THE ART OF SHADOW PLAY : KEY FRAME ANIMATION FOR WAYANG
KULIT KELANTAN

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DECLARATION

I hereby declare that this thesis is my own work and effort and that it has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged.

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ABSTRAK

Seni Wayang Kulit merupakan salah satu keunikan dalam seni persembahan teater di Malaysia. Dalam usaha untuk memelihara dan mengekalkan keunikan khazanah warisan Wayang Kulit, UNESCO telah menetapkan Wayang Kulit sebagai nilai khazanah warisan seni kemanusiaan pada 7hb Oktober 2003. Namun, realitinya Wayang Kulit pada hari ini berada dalam keadaan kritikal dan semakin dilupakan khususnya di Malaysia. Justeru, kajian ini memperkenalkan satu kaedah animasi komputer 3D bagi menghasilkan Wayang Kulit khususnya Wayang Kulit Kelantan. Objektif kajian ini adalah bagi menerokai seni asas tradisional Wayang Kulit serta kaedah penggabungan menerusi teknik 'Key frame' komputer menerusi sejarah dan fakta Wayang Kulit. Selain itu, objektif kajian ini juga turut menilai tahap 'expressitivity' iaitu ciri-ciri atau permerhatian seni berdasarkan penghasilan Wayang Kulit animasi komputer 3D khususnya pada kumpulan sasar yang dibahagikan kepada dua iaitu pakar dan sebaliknya. Terdapat beberapa elemen utama yang akan dikaji dalam penyelidikan ini termasuklah rekabentuk patung, cahaya dan bayang, pergerakan atau animasi dan penceritaan (audio). Kajian ini menerusi pembangunan Wayang Kulit animasi 3D ini telah berjaya menemui beberapa aspek penting termasuklah peranan animasi 3D sebagai teknik serta media alternatif bagi memberi satu dimensi baru dalam dunia seni Wayang Kulit, penemuan ciri-ciri seni estetika atau "expressitivity" terutama pada rekabentuk patung serta pergerakan animasi Wayang Kulit 3D, serta penemuan secara "hypothesis" berkenaan hubungan 12 prinsip animasi Walt Disney didalam seni Wayang Kulit.

THE ART OF SHADOW PLAY: KEY FRAME ANIMATION FOR WAYANG KULIT KELANTAN

ABSTRACT

The art of shadow play or puppetry has evolved as a unique form of theatre in Malaysia. In an effort to preserve and safeguard the unique heritage of Wayang Kulit (Shadow Play), UNESCO has designated it as a Masterpiece of Oral and Intangible Heritage of Humanity on 7th November 2003. The reality is, Wayang Kulit is currently threatened with imminent extinction in Malaysia. This research describes a method of 3D computer animation technique to develop Wayang Kulit mainly focusing on Wayang Kulit Kelantan. The research objectives comprise of exploring traditional visual arts in Wayang Kulit and emerging computer technologies related to key frame animation through historical and theoretical inquiries as well as focus groups. Also, the objective of the research is to evaluate the expressitivity of a 3D animation prototype by using expert and non-expert focus groups. There are several main components between traditional and computer animation of Wayang Kulit studies that this research will focus on the research objectives including puppet design, light and shadow, animation narrative and audio . Moreover, the prototype versions of 3D Wayang Kulit animation are also being developed. This research through the development of Wayang Kulit 3D animation were able to contribute several aspects including describing the role of 3D animation as a technique and alternative media, as well as new dimension arts for Wayang Kulit. Subsequently, discovering several aetshethics or expressitivity related to design and movement of the puppets and finally, a hyphothesis finding related to the relationship of Disney's twelve principles of animation in Wayang Kulit visual arts.

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CHAPTER I

INTRODUCTION

1.1 BACKGROUND

Puppet shows are a popular form of entertainment all over the world. According to Cariad Astles(2009), puppetry represent an ancient art, a aide memoire of age lengthy past. Puppetry is a medium for contemporary artists to experiment with shapes, colours and movements. In Malay society, people living in rural areas practise traditional values in their daily lives. Up until the mid-20th century, traditional arts flourished in these areas (Patricia Matusky, 1997). Now, puppetry is undergoing a tremendous revitalization as medium of activities for both adults and children as it is used more commonly in education and entertainment. The inclusion of puppetry encourages children to give their imagination free rein to enact and come to terms with everyday experiences. This plays a considerably big role in nurturing their emotional satisfaction and social development. In an effort to safeguard the unique masterpiece of shadow puppets or *Wayang Kulit* performing arts (Shadow Play), UNESCO has specially selected it as a Masterpiece of Oral and Intangible Heritage of Humanity on 7th November 2003, where currently Wayang Kulit is threatened with imminent extinction in Malaysia.

Shadow puppetry or Wayang Kulit is one of the main prehistoric forms of traditional theatre and it is originated from Malaysia, Indonesia, Thailand, Cambodia, India and Turkey. The origin of Wayang Kulit (shadow puppetry) has been mentioned frequently in many sources. The Wayang Kulit itself is believed to refer to Ramayana and Mahabharata, the two great Hindu epics which form the core of the shadow play's repertoire. The Malay word *'Wayang'* refers to a shadow that is moving (Ainu Sham Ramli, 1994). Wayang also denotes a number of concepts including the representation of a person and puppet, more specifically a shadow puppet. It constitutes a performing arts theatre that uses light and shadow. Puppet theatre has given the audience a variety of aesthetics and stylish purposes, and the puppeteer and the puppets are perceived as the main focal point or attention (Cariad Astles, 2009).

Wayang Kulit is usually given life through the deft manipulation and vocalisation of the *Dalang* or puppeteer (Nassaruddin Ghouse, 2002). Puppets in Wayang Kulit are typically representations of human characters and the physical world. Each component structure of puppet design has semiotics or symbolic meaning. The articulated shape or sizes of a puppet's physical or facial appearance including eyes and nose symbolize such qualities as dignity, supremacy, simplicity, persistence, force, loyalty, hilarity or perception. Wayang Kulit or shadow puppetry in Malaysia is among the first traditional Malay dramas which is believed to have started in the 13th or 14th century (Mana Sikana, 2006).

In Malaysia today, Wayang Kulit Kelantan or Siam is the most popular version performed. Unfortunately, it is slowly starting to be forgotten. In fact, Wayang Kulit is currently facing the threat of disappearing due to the globalisation or digital technology age, which provides a significant impact on performing arts. Even the number of Dalangs has slowly decreased (Amin Sweeney, 1972). Despite the fact that Dalangs are virtuosos (able to narrate and recite complex verses that breathe life into the filigree puppets), it seems that the younger generation is not interested in pursuing the field. At one point, according to Amin Sweeney (1972), the number of Dalangs in Kelantan was more than300 in 1960. However, this number was later reduced between 37 in 1982 and 11 in 1999. The arrival of television further damaged the popularity of Wayang Kulit. In an interview with Pak Hamzah, a famous Malaysian classical Wayang Kulit Kelantan performer, he described on how watching Wayang Kulit performances used to be a popular pastime back when television and entertainment programs were not fully integrated (Rashid Bakar, 1988).

The situation worsened in 1991 when Wayang Kulit performances in Kelantan were banned by Parti Se-Islam Malaysia (PAS) as elements of the theatre is totally opposed to Islamic teachings. For example, according to Suriyati Hamzah(2007) from an article written by Md. Nor Yousoff in 1977 who described that the prohibition was involving the practices carried out during the "*Upacara Buka Panggung*" or *Opening Ceremony* where charms and incantations praising the deities of Hindu will be recited. Also, some offerings will be performed for the deities to ensure protection from the evil spirits and smooth running of Wayang Kulit performances.

Similarly, according to the statements made by the experienced Tok Dalang Seri Neng Buah during the interview session with the author in August 2010, who stated that Dalangs or puppeteers are having a difficult time dealing with urban society stories in the context of globalisation. The earlier Wayang Kulit performances were based on Ramayana and Mahabharata with husky and stylish narration in the Kelantanese dialect that mesmerised audience for hours.

According to Fahami Ali (1991), audiences in urban areas today are more familiar with modern elements including music, visuals, technology and lifestyle. He added that introducing these elements in the narrative and implementing the English language in the narration could attract the younger generation and ensure the survival of Wayang Kulit in this new era. Thus, the problems faced in Wayang Kulit should not only be viewed from the perspective of the Dalangs, but also as a collective issue in order to find ways to rejuvenate its culture and traditions. According to Marina Mahathir (1991), traditions such as Wayang Kulit should not have to die out in order for new ones to emerge. It would be difficult to create a new medium if there is no reference point. Wayang Kulit in the era of globalisation is in need of new features that would allow it to be digitalised and watched on computer or even cinematic screens. As noted by Khor and Yuen (2009), Gotot Prakosa, Indonesia's well known experimental filmmaker acknowledge that many international successful animator experts such as Walt Disney and Lotte Reiniger were highly influenced by shadow puppetry.

Hassan Muthalib et al. (2003) define the first example experiment or concept of animation in the world is Wayang Kulit. In fact, Wayang Kulit can be perceived as the derivation of artistic visual (illusion of movement), as it is said that Walt Disney learned about Wayang Kulit by observing shadow motions before he began creating animations.

According to S. Valtonlina and S. Franzoni (2005), the use of computer graphic imagery (CGI) through 3D computer modeling and animation is the first step in the production pipeline, especially if the goal is to reconstruct a 3D model building that performs a particular social function such as a house of worship or a puppet theatre. The scope of this project will focus on the prototype development of Wayang Kulit performances using 3D animation transformed into digital entertainment.

Ghulam Sarwar (2004), Che Mohd Nasir Yusoff (better known as Dalang Pak Nasir) stated during an interview at the National Arts & Heritage Academy (ASWARA) in 2010 that the preservation of Wayang Kulit focuses more on theoretical studies or music rather than the visualisation of the art itself. Furthermore, not enough digitisation work has been done to promote such visualisation (Khor &Yuen, p.3) In line with this, the development of a digital Wayang Kulit prototype using 3D animation is necessary to promote visualisation as a cultural identity in performing arts. Should Wayang Kulit vanish one day, our new or future audience would still be able to view this conventional art masterpiece being presented in an alternative media (animation), thus helping to preserve it as a national heritage, especially for the younger generation.

1.2   Problem Statement

Wayang Kulit in Malaysia is now facing the threat of becoming obsolete (Khor & Yuen, 2009).   The current scenario and level of encouraging support that Wayang Kulit is negative and doubtful to survive without some types of sturdy support such as from non government organizations , the government or private sectors (Ghulam Sarwar, 2006).

Several factors that contribute to this slow death have been determined based on interviews and theoretical research conducted (Ghulam Sarwar et al., 2010) and (Abdullah et al., 2004).

i)   No interest among the youth and urban society

ii)   Misunderstanding among Muslims

iii)   Lack of promotion and financial support

iv)   Lack of innovation / creativity

Che Isa Samad (2010), a well-known Wayang Kulit craftsman and traditional musician, believes that Wayang Kulit suffers from lack of support and appreciation among the younger generation. Youths today prefer to watch movies at cinemas, surf the Internet or buy high-tech electronic gadgets such as mobile phones rather than spend time watching shadow play entertainment which is ironically free of charge.

Portable (mobile) phone usages are widely embraced by Malaysians, particularly youths. Digital mobile communication phones come together with types or features that facilitate more advanced forms of communication and entertainment such as Multimedia Messaging (MMS), Internet, video interactive games, and YouTube (Sheereen et al., 2009).

Youths often describe that having a mobile phone is necessary component of their lives. Therefore, they can be categorized or known as 'Digital Natives' individuals obviously attracted or fascinated with digital sophisticated gadgets (Abdul et al,. 2004). According to Ito and Okabe (2004), youths today having their own mobile phone are not primarily as a tool for communication but also as a way to express their own identity. As noted by Ling (2001), there is a desire among youths to maintain a hip and cool lifestyle. This means that it would be difficult for them to appreciate something as traditional as Wayang Kulit when most of their time and money are spent on gadgets.

Youths and urbanites in particular have no interest in watching Wayang Kulit even with the atheistic values, moral and entertainment it contains. The ability to adapt to a new environment such as the city and be consumed with its way of life has also contributed to the lack of interest among youths when it comes to puppet theatre (Zulkifli, 2009).

According to P. Atiyyahnatasya (2009) and Che Isa et al. (2010), from the youths' point of view, watching Wayang Kulit is a waste of time because it is outdated, lacks showmanship, repeats the same repertoire over and over again and employs stereotypical music. The use of dialect in Wayang Kulit is also difficult to understand and many youths feel that there are too many elements of ancient history involved. Furthermore, youths feel that Wayang Kulit lacks new creative features and values. In a *Dewan Budaya* article, Pak Majid, a famous puppeteer, agreed that today's generation is more interested in going to the cinema, watching television, surfing the Internet or playing mobile video games that promise attractive visual and audio effects (Yusoff Ariffin, 2006).

The issue of misunderstandings related to religion, especially among Muslims, is another factor that has contributed to the near-demise of Wayang Kulit. This is because Wayang Kulit contains Hindu, Buddhist and animistic influences which are deemed unIslamic. For example, the character designs in the original Wayang Kulit are influenced by Ramayana and Mahabharata in the form of superstitious offerings, characters and more. According to Sulaiman Jaafar (2006), even the state government of Kelantan has defended its policy to ban Malay folk traditions such as Mak Yong, Menora and Wayang Kulit in 1991 due to its conflict over the Islamic point of view.

The extent of the ban included the prohibition of allowing women to participate in various performances according to the Halal-Haram and Aurat regulations in Islam (Zulkifli, 2009). In an interview with Ghulam Sarwar (2011) at the International Islamic University, he explained that Dalangs believe that the performances, rituals during performances (opening and closing the theatre) and symbols or objects (*kain kuning*, *Pohon Beringin*, *decorative puppets*) used in Wayang Kulit are very important to obtain the spirits' permission lest something uninvited should happen. The late Dalang Pak Hamzah did not say more than the fact that certain spirit-invoking rituals preceded performances (Jampi, Opening and Closing theatre ceremony) to protect both the performers and audience from evil spirits (S.P Lee, 1986).

According to Abdullah (1984) in his article The Malay Philosophy Cosmology Symbol in Wayang Kulit, explained that each element or symbol used in Wayang Kulit represents a direct recantation or metaphysic connection to God. Of course, these practices are misleading and do not represent the teachings of Islam in any way. They are known as *Syirik*. Islam states that humans have direct contact only with Allah (Subanhu Wata'la). In addition, the lack of promotional activities for Wayang Kulit in Malaysia has left a negative impact on the domestic performing arts scene. We rarely hear of any promotion in the mass media be it television, radio, Internet, etc. regarding Wayang Kulit performances. For example, the Cultural Theatre (Istana Budaya) only featured Wayang Kulit in their radio promotions, banners and newspaper advertisements once or twice in the year 2010.

The Ministry of Arts, Culture and Heritage is planning to build an Arts Centre in Kelantan valued at RM15 million. The centre is expected to be completed within one and a half years with provisions already included in the 9th Malaysian Plan (Maslan & Rizal, 2010).

The question is how many Wayang Kulit performances can people expect to watch in a year including the number of Wayang Kulit performances be equal with the number of local films produced each year. According to Istana Budaya's website, it did not hold any Wayang Kulit performances in 2010 and 2011. The last performance was held in 2007 where six Wayang Kulit Siam and Kedah shows were performed. Therefore, it has been almost five years since Wayang Kulit was performed at Istana Budaya. Is Wayang Kulit losing its touch compared to the films or musical theatres that are often shown at Istana Budaya due to budget or religious constraints.

Dalang Seri Neng Buah stated that Wayang Kulit was gazetted in the Malaysian Parliament in 2005 under the National Heritage Act 2005 (Meri Anad, 2011). It is vital to promote Wayang Kulit activities more actively as the mindset of today's society depends on a fast-paced and technological lifestyle. Thus, traditional performances such as Wayang Kulit need to stay in line with this scenario in order to survive. The Academy of Arts and Heritage (ASWARA) is the country's sole public institution of higher learning that offers formal training in performing arts (Rohana Mustaffa, 2010).

Unfortunately, NGOs and those from the corporate sectors prefer to invest more money in promotional or incentive-driven activities for sports, music, entertainment and other events without taking into consideration that the status of Wayang Kulit as a form of cultural entertainment is being threatened.

For example, millions of ringgit were spent by Standard Chartered Malaysia in order to bring English Premier League (EPL) Football to Kuala Lumpur and organized a gala dinner for EPL Football Masters Players 2011 were able to gather RM30,700 from public sale off EPL sports memorabilia for Standard Chartered's 'Seeing is Believing' charity program (Fazleena Aziz, 2011). The question at hand is why these entities are reluctant to contribute towards the development, charity and promotional activities for local performing arts like Wayang Kulit.

There is a need for Wayang Kulit to have a fresh approach in terms of character design, storyline, venue, music and media among others. According to Ghulam Sarwar (2009), Malaysian shadow play puppetry has suffered a decline due to several factors related to the economy, politics and culture. A few troupes are left and those that remain are struggling to find new ways of adapting to the changing circumstances. The virtual world would not be able to replace the pure or original knowledge of performing with real puppets and real life audiences, but innovative potential techniques(medium) may perhaps occur from worldwide availability and from cultural and society(intercultural) interactions of local content through puppet entertainment (Wahju et al., 2008).

The Minister of Culture, Information and Communication, Dr. Rais Yatim during his visit to ASWARA in February 2010, urged the institution to advance animation as a new field to promote local cultural heritage arts. Rohana Mustafa (2010) explained that "we should not neglect our artistes, our cultural activists and those related to become excellent writers, transforming our dances, our music in a way that others are amazed that a small institution like ASWARA could advance towards excellence."

The identity of culture plays a vital role in the development of a society and country. Performing arts such as Wayang Kulit should not be forgotten, especially by today's generation, due to their aesthetic and artistic wealth which has created a metamorphosis between history and modern society. Institutions such as ASWARA may help to preserve this art through formal education and also by producing quality performers within the field to promote traditional arts at the local and international level.

1.3   RESEARCH OBJECTIVES

This research focuses on the study and development of 3D animation of Wayang Kulit entertainment where several objectives have been identified:

i)   To explore the traditional visual arts in Wayang Kulit and emerging computer technologies related to key frame animation through historical and theoretical inquiries as well as focus groups.

ii)   To design a 3D computer animation Wayang Kulit animation prototype (demo).

iii)   To evaluate the expressivity of a 3D animation prototype by using expert and non-expert focus groups.

iv)   To identify the existence of Disney's 12 principles of animation in Wayang Kulit traditional styles

1.4   RESEARCH QUESTIONS

This research questions were mainly design based on research objectives from the aspects of historical and theoretical, 3D key frame animation, and expressitivity. This include questions related to visual arts, key framing, Disney's Twelve Principles cinematic in Wayang Kulit.

A. **Research Question (RQ) Related to Research Objectives 1** - (historical and theoretical inquiries):

RQ 1: How does traditional visual arts information based on historical and theoretical inquiries facilitate the development of an animated Wayang Kulit prototype?

RQ 1: What is the significance of key framing and other animation techniques?

B. **Research Question Related to Research Objective 2-** (Design Wayang Kulit 3D Animation):

RQ 2: What are the most effective animation design tools that can be used to create and sustain an animated Wayang Kulit prototype?

RQ 2: Can 3D animation demonstrate the same visual style qualities as traditional Wayang Kulit?

C. **Research Question Related to Research Objective 3 -** (expressivity modeling and animation) **:**

RQ 3 : Is the expressivity of hand movements in 3D puppets similar in style to traditional Wayang Kulit puppets?

RQ 3: Does photorealistic visualisation demonstrate the same qualities (3D texture, lighting or cinematography) as traditional Wayang Kulit?

Research Question Related to Research Objective 4:

RQ 4: Does Wayang Kulit have Disney's 12 Principles of Animation?

1.5   RESEARCH SCOPE

Before commencing the development of a 3D computer animation Wayang Kulit visualization prototype, a study on the background or history of the tradition will be conducted in the Klang Valley and Kelantan. This includes the influence of Wayang Kulit, types of Wayang Kulit and its current status in the entertainment industry. The research will focus on details of the Wayang Kulit components that make it so fascinating. This includes a study of Dalangs or puppeteers, puppet character designs, animated shadows, cinematography, narrative and music. Related literature on Wayang Kulit theatre elements and past research attempts to digitised Wayang Kulit will also be looked into.

1.6 THESIS ORGANISATION

This thesis consists of seven chapters:

CHAPTER I: This chapter provides an introduction to the definition and history of Wayang Kulit in Malaysia as well as its current status.

CHAPTER II: This chapter highlights the literature related to Wayang Kulit as well as Computer Graphics Imagery (CGI) and 3D animation encompassing the puppet environment and 3D animation fundamentals. This includes its history, puppeteers, repertoire or storytelling, puppet design, movement and ritual practices. Next, 3D animation background and related work to digital puppetry are discussed. Samples of research related to the digitalisation or animation of Wayang Kulit are also explained in this chapter.

CHAPTER III: This chapter focuses on three (3) components in order to achieve the objective of this research: i) preparing the questionnaire; ii) developing the model for the 3D visualisation; and iii) developing and testing of the animated Wayang Kulit prototype. The questionnaire will be administered to expert and non-expert focus groups. The prototype or 3D demo will be the main reference point for the questionnaire and the results produced.

CHAPTER IV: This chapter defines the development process of the model in the 3D computer animation prototype. Each component, especially the process flow required to complete the animation is elaborated from pre-production up to post production. Pre-production work includes conceptualising ideas, scripts, sketches, storyboards and puppet character design. The production will focus on animation software ranging from 3D modeling, rendering, rigging and animating to lighting and texturing the puppets. Lastly, post-productions will focus on the editing process including music and voice-over recording. This is to give a clear understanding of the development process of a 3D computer animation of shadow puppet animation.

CHAPTER V: This chapter explains the findings of the process of producing a 3D animated Wayang Kulit prototype as well as the feedback from questionnaires distributed to the focus group which includes experts and non-experts (performing arts and animation practioners).   The qualitative data will be analysed and discussed. The results will indicate the focus group respondents' expressitivity and perceptions regarding the components of computer animated and traditional shadow puppets or Wayang Kulit.

CHAPTER VI: This chapter will discuss on the issues raised in the problem statement as well as answering all the research questions outlined in Chapter I. Key elements and findings yielded in the research will also be discussed.

CHAPTER VII: This chapter will summarize the main points of the research by clearly relating the objectives and results of the research. It will also discuss on implications of the findings and limitation of the research.

CHAPTER II

THE ART OF PUPPETRY

2.1   INTRODUCTION

Wayang Kulit or shadow theatre is one of the most ancient forms of all traditional theatres and it is found in Malaysia (Nasuruddin, p.1). The puppeteer has its own identity in presenting to the public a unique form of entertainment. When artificial objects speak such as puppets, the presence of breath is intimated and an illusion of life should be more or less guaranteed (Ian Grant, 2005). With the current advanced technology, there is an opportunity for the traditional shadow play puppet to move forward by the creation of digital puppetry through the use of computer animation. Studies on 2-dimensional (2D) animation related to shadow puppets have been done on multimedia such as interactive comics, game, and animation. Therefore, this is an extension study to develop a 3-Dimensional (3D) Wayang Kulit or shadow puppet animation.

The puppetry are symbols of manipulation between inanimate figure(objects) and human perception that has existed and are well known icon of cultural motifs during ancient civilization (Foshan, 1983). Communication between the puppeteer and the audiences by means of puppets which express stories, narration and music that provide entertainment to the audience. Unfortunately, in Malaysia, Wayang Kulit Kelantan or shadow puppets is now slowly facing extinction.

In order to preserve these performing arts from going into extinction , the author will develop a 3D visualization animation prototype for the digital puppetry shadow play. This will be a positive start for other researchers or film producers to be involved in digital puppetry as part of promoting this heritage to the local community as well as tourists. The researcher intend to explore how the current technologies of computer graphics or CGI based on 3D modeling and animation are applied in the creation of digital shadow play puppet and make comparison between the traditional method and computer graphics (CG) method.

2.2   Shadow Play Puppet (The Beginning)

This section will cover the background aspect of shadow play puppet where the focus will be on the overview and related work referring to :   i) Background of shadow play puppet; ii) Types of shadow play puppet;   iii) Influences of Wayang Kulit in animation and multimedia, and iv) Impact of shadow play entertainment. It is hoped that with the new media facility being used as an alternative platform to present our oldest performing art in Malaysia (wayang kulit) into the current and future generation entertainment viewing, it will help to preserve this heritage from facing extinction.

2.2.1   Background of Shadow Play Puppet

The Spread of the Shadow Play

Figure 2.1   The Spread of Shadow Play Puppet From Asia to Europe

Based on many accounts, the shadow play appears to have been one of the earliest forms of entertainment known to mankind. The shadow play puppet record shows that it has existed and spread from eastern countries such as Thailand, Malaysia, China, India and Europe including Turkey (Refer to Figure 2.1) Shadow play requires a combination of light, casting a shadow on a surface when a figure is held in front of it to initiate the figure into an art of momentous significance in the history of mankind (Jayadeva, 1999). Researchers in general acknowledge the existence or beginnings of shadow puppetry are mainly from Asia including Indonesia, India or China(Fan, 2003).

Puppets were used in the early process of communication where their shadows function as visual communication iconography forms representing animals and human. For example, Plato's Republic as manifestation between hidden operators and the prisoners in front of a fire portraying the effigy of darkness and echo voices. Soren Kierkegaard, a Danish philosopher, described shadow puppetry or *Schattenspiel* as an illusion of art substance which the audience or individual can feel the mood or aura, phony environment and unique shapes of objects communicating within themselves.[1] Shadow play performances around the world are simply astonishing that indirectly has its own identity and philosophy based on each country it represented. Thus, we will look into the visual approach from various countries related to shadow play puppetry.

2.2.2 China

In China, shadow play puppetry is an ancient art form of entertainment that are performed at night markets and villages, where merchants, and also travelers would gather to witness the performances by the puppeteer which is based on myths, folklore, and religious tales (Kyle & Susan,2002). Chinese Shadow play began with silhouette shadows portraying The Emperor Wu during the Han Dynasty portraying the people and kingdom as a fundamental element in their daily life. The technique for Chinese shadow puppetry is using torches and curtains to visualize the shadow figure motions which creates depth and illusion for the audience and is considered as adequate related to origins shadow play theatre. Classic Chinese Magician has the power to summon spirits, by performing light effects from torches through curtains laid around with offerings such as wine, meat, and fruits.

