang Kembang". This stage is based on observing the video of the scene of the "Perang Kembang" puppeteer by Ki Bayu Aji Pamungkas.
- 4) Make an animation per scene "Perang Kembang" based on a predetermined classification of motion.

The following are pictures that explain the experimental process of transforming the shadow motion of the "Perang Kembang" scene into silhouette animation.



Figure 2. Arjuna and Cakil puppet modeling (source: personal document)



Figure 3. Cutting for puppet joints (source: personal document)

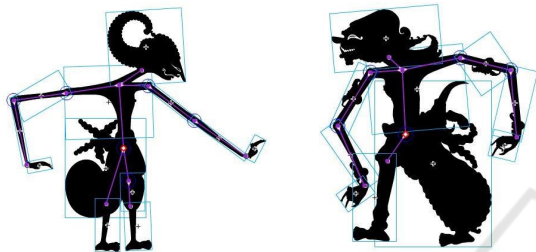


Figure 4. Arjuna and Cakil puppet armature processes (source: personal document)

The following is an example of silhouette animated sequence images based on the shadow motion of the puppet scene "Perang Kembang".



Figure 5. Pre-war dialogue scene (source: personal document)



Figure 6. War scene, Arjuna "Njblos" head of Cakil (source: personal document)

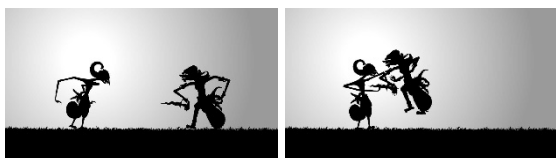


Figure 7. Animated wayang scenes using weapons (source: personal document)

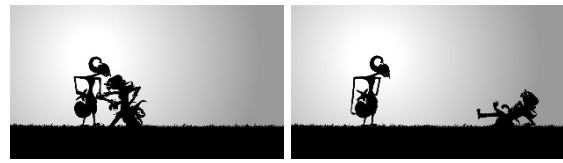


Figure 8. The climax scene, Cakil was killed by his own weapon (source: personal document)

5 CONCLUSION

Based on the experimentation of the animated motion of the "Perang Kembang" scene, it can be concluded that the transformation of motion is very possible in animation even though it is different in medium. The aesthetics of puppet motion must be understood by animators before carrying out motion transformation so that the beauty of puppet motion can be transformed into animation. But animators must also be sensitive to artistic language in animation (12 principles of animation) which is also different from the language of puppet movements even though they are interconnected. Thus the possibility of more animatic movements can be done in animation because of wider and unlimited motion control on the animation medium. The silhouette animation is one of the best choices to be able to carry out the artistic transformation of the shadow puppet scene of the "Perang Kembang".

ACKNOWLEDGEMENTS

This research can be realized due to research grant support from the Ministry of Research, Technology, and Higher Education, Bina Nusantara University in 2018.

REFERENCES

- Darmoko. (2004). Seni Gerak dalam Pertunjukan Wayang. *Makara: Sosial Humaniora*, 83-89.
- Frank Thomas, O. J. (1981). *The Illusion of Life Disney Animation*. New York: Walt Disney Production.
- Furniss, M. (2017). *Animation the Global History*. London: Thames & Hudson.
- Ghani, D. A., & Ishak, S. B. (2012). Relationship Between The Art of Wayang Kulit and Disney's Twelve Principles of Animation.

- Revista de cercetare si interventie social*, vol. 37, pp. 162-179.
- Gray, C., & Malins, j. (2004). *Visualizing Research A Guide to the Research Process in Art and Design* . England.: Ashgate Publishing Limited.
- Heru S Sudjarwo, S. U. (2010). *Rupa dan Karakter Wayang Purwa*. Jakarta: Kaki langit Kencana.
- Isharyanto. (2016, Desember 1). *Perang kembang primadona pagelaran wayang*. Retrieved from <http://isharyanto.wordpress.com>: <http://isharyanto.wordpress.com/2015/06/28/perang-kembang-primadonapagelaran-wayang/>
- Ismurdyahwati. (2007). Kajian Bahasa Rupa Berdasar Rekaman Video Pergelaran Wayang Kulit Purwa dalam Lakon 'Parta Krama'. , Vol 1D, Bandung: ITB. *Jurnal Wimba*, Vol 1D.
- Khia K.K, C. Y. (2009). A Study on the Visual Styles of Wayang Kulit Kelantan and Its Capturing Method. *Sixth International Conference on Computer Graphics, Imaging and Visualization. IEEE Journal*.
- Koendoro, D. (1998, February 6 - 12). Menghimpun Karya Animasi Indonesia. *Pekan Komik dan Animasi Nasional 98*, p. 27.
- Lasseter, J. (1987). Principles of Traditional Animation Applied to 3D Computer Animation. *SIGGRAPH Computer Graphics*, (pp. 35- 44).
- Prakosa, G. (2004). *Film Animasi Indonesia pada Masa Reformasi*. Yogyakarta: Fakultas Sastra UGM.
- Shushkov, A. (Director). (2010). *Invention of Love* [Motion Picture].