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[1] Kenneth Gross, 2011, An Essay on Uncanny Life, Chicago Press, London pp: 126-127

For example, Emperor Han Wu Ti (121 BC) witnessed his late wife, Lady Li, circling around the curtain observing each shadow and persona movement that was able to mesmerize the emperor himself. Even though Emperor Wu was unable to feel her with the emotions at that time, he was able to create poems as an expression of his sadness upon her departure. Piying Xi is one of the most famous shadow play theatres in China. Chinese shadow plays are not only meant for the masses and dignitaries but also as a sign of worship and appreciation to their creators (gods). The conflict between modern and traditional Chinese culture has slightly ended the beauty and aesthetics appearance of Asian Theatre (Fan, 1999). For example, the Temple of Guanyin or Guanyin Tang is slowly losing its popularity among the Chinese society due to modernization. The shadow play through its combination of artistic values of design, detailed carving and a variety of music melodies were capable of creating unity and harmony for the people from different socio lifestyle.

Figure 2.2 The Opening scene of The Temple of Guanyin

The entire "The Temple of Guanyin"(Refer to Figure 2.2) is a Chinese shadow play performance that hinges on the puppeteer (puppet-maker, shaman, craftsman and musician) who manipulates the puppets using iconography visual forms of puppets such as animals, men, women, demons, and gods (Refer to Figure 2.3). The shadow play is performed based on the story structure for the audience to get pleasure with moral values from the entertainment.

Therefore, the significance of the Chinese puppet theatre has truly given a clear perspective that this kind of entertainment has a lot of influence towards the culture and society among the Chinese community and also as manifestation related to political issues, war, economic and social issues with the audience through shadow play entertainment.

Figure 2.3 Costumes of human and animal's iconography in Chinese puppetry

2.2.3 India

India can be described as a country that appreciates the passion of classical art and music or known as *sangeet*. The advent of Indian cultural shadow play performances has existed since the first millennium B.C[2]. The influence of Hinduism and animism in Malaysia performing theater has been assimilated into the local performances such as Mak Yong and Wayang Kulit. The well known Indian classical epic shadow puppets repertoire, *Ramayana* and *Mahabharata,* has been the main source of dramatic entertainment. The stories of Kingship, love and divine status are the focal point in these classical epic and visual puppet designs of Indian shadow play and are defined as unique.

The vivid colored translucent puppets figures consist of small and large sizes which are commonly found in Karnataka, Andhra Pardesh, South Tamil Nadu, and South Maharashtra of India (Refer to Figure 2.4). For example, in the area of Karnataka, the puppeteer uses small figures (about two to four feet tall) in order to move the puppet more easily. Also, the Andhra shadow puppets for example, are designed with intricate designs and textures with vivid color scheme suitable for the puppeteer to handle its articulation movement (Jayadeva Tilakasari, 1999). Different sizes and designs of puppets are needed as an identical visual form to communicate various epic stories for the audience to be able to differentiate protagonist and antagonist characters, genre, conflicts, and also music rhythm that brings out the excitement within shadow play performances.

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[2] Fang Pan Shen, a researcher on puppetry did studies on the shadow play existence around the world.

Most of Malaysian shadow puppet show starts with the puppeteer placing the protagonist (good) characters on the right and antagonist (bad) characters at the left corner of the 'Kelir' or white blank screen.

Figure 2.4 Large puppet figure known as 10 heads Ravana (Tanjore) in Maharashtra, India.

2.2.4 Indonesia

Southeast Asia Shadow Play puppetries particularly in Indonesia are very significant and ubiquitous within culture, ritual and entertainment (Dowsey, 2002). The shadow play artistic concept and metaphor are detailed with a complex articulation especially in the puppet craft though some art values are believed to be influenced from India.

According to Brandon (1996), the Indonesian visual styles in particular with shadow play can be considered as unique and specific , unique and refined impressive structure of theatritical performances. The word "Wayang" or "Wajang" which means shadows are the manifestation used by the Kingdom of East Java people to alleviate grieve by viewing shadow play theatre. Prior to that, "Wayang Beber" was one of the earliest theaters with non screen or display, only one storyteller who unrolled various long scrolls while narrating the story to an audience (Reid, 1988). In Indonesia, there are two types of common and well known shadow play which consist of Javanese and Balinese style. The Javanese visual styles are more attractive, with longer duration and more detailed puppet designs compared to the Balinese type.

The Indonesian artistic visual and aesthetics content of puppet characters, narration, and music styles in shadow play performances are the notion of soul for the people to have the benefit of it even though the performances last for several long hours. For example, in 2007 University of Hawaii conducted a production shadow theatre known as The *Tempest*, in the form of a Balinese shadow play performance that has attracted a large crowd (Jessica, 2007). According to Hobart (1987), night long performances are given auspicious circumstances to promote good fortunes for the entire village, and also serve as a form of entertainment.

Moreover, several puppet plays in Indonesia including *Wayang Wong* or *Wayang Orang*, are similar to the approach and styles in the Japanese *Buranku* puppet play, involving mask, dancing, talking, and singing with Mahabharata stories. According to Iyer(1968), the puppets characters motion in Indonesia defines several meaning including puppets right handed(side) is applicable for protagonist(noble) characters whereas the antagonist(evil) characters appearance are mostly on the left side, which is believed to be adapted from South India shadow puppetry visual art.

2.2.5   Thailand

The Thai shadow play theatre styles *Nang Talung and Nang Yai* are regarded as a classical culture theatre among Thai village people which is related to traditional dance, related arts, religious and ceremonial occasions (Shephard,1968). Nang Talung (Refer to Figure 2.5) is one of the most prominent classical traditional folk theatres in Southern Thailand originated from King Rama V reign (1868-1900). Nang Yai also known as large puppet uses *Ramakien* Thai stories similar to the Ramayana in Indian epic. According to Suchart Subsin, a 73 year old Nang Talung Puppeteer, performing Nang Talung to the people is regarded as a satisfaction and gratitude in the context of socio-lifestyle. Nang Talung allows communication and connection between the government and the people (Nualmorakot Taweethong, 2010). With Suchart's mastery and skill in this artistic art, it has given him the opportunity to perform for the King of Thailand and also international audiences such as Germany, Holland, India and Japan. Since this art is also facing extinction, Suchart built Nang Talung gallery to preserve this art from dying among the young generations.

His philosophy "shadow is a movement; puppet is a design of artistic features" has given him the courage and motivation to continue the survival of Nang Talung. In general, the Thai Nang Talung shadow puppet can be described as an archetype to Wayang Kulit structure even though both have different visual styles elements. Finally, Nang Talung is an art and a form of expression to communicate and entertain the people through expression, opinions, and experiences.

Figure 2.5 Famous Nang Talung Puppet show in Thailand

2.2.6   Malaysia

As mentioned earlier, the concept of Malaysian shadow play visual style are assimilated with animism, Hindu/Buddhist, Islamic/middle eastern and Javanese essence. Since Asian countries such as India, China, Thailand and Indonesia were the early pioneers in shadow play entertainment, Malaysian shadow play has slowly adopted their aura. From visual appearances to spiritual philosophy of shadow play, slowly the Malaysian Wayang Kulit was introduced.

Wayang is define as theatre and *Kulit* means hide or leather refers to the puppet and other materials used throughout the production of this performing arts. Each object in Wayang Kulit such as human (puppeteer), stage (panggung), screen (Kelir), puppets (patung) represents the semiotics in Wayang Kulit entertainment. According to Jan Mrazek (2005), the most important object representation of the shadow play or wayang theatre is human being. The visual arts of Malaysian shadow play theatre are always filled with lights and shadow (Hamzah Awang Mat, 1994). The Malay communities in the rural areas are sensitive and protective of their identity and cultural values. Furthermore, Islamic belief and practices also have influence on the flourish of Malay traditional theatre. The resemblance of Thailand and Indonesia visual arts shadow play theatres are reasons to the designs of shadow play in Malaysia (Ghouse Nasuruddin, 2009).

Basically, there are four types of shadow play which is popular in Malaysia (Refer to Figure 2.5) which consist of Wayang Purwa (developed in Java and performed only in Johor), Wayang Gedek (active in Kedah and Perlis), *Wayang Melayu,* and *Wayang Kelantan* or sometimes known as *Wayang Siam* (found in Kelantan and Terengganu) . Each type and concept of a shadow play is often described as pure legibility and provides direct access between human emotions with melodrama genres (Alice Maurice, 1922). It is the notion that wayang kulit unites the people from different culture and socio-background through entertainment.
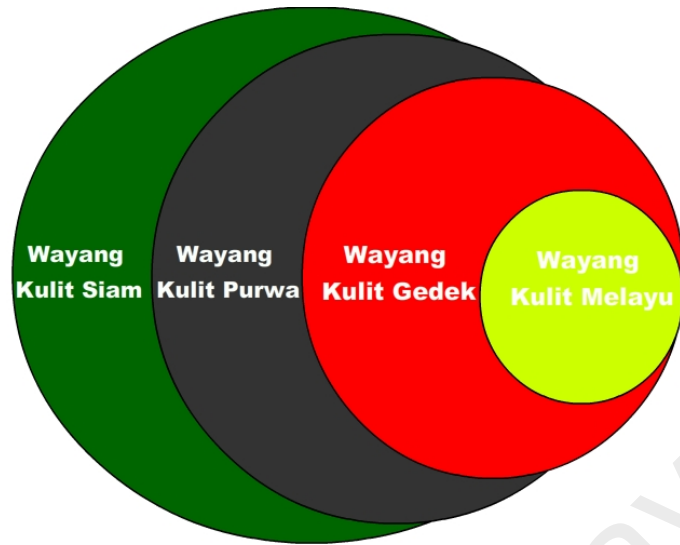
Figure 2.6   Types of Popular Malaysian Shadow Play Theatre in Malaysia

The Malaysian and Indonesian shadow play theatre are well known by Javanese style known as *ringgit wacucal*, which is one of the world's oldest and most dramaturgically sophisticated continuing theatre traditions (Samuel L.Leiter, 2007). According to Patricia Matusky (1997), *Wayang Jawa,* or also known as *Wayang Purwa* are performed by the Javanese ancestry in the southern Malaysian states of Johor and Selangor. The influence of Hinduism aura are from the epic stories and characters, the puppet visual styles are carved and made and are mostly influenced by the Javanese concept. Nasaruddin (2009) described that the characteristic and artistic style in Wayang Melayu has only one rig arm compared to Wayang Java(Javanese Puppet) which has two rig arms (Refer to Figure 2.7)

Figure 2.7 The Javanese Puppet Style with two moveable arms

As mentioned by Ghulam Sarwar Yousof (2004), Wayang Kulit Melayu is derived from the highly refined Javanese Wayang Gedog, that uses *Javanese Panji* romances as the main storyline, triumph of good over evil, which is only performed in Kelantan and Terengganu. Wayang Melayu was unpopular for a long time before independence in the year 1950's, however it was recreated but the audience focused towards common people rather than reserved for royal entertainment. Unfortunately, it is becoming obsolete for many years due to the practitioners including the younger generation who are not interested in shadow play performances anymore. This is also due to modernization, lifestyle change and lack of appreciation towards traditional arts.

Wayang Kulit Siam or Wayang Kulit Kelantan is the heart of Malaysian Wayang Kulit. The word "Siam" itself established the influence between Patani(Thailand) and Kelantan regions. Known as one of the oldest traditional art form, the ubiquitousness of Wayang Kulit Siam has been able to unite the Malay society from different culture and religious background through entertainment.

Even though this art is slowly dying, there are still some Tok Dalang or master puppeteers with their troupes who performed at some occasions. Pak Hamzah was well known among the most classical and influential master puppeteer or *Tok Dalang* in Wayang Kulit Siam. According to an interview with Pak Hamzah's apprentice, Adiguru Pak Nasir in year 2011 at ASWARA, he described Pak Hamzah as an exceptional master puppeteer with unique storytelling style, puppet control, and shaman and music skill. Shadow play from the Asian perspective defines clear motives but it also has mixed visual appearances or aesthetics styles that can be called as "Rojak" (Tay, 2001). From the concept, storytelling, puppet design, ritual and music in shadow play are brought together into a sign of respect, belief, and identity and culture fragmentation. Thus, Wayang Kulit Siam can be divided into three influences segmentation and flavors of different countries which are story (Hindu), puppet(Siam) and puppeteer(Islamic).

2.2.7   Europe (Turkey)

The art of puppets in Europe typically include shadow puppets, marionettes and hand puppets where both are classified as petrifying and famous. In Europe, the art concept of shadow play was inspired by Chinese, Arabic and Indian styles, but the European visual styles of shadow puppets have different approach compared to the Eastern style. European shadow puppets are designed to hide the puppet rod in order for the audience not to see it (Tewksbury, 2002). The art of silhouettes or shadow puppets are more embedded with realistic and artistic designs in the European shadow play movement.

The Legend of Sleepy Hollow in 1759 was based on the concept of silhouette (shadow) which was the main visual in Shadow Play entertainment in Europe. According to Cariad Astles (2009), Western puppetry can be associated with the domain of articulation and animation involving the art of narration, manipulation and action. This can be proven through some of the famous Western puppetry plays like War Horse (National Theatre) and *The Giraffe and The Pelly*. Shadow or silhouettes puppetry are not only limited to folklore or epic stories in the American schools, but new and modern communications subjects related to philosophy, history and arts are also introduced. The Washington Board of Education Puppetry in the Classroom (1954) initiative was to encourage the art of "fun & learn" with puppet entertainment especially which involves stories replication.

Turkey, a country that is known for its beauty of nature and monuments has a rich theatrical cultural performance known as the Karagoz (Tietze, 1977). Karagoz is a 16th century shadow puppets that described the Ottoman Empire administration in Turkey. According to Hattox (1996), the plot and characters of Karagoz are basically reflections of the socio lifestyle criticizing the political and corruption rising amongst the people. The storyline in the Turkish shadow play reflects the constructive dignity of honor, royalty, revenge, and kingdom within the Turkish society lifestyle.[3] The art of Karagoz shadow play uses detailed carved puppets that produced vivid colors of shadows, controlled by the puppeteer using horizontal sticks with simultaneous voice over and music melodies.

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[3] Ozcan.O, 2002 a researcher related to Turkish shadow play and interactive media.described the Turkish shadow play as a design in a unique technique using "shadow play" which is quite parallel to interactive media

Figure 2.8   The Traditional Turkish Theatre 199 of Hacivat and Karagöz

The puppets visual style of Karagoz represents the essence of Arabic concept from physical appearance and figure. *Hacivat* and *Karagöz* (Refer to Figure 2.8) describe as the main characters related to Turkish shadow puppetry. *Karagöz* symbolized the tone of an ordinary human(man), while Havicat signifies superior group of thought. This allows the puppeteers and audiences in coffee houses and theatres to narrate and illustrate the present critiques between social aspects of Ottoman groups(society) where they were not only mesmerized with the beauty of shadow movements but also through the stories' moral value. Moreover, the visual aesthetics of Karagoz and *Hacivat characters* in Turkish shadow play reflects the discussion which was so entertaining and finally they were killed by the decree of the Sultan (Ugur Guduk Bay et al., 2000). Overall, from the author's observation, the shadow play of Karagöz is indeed a creative art that manifests communication and unity towards social civilization matters related to political and humanities of the Turkish people and European shadow play styles.

2.3 Types of Puppet Entertainment

Before creating the 3D animation of Wayang Kulit or shadow puppet entertainment, it would be important to study and understand the types of puppet entertainment in order to gain a clearer perspective between art and technique used to differentiate its own identity. European Puppet animation pioneers such as Jan Svankmajer, Jiri Trnka, Ladislav Starewitch, Yuri Nornstein, George Pal, Lotte Reineiger and Quay Brothers, were considered as skillful both in the narrative and technicality to create illusion of life through moving image assembles through the world of animation history.

The word "puppet" comes from the Latin 'pupa', meaning "doll" (Leslee Asch, 2010). In Arts Theater, ideas were translated into action and the visual styles were given form. According to Lewis Latimer (1998), each puppet was defined as figures constructed by and originally man-made and each motion or movement is guided by humans. Puppets are basically divided into size and performing types as shown in Fig 2.8. With the development and techniques used in Puppetry Theater, several types of puppetry have been identified. They are *marionettes or string puppet, body puppet, marionettes, hand puppet, rod puppets,* and *shadow puppets* (Cariad Astles, 2009)
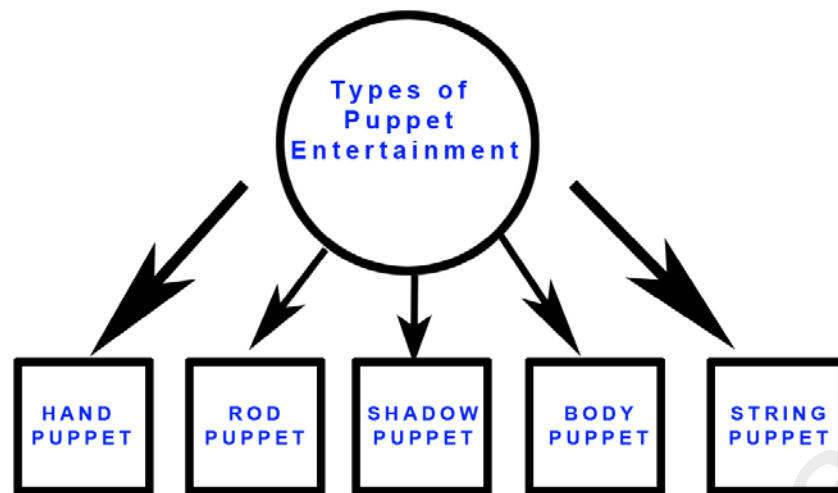
Figure 2.9 Types of Puppet Entertainment Techniques

2.3.1 Hand Puppet

The hand is a mysterious physical and spiritual element capable to coordinate physics of motion. The hand puppet movement includes the whole structure torso or body of the puppet, two fingers are animated to create the motion of arms utilizing a single finger to control the entire movement of the head. Darren Brown from the *Brewery Puppet* (Refer to Figure 2.10) uses his middle finger and thumb functions for the arms and his forefinger for the head. Such finger movement for puppets is one of the simplest hand puppet styles. Similar to ventriloquist entertainment, the puppeteer operates the articulation of the middle fingers to serve as the puppets legs, whereas the faces are painted on the side of the hand. From the author's point of view, *Brewery Puppets* entertainment can be simply defined as puppet entertainment that expresses with various motions and emotions (fear, rejoice, sadness).

Figure 2.10 Darren Brown from the Brewery Puppet Troupe operates hand, rod and string puppets techniques.

The art of Hand Puppet Theater by Philip Roth based on the famous novel "Sabbath Theater" in 1995, features comic realism genre (Philip Roth,p.373). Roth style of expression and vision has conjured puppeteer like Micky Sabbath with his capability to mesmerize audience with the dexterity of his hands. His interaction with the puppets allows his hands to hypnotize and impersonate the world of attitude and visualized it through his flourished styles. His hands are animated by giving life with echoes of animation and metamorphoses into human life expression of war and freedom (Philip Roth,p. 375). Another famous hand puppet theatre is known as glove puppet. Sesame Street & Captain Kangaroo were some of the famous glove puppets in the United States. The famous traditional English glove puppet is *Punch and Judy puppet show* (Refer to Figure 2.11).

Punch is a very popular main character in the puppeteer show of Punch and Judy. His best adversary is a character called Judy who is portrayed as a typical wife with attitudes in her life. The Punch and Judy performances were origins from United States and were slowly becoming popular between 19th and 20th century (od). From the author's observation of puppets characters styles in Punch and Judy, it consists of human hilarity, desire and fear. The art of storytelling in this entertainment is simply conceptual and variable which is performed in various countries around the world.

Figure 2.11 The famous 1900 Punch & Judy show uses glove puppet (hand puppet)

Sergei Obraztsov (1901-1992) was the pioneer and an influential Russian puppeteer in hand puppet entertainment where he used it as a manifestation towards educating the Russian society during the 19th century. Sergei used his expressive hands and wooden balls in the famous 1930, *Attitude to a Lady* (Refer to Figure 2.12). The wooden puppet characters were given life to the gesture of love, passion, and violence with abstract emotions. His capability to manipulate, articulate and create variable movements of rhythm has enabled Sergei Obraztsov to create distinctive and vivid creatures.

Sergei has the ability to control a single or both puppets with his hand while expressing jokes and facial expression that mesmerize the audience. Sergei, in an interview described his puppet show as an extra personality side and link which is the soul of his hand performances[4].

Figure 2.12 Sergei Obraztsov manipulates hand puppet "Attitude to a Lady"

Muppets is another kind of hand puppet entertainment developed by Jim Henson for television production. The concept of it uses small puppet figures including wide mouth design that allows the puppeteers' thumb to animate the jaw. The puppeteer is responsible to create expression based on the size and shape of the head, animating with his fingers creating an extraordinary feeling between audience and the muppets. It has various colors and textures that represent the character identity. Also, Muppet speaks on moral and lifestyle issues.

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[4] Sergei Obrazstov and English Puppeteer, an Interview ,Verbatim Report from Toynbee Theatre, September 1966

For example, The Muppets of *Sesame Street* in 1969, had attracted many children with formative curriculum and edutainment. The "Muppet Show" represents pleasant memories of many people including children and youth, and puppet characters are particularly well accepted by the young audience because of the puppet natural appeal and style.

In France in the year 1974, little Muppets *Chapi and Chapo,* produced an educational material in its episode and assist/support the AIDS victim in South Africa, and *South African Sesame Street* by adding an HIV positive Muppet to its regular show. Overall, children's attention is more drawn visually to colorful puppet characters on television and stories by using hand puppet approach than to regular adult actors especially in edutainment (Eileen Blumenthal, 2005).

2.3.2 Rod Puppet

Rod puppet is another method of puppetry using rods and sticks from beneath the stage. According to Ghulam Sarwar (2004), rod puppets are dolls that are operated by three wooden rods. The puppeteer operates the motion control technique through single or many attached rods. According to Hugo (2009), the puppets themselves can be small or large, like the giant puppets in Peter Schumann's *Bread and Puppet Theatre*, which requires over a dozen puppeteers to operate. Rod Puppets are quite common in Asia in terms of popularity and in traditional culture performances (Lewis Lettimer, 1998).

Thailand's **Hun Krabok** is a famous rod puppet style. *Hobby Hut* (Refer to Figure 2.13) is one of the most famous rod puppet troupes that performed at the Rachmanka Hotel, Chiang Mai in 2010. Not only that this troupe has won International Marionette Award in 2008, their performances were also so mesmerizing, with aesthetic and artistic visual qualities accompanied with puppet size and gesture, narration, puppet movement, music and husky voices of puppeteers.

Figure 2.13 Thailand Hobby Hut Rod Puppet Troupe

Buranku (or also known as "Ningyo Jojuri) is one of the most famous Japanese style related to rod puppetry. Buranku uses one-half to two thirds life size puppet figures from different heights and sizes comprising of wooden head, with eyes and mouth. The puppeteers are dressed in black. For the movement, the head has a grip that controls the strings of each eyes and mouth, as the arms and legs are hung from the shoulder with the long kimono dress which is able to cover the lower half of the body. *The Love Suicides at Sonezaki* is a scene from this famous Buranku play by Chikamatsu Monzaemon. Chikamatsu has a style of classic genre especially in domestic drama which focuses on human and emotions conflicts and also the severe restriction and obligations of the contemporary society.

In 2007, *Buranku* Bay Puppet Troupe of United States (Refer to Figure 2.14) took part in Japan's largest theatre festival, Iida Puppetry Festival, the festival that devoted to the art of puppet drama and attracted over 150 troupes around the world including the host Japan. The performers were grateful to appear on stage both puppet troupes from Kuroda and Imada, with fascinating performances with concept of Buranku (Martin Holfman, 2007). *Theatre Sans Fil* in New York first began creating its "theatre without strings," where it turned out to be a popular form of puppetry inspired from the Japanese tradition of *Buranku* puppetry (Kerry, 2003). With exotic and vibrant colors in their costumes, the play attracted many local audience and tourists.

The author would like to stress that although rod puppets worked similar to the style like the metaphor of chopsticks (human control two sticks to pick up food such as rice , fish , meat on a plate or bowl), and *Buranku* puppetry significance in using (rod) to control the arms separately, range in size from miniatures to the giant pageant figures, the puppet and puppeteer plus their enchanting music is able to mesmerize the audience and maintain the visual styles of puppetry identity in the country.

Figure 2.14 Buranku Puppet played by *Bay Puppet Troupe* in the United States.

2.3.3 Shadow Play Technique

Shadow puppets are described as two-dimensional (2D) figures made with hinged parts and controlled by rods. Shadow and silhouettes of puppet figures are portrayed by a source of light for the audience to view them two-dimensionally (Wright, 1996). Helen Binyon (1966) described the three main essentials to construct a shadow play theater consists of light source, screen and object (puppet). The shadow puppets movements are dynamic between the light source and the screen (Leslee Asch, 2010). The author had the opportunity to witness a performance by Tok Dalang (master puppeteer) Pak Nasir in 2011 at Panggung Bandaraya Kuala Lumpur (Refer to Figure 2.15) where he performed a shadow puppet of Wayang Kulit Siam performance called "Siti Dewi Kidnapped". From the author's observation, Pak Nasir was skillful in handling and manipulating the puppets by controlling the wooden rod attached to the puppets, in a synchronized movement (mouth, body and hands) and creating a pleasant mood with the lighting personas.

Figure 2.15 Dalang Pak Nasir is controlling shadow puppet using rod (stick) at Dewan Panggung Bandaraya shadow puppet (Wayang Kulit Siam)

The puppeteer's (Pak Nasir) hands were just like the window of the soul that passes to the rod which is able to control the puppet movements (vertically and horizontally) with dynamic and energy. The beauty of the translucent and vivid colors of shadows displayed on the *Kelir* or screen, using wood rod was to support the articulation, balance and movement of each puppet to project each character The art of shadow play puppetry is not really about animating objects, but artistically it is about portraying a variety of visual opaque or colored silhouettes that represent the identity, culture and values in the context of art and the society.

2.3.4 Body Puppet

The art of body puppet can be described as a full-bodied figure worn by one or more performers and controlled and manipulated from within. The United States TV Kids edutainment famous show, Jim Henson's "Sesame Street" uses the characters of *Snuffleeupagus* and *Big Bird* (Refer to Figure 2.16) , where it takes more than one operator to handle the puppet in terms of controlling the body and movement. With bulky and heavy costume, it makes some of the movement sluggish and less appealing.

Figure 2.16 The Famous *Snuffleeupagus* (right) & Big Bird (left) from Sesame Street
Children show using body puppet technique

2.3.5   String (Marionette) Puppet

String puppet has always been a favorite method in puppetry styles especially in attracting children of all ages. String or Marionette puppets are animated by using strings (Hugo Bélanger, 2009). String puppets existed almost 500 years ago in Europe which translates religious stories (Christian) such as "Little Marys" or Marionettes (Kerry, 2003). Marionette is a small puppet with articulated joints which are connected similar to the structure of human anatomy such as knees, elbows or sometimes ankles, and manipulated from above by a puppeteer using his hands or fingers. For example, the original Pinocchio (Refer to Figure 2.17) was a marionette type.

Figure 2.17 The original character of Pinocchio was played using Marionette Technique

Figure 2.18 Thang Long Water Puppet Troupes performing at Sydney

Another example of puppet that uses Marionette style is the famous Vietnamese Water Puppets (Mua Ruoi Nuoc). Water puppets or Puppets Dancing on the Water is a unique art style of puppetry which is performed in a deep pool of water, while the puppeteers will be behind the stage manipulating the movement of the puppets using the combination of strings (marionettes) and bamboo rods.

Water is an icon that represent the Vietnamese society, their culture and lifestyle especially the farmers, and it combines the uniqueness of arts and design (painting, sculpture and architecture). [5] The famous Thang Long Water Puppet Troupes from Hanoi (Refer to Figure 2.18) did a performance at the Royal Botanical Garden, Australia that mesmerized the audience with their artistic poetry, fireworks display and vibrant colors of puppets on the water and that this art is full of complex artistic and attractiveness (Richard Philips, 1999). The performance were simply amazing especially when the puppets performed a versatile movement in and out of the water such as diving, gliding, swimming and dancing using rod and strings. This water puppet is so special that other traditional puppeteers may find it difficult to perform.

The author would like to stress that puppet technique has really provided an impact towards the society, culture, in describing the scenario of politics and economy, and as life escapism. Each technique used in puppetry has its own identity, style and creativity. Puppets (hand, shadow or marionettes) are ancient forms of theatre and a powerful animated object (sacred) that give the notion of life by the puppeteer to communicate with audience. The question raised is, with the current digital and technology era, would this historical and cultural value puppet entertainment slowly face extinction especially shadow play puppet? Therefore, the author would like to focus on one example of the popular puppetry in Malaysia that is slowly becoming extinct known as Wayang Kulit or shadow puppets. The author would also like to focus on the use of computer technology (key frame animation) to develop animation of 3D Wayang Kulit. Next, the author would like to concentrate on the art and qualities in the perspective of Malaysian shadow puppets.

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[5] Le Trang in his article Vietnamese Water Puppets July 2008, quotes Nguyen Huy Hong stating that Water Puppets consist of painting, sculpture, music, literature and architecture

2.4   The Art of Malaysian Shadow Play Puppetry

The author would like to focus on the Malaysian shadow puppets or Wayang Kulit by studying the visual concepts in order to gain a better understanding in this research area before developing it in computer animation. The art of Wayang Kulit or shadow play puppets are believed to be 800 years old. Wayang means theatre and Kulit means leather and the Malaysian styles of Wayang Kulit is believed to be influenced by the Javanese styles (Chad Habel, 2007). The reality and illusion from Wayang Kulit has enabled us to create self realism with moving or distort shadows, music, narration that synchronize the human relationship and arts between groups, troupes and individuals.

According to Dahri Zakaria (2006), there are several groups of famous shadow play troupes which are still active and famous among the Malaysian society that performed Wayang Kulit Kelantan including the troupes that were taught by the famous Hamzah Awang Mat, Dollah Baju Merah, Nik Mat Suara Mas, and Dalang Eyo Hock Seng (mainly from Kelantan state) and also Pak Majid Seri Asun from Kedah (Dahri Zakaria, 2006). For example, the Dalang Saupi troupe is the most well known troupe in performing shadow puppets theatre with modern stories or genres among the society and also the young generation.   Thus, from this influence and characteristic, the author would like to focus on some elements that would be used eventually in the Malaysian shadow play which will cover the aspect of puppeteer, types of character's design, storyline, puppet movement, ritual practices and music.

2.4.1   The Dalang (Puppeteer)

Stories or narration are similar to the spine or the backbone in human anatomy. For puppeteers, stories are considered synonymous with their capability and creativity. The *Dalang* or puppeteer can be described as animator, storyteller, shaman and the orchestra of wayang kulit. The master puppeteer is the pivot point controller of the art direction, narrative, and music in shadow puppet theatre (invisible entertainer) although some audiences are able to watch his real performance behind the screen (William, 2002).

The *Dalang* or puppeteer in the context of scene play, various puppet characters will use his vocal intonation with expression and emotion using husky voices to stylized the puppet's role in a dialogue. Each puppet's character has different intonations which are necessary. According to an interview with *Dalang* Siri Neng Buah in 2011, the voices are identical to each puppet in describing their characteristic such as Pak Dogol(Refer to Figure 2.19), a comical character known for its gruff and dynamic vocal styles.
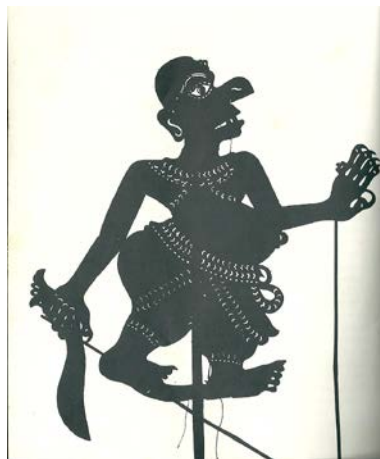
Figure 2.19 Pak Dogol Puppet character combines gruff and husky voice©
Ameen Sweeney 1976

TROUPE'S NAME	CHAIRMAN	INFORMATION
1. Wayang Kulit Seri Setia	En. Hamzah Awang Hamat	**Registered (Not Active)** Address : Kg. Gerung, Palekbang, Kota Bharu Members : 25 people
2. Wayang Kulit Dollah Baju Merah	En. Abdullah bin Ibrahim	**Registered (Active)** Address : Kg. Batu Tinggi, Kok Lanas, Ketereh Members : 30 people
3. Wayang Kulit Suara Mas	En. Hamzah Awang Hamat	**Registered** (Not Active) Address : Kg. Kemasin, Bachok Members :35 people
4. Wayang Kulit Merak Mas	En. Jusoh bin Hassan	Not Registered (Not Active) Address :Kg. Mesira Morak, Wakaf Baharu Members : 32 people
5. Seri Wayang Kampung Paloh	En. Daim bin Othman	Not Registered (Not Active) Address : Jalan Bayam, Kota Bharu Baharu Members : 30 people

Table 1.1 Sample list of Registered and Unregistered Dalangs(Troupes) between 2009 – 2011 (source: Jabatan Kebudayaan Kesenian Negeri Kelantan(JKNNK),2011)

The Sample list of Registered and Unregistered Dalangs(Troupes) between 2009 – 2011 (See Table 1.1) has been identified by Jabatan Kebudayaan Kesenian Negeri Kelantan(JKNNK) in 2011 with 11 Troupes active but not registered officially with JKNNK, 3 Wayang Kulit Troupes are active and registered officially, while 9 troupes are identified as not active.

There are several factors involved in this scenario including the cooperation given by Wayang kulit troupes that are not encouraging such as their lack of awareness, preference to self funding, lack of cooperation, and socio-economic background. Therefore, there is a need for survival especially for Wayang Kulit Kelantan as the statistics have indicated that this art is in "critical" state. Next, the author would like to look at several key persons, their contribution, skills and success as puppeteers which are related to Wayang Kulit.

According to Ghulam Sarwar (2008), there are three famous Dalangs or puppeteer known for their skill in Wayang Kulit Kelantan or Siam puppetry entertainment. They are *Awang Lah Pandak, Hamzah Awang Amat and Dalang Dollah.* Awang Lah Pandak was a "guru" (teacher) and an influential and renowned Kelantanese Dalang at the time and was later accepted Hamzah Awang as his prodigy. In order to recognize his contribution, Prof. Hatta Hazad Khan produced and directed a film called "Wayang" in 2008. The film reflects the norms and dogma inside of Wayang Kulit where Awang Lah Pandak was the main character. The film also describes some values of reality (secular) and orthodox styles within the Malay Muslim community in Kelantan (Hassan, 2008). Unfortunately, in Malaysia the numbers of *Dalangs* or puppeteers in the country has slowly decreased. For example, for Wayang Kulit Kelantan, the number of Dalangs or practitioners of Wayang Kulit Siam (Kelantan) has dropped from 37 in 1982 to 11 in 1999, even though at one time there were almost 300 Dalangs in 1960 (Amin Sweeney, 1992).

The character Awang Lah, which refers to Kelantanese renowned puppeteer Awang Lah Pandak, holding the Dalang role not only as an image of puppeteer(entertainer) , but also with a sense of caring, responsibility, challenge (between religion and family) and willing to share knowledge with the younger generation hoping that wayang kulit will survive and be passed down to the younger generation. This film can be described as a manifestation between the puppeteer's survival of Wayang Kulit art and passion within the community.

Another iconic puppeteer who is familiar with the world of Wayang Kulit Kelantan is Hamzah Awang Amat or also known as Pak Hamzah (Refer to Figure 2.20). He is a typical classical performer of wayang kulit who totally rejects any new techniques or styles to Wayang Kulit Kelantan. Barbara Wright (1970), described Hamzah as the heir to the classical tradition of shadow play or wayang kulit entertainment. The reason that Pak Hamzah is unique with Wayang Kulit performances is that he is a "complete" person. Here, it refers to skills from the basics *Pendalangan* (puppeteer), carving the puppets, animating, as a shaman, playing and orchestrating music, narrating the repertoire of Ramayana epics and many more. Pak Hamzah motivated, with his guidance and also leadership that Seri Setia Wayang Kulit Troupe was established and later this troupe performed in 10 European countries between 1969-1974 sponsored by the local and international organization including Malaysian Arts and Tourism and UNESCO. Pak Hamzah was also invited to perform wayang kulit in Belgium, Netherlands, France, England, Canada and the United States.

His performance and skill in Wayang Kulit Kelantan was totally captivating and entertaining both in visual and narration especially to the international audience. Pak Hamzah was able to amaze or mesmerize with his husky voice, rhythm of narrative with creative motion control of the puppets in and out on the screen, including the performance to international audience, scholars and researchers during traditional theatre and music South East Asia conference 1969 held in Kuala Lumpur (Shanon, 2004).

His amount of sacrifice on transferring knowledge and experience of shadow puppetry art heritage, Pak Hamzah was finally awarded the title of the first National Artist in the National Art Award in 1993 from the Yang Di-Pertuan Agong and was also recognized as the first Malaysian to receive the Fukuoka Asian Culture Prize in 2000, Japan on Arts and Culture Prize categories (Zainal Jaslan, 2003). Pak Hamzah once said "*The prize is in fact for our beloved country Malaysia and the development of traditional arts, it should be done in earnest and full of feeling and responsibility*". S.P Lee stated that Dalang Hamzah is one of the leading exponents of art and culture to the country. (S.P.Lee, 1986). According to Sitieza (2010), Hamzah Awang Amat is the symbol of Dalang Malaysia and has provided a huge influence towards the survival of shadow puppet play in the country. Although Pak Hamzah is not around anymore, his passion, skill, and legacy is hoped to inspire the younger generation especially the young Dalangs today to perform wayang kulit and preserve it from being extinct.

Figure 2.20 Hamzah Awang Mat performed Wayang Kulit at international level

Dalang Pak Dollah or Abdullah Bin Ibrahim was one of the puppeteers that have been performing wayang kulit for nearly half a century. He was known as "*Dollah Baju Merah*" because he wore a red jacket each time he performs wayang kulit as a trademark. According to Ghulam Sarwar (1997), Pak Dollah was popular among the Malay village's audiences for his style of introducing the stories with modern concept or genre and with impressive dialogues. Dollah Baju Merah demonstrated his skills in conveying the mythical and parable of the antagonist and protagonist plots at NN Gallery in 2002 (Zatashah Idris, 2002).

In 2005, Eddin Khoo, an apprentice shadow puppeteer and student to the renowned puppeteer Dollah Baju Merah, staged an adaptation of the shadow screen Shakespeare's Literature 'Macbeth' at Kuala Lumpur Performing Arts Centre 2005 to acknowledge Dalang Dollah Baju Merah's contribution to the puppet theatre (Sharon Bakar, 2005). His performance was enthralling with the use of intonations, puppets play, and music to modernize the story of Macbeth with a sense of humor.

Dalang Eyo Hock Seng (Refer to Figure 2.21) is one of most popular and unique Tok Dalang or puppeteer because he is a Chinese ethnic but communicates mostly in Malay language with Kelantanese dialect. He started to engage himself with Wayang Kulit since the age of 14 and became a professional Tok Dalang or master puppeteer at the age of 19. His philosophy of performance is "*audience convenience*". At the age of 56, the unique style of narrative, the statue of the skin makes it so much more unique with the presence of Dalang Eyo Hock Seng sitting behind a white screen and in the middle of the light beam since he is known to be the only Malaysian Chinese man as wayang kulit dalang (Noor, 2009).

Since 1983, the group behind the 'Sri Campuran' troupe, which comprises of various ethnic groups including Malays, Chinese and Siamese did their performances in various countries including Thailand, Singapore, France and Japan. Dalang Hock Seng also did a performance called "Bayangan Gerna" at the Palace of Culture (Istana Budaya) in year 2006(Asma Hanim, 2009). From the author's point of view, Dalang Hock Seng has a sharp melodic intonation with various voice intonations, is modern, a puppet designer, an excellent storyteller, and a dynamic *p*uppet controller. According to Dalang Eyo Hock Seng, in an interview 2012, he is optimistic that Wayang Kulit has a promising prospect when he refers to the techniques and steps implemented to ensure its survival. According to Siew Lian Lim (2012), Dalang Eyo Hock Seng performs with a minimum of 20 variety icon puppet characters in Wayang Kulit Kelantan performances within 15 hours total, five days a week. Also, each performance of Dalang Eyo has at least 12 different stories to be presented.[6]

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[6] Mud Ismail Adami, 2010, interview *Eyo Hock Seng , Dalang Wayang Kulit* Article, Pentas Magazine Istana Budaya, October – December, pp : 24 - 25

Figure 2.21 Dalang Eyo Hock Seng @ Pak Chu

In the modern context, the Dalang or puppeteer the author would like to highlight the former Vice Chancelor of University Malaya, Prof Hashim Yaakob was also known as a Tok Dalang before. As an esteemed *Dalang* (puppeteer and storyteller), he performed a special shadow play performance with the title 'Sir Issac Newton' and 'The Fallen Apple' in early December 2010 at the Museum of Asian Arts in Kuala Lumpur (Refer Figure 2.22). Prof Hashim, as an academic and educationist, understood the needs to introduce modern and educational content for the younger generation to learn and at the same time be entertained through shadow play arts. Prof Hashim and his gamelan musicians were simply amazing and full of energy. As a puppeteer, he has the skills to narrate and control the movement by manipulating the puppets by moving the characters across the white screen, incorporating sense of humor into the life and soul of the play and plots that was simply mesmerizing during the performance.

Figure 2.22 Prof Hashim mesmerized the audience with 'Sir Isaac Newton and The Fallen Apple' shadow puppet show in Kuala Lumpur 2010

Overall, the puppeteer in a shadow play is a symbol between the spiritual and the reality of life. The author believes that the skill of a puppeteer is not simply inherited from family members of older generation. It is a gift from god, and a passion that determines the success and appreciation from the people and their surroundings. The future of Wayang Kulit is not in the puppeteer's hand but it is more of a collective effort of various parties.   The level of optimism or pessimism is more of a challenge between traditional and digital, whether it is destroying or providing an alternative method, it all depends on the perception of the audience.

2.4.2 Puppet Design

En Mohd Nasir from ASWARA (The Academy of Arts & Culture Malaysia), an instructor and Tok Dalang, in an interview year 2011 believes that the influences between Hindhu(repertoire stories), Siam(Puppets) & Malay (Tok Dalangs), as a unique mixed culture into Malaysian shadow puppetry character especially in Kelantan which is a strong influence factor inside the performing arts culture in Malaysia. Wayang Kulit Kelantan (Siam) is a classic shadow puppet theatre in Malaysia. The total of a common puppet collection is estimated between 65-120 puppets with the concept for the characters based on the Ramayana epic (Ghulam & Syed Jamal, 2007). The philosophies of puppet design represent the symbol of kingdom, love, war, hierarchy and societies which are the manifestation of the two neighboring countries (Thai and Malaysia) have in common.

The puppet stylized and crafting are potrayed and represented based on good and evil figures such as ogres, demon kings, demigods and warriors are the common shadow puppets play (Mark & Harris, 1990). The detail of contour lines, texture, color and shapes for each puppet is important to create the "appeal" factor for the audience. According to Hobart (1987), his argument on motion of shadow puppets (silhouettes) are basically a form (figurative or non figurative) rapidly moving in and out of the stage, that each texture or contour should be accurate in order for the audience to accept it. Jan Mrazek(2005) also stated that the void space in wayang kulit puppetry can be described as "fertile" where anything appears represents a symbol of life. As mentioned earlier, the audiences are focusing on the shadows or silhouettes, and therefore most of the shadow puppets in Wayang Kulit Siam are made from cow skin.

Dalang Pak Hamzah prefers to use cow hide with the level of thickness for longer lasting, strong translucent colors reflection, and it doesn't shatter easily when animating it by the puppeteer (Osner, 1992). In Wayang Kulit Siam, the plot in each narrative is defined with protagonist (noble) and antagonist (evil) characters. In other words, the factor of height and size in each puppet also determines their status and functionality in a plot. For example , hero characters such as (Sita Dewi, Seri Rama and Maharisi) with height proportion tall and flat (slim), estimated between 39 - 42 cm tall whereas villain puppets such as (Rawana, Indrajit, Ogre) are physically immense and large.

In the United Kingdom, the most popular Skeat's 149 Dalang Abas masterpiece puppet collection which are at present being kept are described as less complexed (crafts) and casted black opaque silhouettes, as most of the puppets are applied using solid layer of cow skin and are mostly thick (Najib, 2008). Nowadays, Wayang Kulit Siam figurative puppets are shaped or crafted out from emaciated (filigree goatskin or cowhide) and coated with vibrant colors which allow colorful silhouettes to emit on the screen (Ghulam Sarwar, 2004). These translucent vivid colors are perceptible as visual style and expression in Wayang Kulit Java, Thailand (Nang Ta Lung), Turkey(Karagoz) and China(Chinese). Color and symbolism are two entities that are commonly used to portray the noble or villain characters and also the puppets' identity.

For example, Seri Rama's (Refer to Figure 2.23) color is green, Laksmana is in pink and Siti Dewi is in red (Refer to Figure 2.24) while the clown comical figure Pak Dogol is in black. These colors are significant to the characteristics of the characters and also sacred, derived from the Hindu religion (Ghulam Sarwar, 2004). Moreover, noble characters that represent Kingdom status, has their own style, role and authority in each play. Their attire also reflects the soul, power and authority of the King, princess, society and villagers. According to an interview with Dalang Eyo Hock Seng or Pak Cu in 2011, the attire or clothing of Seri Rama must be royal and he must always hold a special bow to symbolize dignity, power and respect. Dalang Pak Hamzah mentioned that most of the puppet characters in Wayang Kulit Kelantan must look fierce and arrogant with a sense of warrior behavior and physical appeal.

Figure 2.23 Seri Rama is colored in green for shadow play entertainment© Amin Sweeney 1992

Figure 2.24 Sita Dewi is colored in red for shadow play entertainment © Amin Sweeney 1992

The ogres which were described as villains in Wayang Kulit Kelantan were decorated and painted with red faces (eyes, mouth) as the belief and concept were adapted from the Holy Quran which symbolized that ogres and jinn derived mainly from fire (Ghulam Sarwar, 2004). Finally, in terms of motion control of the shadow puppets, Wayang Kulit Kelantan defined that the puppet characters have a single articulated movement for Sita Dewi, Hanuman, including a non figurative, the 'Pohon Beringin' moving and turning (vertical and horizontal) on the screen (Refer to Figure. 2.24). In terms of movement, most Wayang Kulit Siam or Kelantan puppet characters use the concept of single direction(uni-directional) articulated arm movement especially vital characters such as Seri Rama, Laksamana, Sita Dewi and Hanuman (Refer to Figure. 2.25) symbolizing the concept of larger, power and authority. Pak Dogol and Wak Long are categorized as comical characters with both directions and articulated arms referring to comedic style with fast movement (mouth or jaw).

Another aspect of puppet is that it is non-figurative such as the Pohon Beringin or the Tree of Life. It is the symbol of motifs that represent the world, which animates the world with light and shadow. According to an interview in 2012, Dalang Pak Nik described the importance to animate the Pohon Beringin into Wayang Kulit performances at the beginning by moving the entire angle as basic directions of cosmos, horizontal "8" that represents perpetuity or infinity. According to Kenneth Gross (2011), the puppeteer will animate the Pohon Beringin far from the screen to symbolize the depth of shadows pulsing through the white area. Overall, the Pohon Beringin is a metaphor that signifies the relationship between Gods, with the human, animals, cosmology, and nature

Figure 2.25 The main characters such as Seri Rama or Sita Dewi uses the concept of uni-directional articulated arms to define superior and authority

The relationship between the puppeteer and puppet or thing, needs to be constantly coherent between providing life to the unliving and the living (Jurkowski, 1996). The puppets in shadow theatre are basically using metamorphosis as a tool to transform from visual, stories, dramatic concepts that cultivate the art of shadow puppets to be appreciated, even though it takes long hours to complete the stories or epic repertoire.

2.4.3 Repertoire / Story Type

Story is the center of entertainment. Stories are divided into plots and act to convey a message. Story or narrations are inspired from epics, legends, fiction, folklore, or fairytales. The traditional shadow puppets arts are often adapted from the ancient Hindu epics Ramayana and Mahabharata (Sandra, 2003). The Ramayana epic has a dominant theme and wisdom based on Indian visual and performing arts, literature and religion.

In Malaysia, the Ramayana are the basis in delivering exciting repertoire stories which consist of branch stories (*cerita pokok*) and twig stories (*cerita ranting).* (Ghulam Sarwar, 2004). Furthermore, Wayang Kulit Siam repertoire are based on Ramayana epic, where the Dalang will perform two types of repertoire *(cerita pokok)* trunk stories and (*cerita ranting*) twig stories (Ghulam Sarwar, 2004). Also, according to an interview with Ghulam Sarwar in 2011, he stated that each performance of the repertoire stories would take up to 45 nights to complete. According to Hamidon Ali(2006), during Dalang or puppeteer Pak Nasir and his troupes shadow puppets Wayang Kulit performance in New York and New Jersey 2006, he describes that shadow puppet is an art of storytelling that uses instruments to convey the message of culture, moral, religion through crafts.[7]

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[7] An article of Wayang Kulit (shadow puppets) presented an New York and New Jersey by Malaysia Star newspaper, 2006 (online resource)

The famous Dalang Pak Hamzah prefers to use Hikayat Maharaja Wana and Cerita Kusi Serawi which focuses on the journey and adventures of Rama's two sons Lava and Kusha. According to Shahnon (2004), during the performance in Kuala Lumpur in 1969, he performed a narrative story titled *Sita Dewi Diculik*". The synopsis of this story mainly focused on courage, revenge, wisdom, illusion, love, and sacrifice. Even though this performance lasted for hours with Kelantanese accent, but the crowd were entertained with the repertoire stories being described, with the accompanying intonation and the music which was totally mesmerizing.

On July 8, 2007, Dalang Siri Neng Buah led the Association of Sunan Club Sriwijaya shadow puppet of Wayang Kulit Kelantan performance which was held at the Istana Kelantan Cultural Club organized by Sunan Sri Wijaya (Manit Sripadit, 2010). He performed based on *cerita pokok* which is an adaptation of *Ramakieh (Thai)* or Ramayana epic. His intonations or *lengok* , skillful handling of puppet with gruff voices, were drifting during his performance.

Branch stories ("cerita ranting") are designed as the imaginative vision and art direction derived from Ramayana repertoire, including the famous "The Panji Tales" relating to *Raden Inu Kertapati* and *Galuh Chandra Kirana* high Panji's romance (Ghulam Sarwar, 2008). The aspects of kingdom, marriages, love, revenge, honor, pride and dignity, are part of the stories event involved in the branch stories for wayang kulit. As described by Sweeney (1992), most of the branch stories (*cerita ranting*) are basically idiosyncratic, though a few more standardized.

An example of a famous branch story (*cerita ranting*) which is popular in Wayang Kulit Kelantan is *Anak Kerbau Hamuk*. The Dalang composes the dialogue spontaneously as he performs, fleshing out the plot as he does in the branch story in Anak Kerbau Hamuk.

From the author's point of view, the method where a puppeteer recites a story is similar to a concept of a storyteller in conveying stories (fairytale, folklore) to a group of people (adult or children) from many years ago. It is amazing that Wayang Kulit Kelantan performers in the past convey elicit epic stories for long hours and nights, to the people of various backgrounds which were able to unite them and enjoy the night of illusion, soulful entertainment. Islamic heroes and legends were also used to narrate stories using shadow puppet. It was a method to build the concept of martyred, survival, freedom in Islam and also the lifestyle and leadership of the Prophet Muhammad (pbuh). A traditional visual style of "Wayang Kulit" has been applied by Indonesian Muslims to carry out da'wah or religious message especially related to the contribution, sacrifices of the infamous and legendary saints, the Wali Songo in the land of Java. This proved the efficacy of the "Wayang Kulit" media in promoting Islam to the local people. This media were used by the saints because of its popularity among the Javanese regardless of their age and cultural background (Abdul Aziz,1997).

The story about Hamza bin Abdul Muttalib hold a vital role during the process development of Islam. He was a leader of personal support for the Prophet Muhammad. The plays depict the story and the battle of Amir Hamzah, the uncle of the prophet Muhammad, and later martyred at the *Battle of Uhud* on 19th March 625 by an Abyssinian slave.

This is the significance of the concept of religion (Islam) and obligation that is needed for each individual to be granted blessings now and hereafter through understanding and appreciating of the religion. Dewa Ruci, a repertoire written by Sunan Kalijaga in his shadow puppets entertainment highlighted on the importance of Law and Shariah as signs of respect, responsibility and punishment. The shadow puppet or wayang kulit itself replicates humanities and, the puppeteer to corresponds to god (Allah Subahanahu Wata'ala), Creator of the Universe (Rinkes, 1996). In Javanese literature, Dewa Ruci stories clearly states the scenario of human struggles of the soul and *nepsu* as a pilgrimage of an individual (Woodward, 1989). Stories such as *Ali Baba and the Forty Thieves* and *Sinbad the Sailor* are some extracted repertoires from the famous One Thousand and One Nights were used to describe the lifestyle of the Arab society.

2.4.4   Ritual Practices in Wayang Kulit Kelantan

The shadow puppets are mostly defined as spiritual, ritual and sacred, especially where most Malay traditional theatre are influenced by Hinduism and Islam. Traditional performance such as Wayang Kulit or shadow puppets served as an animistic and directive message of the internal and external factors involving physical, soul and spirits (Nasuruddin Ghouse, 2008). Hindu symbolism and deity such as Batara Guru, Brahma, Vishnu and Shiva are used to evoke the spirits during the opening and closing in shadow puppet performance. Scott (1972) described Indian epic shadow puppet performances that involve ritual offerings as a symbol of worship and thanksgiving to the deity known as *Natya Sastra.*

Natya is defined as an art of theatre and performance and Sastra is an exposition of Natya, which means an art of theatrical presentation and Sastra is "a treatise of scriptural laws" tradition which was carried forward in the traditional Malay performances. Wayang Kulit Kelantan or Siam, involves unexplained depth referring to the Malay psyche angin and *semangat* which represents the energy for communicating with the spiritual world. It is similar with the styles of Hindu deity Vishnu where the puppets are manipulated based on his *semangat*. The Indian taught the pagan Malay words of power such as *Om* that collectively represent the Hindu gods Vishnu, Shiva and Brahma (Rafi, 2007). During the early years of Wayang Kulit Kelantan performances, the concept of ritualistic opening ceremony with recitation mantras and special devotion to the spirits were held. This is done by the puppeteer during the opening (*buka panggung*) and closing *(tutup panggung)*.

Well-known Dalangs or puppeteers such as Pak Hamzah, Pak Dain, Eyo Hock Seng, Siri Neng Buah, and Pak Soh were said to have practiced *Berjamu(*feasting the spirits*)*, *semah angin* (wind blandishment), *sembah guru* (acknowledgement to the teachers), where at that time most village people were still having the animism, spiritual belief and superstitious thoughts. Wayang Kulit Kelantan is not only about entertainment, but it also involves supernatural reasons, uncanny and exorcism (Barbara S.Wright, 1979). The puppeteer believes in the responsibility to protect the before, during and after of each performance from the evil spirits that might haunt the people that come to watch wayang kulit. The spirits are quite active especially at night (after Maghrib prayer) where these performances commence at night and sometimes will end till late midnight or early morning.

The introduction of Islam as the way of life has really changed the perception and understanding of dramatic expression, tradition and performance based on Islamic teachings. There was more drama and controversy added to Wayang Kulit Kelantan in 1991 when the ruling party of Kelantan Parti SeIslam Malaysia (PAS) banned these performances because it does not follow the guidance and practices of Islam. In other words, Wayang Kulit Kelantan performances from the aspect of the rituals, spiritual, feasting, and Hindu influenced stories must be demolished, and it must be oriented to the Islamic perspective. According to Ghulam Sarwar (1997), Dalang Hamzah once was told by a police officer to stop playing wayang kulit because in Tumpat, Kelantan any practice and elements in Wayang Kulit are *Haram* or erroneous in Islam.
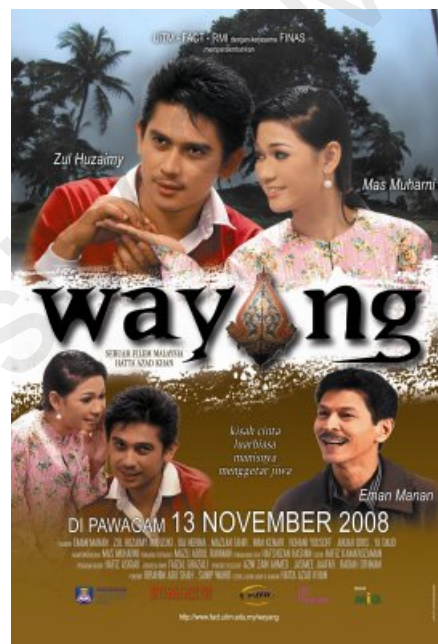
Figure 2.26   Film "Wayang" the first Malaysian film that manifest the challenges and survival of Wayang Kulit Kelantan

Some effort by Malaysian film makers to preserve the heritage of wayang kulit was seen on a small scale. In 2008, a film "Wayang" (Refer to Figure 2.26) directed by Prof Hatta Hazad Khan with the assistance from University Teknologi MARA students, was the first Malaysian film produced which propagates the culture, lifestyle of the people and the influence for the survival of Wayang Kulit Kelantan among the religious group and the general public. This film portrayed the puppeteer's challenges that he faces from society that rejected wayang kulit from its banning and un-Islamic per se , also his survival to transmit the art and knowledge to the younger generation as a part of survival. Thus, Dalang Nasir quoted *"Why Kelantan state government ban wayang kulit? The reason is that the leader did not study well enough about the art of wayang kulit, and their point of view is only from the religious aspect"* (Dahri Zakaria, 2006).

This had given a negative impact in terms of the future shadow puppet traditional theatre art and the survival in Malaysia which is already being extinct[8]. As time and thinking perspective changes, the puppeteer seems lack of understanding needs and religion sensitivity with modern lifestyle. Some Dalang or puppeteers today do not practice rituals that are against teachings of Islam. Dalang Pak Su Ghani said, "*Puja-adoration* before the opening stage or smoke is not practiced anymore".   Pak Su only read verses of the holy Al-Qur'an and read a little prayer before playing the shadow theatre, and this is the way to correct some superstitious practices which are now being adjusted to the Islamic requirements (Hanif Nor, 2011).

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[8] Interview with Prof Ghulam Sarwar 2012, at IIUM Gombak, stating that shadow puppet and Mak Yong Malay traditional theater at a vital stage and it's considered dying.

Islamic elements are conveyed through the message of lifestyle in shadow puppets, with the unseen powers of *rituals* and *semangat* to the transmission of du'a as a weapon and seeking blessings from the creator Allah SWT is defined as the right way of Islamic approach (Rohani, 2008). Today's puppeteers do not perform any un-Islamic style or approach in Wayang Kulit performances and this includes some non-muslim puppeteer like Dalang Eyo Hock Seng. The author was able to observe a Wayang Kulit performance by Dalang Pak Nasir and his troupes at School of Arts and Culture (ASWARA) 2012, title "Siti Dewi Diculik" where in his two (2) hour performance he included a recitation of du'a, and there was no ritual performance performed, the stories were modernized with a lot of sense of humor, and the audiences were mainly children and adults.

2.4.5   Music

Music is an integral element of shadow play theatre. It brings the repertoire to life, puppets and spirit of shadow play puppet to life (Ghulam Sarwar, 2008) "Lagu Bertabik' as the introductory element in wayang kulit musical ensemble, is probably the most powerful of all traditional Malay music. According to Patricia and Hamzah (1998), the shadow puppets will move simultaneously with the music played. But once the Tok Dalang begins the dialogue, the music stops and if the stresses are on certain dialogue especially humor, the music will play special sound effect called "gertuk perkakas" to accompany the puppets movement (Patricia & Hamzah, 1998).

The music repertoire in Wayang Kulit Kelantan for example, has 30 pieces which consist of actions, rhythm and mood for each puppet characters. The loud, dynamic sound of drums, gongs and reed wind instrument can best describe the entertainment of wayang kulit Kelantan. The main instrument is a quadruple reed wind instrument called *serunai.* The musicians are known as *Panjak* and the number of musician varies between seven to ten people. The musicians are highly skilled and versatile with experience in Menora, Mak Yong or Silat. Dalang Eyo Hock Seng said during an interview with the author in 2012, the musicians must focus each time the Dalang starts his story or dialogue session in order to play the right music especially once the Dalang stops.

The musicians are generally attached to one puppeteer, but may move between troupes. In other words, the puppeteers and musicians work with conventions which make group creativity possible. The music component in Wayang Kulit Kelantan can be categorized into three main elements. Idiophones consist of *canang, kesi, tetawak*, Membranophones; *geduk, gedumbak, gendang* and Aerophone; *serunai.* Training for musicians start at a very early age as apprentices which is essential in order to be established musicians and performing the repertoire. Dalang Pak Hamzah, Dalang Eyo Hock Seng, Dalang Pak Cu, Dalang Siri Neng Buah, Dalang Khan Boon An, Dalang Nasir and many more are well known Dalangs or puppeteers who started their trainings from an early age by observing and learning to play musical instrument for Wayang Kulit Kelantan performance as part of the fundamentals to be a successful puppeteer apprentice.
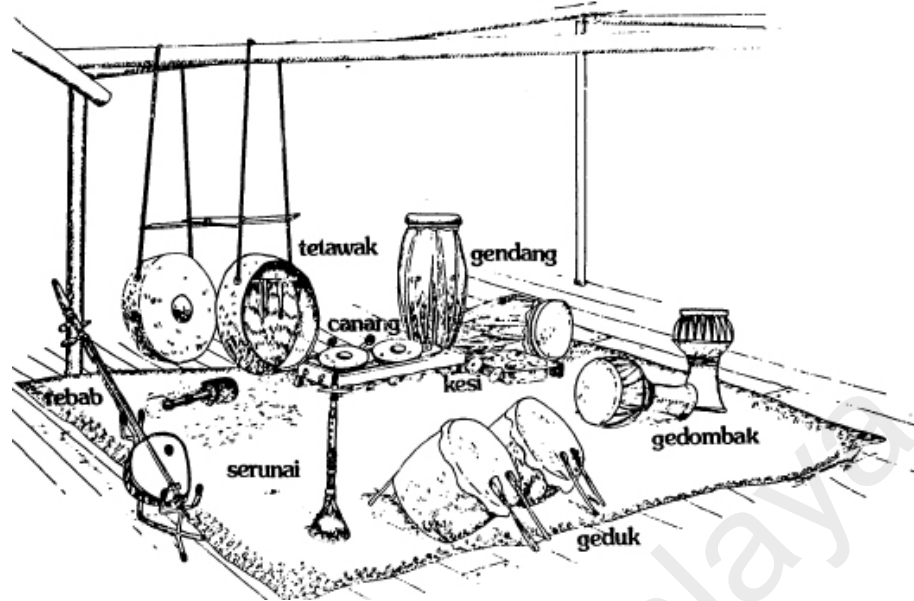
Figure 2.27   List of Wayang Kulit Kelantan Music Instruments

The Wayang Kulit Kelantan(Siam) music instruments (Refer to Figure 2.27) consists of a pair of each large and small musical instruments called mother (*ibu*) and child (*anak*). Songs such as *Lagu Berkabar*, *Kabar & Dayang*, and *Menyanyi & Mengulit* are accompanied by serunai *anak* which is much softer than serunai *ibu*. Also, movement of the puppets always require music from the musicians or orchestra. Examples of some pieces include violent action (*Lagu Berperang*), Walking puppet characters (*Lagu Berjalan*) and (*HuluBalang Orang Darat*), puppet characters (*Lagu Seri Rama, Maharisi, Maharaja Rawana*), (*Lagu Tukar Dalang*) or giving news (*Lagu Berkabar*). Overall, music is an important medium to entertain audience and the role of *Dalang* (puppeteer) to fascinate the audience rely/depend highly on the music skill played by the orchestra troupe.

The music of shadow puppet serves as unique, ritualistic, dramatic and structural functions between the audience and performers (Ghouse Nasuruddin, 2009). From the author's point of view, Wayang Kulit music is similar to a "bridge" concept that connects human with nature, with its melodic and rhythm of notation.

2.2.6 Light Source & Kelir

Lights are common with wayang kulit or shadow puppetry which are related to the sources for human to seek the truth in life and in defining mood. The position of the light is static, and hanging between the height and the face of the Dalang perspective view. As time goes by, from using oil or paraffin lamps in the past, most wayang kulit nowadays are replaced by electric bulbs (Ghulam Sarwar, 1997). The Kelir reflects the concept of "Clear Sky" where productive and experienced puppeteer or researchers observes oil lamp shadow play as aesthetically superior with direct glare and lamp heat drop down onto the Dalang's face.

Dalang Saupi, in an interview 2011 described the movement of puppets on the Kelir like "Gelombang" or wave effect due to the soft edge shadows created that is cast onto the 'Kelir', with left and right, in and out, up and down movement that flickers with a more satisfying appearance. According to Ghulam Sarwar(1997), veteran wayang kulit fans pointed out that the light effects using paraffin oil lamp in traditional wayang kulit creates contrast and mood, describing it as rich with aesthetical culture.

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Also, according to Kenneth Gross(2011) he quoted from Thomas De Quincey stating that the qualities of shadow output in Wayang Kulit are projections of umbra and penumbras (light tone) with shadowy focus and contain menace of thinking with emotion and feeling substance of shadow presence. Adiguru Pak Nasir mentioned with the researcher during an interview after his performances at ASWARA "Bunga Cempaka Rindu Malam" shadow puppetry performances in April 2011, light source in Wayang Kulit performances are only to be strike or moved on purpose as long as there is non-movement puppets during the performance while numerous puppets positioned incline or slanting within the screen. Each puppets motion involves casting a shadow creates an illusion with lighting aura, mood and effects that provide the audiences more enjoyable scenes to watch.

2.5 The Art of Animation

The combination of science and art created diverse cultural forms and has given an impact to the world of culture and communication. Animation is referring to the context of space, pervasive and expression. Animation is similar to shadow puppets qualities and styles that involve narrative, aesthetic and technical aspects. Animation is capable to explain and imagine anything that a human mind can visualize (Frank Thomas & Ollie Johnston, 1981). The context of imagination and representing an action is specific in animation. An animated film uses to convey message by using three perspectives; entertain, educate and informative. Animation itself has the art and technology component. Therefore, animation, from the authors' point of view, could be considered as a convergence between arts and science especially in today's animation style and techniques.

It has absolutely created a new medium of entertainment using the traditional style combined with computer generated that produces stunning 3D graphics not only for entertainment, also for education, medical, military and many more.

2.5.1   Introduction to History of Animation

Animation is an illusion of frame by frame illusion of movement through sequences assembled (Richard Taylor, 2003). Animation consists of imagining and action representation. Paul Wells's in his book, Understanding Animation (1998), claims that 'animations as representative of art and language in film context, with stylish and dynamic compared to original mainstream films. This is an art of between life, illusion and entertainment. As Denslow(1997) mentioned, bringing an object to life is the concept and the heart of animation. Simple illustrations or cartoon drawn characters since the era of World War I were examples of juxtaposition between animation and the illusion of life. James Stuart Blackton, an American cartoonist, was known as the Father of Animation in early 19th century, created an experimental animation title "*Humorous Phases of Funny Faces*" (Refer to Figure 2.28) in 1907 using stop motion shots of drawings on a blackboard. The animation was a successful pilot test on illustration, movement and illusion.

Figure 2.28 Stuart Blackton *Humorous Phases of Funny Faces* (1907) stop-motion shots of drawings on a blackboard.

Animation techniques quickly developed thanks to the contributions of other pioneers like Emile Cohl, Winsor McCay and Walt Disney. Later, the Japanese started their animation in 1970 with "Anime" including famous animators like Osamu Tesuka (Astro Boy) and Hayo Miyazaki (Princess Mononoke). In Malaysia, according to an interview with Hassan Muthalib in 2010, he described the Malaysia's animation pioneer was Hikayat Sang Kancil (created by Anandam Xavier, 1978) and was screened in 1983. Using 2-Dimensional cel animation drawings with hundreds of frames and colors, the animation moved frame by frame which focused on "*Cerita Rakyat*" stories to educate children. Later, animation in Malaysia on TV series were created such as Usop Sontorian and Kluang *Man* even though the quality of animation were sub-standard compared to Western or Japanese animation in terms of animation qualities such as character design, movement, lip-sync, inking, layout and others.

Nevertheless the animation was a success in terms of narration, creating a local content and identity that suits the culture of the Malaysian society. With Disney's leading the traditional art form, in 1930 Ollie Johnston and Frank Thomas developed the *"Traditional Twelve Principles of Animation"* as guideline to the fundamentals of traditional animation style. Since the era of computer technology in the 1980's, the industry of animation was given another spectrum with the concept of photorealism. John Lasseter's (1987), described the art of mainstream cartoon animation and computer graphics as not mainly to complete an object, but most importantly it is to contribute towards a complete story.

2.5.2 Types of Animation Techniques

In the 18th century, animation has been explored on the understanding and inventions. The first real concept of animation was in the 1800's with a few inventions that were created and can be considered to be animations. The first of these was the Phenakistoscope in 1829 invented by Joseph Plateau. The Phenakistoscope was a rotating disc with a series of illusion of drawings around the side in frames. When it spins, it creates the illusion of movement. The Zoetrope (Refer Figure 2.29) uses the concept of looping animation, frame by frame movement with exact frame size and shape, using spinning as a technique to animate the pictures. Also, during the Victorian era, Zoetrope was a popular toy for children and also adults to communicate and entertain related social and political matters (Nate & Ryan Eckerson, 2006). Here, we can stress that innovations during the 18th century on animation are basically movement sequence through illusion of images which are the fundamentals in animation.

Figure 2.29   Zoetrope as the innovation pioneers in defining animation concept

Innovation moves on to a bigger and more complexed technique due to the demand among audience and production companies. Traditional hand drawn technique was popular especially during the 19th to 20th century. Mark Kayo (2011) mentioned that cel animation uses layers of *Acetate* (originally Celuloid) in order to keep some of the frame static on one frame (background for example) and the other one drawing moving on a layer above the first character.

Early cartoons like *The Flintstones* uses traditional hand drawn technique. William Hana and Joseph Barbera created *The Flintstones* in 1960 (Refer Figure 2.30) and it was one of the first TV animated sitcoms in the United States that uses cel animation. The stories focus on the adaptation of the modern society lifestyle being transformed into the caveman era. Lena and Brian (1997) mentioned that Frank and Johnston, two of Disney's most famous experienced animators, during their early days in animation, the concept and study of silhouettes and shadows are vital that allows to create a proper anchored figure and gestures (Lena al., 1997). The art of traditional hand drawn technique is an innovative approach to hand drawn animation which is more considered as complicated, yet it allows the study of frame by frame movement, saving labor cost, even though the output does not look too realistic but it still provides the opportunity for cartoons to be established on a small scale television budgets shows.

Figure 2.30 Flintstones cartoon by William Hana and Jospeh Barbera uses traditional hand drawn technique animation

The art of drawings to visualize motion or action are known as cut-out animation. Although it is one of the oldest form of animation technique it is almost certainly the easiest to design. The cut out animation involves outline intricate cut out shapes and animated frame by frame using stop motion style. Digital camera, video camera, or hand phone cameras are devices that provide the solution to create cut-out animation. The pioneer master of cut-out is a Russian animator Youri Norshteyn, uses multiple layer glass planes to provide his animation a notion of three-dimensional view with depth and quality. *Tale of Tales* (Refer to Figure 2.31) by Youri Norshteyn in 1979 was an animated film directed by Youri himself involving between robust and delicate style of action between nature, human and emotional (Richard Taylor, 2006). He prefers to experiment with animals and foggy background to establish the mood in his animation or trademark.

Figure 2.31 "Tales of Tales" by Youri Norshteyn used cut-out animation

Cut-out animation can be described as the pioneer related to shadow play and animation technique. Gotot Prakosa, during the Animation Film Festival 2003 in Jakarta, described in generic that some world class animation experts in the early years have been inspired by shadow puppets including a theory stating that Disney had done some observation from the Chinese or Hindu shadow puppets before he created animation.

The first successful international silhouette cut out animation was created by a female German experimental animator known as Lotte Reineger in 1926. She created *"Adventures of Prince Achmed"* (Refer to Figure 2.32) using multiple layers of cut-out silhouette characters (human and non-human) from cardboard. Her skill in manipulating the silhouettes was astonishing especially in Adventures of Prince Achmed with the theme or concept of Arabian Nights, she introduced various lighting, music and vibrant color, also fuzzy effects techniques precise animated articulate silhouettes figures. The animation had less than five(5) characters involved throughout the animation sequence.

Figure 2.32   Lotte Reineger's film *"The Adventures of Prince Achmed"*

As discussed earlier, Stuart Blackton is one of the early pioneers in the world of animation in the early 19th century, when he did *Humorous Phases of Funny Faces* (1907) stop-motion shots of drawings on a blackboard. Stop motion animation uses still pictures with static scenes and are recorded frame by frame using camera. As mentioned by M.C Vaz et al. (1996), stop motion involves the art of motion, dynamic, persistence and passion to create regular animation productions output including for television or cinema.

Some of the early pioneers narrative film-maker like Edwin S.Porter uses stop-motion dolls in his short animation 'The Teddy Bears' in 1907 (Ryan Ball, 2004). Paris born artist, Emile Cohl, who uses special effects in *The Dentures* with effective narrative film compared to live drawing motion graphics. (Le Ratelier, 1909). His first animated film called "Fantasmagorie" uses epic puppet character (stick figure) known as 'Le Fantoche' using pieces of drawing with output featured on negative film. The silhouette gesture of the puppet character movement indicates the expression and emotions within human and non-human.

Figure 2.33   Jiri Trnka, the puppet animator known as "Walt Disney of the East"

Jiri Trnka (Refer to Figure 2.33) was one of the world famous Czech puppeteers, directed his first puppet animation film called "The Czech Year" in 1947, and has changed his previous cel-animated cartoon style, to new dimension of expression and creativity using shadow and figure puppet. Edgar Dugka (2000), described Jiri Trnka as "Walt Disney of the East" (Disney focuses on children while Jiri is more engaged with adult audience). His stop motion puppet actions are almost realistic compared to a puppeteer control, including the American western style in his '*Song of the Prairie'* including American Western, singing, and stagecoach ride that involves intricate props and sets of puppets.   Hungarian animator, George Pal was also known for his famous film "Puppetoons" uses puppet characters made out of wooden figures.

His detailed work especially in creating 'Puppetoons' include detailed facial expression from various forms, with 3D looks, including color, repertoire of fantasy film and stop motion photography. Total of 28 puppets represent the 2 seconds of animation with thousands of intricate wood puppets. In addition, the carved head of each puppet lip-sync in detail every mouth movement of intonation, vowel and consonant pronunciation. Overall, the puppet style and set design in George Pal films are considered versatile, aesthetic and carefully done. According to Charles Solomon (1987), George Pal's prologue and epilogue in Puppetoons are merely incredible and his 40 years legacy still remains a merit to puppet entertainment.

Tim Burton is one of the most influential film directors and a renowned stop motion artist. His famous animation visual styles are *Vincent, Beetle Juice*, *Corpse Bride* and *Nightmare before Christmas* and also the recent production of *Alice in Wonderland*. Tim Burton is considered as a passionate person when it comes to stop motion animation. Tim Burton in 1993 produced the successful feature animation using fully stop motion technique for *The Nightmare before Christmas* (Refer to Figure 2.34). He adapted and modified this aesthetic piece through his own style or compositions of appearance, gothic, distorted in size, are much disturbing. (Niamh Coghlan, 2009). Tim Burton practices in a small studio space setting where the puppets, miniature sets, props, models, and the art direction all creatively coming together in an incredible imaginative world which can be produced in a small studio space setting and still achieve high production values.

Figure 2.34 Gothic style(concept) used by Tim Burton Stop Motion *The Nightmare Before Christmas*

Sand animation, also known as sand art, involves creativity of narration and tedious animated images using sand (Rubaiat & Kien, 2011). The artist animates series of images using sand by applying sand to the surface and rendering it by drawing lines and figures with hand control. Su Dabao, a famous Chinese sand artist designed using epic stories/materials. Joe Castillo is one of the pioneers in European sand animation visual styles today. He inspired millions of people through his talent with new styles including Kseniya Simonova. He uses vibrant colors and portrait styles as his favorite approach in his work. Kseniya Simonova a winner of *Ukraine Got Talent 2009,* performed two minutes sand animation video (Refer to Figure 2.35) demonstrates emotional and personas graphic styles related to World War II era. Kenyon (1998) described sand animation as an art that has increasingly attracted audiences and artists because of its mesmerizing style of innovative and expressive graphic style. Simonova performed 'live' sand drawings in front of audiences by communicating German history of conquering Ukraine during the World War II.

In Malaysia, Bee Ghee is also one of the most famous sand artists in Malaysia today who uses conceptual visuals and expressions. *Butterfly Lovers* is one of his famous arts, which portrays the legend of the Chinese Liang Shang Bo and Zu Yingthai through sand art using his hand, sand and frosted glass. According to Tho Xin Yi (2010), Loo Beng considered his work as unique with series of drawings and music which are all synchronized to established the 'mood' and able to mesmerize the audience. He even tried using other fine medium but sand still produced the best quality.

Figure 2.35 Kseniya Simonova World War II sand animation technique

Therefore, it can be described that animation is able to be produced from cut-out, cel hand drawn; puppets stop-motion and sand styles which are related to persistence of vision in animation world. The traditional animation which uses various medium and style of frame by frame animation is indeed a creative mind, expression and communication in the golden age. As human mind and creativity develops by years, the animation has taken another step by introducing computer technology as a convergence media between arts and sciences.

Therefore, the next chapter will look into computer graphics especially the 3-Dimensional animation and its advantages in today's generation.

2.5.3   3D Computer Animation

The 3-Dimensional (3D) computer graphics or animations are defined as visuals fusion of real or imagined objects designed in computer software applications. According to Foley et al.(1996), the projection of 2-Dimensional(2D) and 3-Dimensional(3D) visuals are reconstruction of models from their original picture. Also, according to Gary R. Bertoline and Cary Laxer (2002), 3D graphics are pure computer graphics discipline not only consisting of arts and sciences but also humanities and communication. It is an overlapping process between technology (science), arts and humanities as visualized in Figure 2.36. The usage of creative ideas translates into visual storyboard and art concept and later visualized into 3D computer software.
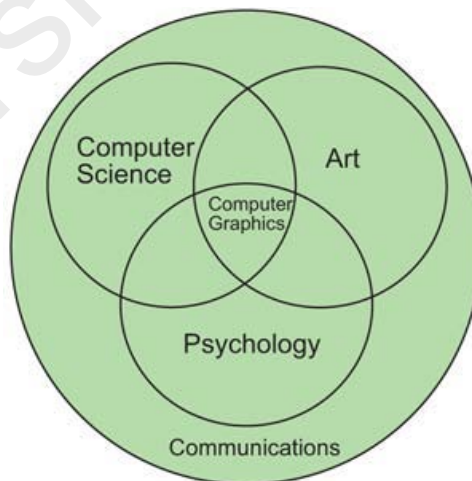
Figure 2.36   Gary R. Bertoline and Cary Laxer explains 3D Animation in the world of computer graphics involves overlapping of technology, arts and humanities

According to Mohd Izani et al. (2003), there are three techniques used to animate 3D models or characters in animation such as *Key frame, Procedural* and *Motion Capture* . Key Frame and Motion Capture are known to be the two common techniques used in animation industry even though Motion Capture are best known for its "Realistic Motion" and accuracy used in feature films such as James Cameron's experimental film AVATAR, Peter Jacksons' *Lord of The Ring*s, *King Kong*, *Monster House* and many more.

Motion captures are quite costly and has complex features in terms of managing the equipment or software and the techniques involved whereas *Key Frame* techniques are done totally inside the 3D software which includes the modeling, animation and rendering. According to the interview with animation director, Usamah Zaid, he described *Upin & Ipin (Geng)* 2009 as the first 3D Malaysian feature animation film done using Key Frame technique and described it as a much easier technique to manage and produced quality results in terms of visualization and audience needs.

The animation which started out with series, were done in different approaches. *Upin and Ipin* are not similar to the Western animation such as Marvel's *Iron Man* and *Spider Man* which are synonymous with the children as super heroes. *Upin and Ipin* use small children as metaphor to relate to the Malaysian lifestyle and culture in today's generation. Characters facial expression and lip sync is also another important element in character animation to create gesture proportion.

In general, computer 3D animation is concerned with the animation in 3D world, the process which involves computer modeling, lighting, camera, decorative colors and textures including special effects and rendering that is widely used in short or feature film 3D animation industry today.

The Adventures of Andre and Wally B. (Refer to Figure 2.37) was the first prototype experiment of 3D computer animation short film created by the computer graphics team at Lucas Film studios in 1984, and the story symbolized the idea of computer animation and creating possibilities around it. Amid Hamidi & John Lasseter (2009), stated that the team had several ambitions in 3D computer graphics including portraying articulated character animation and definite character, and understanding cinematic techniques for future development of feature films. Later on, some short animated film experiment including *Luxo Jr (1986)*, *Tin Toy (1987),* and *Knick Knack (1988)* short animation movies using more extensive experiment on 3D graphics from modeling and rendering techniques to produce realistic virtual effects.

Figure 2.37 Pixar The Adventures of Andre and Wally B developed using 3D computer animation (short film)

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From the success of experimenting with *The Adventures of Andre and Wally B , Tin Toy, Knick Knack* (the first short 3D animated film with photo-realistic rendering), *and Luxo Jr* short animated(3D) film, finally Pixar animation studios in 1995 created their first fully 3D animated feature film called *Toy Story* shown in picture 2.38.

During an interview session, Burn Snider, the editor of Wired Magazine with John Lasseter, the director of *Toy Story* in 1995 mentioned that, key frame computer animation has provided more flexibility and production time fast and effectively. Toy Story was a breakthrough in computer graphics entertainment that a feature film can be produced with full 3D graphics with extensive photorealism appearances using only key frame animation. Other successful feature films by Pixar and DreamWorks animation house include films such as Bugs Life, Ratatouille, Up, Cars, Shrek, Over The Hedge, Monster House, and Ice Age with a variety of storyline, characters, effects, audio, and many other elements just to entertain the audiences.
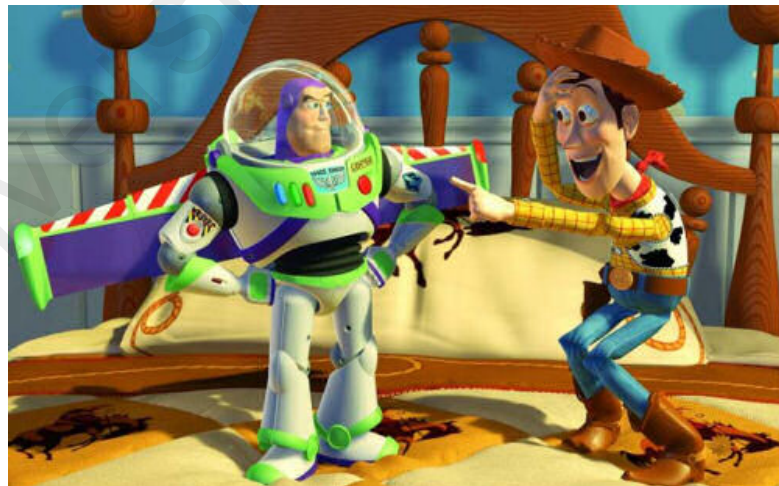
Figure 2.38 Toy Story (1994) the first full 3D animated film produced by Pixar animation studio in 1994

In particular with Malaysia, the animation industry started very slowly, and currently it is improving positively. According to Hassan Muthalib (2007), the animation development in Malaysia started in the early 1980's (Hikayat Sang Kancil) and the first animated television series 'Usop Sontorian' was only screened in 1995. Malaysia's first animated feature, *Legendary Silat Warriors* known as 'Silat Legenda' shown in Figure 2.39 hit the screens in 1998 where it was mostly done with cel animation including some scenes using 3D animation.

An interview with former 3D animator of *Silat Legenda,* Rafidei Mohamad in 2011, mentioned that *Malaysia's first 2D animated feature film* was a success in terms of Malaysia's capability to produce animation based on local content and created opportunity for feature animation local content development in the country. He added that people around the world are able to understand the culture and lifestyle of Malaysian society and this can be done through animation. Unfortunately, the animation did not receive positive revenue and response due to lack of budget, poor animation and narration qualities including manpower and computer hardware.

Figure 2.39 *Silat Legenda* (1998) the first Malaysian feature animation film using 2D visual styles

Upin and Ipin "Geng Pengembaraan" (2009) shown in Figure 2.40 was Malaysia's first full 3D animated feature film. The animation itself from overview of the local contents market, despite the continuous support by the government, only a small number of local industry players are producing world class creative content for international market such as *Upin* and *Ipin.* (Nik Marzuki, 2008). Again, Usamah said that Malaysian 3D animation (referring to Upin and Ipin) are among the best animation in Asia in terms of providing local flavor, culture and animation standards.

It might be difficult for Malaysian animation benchmark to be at the same level of visual arts animation of Pixar, DreamWorks or Disney style. For instance, countries such as Indonesia, Singapore, and the Philippines have accepted *Upin & Ipin* Feature Film and TV Series including the success to be accepted for TV Disney Channel. The process of 3D animation pipeline was used for *Upin and Ipin "Geng Pengembaraan".* It was used for very focused categories such as pre-production (story & concepts) and production (modelling, animation, lighting, compositing, and background). 3D computer software such as Maya, 3D Studio MAX, Photoshop and Adobe After Effects were used to model, design, animate and composite the final composition. Furthermore, most of the rendering process were done by MIMOS grid computing that provided high and fast quality rendering. According to Henry Casanova (2006), grid computing allows sharing of multi-resources from computer hardware such as memory and microprocessor or storage with wide area networking especially for animation rendering purposes at various production companies. With grid computing, each final 3D rendered image with a huge capacity due to screen on cinema format, would be able to be rendered faster in real-time capacity.

Figure 2.40 *Upin & Ipin* : *Geng Pengembaraan* (Journey of Adventure), Malaysia First successful Full animated 3D feature film in year 2009

The digital animation revolution has just entered its third decade of development. There remains much to be discovered when it comes to the new possibilities with digital production. While 3D animation is still maturing, 2D animation has barely begun its own process of experimental development. This potential will begin to be realized in the coming years as digital 2D animation processes mature and rising artists push the boundaries of the directions of growth that digital production systems allow, giving the public new ways to experience old and new stories alike. The vigor and determination of young artists today will continue to drive the digital revolution of tomorrow. They will nurture a new art form that allows a full range of style to mature and develop into a long future of conceptual and meaningful storytelling.

2.5.4 The Advantages of 3D Animation

Even though the computers' speed increases tremendously, the amount of detail and quality work seems to increase with new technology, infrastructure, hardware and software. 3D computer animation can be defined as a unique approach to present ideas, creativity, reality or imaginative.

From arts, humanities and science have allowed 3D computer animation to provide learning and entertainment with clear photorealistic images with depth, lighting, texture, effects and much more which can be described as beautiful. Local and international film producers and directors, animation production studio, government and non government agencies are embarking much more in 3D computer animation with new media technology that provides advantages with 3D computer animation. Here are several advantages related to using 3D animation (Elliot et al., 1999) :

- Developing visuals that are not possible to be obtained in real life situation, such as at war or landing on outer space.
- Replicate some related work of art destroyed by natural causes or by human.
- Developing products through computer 3D visualization that has not been produced.
- Creating photo realistic character animation (human or non-human form).
- Producing frame by frame movement of images generated from graphical materials such as photography, illustration, painting, figure and sculpture.
- Animating fantasy and mythological heroes.

According to Manovich (2006), realistic features are the ultimate goal of most digital experiments and opportunity in 3D computer animation. With 3D features including lighting and camera, replicating reality with realistic visuals are diversifying many opportunities or advantage related to computer animation particularly 3D such as computer modeling with texture and light particles (visual effects) are some of the effort to 'reconstructing realism or realistic in 3D visualization or computer graphics. In 3D computer animation or graphics, it is all focused on the realism or creating realistic characters that are able to mimic actual performance of humans.

The dominant symbols in 3D computer animation applications for film production, especially the various visual effects and technology such Motion Capture (MOCAP) or 3D Stereoscopic camera and much more impersonate the restrictions in feature films such as Avatar, Lord of The Rings, Monster House and King Kong that integrates computer motion capture technology with 3D computer animation to produce film with the concept of inevitably accompanies and assimilation of CGI (Computer Graphics Imagery).

As three-dimensional (3D) photorealistic imagery is used broadly in mainstream visual culture film or art, issues of cost, technology and human skill are also some of the limitations that are present in the three-dimensional (3D) area. Even with key frame animation technique, procedural and motion capture techniques used in 3D animation environment, it can be tedious especially expecting the output qualities to be the same with the level of realism or realistic visualization. But in the end, it is all about satisfaction in admiring a piece of personal animation product being produced. 3D computer animation is crucial both in production and visualization approaches in different discipline or areas. Animation can be in the form of cartoon or realistic looks, but most importantly is it contains visual expression, edutainment and stylish looks in supporting various industry or sectors including medical, military, education and entertainment.

From pioneers of Disney animation (traditional hand drawn) animation to 3D computer production companies including Pixar, DreamWorks, or local production animation house such as Les Copaque(Malaysia), have created a new paradigm shift between hand drawn visuals to realistic features, which Wayang Kulit survival and computer animation are important and relevant to the society.

2.6   Digital Puppetry

2.6.1   Background

As described earlier by Steve Tillis (1988), Stephen Kaplin stated that there is a distinctive correlation between traditional and digital puppetry. It is referring to the world of tangible (tangible) and non-tangible (virtual). It is about allowing the audience to be inside two (2) different styles of puppetry. The traditional puppetry has mystic, physical touch, desire, and appeal of each puppet characters. Compared to 3D computer animated which provides more depth and photorealism factor. Thus, to develop 3D digital puppetry, the author would like to look into several works done in the context of digital puppetry techniques with reference to several case studies. Traditional puppetry is a well known form of theatre performance around the world. Even though there are still insufficient effort done specifically on digitizing "Wayang Kulit Kelantan", several experiments have been done around the world which are related to shadow play or digital puppetry.

The author would like to look into the convergence between traditional and digital in this case of 3D visualization or animation technique used in Wayang Kulit entertainment including the advantages of digital puppetry.

2.6.2 Related Work on Digital Puppetry

According to Khor & Yuen (2009), at present it seems very less effort on animation styles particularly in the Asian region, that portrays digital aesthetic qualities related to shadow theatre. According to Siew Liam Lin (2011), quoted from her interview with Larry Reid, a famous experimental shadow puppet producer and puppeteer, he described that the survival of wayang kulit in Malaysia is at a critical level.[9] Also, Jan Mrazek (1999) stated that Malaysian Wayang Kulit is slowly facing extinction due to the lack of promotion and awareness programs. An effort that would be highlighted for instance Malaysia TV advertisement "*Ubat Batuk Cap Ibu dan Anak*" or " Mother and Child Cough Syrup" (Refer to Figure 2.41) was an example of digital approach using shadow puppetry visual arts to sell the product and also to promote local culture values. The 2D puppet animated Javanese influence, from stylish and complex craft design to the particular puppets with animated backgrounds and voice over, represent the element of shadow play qualities to promote cough syrup product.

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[9] Siew Liam Lin, 2011, conducted a personal interview with Larry Reid in her Master Thesis of Preservation and Practices of Wayang Kulit In Malaysia, Interview with four Dalangs

Figure 2.41 Javanese influence using 2D animation puppet for TV Commercial 'Cap Ibu Dan Anak'

"Jala Emas Jala Perak" (Refer to Figure 2.42) is an example of Malaysia's first CD collection animation series influence and using the concept art of Wayang Kulit Kelantan. The puppet characters are basically 2-dimensional (2D) looks with cartoonish visual appearance (color, facial, props, costumes are all adapted from original Wayang Kulit Kelantan characters) with narrative voice over of puppeteer Dalang Saupi adapted from Ramayana epic. Even though the animation is not being shown on local TV stations and cinema due to lack of visual appeal (Khor & Yuen, 2009), but positive aspects in terms of surviving and also promoting local culture performances such as Wayang Kulit using computer animation are encouraging with a variety of vivid colorful characters including nature, animals, and much more.

Yuen and Khor (2009) did a study on the visual styles of wayang kulit Kelantan and its capturing methods. The study or research of experiment visual styles wayang kulit Kelantan were focused on four major aspects, which consist of the puppets, shadows, screen for shadow projection (Kelir) and its light source.

Also in 2012, Khor personally conducted a research on experimenting with Motion Capture to capture realistic movement of the Tok Dalang animating "Pohon Beringin" in Wayang Kulit Kelantan. From observation, this research is mainly focused on using Motion Capture Technology (MOCAP) to capture the Traditional Wayang Kulit Siam realistic movement and aesthetic components. No attempts were made in terms of music and story approach.
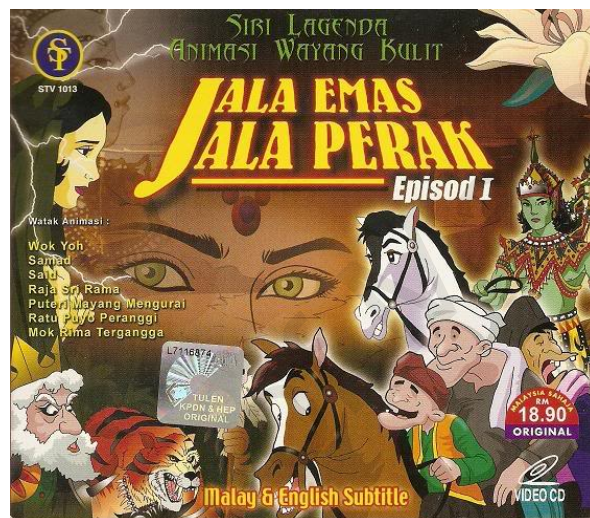
Figure 2.42 Jala Emas Jala Perak, Malaysia first's Wayang Kulit 2D cartoon

Mohd Azam et al.(2008) experimented with Wayang Kulit visuals with computer programming using OpenGL to develop a real-time prototype interactive and virtual product related to Wayang Kulit characters. The prototype interactive virtual using Seri Rama character, were modeled and animated based on lighting and texture including adding vibrant effects such as lighting and motion blur developed using computer algorithm with OpenGL. However, there were some drawbacks related to this research in terms of visual designs which were fully 2-Dimensional (2D) graphics, with no narrative or music; and also the puppets lack of artistic features.

Figure 2.43 First 2D feature Film ("Sita Sing the
Blues") base on Shadow Play epic of Ramayana & Mahabharata in Wayang Kulit

In year 2008, Nina Paley an American cartoonist, director created the first 2D animated feature film based on shadow play visual style called *" Sita Sing The Blues"* (Refer to Figure 2.43). Using flash animation vector technique with musical version, she managed to produced the two(2) hour film based on Sita and Rama characters adapted from the classical epic Hindu of Ramayana episodes . The animation movement looks smooth, cartoonish vector styles with the impetus of the film were not that encouraging.

Wayang Virtual, an application research conducted by Hasnizam in 1997 (UNIMAS), is another effort using digital or computer medium to portray the art of Wayang Kulit. It was developed by using 3D computer animation, music and live performances. The whole purpose of this research was to experiment the effectiveness by combining several elements such as using computer animation (SGI) , music (MIDI) as well as live performances of the puppeteer and musical live performances integrating with 3D computer animated puppets.

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The concept of combining 3D animated puppets controlled and animated by the Dalangs or puppeteers with real puppets and projecting 3D puppets onto a white projected display were astonishing. According to Hasnizam(2007) the art of creativity and similar qualities (narrative, puppet and audio) of traditional Wayang Kulit performances still exist in Wayang Virtual and with enhancement features using computer for the audience to appreciate. In year 2008, Ian Grant developed *Minnie the Moocher and Me*, a dynamic musical system that uses computer animated puppets with hybrid real time audio through wireless using Apple Quarts computer system. Several avatars were also designed and controlled using Bluetooth device (Ian Grant, 2008).

The flame animation effect with vivid colours that allow silhouettes to be generated. Figure 2.44 shows Ian experimenting with visuals from Lotte Reinigers short film "Prince Achmed". Referring to black opaque silhouettes images in Prince Achmed, Ian was able to animate and control the system of the moving silhouettes within the film itself. The silhouettes movement are also similar to the concept of Wayang Kulit shadow movement, and therefore Ian's system were able to capture and control the entire process in real time.

Figure 2.44 Ian experimenting with Lotte Reinigers silhouettes animation

In 2005, Shu and Tsai designed a shadow puppetry of Chinese style influence with animated features at SIGGRAPH 2005 using motion shadow movement. The shadows are basically moving with distort and scale size developed using motion plan algorithm with user input and character animation. The shadows are basically opaque silhouette which the system allows to control characters with primary and secondary motions. Overall, the system is complicated with menus and buttons and also the instructions might be difficult for users to follow and use in future and also the background color reflecting a sun set mood could be experimented with more pulsating colors and designs.

In digitizing shadow play puppets, Wahju et al. (2009) developed an interactive multimedia courseware application to educate children using Javanese influence visual arts of Wayang Kulit puppetry to support literacy on media with the concept of learn and entertain. The application provides children to design various narrative or stories with Javanese puppets visuals, which can be saved and shared using the application with immersible approach. The application was developed using several advanced programming language including object oriented JavaScript, providing dynamic or interactive features including drag and drop, colouring, music and animated cut out visuals. Overall, the application has limitation in terms of the number of puppets visuals and customization (e.g. coloring the puppets in real time).

Mareeya Binmalee & Sunchanee (2010), came out with an experiment using multimedia authoring tools which improvise the understanding on storytelling creativity for Thai's seventh grade students with vector graphics adapted from visual styles of Nang Talung puppets from Thailand (Refer to Figure 2.45).

From this research, the targeted group students were fascinated with the concept of using animated puppets with digital video, providing more opportunity to learn or gaining knowledge for the students. The students were able to be familiar with content from the animation video effectively, including the usage of verbal communication or language that are recognizable for students and also audio of music used for puppet entertainment makes the students learn and they have benefitted from it.
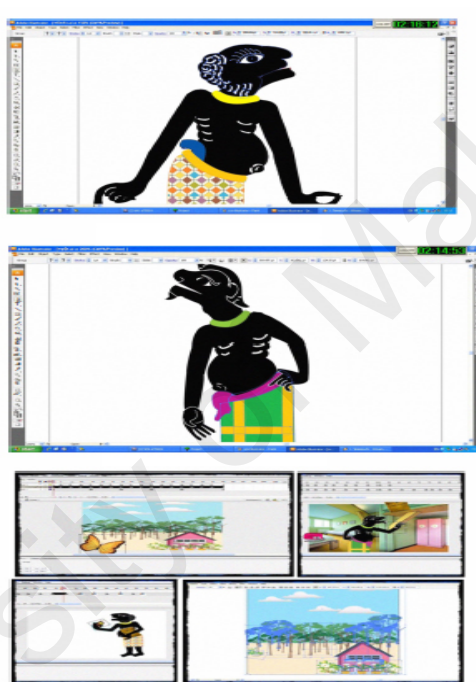
Figure 2.45   Puppet Design *Nang Talung* used for Multimedia video for seventh grade students in Thailand

In experimenting the digital system and puppetry, another approach developed by Oscar Mayora was done by using immersive function interactive system for narrative style of storytelling targeted for kids or young children using puppet system based on hand controlled known as i-Theatre (Refer to Figure 2.46). i-Theater permits the children to the full access of the story (Oscar et al., 2009). This is applicable based on the children requirements regarding their sense of immersive or interaction with

technology features, social context and creative tools. Computer technology with i-Theatre allows the inquisitiveness among the children with passion and requires control or guidance for each activity involved. I-theatre uses RFID to identify the several options from the users to stage or setup a scene of virtual dynamic puppet theatre with audio and motion control.

Figure 2.46 i-Theater system uses hand puppet character with RFID

Figure 2.47 TinToy Chou showing two Wayang Kulit Star Wars puppets : black (Dark Vader-left) and Perantau Langit (Luke –Right)

Another fascinating visual approach using the concept art of Wayang Kulit aesthetics styles by combining Wayang Kulit Kelantan puppet characters (craft shapes and articulated joints) with Star Wars recognizable visual arts. The puppets are crafted and colored using two famous Star Wars protagonist and antagonist characters Luke Sky Walker and Dark Vader. The artist, Tintoy Chuo also named the puppets Dark Vadeh (Dark Vader) and Perantau Langit, influenced from George Lucas *Star Wars* films (Michael Cheang, 2012). The process of designing the puppets includes laser cutting, art board and software.   The puppets height and size are roughly estimated around 1 meter tall and are available in black and white only (See Figure 2.47). Unfortunately, proper development of storytelling and audio are some of the elements still lacking in presenting a proper performance of the version "Wayang Kulit Star Wars". However, this can be considered as a positive effort to incorporate modern elements into traditional styles especially for the younger generation to appreciate.

2.6.3   The Impact of Digital Puppetry

Digital puppetry is a significant up-and-coming domain in computer animation. Improvement in the contribution to modern technology such as infrastructure, software or hardware have created potentially new experiments of animation fundamentals that allow for instance, the puppeteer using series of specialized input devices to direct each movement of animated puppet characters in 3D computer animation (real-time), which is an inherently online or real-time technique.

Unlike traditional animation which is rendered as a batch process hours or days after it is scripted by an animator, digital puppetry allows puppeteers, directors and other performers to directly interact with the animated characters. Where previously animations had to be methodically storyboarded, digital puppetry permits spontaneity and improvisation.

Puppetry is a 30,000 year old piece of art (Blumenthal, 2005), where most puppetry involves storytelling and techniques, and its impact is determined by the ability to create a fictional space for the spectators that has aspects of magic with the play. According to Celine & Guilo (2010), if the audience is invited to view the fictional and the fertile space in puppetry, an engaging experience between the puppeteer and the audience would happen. Thus, the audiences are realistically important to value the art of puppetry from many perspective and the classical shadow puppets like Wayang Kulit will always be remembered as an art inheritance for many years to come.

Digital puppetry is an alternative method to promote new life to the existing traditional theatre such as wayang kulit (shadow puppets). Findings from the experimentation and system design in digital puppetry may perhaps provide new opportunities and possibilities not just for entertainment and education applications, but also for other scenario-types applications which were originated from puppet theatre such as therapy and art creation. These include joint approaches to the technology enhancement digital puppetry such as multi user remote, virtual environment, immersive story-telling and many more. Based on the evaluations and the experiments that have been carried out, the approaches and techniques are acceptable for digital puppetry including shadow puppetry or Wayang Kulit. The approaches allow real-time and are interactive related to virtual and system (program) based digital puppetry.

2.7 Discussion

Overall, from the literature study of this chapter it has covered from the time line of history of puppetry to the latest technology in relation to animation and digital puppetry. The first part of the studies focused on the puppets of shadow play origins and influences that existed in countries including Asia, South East Asia and Europe. This includes the types or identity of the puppet and visual style which represent each of the country. Next, the author focuses on the types of puppets that exist around the world. Even though shadow play is the main focus for this research, the author would like to gain a deeper understanding on the current types or techniques available in puppet entertainment. This includes the five(5) main types of puppet techniques and most importantly several past work or experiment that was done.

The author was impressed with the variety of puppet techniques by including Japanese Buranku , Vietnamese Water Puppets and also famous TV education series Sesame Street which uses several techniques of body and hand puppet techniques. From the understanding of puppet history and techniques, the author would like to focus on shadow play puppet as the main technique. Since shadow play or Wayang Kulit is famous in Malaysia; the author would prefer to look into several main elements in shadow play such as repertoire, puppet design, and animation.

It was quite amazing to understand the unique and aesthetic form available in wayang kulit entertainment especially the Dalang (puppeteer). Pak Hamzah, a Dalang, has a totally different style when conducting a shadow play and also it was interesting to understand that many puppeteers in Malaysia had performed internationally. The author was able to understand the basic needs in performing a wayang kulit, the puppet design, musical instrument, and many others that benefits the author towards this research project. Thus, from the visual styles available in wayang kulit, the author will then look into the context of 3-Dimensional (3D) for Wayang Kulit. The author's main focus is to understand the concept of 3D modeling and animation. By understanding the concept and by studying several work done by the pioneers in 3D animation, it will help towards the development project on 3D keyframe shadow puppetry qualities for this research.

The concept of animation which was coined since the 18th century and was improvised by Walt Disney in 1930 and also was a pioneer in the development of Disney's first hand drawn twelve principles of animation. Later, as human thinking advances and technology evolved, Pixar animation studios started working on 3D animation since 1980 and started working on short film as their bench mark before

moving successfully into feature films such as *Toy Story*. With vast improvement in 3D software including modeling, rendering and animation, the perspective on entertainment industry has changed. For example, 3D computer animation in Malaysia was created successfully by Les Copaque production which created Malaysia's first feature animation film "*Upin & Ipin*" and it was successfully accepted locally and internationally. Until today, 3D technology has been a talking point in terms of entertainment and education, and therefore the author would also look into the benefit of using 3D as a technique in this research.

Finally, the author would like to study several past work related to digital puppetry which include wayang kulit art. Even though there are not much effort being put into the experiment specifically on shadow puppets or wayang kulit, the author was able to look at several similar approaches using shadow play and digital technology. Overall, from the author's observation, there are many types of experiments that were carried out including puppet types, algorithm design, authoring, complex system, animation and many more. From shadow play to physical puppet, there have been several experiments in terms of content and entertainment carried out in order to give a new dimension of entertainment from the existing traditional style.

Therefore, in the next chapter, the author will focus on the development of a prototyping 3D "Wayang Kulit" or shadow puppet, by developing and explaining the art of methodology studies which will be done to gain respondents' feedback between traditional and 3D digital shadow play entertainment and hopefully it would be beneficial towards the survival of wayang kulit in Malaysia.

CHAPTER III

METHODOLOGY (ANIMATION PIPELINE)

3.1 INTRODUCTION

The primary aim of this research is to develop a 3-Dimensional (3D) computer animated Wayang Kulit demo video prototype by using a 3D animation software based on key frame animation technique. In order to do this, historical and theoretical inquiries as well as prototype development related to Wayang Kulit, mainly Wayang Kulit Kelantan are conducted. The objectives of this research are:

i)   To explore the traditional visual arts in Wayang Kulit and emerging computer technologies related to key frame animation through historical and theoretical inquiries as well as focus groups.

ii)   To design a 3D computer animation Wayang Kulit animation prototype (demo).

ii)   To evaluate the expressivity of a 3D animation prototype by using expert and non-expert focus groups (respondents in Wayang Kulit and animation)

iv)   To identify the existence of Disney's twelve principles of animation in Wayang Kulit traditional styles.

3.2 Research Approach

In order to describe the research model used in this research, the studies from Chapman & Sawchuck (2012) Research-Creation model were discussed and analyzed as part of designing the research model for 3D key frame animation Wayang Kulit. It is a concept that focuses on integrating qualitative creative process and experimental aesthetics research with the current digital humanities and social sciences. The concept of writing qualitative research is similar to the creative work of an artist, which mainly focuses on presenting a set of meanings to an audience. As traditional Wayang Kulit or shadow puppets and animation are in the form of culture analysis, the aspects of research-creation partakes the spectacle of the artistic work and its demonstration of alternative models or frameworks as part of communication, understanding and disseminating knowledge. With tacit knowledge, the Research-Creation , with media and techniques of developing and disseminating knowledge will benefit in revealing new contexts and methods for cultural analysis such as traditional dance or theatre performances converging or collaborative prototyping digital media application, et cetera. Five types of activities were employed in order to carry out the qualitative research and activities namely: i) theoretical studies, ii) empirical research, iii) animation pipeline, iv) animation puppetry prototype development and v) evaluation of animation puppetry. Figure 3.1 shows the five (5) components used in this research method. The theoretical studies and empirical studies were used as sources of reference in the process of gathering the data for the development of 3D Wayang Kulit puppetry prototype.

The model or animation pipeline developed also served as a source of reference in the development of the animation prototype. Once the animation pipeline or workflow was designed, the animation prototype product was developed. This is important in order to gain a better understanding of the product in terms of content, animation and other visual styles in Wayang Kulit puppetry. Finally, the prototype was tested within the specific focus group of target respondents.
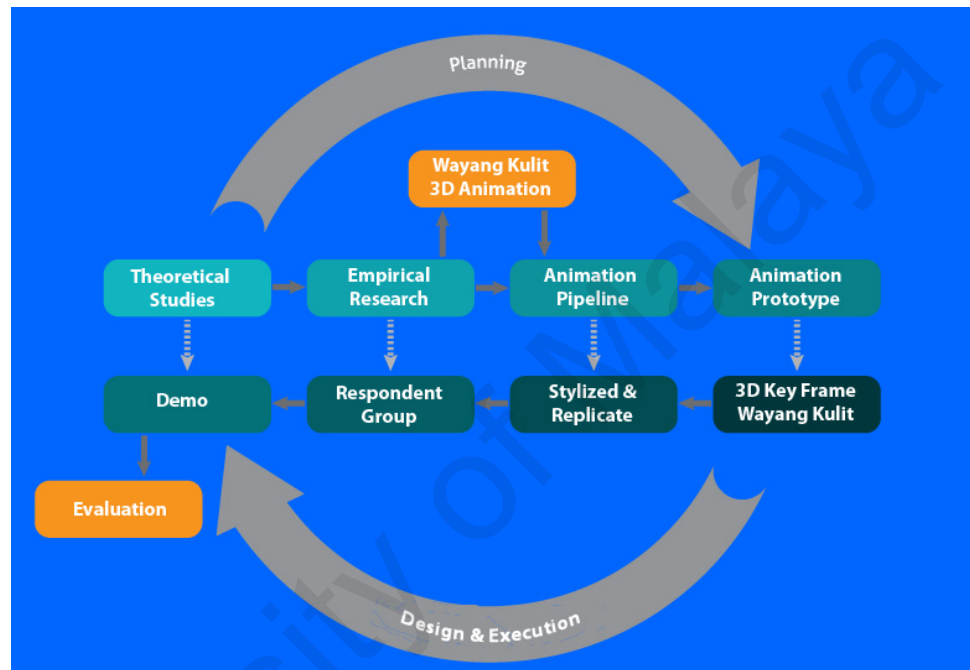
Figure 3.1   Five components used in the research approach

Theoretical Studies: This research will focus on selected previous works on theoretical, literary and historical aspects of puppetry studies, visual styles of wayang kulit Kelantan, types of animation techniques, effectiveness of (3D) 3-Dimensional animation and previous attempts towards digitizing wayang kulit. The discussions of these aspects will be useful towards the development of the 3D wayang kulit animation prototype.

By understanding the puppetry and animation techniques in general, the effectiveness of the 3D animation used to develop the Wayang Kulit puppetry focus on the comparisons between traditional shadow play puppetry and 3D digital puppetry. This includes puppet's characters design, movements and other visual styles related to wayang kulit.

Empirical Research: This research aims to gather the relevant data needed to develop the 3D wayang kulit prototype. Several approaches are employed such as interviews, surveys, observations, journals and articles in order to collect the relevant data and information. This information will be useful in constructing the prototype, especially in terms of relating it to the puppet model and animation style. Empirical studies are also beneficial in terms of designing survey questionnaires, identifying samples, data collection and data analysis. The sample used for this research is based on the focus group which targets expert and non-expert including animation and shadow puppet experts, and also the general public audience.

Designing Animation Pipeline: The theoretical research and findings from the empirical studies will lead to the development process flow for the animation pipeline design. The animation pipeline shown in Figure 3.2 consist of three (3) basic processes which is known as *Pre-Production, Production* and *Post-Production*. The design of the animation pipelines for wayang kulit was based on a 3D animation key frame workflow theory process designed by Adam Watkins which focuses on the production workflow including transition of idea, concept and illustration for 3D computer animation. According to Watkins (2001), to measure and identify the amount of tasks required to complete the animation prototype, an appropriate pipeline or workflow should be constructed.

The pipeline for this particular research is divided into three phases, Pre-Production, Production and Post- Production. Pre-Production specifically involves the process of idea, storyline, storyboarding including sketches and illustration based on the concept art.

On the *Production* phase, it covers the implementation of approved illustration and concepts art from *Pre-Production* and turning them into computer generated images or 3D computer animation visuals including modeling , texturing, lighting and most importantly rigging or animating the character , and finally rendering for video or still image (high-resolution) output. Finally, in the Post-*Production* phase, upon completion of the final rendered animation, the rendered animation video from the 3D software is transferred to Post-Production for editing purposes using software such as Adobe After Effects or Adobe Premiere. This includes adding music, editing of voice-overs, effects, transition and other related features. The animation pipeline provides a clear process towards the development of the 3D computer animation shadow puppetry.

3D ANIMATION PIPELINE FOR WAYANG PUPPETRY RESEARCH
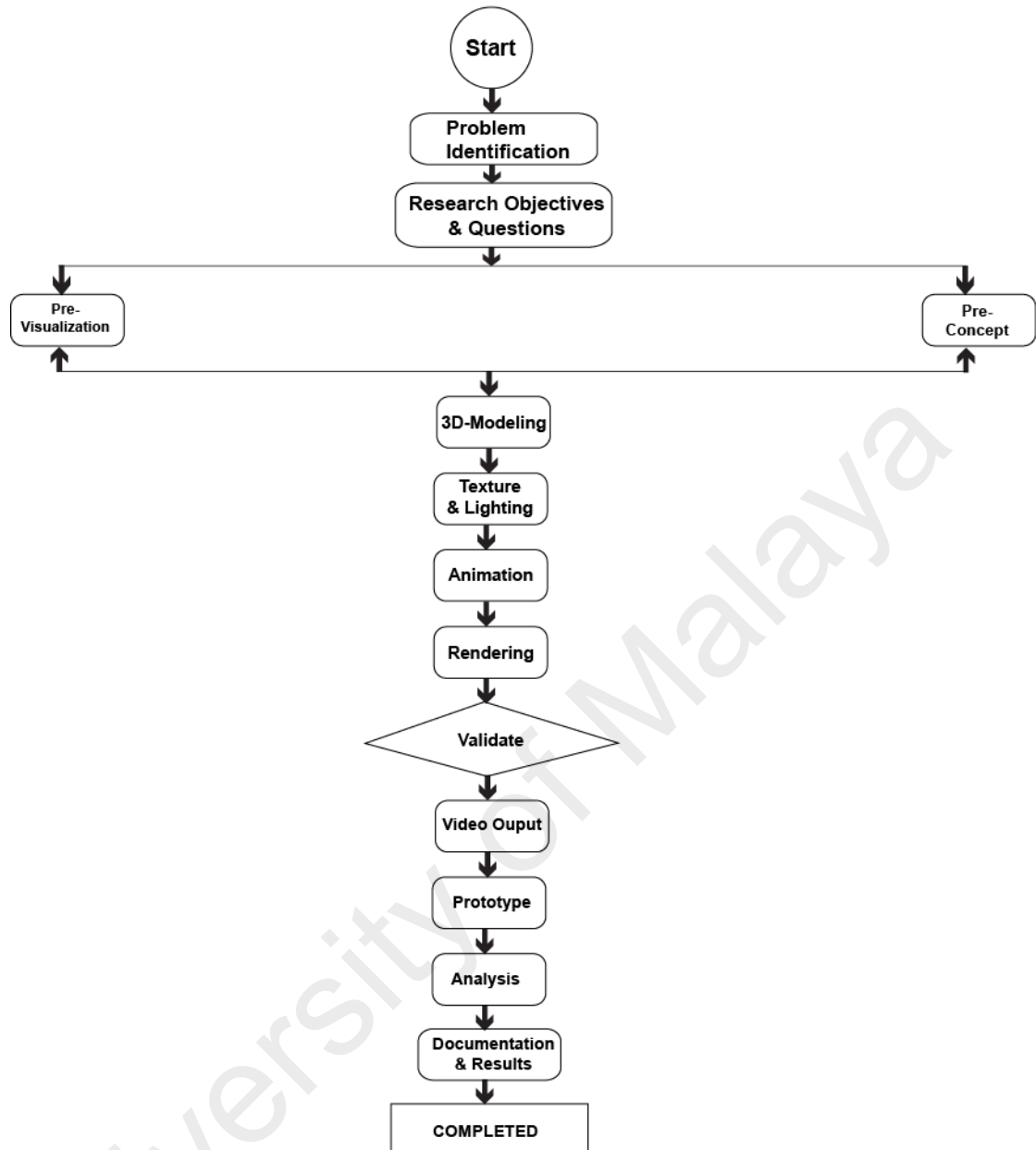
Figure 3.2 Adam Watkins animation pipeline design used for the development of

wayang kulit animation

Animation Prototype Development: The 3-Dimensional (3D) wayang kulit computer animation is developed using 3D key frame computer software known as 3D Studio Max. The final animation output is normally produced in an uncompressed AVI (Audio Video Interlace) video format (based on high resolution still per frame images). The prototype development consists of frame-by frame rendered images and later, the output from post-production. Several 3D techniques such as modeling, animation (rigging), texture, lighting and rendering are employed during this process. The key frame technique is the method used to animate the 3D puppet models. This is to ensure that the quality of the rendered images remains the same as in the production stages. In the case of any changes required for a scene, the animation pipeline especially in the production stage should be referred to in order to amend or re-render the image based on each sequence file. The expressitivity of the puppets in terms of movement and character design will take precedence during the product development.

Evaluation: The prototype will be evaluated based on qualitative and quantitative approaches. The qualitative approach is based on the focus group of respondents using the qualitative interviews method to gain their experiences. This is done by referring to traditional and digital Wayang Kulit puppetry implemented throughout this research. Some aspects of visual styles in wayang kulit including lighting and shadow, puppet model, animation and story direction are considered part of the survey and analysis. As for the quantitative approach, selected respondents such as local active puppeteers, animation directors, academicians and so forth are interviewed to obtain various viewpoints relevant to this research experiment.

Consequently, the respondents' feedback will be factored into the research and development of the 3D wayang kulit key frame animation prototype. Figure 3.3 provides an overall summary of the five research approaches used in the development of 3D wayang kulit animation.
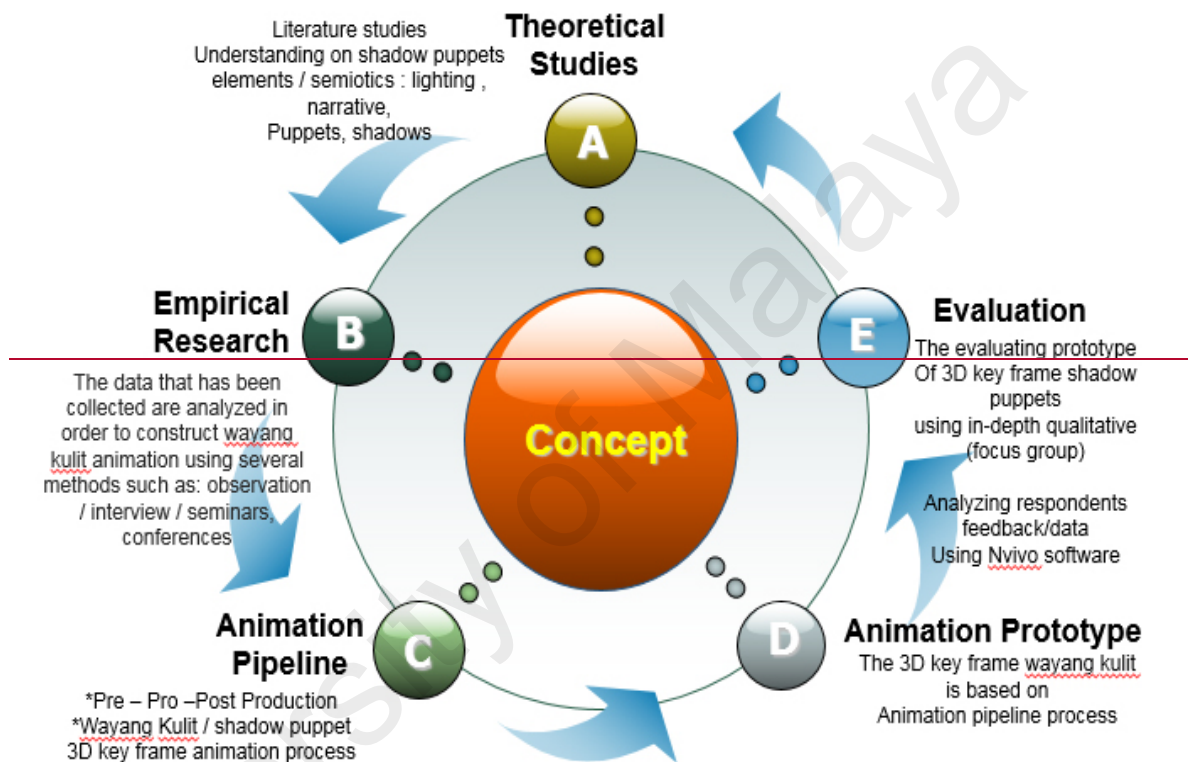
Figure 3.3 Five research approaches used to develop Wayang Kulit 3D animation

3.3 Theoretical Framework Research

With computer animation capability to produce 3D visuals with spontaneity and exuberance, the theoretical framework in designing Wayang Kulit 3D animation relies on the visual aesthetics, culture and technology based on the origins of Wayang performances. As Klein (1996) described , "what began in the 1890s as a caricature of vaudeville space, on a surface borrowing from popular illustration, became, by the 1990s, a domain on a platform of digital memory" (p.241), which animation aesthetic has been applied to computer interfaces including other entertainment medium. There are several different paradigms or theoretical research metaphors to explain the emergence of novel interaction techniques and experiences that are related to real-time animation puppetry. Recently several research scholars have used different design performative or theoretical framework metaphors to describe the emergence of novel automated and interaction techniques and experiences that are related to real time animation puppetry.

Dalsgaard and Koefoed Hansen (2008), designed a theoretical metaphor to observe the perception of the user interaction simultaneously between the operator, performer and audience. The central facets of visual aesthetics of interaction are centralized, by adding the expressitivity experience by performing herself . The argument here is more towards creating a three in one situation by visualizing the users understanding and perception of animation and interaction, and they concentrate on the notion of the performative spectator and spectating performer.

Another central discussion related to digital puppetry studies, animation and interactivity is the framework of "Interaction as Performance" (Jaccuci et al., 2005). This theoretical framework is based on anthropological studies of performance that have roots in a pragmatic view of experience . In particular, the framework proposes a variety of principles aimed at describing performative interaction. One of these is that of accomplishment and intervention. The etymology of the word "performance" describes that it does not have the structuralist implication of manifesting form but rather, a processual sense of bringing to completion or accomplishing. The concept of event and processual character is also key: performances are not generally amorphous or open-ended; they have diachronic structure, a beginning, a sequence of overlapping but isolable phases, and an end. Expression and experience is another element of import. According to pragmatist views, an experience is never completed until it is expressed. Also, in an experience there is a structural relationship between doing and undergoing.

Also, puppet performance can be approached with different tools. Example, possibility is a synchronic approach, like Richard Schechner's Performance Theory (2002), which gives us helpful frameworks to understand performance by dividing it into three spheres as drama, script, and theatre and considers the evolution of puppetry from ritual to theatre, to modernization. While Schechner's approaches are useful, the concept and metaphors performance in Wayang Kulit puppetry better explains how creativity allows ancestral theatrical forms to survive through the puppeteer's artistic creativity which shapes his performance, continuously creating a dynamic triadic-interplay of form story and characters.

In studying Wayang Kulit puppetry, this framework has allowed the author to view the perspective of the form, content and context (function, meaning, and significance), to analyze the tradition and its innovation in response to the demands of fluctuating time-place-circumstance. These three variables engage artists to re-interpret, re-structure, and use local genius to create arts that are relatively similar and yet different

An emerging methodological theoretical framework approach called *Media Archeology* based on Ian Grant's 2005 digital puppetry model will be used to trace how traditional puppetry forms (Wayang Kulit), often described by their mode of interaction and media, (rods, shadows, strings and gloves) , map into current paradigms of communication with virtual worlds, automated animation; culture and associated areas of digitally puppetry and automata. In order to obtain information related to the research, media sources including books, Internet articles, academic journals and academic proceedings were examined. Some of the activities undertaken in the theoretical research are:

i) Studying and analyzing previous literature related to shadow play, types of puppetry and animation studies based on empirical data.

ii) Identifying differences between traditional and 3D wayang kulit animation qualities (visual styles).

iii) Developing an animation pipeline for Wayang Kulit 3D computer prototype.

iv) Identifying the significance of the 3D computer animation technique in the development of Wayang Kulit styles including Disney's twelve principles in wayang kulit.

The outcomes of the theoretical research are:

v)   Discussion and analysis of issues related to traditional and digital puppetry

vi)   Development of a proper model for an animation pipeline

vii)   Proposal for a new 3D visualization animation technique for wayang kulit

viii)   Discussion of the differences related to wayang kulit in terms of 'expressitivity'

(puppet design and movement).

Figure 3.4 illustrates the research-related activities carried out in theoretical studies and literature studies based from the previous Ian Grants 'Media Archeology' theoretical model as discussed earlier. They consist of relationship between traditional and digital puppetry data that will contribute towards the prototype development(Wayang Kulit key frame animation) in this research.
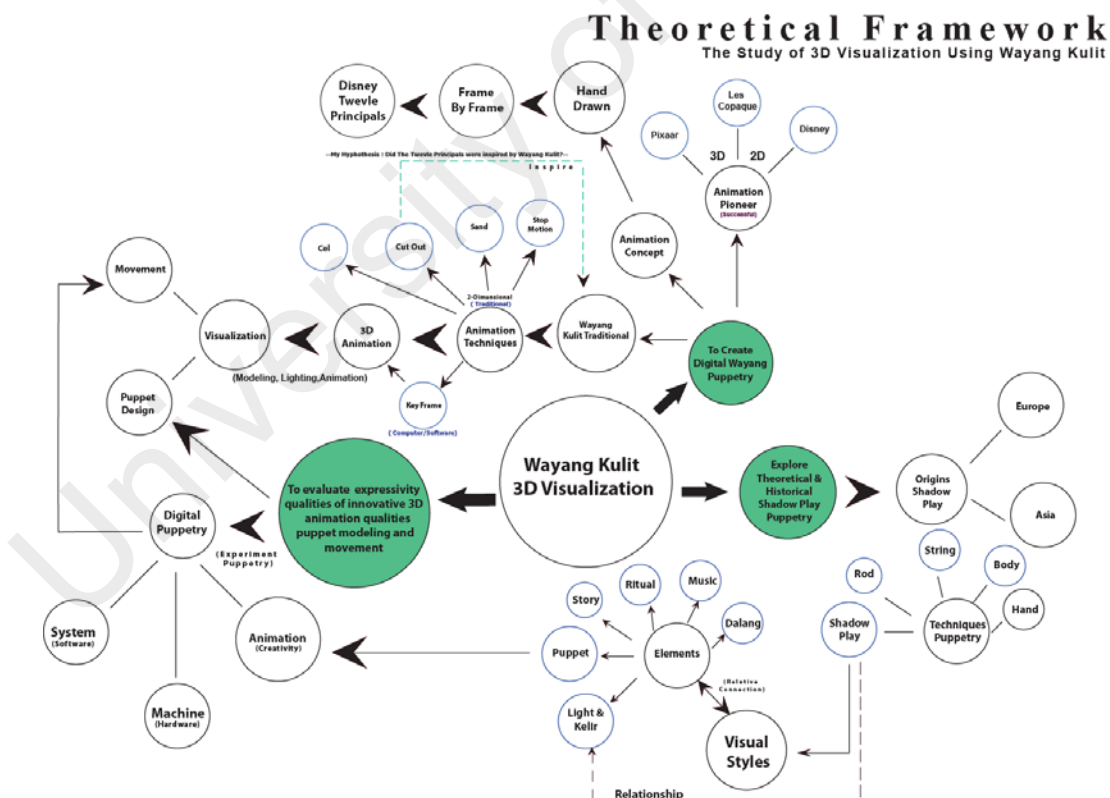
Figure 3.4 Theoretical Research Framework

3.4 Rationale of Method

3D Studio Max animation software was used to design the animation for the proposed prototype. Methods such as 3D modeling, key frame technique, texture (shadow mapping), lighting, character rigging and rendering all proved to be beneficial towards the overall prototype. Observation served as the backbone for acquiring knowledge. According to Kidder (1981), qualitative observation remains under addressed in methodological literature, and has been elaborated as one strategy in a broad consideration of all data gathering techniques for group respondents.

According to Creswell (2007), several categories are vital in analyzing qualitative data such as focus observation, interviews, documentations, and audio-video peripherals. The protocol to conduct the face-to-face interviews with the resource person is mainly formal and properly planned with the respondents such as providing official visit and collecting consent letter, time management, providing open ended questions, strategic location, use of recording device, and others. In order to achieve the first objective relating to the history of wayang kulit and its emerging technologies, the experimental approach centered on two(2) focus groups respondents which consist of expert and non-expert group. The first expert group is divided into two (2) categories; the traditional master puppeteers or Tok Dalangs with one academic experience person and animation expert. The puppeteers that were involved in this qualitative interview were Dalang Pak Nasir, Kang Boon Ann, Dalang Eyo Hock Seng, Dalang Pok Nik Mat and Dalang Siri Neng Buah.

The interview session for Dalang Eyo Hock Seng, Kang Boon Ann and Dalang Pok Nik Mat was held in Kelantan between May and August 2012. The interview session for Dalang Siri Neng Buah was held at the Dewan Bandaraya Auditorium Performance Centre in Kuala Lumpur on the 4th August 2012 whereas for Dalang Pak Nasir the interview session was held on 12th June 2012, at the Academy of Culture and Performance (ASWARA) in Kuala Lumpur. For the academic experienced and experts, Prof Dr. Ghulam Sarwar with an experience for Wayang Kulit knowledge of almost 20 years, he was interviewed at the Faculty of Humanities studies International Islamic University(IIUM),Gombak in December 2012.

For the second expert group which is the animation experts, five(5) individuals were identified. Mr Nizam Razak, animation director at AnimonStar animation studios in Cyberjaya was interviewed on 26th April 2012 at 10.00 am. Next, Mr Usamah Zaid, animation director at Les Copaque animation studios in Selangor, was interviewed on 3rd of March 2012 at 2.00 pm. He was the animation director who produced the Upin and Ipin tv series and Upin and Ipin Geng Pengembaraan first local 3D featured film. Hassan Muthalib was interviewed at UiTM Shah Alam campus on the 6th of March at 8.00 pm. He was the first animation director to produce Malaysia's first 2D featured film called 'Silat Legenda'. Syed Hassan, an experienced 2D animation director and animator, was interviewed on 15th June 2012 in Damansara. Finally, Mr Mike a.k.a En Shamsul Ismail from Silver Ant animation studios in Shah Alam was interviewed on 8th July 2012, 3.00 pm at Silver ant animation studios in Kuala Lumpur. As for the non-expert group, they are basically the general public audience consisting of 15 individual respondents (with passion and experience for watching traditional visual arts of Wayang Kulit Kelantan or Siam) mainly located in Kelantan were selected as the interviewees.

They are Mohd Zaimi (Kota Bahru), Mohd Ismail (Tumpat), Kan Syu Lee (Jeli), Khairul Anuar (Pasir Mas) , Mohd Akmal Hakim (Kota Bahru), Mohd Asrul Zaidi(Kota Bahru), Mohd Azwan(Jeli), Mohd Farid Roslan (Kota Bahru), Mohd Farizi Ismail(Jeli), Mohd Syahrul Imran (Kota Bahru), Rohana Syed Omar(Kota Bahru), Rokiah Jalaludin(Jeli), Saiful Bahri(Tumpat), Samsiah Yunus(Kuala Kerai), and Syafiq Efendi(Jeli). All of these interview sessions were carried out from June until December 2012.These audiences were chosen as the focus group due to the fact that they have knowledge and experience with traditional styles of wayang kulit that could be beneficial for the development of wayang kulit 3D animation.

The objectives of this qualitative research approach are basically:

i)   To explore the traditional visual arts in Wayang Kulit and emerging computer technologies related to key frame animation through historical and theoretical inquiries as well as focus groups.

ii)   To design a 3D computer animation Wayang Kulit animation prototype (demo).

iii)   To evaluate the expressitivity of a 3D animation prototype by using expert and non-expert focus groups.

iv)   To identify the existence of Disney's twelve principles of animation in Wayang Kulit traditional styles

3.4.1 Samples

The main focus group which is the expert group is identified with the knowledge, skill and experience within the domain of Wayang Kulit (especially Wayang Kulit Kelantan) visual styles and comparing them with computer animation approach. Several respondents in the expert group of wayang kulit and an academic research have been identified which include well-known puppeteers including Dalang Pak Nasir, Dalang Seri Neng Buah, Pak Chu (Eyo Hock Seng) and Dalang Pak Nik from Kelantan, also Prof Ghulam Sarwar , a well-known Malaysian researcher for Wayang Kulit Kelantan studies. Most of these Dalang and the academicians cum researcher have vast experience in performing wayang kulit with their troupes and research field including several performances at international stage.

As for the experts in computer animation, several well known animation directors in Malaysia including Hassan Muthalib, Usamah Zaid (Les Copaque animation studio) and Mohd Nizam(AnimonStar animation studio) were interviewed to ascertain their perception relating to animation qualities in Wayang Kulit performance. Lastly, the non-expert group comprises individuals from the state of Kelantan who have passion, experience and knowledge from watching and understanding the traditional or original style of Wayang Kulit. Figure 3.5 illustrates the process of how the interview is conducted among the target respondents. The sampling data used are groups of respondents divided into two main groups consisting of expert and non-expert. The expert group comprises computer animators experts and Tok Dalang or puppeteers including academician researchers, who have vast experience of Wayang Kulit Kelantan studies.

The non-expert group includes Wayang Kulit or shadow puppetry fans mainly from Kelantan. This group consists of the regular spectators of Wayang Kulit Kelantan (Siam), experiencing Wayang Kulit Kelantan mainly from their childhood up to the present day. During each interview session with the respondents, a 3-Dimensional (3D) computer animation of Wayang Kulit sample (demo prototype) is presented as part of an experiment to provide a better understanding and discussion between the researcher and respondents. Overall, a total of 26 respondents were involved during the interview with five animation experts including animation directors and experienced animators, and five experienced Tok Dalangs with an academic researcher. These respondents are mainly from the Klang Valley and Kelantan , and fifteen (15) Wayang Kulit fans (individuals) with knowledge and vast experience related to Wayang Kulit entertainment (mainly Wayang Kulit Kelantan). There are several reasons behind choosing the particular respondents. Firstly, the puppeteers and the academic research have vast experience in knowledge, skill and performances of Wayang Kulit that will provide sufficient feedback for the research and development. Furthermore, since wayang kulit Kelantan is one of the most popular shadow puppetry in Malaysia, the researcher would focus the research scope to Wayang Kulit Kelantan especially on the development and findings between 3D computer animation and traditional styles of Wayang Kulit.

On the non-experts group (which are mostly spectators), the rationale for choosing these following respondents is due to the popularity and history of the existence of traditional Wayang Kulit in Malaysia, which was originally brought and performed in Kelantan. The fans have immense knowledge and experience in viewing or observing the qualities of Wayang Kulit that would benefit the research and development study on 3D computer animation wayang kulit.

These respondents are mostly from the area of Kota Bahru, Pasir Mas and also the Jeli district in Kelantan. Most of the respondents (Wayang Kulit Kelantan Fans) are from the age range between from 18 to 53 years old. Thus, the mixture between young and veteran fans is hoped to provide extensive knowledge towards this research. The data were later compiled and analyzed using QSR Nvivo 8.0 qualitative software. This software is recommended for qualitative data analysis related to interview or survey method, able to analyze from various sources effectively.
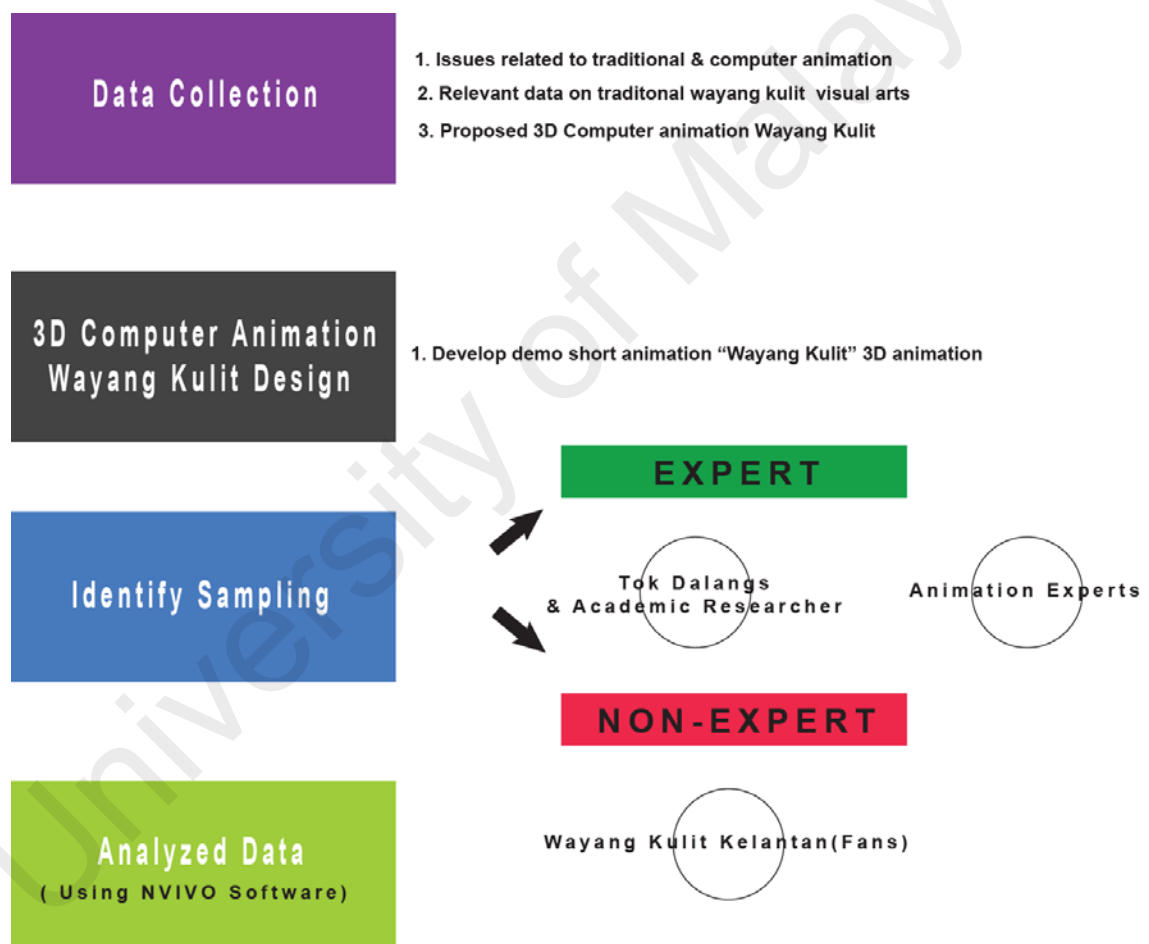
Figure 3.5 Example of Experimental Data sampling

3.4.2 Preliminary Data for Prototype Development

In order to develop the Wayang Kulit animation prototype, a set of preliminary questions were designed in order for the focus group respondents to be provided with necessary information. Each and every bit of information from the questionnaires is vital, especially for the *pre-production, production and* post-*production* animation phases.

The questionnaires relate specifically to traditional and 3D aspects of wayang kulit qualities including their 'expressitivity'. They are divided into four (4) main categories which consist of the following:

a. 3D Modeling Puppet

b. Lighting & Shadow

c. Story Direction (Audio)

d. Animation (Movement)

Upon the completion of the prototype, the focus group is evaluated again on the qualities of traditional and 3D computer animated Wayang Kulit. The experiment compared videos of Wayang Kulit Kelantan visual style with 3D animated Wayang Kulit performances. The focus group shared knowledge and practical skills in wayang kulit performances gained during the experiment.

3.4.3   The Design Questions

The four categories in the questionnaires (**see Attachment A**) provided a good platform to develop the 3D wayang kulit animation. The first category emphasizes on the visual qualities of 3D modeling puppets. Here, traditional Wayang Kulit puppet gestures, proportions, facial expressions and characteristic qualities were researched among the focus group respondents. Below are some of the questions asked which are related to the topic:

i)   The design of the 3D wayang kulit puppets should consist of shapes that are
        mostly organic and non-organic forms (e.g. Pohon Beringin).

ii)   The structure of each shadow play (wayang kulit) puppet comes in
        different heights and sizes.

iii)   The use of new textures such as flowers and batik can be introduced in 3D
        Wayang Kulit.

iv)   Facial expressions of traditional puppet models can be easily determined
        (e.g. sad, happy, surprised).

Next is the concept of lighting and shadow. As discussed earlier, wayang kulit is the product of translucent light and shadow effects. Below are some of the relevant questions pertaining to light and shadow that were designed to assist in the development process.

i)   In 3D Wayang Kulit, is it sufficient to use one type of light source similar to traditional wayang kulit?

ii)   Must the light source always be placed at the top (center) in 3D wayang kulit 3D similar to a wayang kulit *panggung* (stage).?

iii)   Are silhouette shadows important in 3D computer animation wayang kulit?

iv)   Does lighting play an important role in making the texture qualities of puppets more outstanding on the screen?

Story Direction defines the audience's interest or attention, and also helps to determine the story's plot development. Narration or narrative approach in computer animation and traditional performances such as Wayang Kulit typically consists of content, dialogue, narration, plot, character, time and place, with emotion and expression. For example, Wayang Kulit Siam (WKS) has always relied on the famous epics of Ramayana and Mahabharata classical epic as sources of reference. Below are some of the questions provided to the focus group respondents that cover story direction elements including voice-overs, narration and genres.

i)   Should moral or folklore story types be introduced in 3D wayang

        kulit   animation?

ii)   Can an ordinary person perform the (voice over) in 3D wayang kulit

        animation instead of using a Tok Dalang's (puppeteer) original voice?

iii)   Do you think that people, especially those in urban areas, find it difficult to

        understand the plot of famous epics such as *Ramayana* & *Mahabharata*?

iv)   Can various story genres be introduced in 3D wayang kulit such as love,

        horror, science fiction and action.?

The final category is puppet animation or movement. Movement in this context occurs on a minor scale. Most of the time, the puppets' mouth and arms move a lot with their actions executed in time to the rhythm of the orchestra music. Some principles of animation and camera styles are required in the study of puppet movement. From the technical author's point of view, below are some of the questions designed to provide necessary information in developing 3D Wayang Kulit animation:

i)   Is it possible to animate two articulate hands of 3D wayang kulit puppets

        even though puppet hands in traditional wayang kulit puppets are articulated

        separately?

ii)   Can shadow movements occur by overlapping 3D puppet models in wayang

        kulit animation?

iii)   Does Disney twelve (12) Principles of Animation exist in Wayang Kulit?

** Mainly targeted to Animation Experts Respondents only

3.4.4   Data Compilation Process

Figure 3.5 shows the process of compiling data from the targeted focus group. A total of 15 wayang kulit fans (non experts) and 11 experts (5 from animation experts) and 6 from Tok Dalang with academic expert background in Wayang Kulit Kelantan,   give their feedback based on their knowledge, skills and practice in Wayang Kulit. The main focus is on Wayang Kulit Siam (WKS) visual styles as it is very popular in the Malaysian society. In order to achieve consistent and valid data, the compilation process was done via field visits, e-mails and telephone. There were two phases conducted for relevant focus group during the interview and development session.

The first phase was a preliminary data of questionnaire aimed at gaining proper information before developing the 3D Wayang Kulit prototype. These were mainly distributed to several Tok Dalangs including animation experts in Klang Valley and Kelantan before developing the prototype or demo version. Once the data was gathered, development began from pre-production to post production.   The second phase was getting the feedback from the respondents with several questionnaires distributed at various locations (shops, houses, offices and night markets) and they were approached with initial questions in particular related to traditional and computer animation wayang kulit.

The respondents were also presented with a demo or prototype version of "Cintailah Sungai Kita" (a short 3D computer animation video of Wayang Kulit) to compare video performances of Wayang Kulit Kelantan with stylized video performances of 3D wayang kulit animation.
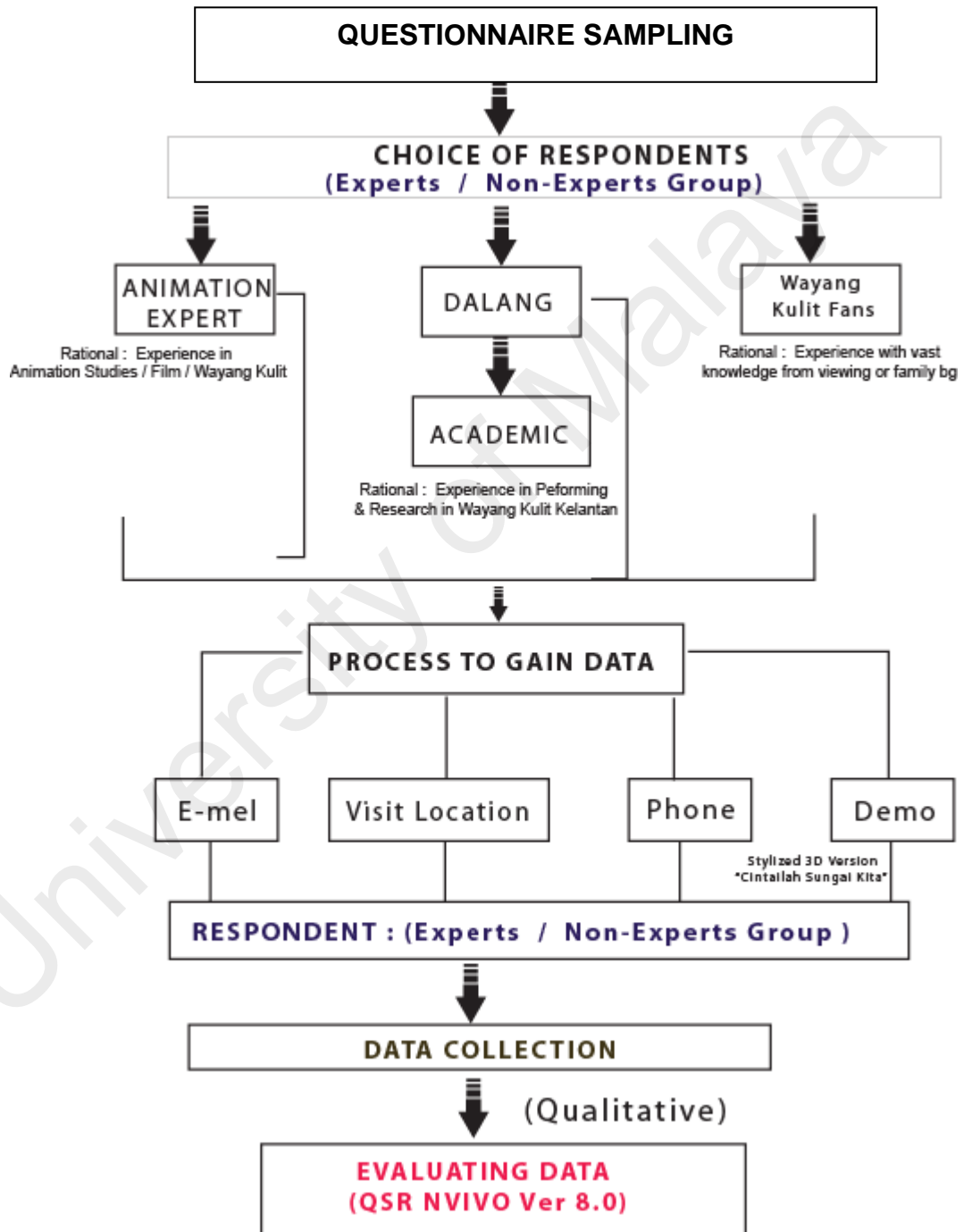
Figure 3.6 Process of gathering data

3.4.5 Data Analysis

This section will focus on the approach used to evaluate and analyze the data in comparing traditional and digital wayang puppetry compiled from the focus groups (expert and non expert). The respondents were specifically asked to provide their point of view in comparing between existing qualities in traditional and digital 3D wayang kulit.

The data was analyzed according to the feedback from the respondents. Observation and critical points of view related to the prototype product were also analyzed. Observation including several semitotics visual element (shadows, motion, color , lighting, screen, Pohon Beringin) questions in traditional wayang kulit or shadow puppet which will be highlighted during the interview session with the respondents in this context can be divided into several categories such as the modeling and visual styles used to compare between traditional and 3D animation Wayang Kulit. Data were entered into the computer using Nvivo 8.0. The results were presented in percentage amount of words frequency and also words coded. The interview data would provide a way to validate the data from the questionnaire. The data will later be transcribed and tabulated in visual graphs. The analysis of interview data went through the coding technique (data code reference from Nvivo software) using identification of categories and themes that were acquired from the analysis. In addition, interviews and questionnaires were carried out among wayang kulit practitioners, academicians and animation directors to acquire their feedback regarding the qualities in 3D computer animation and original styles of Wayang Kulit.

The design of the questions asked during the interviews was based on the survey done on focus group respondents (Puppeteers and Wayang Kulit Fans) including animation experts with some additional knowledge and technical terms related to animation. According to Jack Douglas (1985), creative interviewing allows research subjects to express themselves more freely, having an impact on a higher voice in both the research process and research report.

3.5   3D Animation Pipeline

Once the data from the focus group was collected and analyzed, a 3D animation pipeline or work process flow was designed. An animation pipeline is basically a process flow that allows animation directors, animators, artists, editors and technical team members to understand the process flow towards developing a short animation video. Here, the 3D animation pipeline model was created in three significant phases: *Pre-production, Production* and *Post-production*.

3.5.1 Pre-Production

During the pre-production stage i.e. the preliminary survey conducted on the focus group, the data looked into the fundamentals of idea, concept, treatment and story structure. Upon finalization, concept art visuals including character design, storyboards, sketches and coloring were drawn on paper before being constructed through computer software.

3.5.2 Animation Production

Production is a process in animation that develops what has been planned in the pre-production phase. For example, the hand drawn illustrations of puppet character designs in 3D wayang kulit were modeled and animated using a software program called 3D Studio Max. This software helps to develop 3D computer models and animation from architecture, humans, animals, objects and so forth. Also, the 3D animation technique used to animate the 3D puppets made use of key framing which can be a tedious process. Other animation functions include character animation rigging, 3D virtual lighting and camera, texture and rendering.

3.5.3 Animation Post Production

The final phase compiled the rendered image from the computer software in its entirety and brought it to the post-production facilities for editing purposes. Here, relevant effects, music. Lip –sync, voice over or video transitions were added based on the preliminary surveys conducted earlier. The final output was produced in .AVI (Audio Video Interlace) file format. This video or demo was later used during the interview process.

3.6 Animation Prototype Demo

The design of the wayang kulit animation prototype or demo was specifically based on the early stages of the survey data collection. In this respect, the prototype's development consisted of four components, namely puppet design, lighting and shadow, story direction and movement. The prototype development was based on an animation pipeline reference model that included important points such as research problems and objectives, story structure and concept art to complete the prototype. The prototype animation covers several key points of research objectives, particularly the theoretical part of traditional Wayang Kulit using key frame animation and also 'expressitivity' of 3D puppet character modeling and movements in both traditional and digital wayang kulit. The prototype exists in the form of a video file and therefore needed to be projected on a large TV screen or projector with a proper audio system so that the respondents could view and analyze it. The prototype was rendered for standard television resolution (720 X 576) pixels with an uncompressed codec video.

3.7 Evaluation

Figure 3.7 explains the two main group of respondents who were approached using the qualitative method(interview). The questions were divided into several categories which are relevant with traditional and computer animation approach for wayang kulit (puppet design, lighting and shadow, story direction (audio) and movement). Only animation experts were provided with additional question related to animation fundamentals that the researcher discovered in traditional Wayang Kulit (Wayang Kulit Kelantan) from literature and observation studies. The interview approach focused on the respondents' observation in analyzing and comparing the traditional qualities from concept of art, story or narrative, puppeteers, light and shadow and also puppet 'expressitivity' of design and movements. Further discussion also enabled feedback related to other visual styles such as audio , realism, camera angle or visual shots and narration. As described by Morris (1973), observation is a process "of noting phenomenon" with instruments and recordings for scientific or other purposes. Therefore, this research not only gathers visual data but also opinion and suggestions (from interview based on questionnaires) with certain qualities and experiences in both original styles Wayang Kulit and computer animated shadow play puppetry.
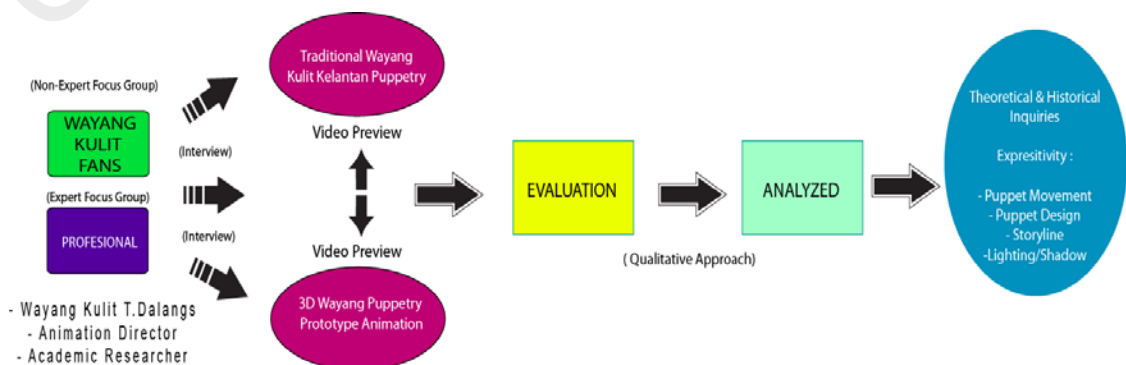
Figure 3.7 Animation prototype and evaluation method

The study of phenomena through action was actively done during the video previews. Moreover, comments and feedback from the interviews with the professionals in the field of Wayang Kulit and animation has yielded an in-depth discussion of the issues explored in the research approach.

3.8   Summary

The 3D computer Wayang Kulit animation research methods are based on:

i)   Theoretical Studies

ii)   Empirical Research

iii)   Animation Pipeline Model

iv)   Animation Prototype

v)   Evaluation

Therefore, the basic objective of this research is to prove that wayang kulit can be developed using 3D animation techniques along with new media to provide a breath of fresh air to the existing traditional wayang kulit. This is not to say that 3D animation is superior to the traditional style but it does act as a platform for people around the world to be exposed to the Malaysian culture, especially wayang kulit. Also, it is sufficient to obtain the number of respondents regardless of their skill, knowledge and experience in traditional wayang kulit and animation field especially in Malaysia as the number of experts in the field of both animation and wayang kulit in the country are basically small. In the next chapter, the results of the methodology and experiment approach will be discussed.

The qualitative approach used within the context of this study helps to enhance future developments in research on animation and shadow play puppetry studies. Most importantly, it helps to preserve a cultural heritage for future generations.

CHAPTER IV

BEHIND THE SCENES

4.1   INTRODUCTION

The development of a 3-Dimensional (3D) Wayang Kulit visualization computer animation is based on aesthetic, creativity and technical skills. In order to develop a stylized version of 3D Wayang Kulit, influence is drawn from Wayang Kulit Kelantan and Wayang Kulit Gedek. This is meant to provide both modern and traditional iconographic representations, especially in terms of the puppets or symbols as an experimental approach towards the computer animation. The modern 3D puppet models are designed in a fully contemporary style such as Baju Kebaya for females and Baju Melayu and Kain Sarung for men. "*Cintailah Sungai Kita*" (Preserve Our Rivers) is a short Wayang Kulit 3D animation show which uses a moral-based experimental theme or genre. The moral values of the stories are important where the younger generation today are facing a lot of challenges especially related to modern lifestyle and globalization. The preliminary stage development is based on illustrations and sketches and is known as the "*Pre-Production Process*". Upon completing this stage, the next stage "*Production and Post Production*" involves 3D development and a video editing process. The 3D visualization of the Wayang Kulit animation is based on software requirement techniques such as 3D modelling, lighting, texture and animation.

For editing or post-production purposes, software related to audio and video is involved including techniques such as effects, audio dubbing and editing timeline. Thus, the study of 3D visualization development will provide extensive details from theoretical and technical aspects for further studies by comparing traditional and 3D animation Wayang Kulit visual styles.

4.2 Pre-Production

The 3D visualization of Wayang Kulit was based on several sketches and illustrations. The 3D puppets were designed and illustrated with influence from the visual style found in Wayang Kulit Gedek. These pre-production process illustrations (sketches) were divided into several categories such as:

    i)   Story Concept / Idea

    ii)   Concept Art for 3D puppet design

    iii) Storyboard Design

For the story concept or design process, the story of '*Cintailah Sungai Kita*' demo was done as part of a moral value story for the young generation to preserve rivers from pollution. The story design is based on the Three Act structure. Each act involves three processes as shown in Figure 4.1 consisting of:

a. Act 1 – Introduction / Set up

b. Act 2 – Confrontation / Build up

c. Act 3 – End / Resolution

Figure 4.1 The Three Act Structure process

Figure 4.1 shows the Three Act structure process used for *Cintailah Sungai Kita*. Act 1 introduces the main characters from various environments/realities and establishes an understanding of their roles as well as the intended mood and genre of the whole concept direction of the animated short.

Act 2 or the turning point as shown in Figure 4.1 demonstrates the incitement of incidents or conflicts. Here, the story continues by revealing how rivers in Malaysia are seriously polluted and action is needed. Finally in Act 3, the ending or resolution is presented to the audience. The resolution is the hardest part to design but it is also the most important part of the overall message. In *Cintailah Sungai Kita,* the puppet characters are basically presenting their ideas or solutions for the younger generation to value the cleanliness of the rivers in their country.

The concept art for the 3D puppet designs is the most crucial aspect in the development of 3D Wayang Kulit visualization. As discussed earlier, the traditional shadow play or Wayang Kulit puppets are moved behind the screen by the puppeteer. Shadowy silhouettes are produced in front of the screen on a 2-Dimensional (2D) surface.

In 3D computer animation, the puppets are presented at the front of the screen and the audience is able to differentiate between their visual physical approaches. Therefore, it is important to design characters with proper gestures and facial expressions while also retaining some traditional puppet qualities as shown in Figures 4.2 and 4.3. In *Cintailah Sungai Kita,* the two main characters introduced are Mak Dara & Pak Seman, both of whom have different styles and characteristics. Figure 4.2 describes the concept art for Pak Seman who wears a traditional Malay costume.

Figure 4.2 Concept art for stylized Pak Seman character 3D puppet model
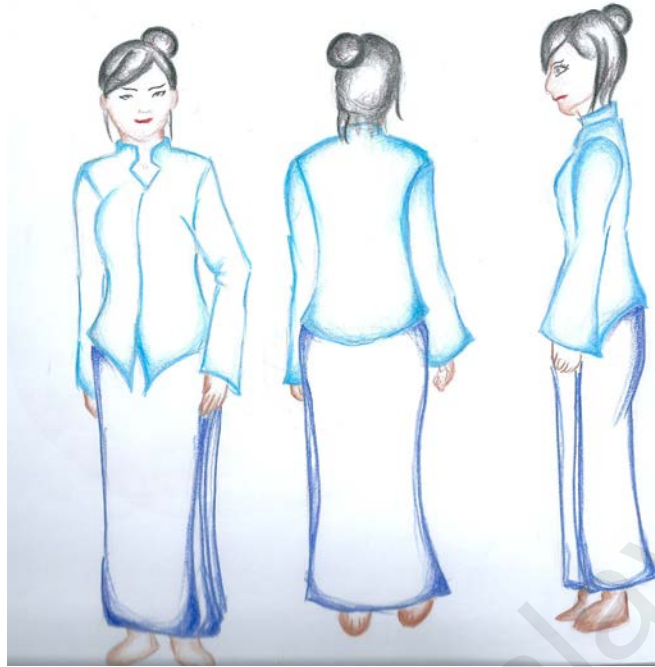
Figure 4.3 Concept art for Mak Dara character 3D puppet model

The illustration concept art for Mak Dara uses several examples as shown in Figure 4.3. With the influence of the Malay fashion, the puppet model uses a baju kebaya style that is different compared to most traditional Wayang Kulit puppets. The puppet characters of Mak Dara and Pak Seman represent a form of human identification that enables the audience to identify and appreciate the aesthetic that is used as a new form of Wayang Kulit. Her 'Sanggul' type hairstyle signifies a typical Malay woman between 40 – 50 years old with passion and vision. There is a pragmatic appearance at work as well. The feature, which is based on 3D animation Wayang Kulit, is challenging in any CG film because characters must be created from scratch. The 3D puppets are done in a virtual software environment compared to the usual master puppeteer who designs Wayang Kulit puppets from cow leather in various colours. The 3D puppets comprise puppet senses such as the ability to move, think and react to situations in a puppetry environment.

Both characters in 3D will apply the '*3 Perspective Turn Around*', that provides the initial stage for the 3D animator to understand the actual height and size of the character before applying modelling and animating it in 3D software,

Figure 4.4 Illustrations of Mak Dara's Facial Expressions in 3D

In traditional Wayang Kulit, shadow is an important element. The puppets are manipulated by the puppeteer behind the screen, and the shadows are shown on the screen with translucent colour effects. Meanwhile in 3D modelling mode, the puppets are shown at the front while shadows overlap and the puppets' characteristics are easily noticeable. Character is also considered an important part of 3D animation. Facial expressions create the mood for the story treatment process. While the dialogue or script synchronizes with the 3D puppet characters, it helps to visualize facial expressions such as sadness, happiness, surprise and so forth. Facial expressions can be used to differentiate between protagonists (noble) characters and antagonist (villain) characters. Overall, facial expressions provide the mood and tone necessary to support the story process and direction

Storyboards are a pre-process development that translates story treatments into visuals. The storyboards are mainly designed for scene sequence framing to describe a film or movie between the ranges of time. In traditional Wayang Kulit, the puppeteers do not draw storyboards. Instead, they memorize the plot of the story or epic which will later be represented by the actors (puppets) using voice-overs (dialogue) and music to accommodate the play itself. In *Cintailah Sungai Kita*, the storyboards shown in Figure 4.4 were drawn between 15 to 20 frames for the length of 3 minutes.
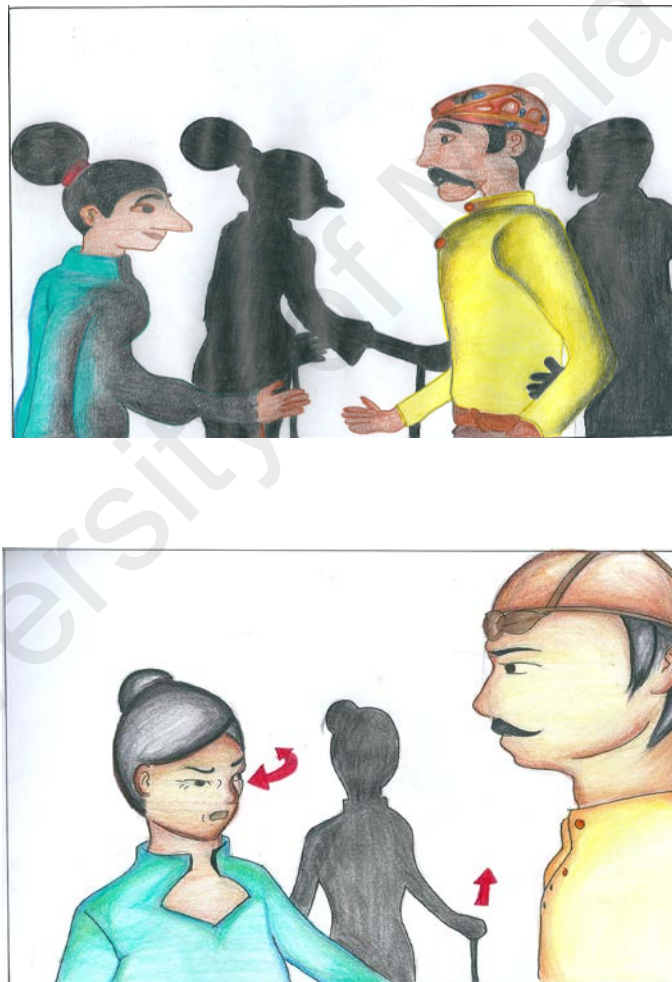
Figure 4.5 Storyboard illustrations from "*Cintailah Sungai Kita*"

Figure 4.5 also displays the camera angle "Reverse Angle Shot" which is used to show how the 3D puppets communicate with each other from two different perspectives. This allows the viewers or audience to have different senses of perspective, angle and focus towards the storyline during the entire animation. In traditional Wayang Kulit, the audience needs to sit at a respective point or angle to view the shadow play movement from afar, and their primary focus is mainly on the shadow movements only. Their views are limited in terms of the variety shots or camera angles available during the entire play, for instance "established shots" or "long shots". Therefore, 3D animation provides more depth and exciting visual shots between the characters. The audience can also experience more exciting camera shots related to the puppets and story concept of 3D computer animation Wayang Kulit.

4.3 Production and Post Production Process

The production process acts to translate the final illustrations from the pre-production process into Computer Generated (CG) imagery using 3D Animation software. Several techniques were used in developing the 3D Wayang Kulit animation including *3D Modeling, Lighting* and *Texture*. An animation process was also required to develop the final sequence of "*Cintailah Sungai Kita*" ("Preserve Our Rivers"). Again, the main reason for the researcher to use the theme "Cintailah Sungai Kita", were based on the past research and interview mainly from the research scholars and Wayang Kulit puppeteers who suggested that the modern Wayang Kulit such as 3D animation should focus on "moral values" especially the challenges faced in the modern world of globalization, where younger generation today tend to neglect these values.[10]

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[10] Dialogue session, Comment & Suggestion on Computer Animation & Wayang Kulit Survival from several international researchers, puppeteers attended *Shadow Play Theatre, ASEAN Puppetry Conference 2011*, Kuala Lumpur: 3th – 5th Nov 2011; Organized By University Malaya, Kuala Lumpur

The philosophy of storytelling in Wayang Kulit has always emphasized on the appreciation of culture, especially towards the development of nation or society with moral value stories and should continue even though it is going through the process of modernization (Dian Marfuah,2011).

4.3.1 3D Modeling

Modeling refers to the construction of 3D models between an X, Y and Z axis relative with puppet characters, objects and sets used in an animated story structure. In contrast to "X", "Y" and "Z", Cartesian Coordinates are applied. These are the coordinates for the original 3D object with the Wayang Kulit characters in the modeling space as another set of coordinates that describes the surface of the mesh by identifying and applying the letters "U" and "V" to both. Two 3D puppet characters were designed for this experiment, namely Mak Dara and Pak Seman. The puppets were designed based on traditional Wayang Kulit Siam and Wayang Kulit Gedek to preserve their aesthetic and moral values. New visual styles were incorporated for the puppets with realistic features such as their attire, anatomy, craft and texture. Polygons and Non-Uniform Resource Boolean Spline (NURBS) were used throughout the process of modeling both puppet characters. This allowed the Polygon and NURBS count for the puppets to be rendered faster as opposed to the slow and time consuming shadow process, and lends information to the models that help to perceive the 3D aspects of the scenes as shown in Figure 4.6. NURBS curves are even more effective and ubiquitous in the world of computer animation.
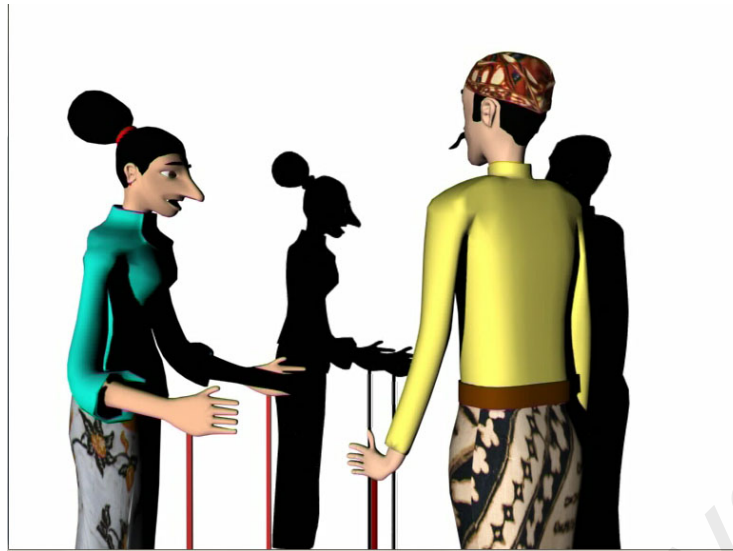
Figure 4.6 3D puppet models using NURBS and Polygon

The use of polygons in 3D models works as a medium relative to stability and functionality. Polygons are also known as visualization platforms that exist between NURBS and SubDivision (SubDivs). The NURBS used within this experiment are basically smooth-ready features to allow mapping, rendering and functioning. NURBS work well with geometric objects or non-organic shapes such as lines or curves including freeform geometry such as cars, houses and human anatomy. The scale and height for Mak Dara and Pak Seman characters were also measured during the development process. Additional NURBS information in the puppet models was rendered, and each 3D puppet model fraction with smooth shades and different perspectives needed at least a second till day for a single image or frame with high rendering (including mental ray function) to optimize a huge amount of computer memory and virtual memory.

The 3D puppet characters provide a broad volume spectrum that allow for depth in their physical appearance compared to 2D puppets in traditional Wayang Kulit, which project black or coloured silhouette effects. Wireframe models are also previewed (see Figure 4.7) to test, render or preview the 3D puppet models from various views such as top and left perspectives to ensure that other parameter functions such as camera, lighting and shading are placed correctly.
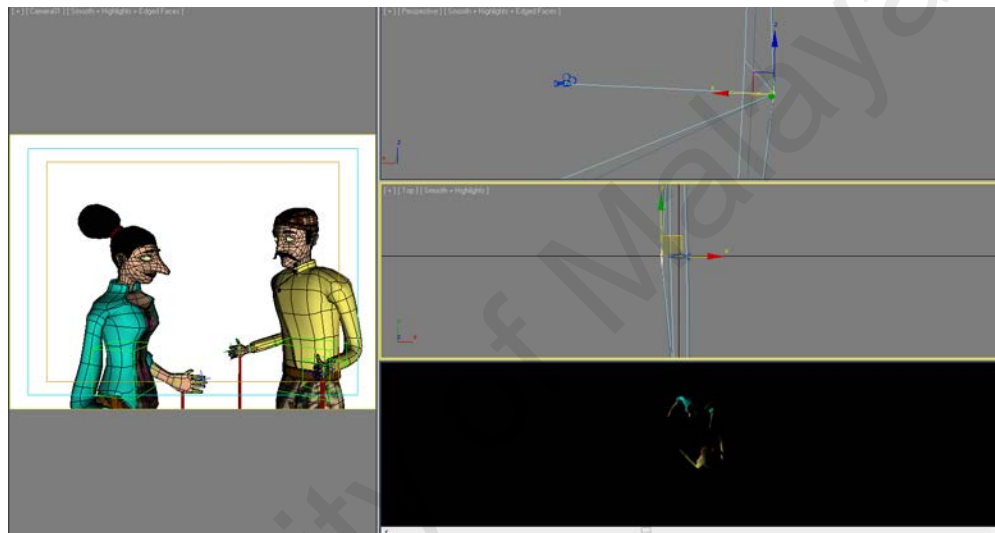
Figure 4.7 Wireframe 3D puppet model view with shade

At the beginning of the 3D Wayang Kulit animation, the *Gunungan* or *Pohon Beringin* is modeled using NURBS in 3D software (see Figure 4.8). In Wayang Kulit performance, The Gunungan, an important non figurative symbol centred stage, serves to create a dogma between atmosphere and audience which represents the entrance into the nether world (Nasuruddin, p.10).The shape of the *Pohon Beringin* is adapted from the visual style of Wayang Kulit Kelantan.

According to Sungu Kingham (2011), the *Pohon Beringin* is known as a highly symbolic and versatile tree in Wayang Kulit as it reflects rituals representing different mantras as well as animistic, shamanistic and Islamic-Hindu relations.

Figure 4.8 3D Puppet model of *Pohon Beringin* using NURBS in 3D Software

It has a 79cm high symmetrical leaf shape and the formation of a tree designed with flora and fauna representing symbols or metaphors between animals, nature and God. It has no additional joints or edges; both sides are mirror reflections of one another, and it is fully decorated with colourful lines and shapes representing cognitive metaphors. To develop the outline of the *Pohon Beringin,* 3D curve lines and the extrusion function in 3D software were used. In order to sustain the smoothness of the *Pohon Beringin*, the curve has to be a chain of very short, straight edges with form and precision. Next, the 2D texture for the inside of the *Pohon Beringin* is mapped to the 3D model based on Cartesian Coordinates base on 3D axis. The map texture is based on Pak Hamzah's Wayang Kulit. It is vital for the texture to be consistent with the 3D lighting system in order to produce shadows; this will be discussed later on.

Next, the lighting and texture techniques used for this experiment that created arguably realistic predicaments between real and unreal environments of traditional and modern Wayang Kulit are discussed.

4.3.2 Texturing and Lighting

In the context of the realism factor as part of photorealism in 3D animation, reflections, shadows and spotlights are some of the key features. However, using texture maps could incorporate extra realism into a 3D animation environment (Catmull, 1974). In *Cintailah Sungai Kita*, the objective of designing effective textures can be deformed and non-stretched to the model by having file-based texture maps that fit within the parameters of the 3D polygon puppet surface cleanly without shape distortion.

Having modeled the 3D geometric polygon skin or surface of the Mak Dara and Pak Seman puppet characters, the next stage is to decorate them with colour and texture. Texture mapping in 3D is similar to the concept of traditional Wayang Kulit puppetry. Usually, traditional Wayang Kulit puppets are coloured with paints and enamels. Most importantly, the level of translucency of the puppets and their shadow appearance depend on the consistency of the paint's diluted form. Furthermore, some colour codes are represented only to a handful of traditional Wayang Kulit Kelantan puppet characters, especially on the body and face such as Seri Rama (Green) and Laksamana (Red). In this experiment, new 3D puppet characters were designed and the texturing process was not too rigid compared to the traditional method. Texture mapping allows the process of polygon transformation and renderation to be done smoothly.

For example, when the 3D puppet model of Mak Dara is viewed in perspective mode, the texture may appear smaller than its actual size (viewing far from the original viewing position). The use of U (Horizontal) and V (Vertical) coordinates in a 3D virtual environment allows the process of unwrapping the 3D model puppet of Mak Dara and applying a texture template or UV grid as shown in Figure 4.9. By running smooth shade functions, it will allow the preview of the UV map applied to the 3D puppet model in real time to appear more effectively.
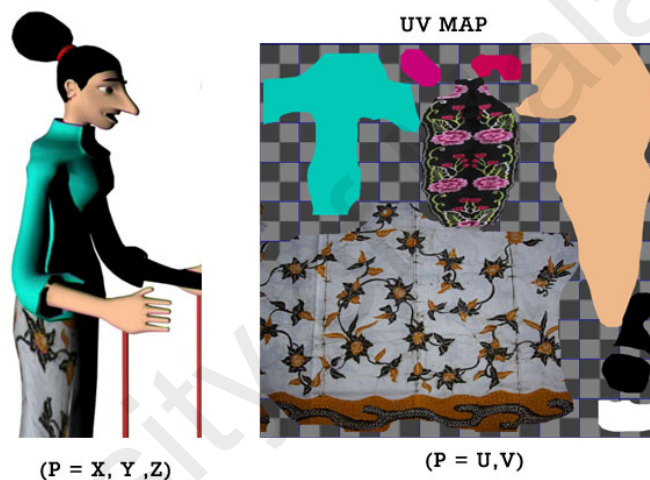
Figure 4.9 Mak Dara 3D puppet model using UV texture Map in 3D

Adobe Photoshop software was used to design and edit the texture of the *Batik* (local arts) visual style with proper resolution in order to map it to the 3D puppet model by using UV in 3D software. UV texture is able to render real time mapping modes, especially in the case of the Mak Dara character since it has different body parts or joints modeled as well as predefined texture mapped to the polygons, and also in the case of the model's animations. In traditional Wayang Kulit puppetry, the *Dalang* or puppeteer pays attention to every detail upon completion of a puppet be it carving, crafting or colouring including articulation of joints.

Sometimes it takes weeks or months to complete several puppet designs with different styles and characteristics. In modern 3D computer hardware, computer memory (Random Access Memory or RAM and Graphic Card) is also crucial in determining the 3D rendered quality texture for the model.

The surface details on a 3D puppet model exist in the form of images, bumps and textures achieved through scanning or photographs, which are projected onto the surface when the object is rendered. Here, 1024X1024 pixels were tested which yielded a total amount of 1048576 pixels. At one point, the rendering was too large and affected computer performance. Therefore, 640X480 pixels were used instead which enabled a smooth preview in real time of the texture on the puppet models. By applying texture to the 3D puppet models, a tacit atmosphere of photorealistic visualization was created that brings the audience closer to experiencing realism in Wayang Kulit. According to Jan Mrazek (2005), one of the essential elements of puppet theatre is that it makes "dead" things appear alive. Although these puppets are not visible physically to the audience, the appreciation and effort demonstrated by the puppeteers and the audience in traditional Wayang Kulit can be considered exceptional. Conversely, 3D computer Wayang Kulit is a challenge to the animator because the puppet is totally visible to the audience and each piece of texture can be viewed clearly. Lighting is one of the most important components in the art of Wayang Kulit as the representation of ancient entertainment. The animation and storytelling is done using opaque, articulated figures in front of an illuminated backdrop to project illusions of moving images. According to Ken-ichi, Shuhei and William (2006), the lighting or shadowing of a 3D animation scene plays a crucial role in visual storytelling such as films, video games and digital content.

In traditional Wayang Kulit, a white curtain is hung in front of the audience to allow lighting effects such as spotlights or soft light to pass through the semi-transparent leather puppets and project itself to the screen. 3D lighting is basically integrated, and it is difficult for the objects (puppets) to respond to details or changes in human eye point relative to light source accuracy. This defines the visual context with lighting effects that are able to communicate more effectively with the audience at the same momentum of time as the desire and passion created. In this experiment, a three-point lighting system known as the *Birn Three Point 3D* lighting system was used. The effects of lighting mood and position are based on Birn's three-point lighting systems which are commonly used in original setups in film and photographic productions (Jeremy Birn, 2007).

In conventional Wayang Kulit visual styles, the light source comes from the centre of the screen with the use of a *pelita* (oil wick lamp), kerosene lamp or even an electric bulb. The light source is normally yellowish or white. The amount of light must be sufficient in order to generate the silhouette effect needed for the puppeteer to pass the figures on to the white screen. In 3D digital puppet scenes, however, the same lighting effect was experimented with, but this time the puppets performed at the front compared to the traditional style where the puppets are manipulated at the back. Here, the experiment was based on the physical appearance of the puppets and the overlapping shadows. In a 3D virtual environment, another experiment was attempted to obtain the same effect as traditional Wayang Kulit. In *Cintailah Sungai Kita*, three common Birn 3D Lighting systems (see Figure 4.10) in 3D Studio Max software which comprises of key, fill and back light were utilized.
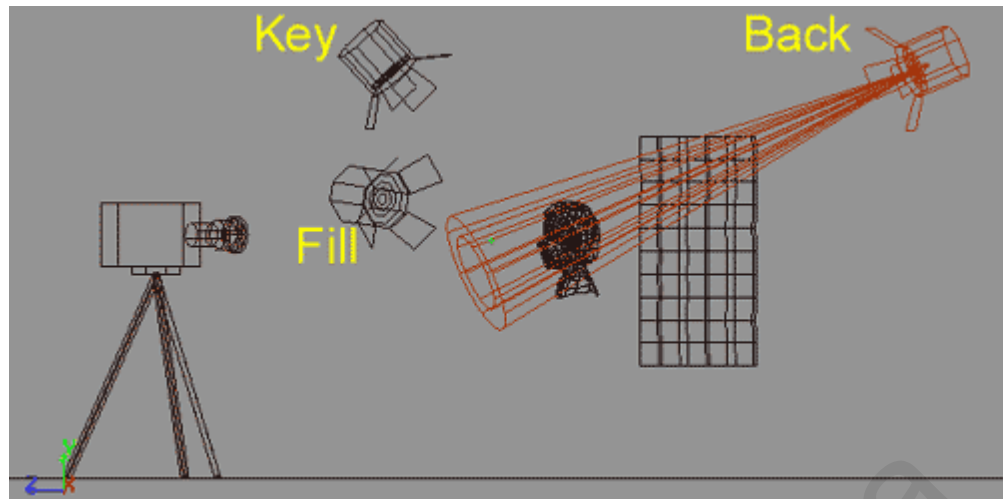
Figure 4.10   Birn's 3D Concept Lighting System Setup in 3D Studio Max

The key light provides a depth of illumination to the overall mood of the scene. The fill light is used on the Pak Seman and Mak Dara 3D puppet models in order to oppose the key light and create a softened effect such as the reflection of a shadow on a plain wall. Fill light reduces excessive contrast on front face objects. Finally, back light allows segregation between the Mak Dara and Pak Seman 3D puppets and the original background to produce smoother edges. Usually, fill light ratios are about half as bright as key light (2:1). To increase the shadowy scenery, (8:1) key light was used to fill ratio for *Cintailah Sungai Kita* (see Figure 4.11). Each time the puppet is animated, the black shadow or silhouette falls out to a white background and overlaps the puppet, creating a holistic or shadowy depth.
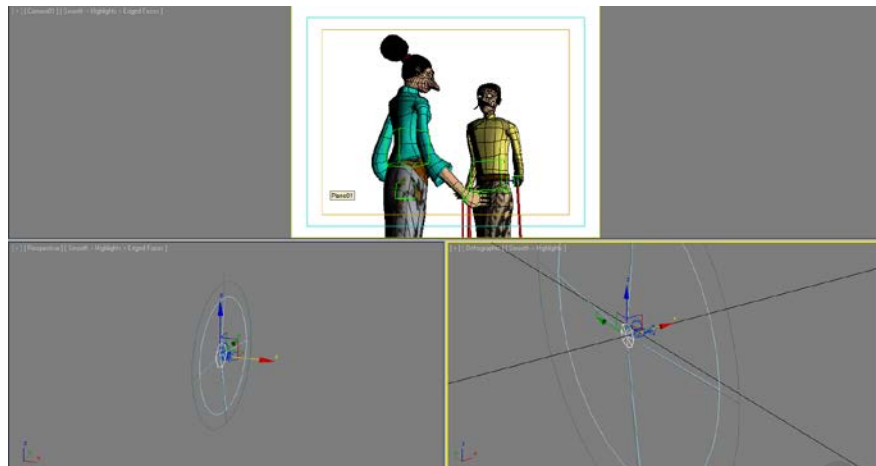
Figure 4.11 Birn's 3D key light ratio (Fill, Key and Back Light) used in *Cintailah Sungai Kita*

For each rendering process, ray tracing was also used to allow simulating reactions as the behaviour of the light source energy in real time. The resulting 3D puppet images of Mak Dara and Pak Seman contain reflections or shadows based on the 3D point including background. The ray tracing in this experiment allows for display casting shadows output, and the edges are softened using 3D parameters such as point or spot light. Thus, ray tracing provides a geometrical approach related to lighting behaviour (more softened), and enables photorealistic images from the camera lenses or perspective view including depth of field or focal length approach. The shadow on each side of the puppet model can receive fill light and bounce off the object but eventually becomes much darker than the whole scenery area of direct illumination. With 3D lightings such as phong light, spot light and point light, the animator has to know the proper amount of light in order to sustain the mood and quality of 3D Wayang Kulit. The lighting technique in 3D provides the opportunity to explore various elements that enhance the quality and mood of a story in the context of 3D Wayang Kulit. Next is a look into the animation process of the *Cintailah Sungai Kita* computer animation.

4.3.3 Character Rigging and Animation

Puppet character animation involves the human presence. In other words, it is puppet behaviour with animated features which are divided into human, puppet or creature forms. Puppet theatre such as shadow puppetry or Wayang Kulit can be described as ambivalences (Kenneth Gross, 2011). With each movement, puppet theatre produces less immense forms of fright, creepiness and also a sense of mere compatibility. Animation is all about movement or motion. It can be described as a motion of sequence images shown in rapid momentum which produces the illusion of movement. With animation, new worlds and dimensions can be visualized. Computer animations related to this experiment could have a great impact on theatre performances and the world of animation in general. This experiment uses the 3D animation technique as it has more versatility, detail, a solid structure and a realistic appearance (photorealism) especially in terms of character animation.

Though handmade and computer puppets and character animations typically differ from one another, their structure (anatomy) and articulation are almost the same. Furthermore, few attempts have been made to create new digital Wayang Kulit puppet characters. Before implementing the animation technique in *Cintailah Sungai Kita*, the basic forms of Wayang Kulit Kelantan puppet movements were analyzed. For example, Seri Rama and Sita Dewi in Wayang Kulit Siam are puppet characters with single articulated arms to join with edges, while a small bamboo is attached to one arm functions as a handler for articulated movement or motion.

Meanwhile, comic characters such as Pak Dogol and Wak Long in Wayang Kulit Siam have articulated arm, eye, leg and jaw movements. The main problem with capturing the visual aesthetic form of traditional shadow play in 3D animation is giving it *realism*. The Mak Dara and Pak Seman 3D model puppets consist of hands, body gestures, expressions and anatomy. These are some basic character movements that were introduced in this experiment and also to add some level of *realism* in Wayang Kulit 3D.

Procedures in animation are employed using key frame animation that allows frame-based animation to be applied in this 3D Wayang Kulit animation. Each motion is divided into multiple phases of huge amounts of key frames with distinct spatial constraints, allowing for appropriate interpolation for the Mak Dara and Pak Seman 3D puppet characters. As discussed earlier, the puppets physical model(3D) are visible at the front of the screen similar to visual styles of 2D animation of Nina Paley's *Sita Sings The Blues* feature animation and Malaysian animated series *Jala Emas Jala Perak* which uses the influence of visual arts and styles of Wayang Kulit Siam. One common aspect within these 2D animations is that the puppets movements and physical appearance are more vibrant and variant with colourful characters, backgrounds, effects and cinematography which are more visually appealing among the kids especially. This provides a different flavour and style to the audience, especially the younger generation to benefit from the visual and storyline, indirectly preserving this masterpiece from dying out. Based on the researcher's observation, silhouette or shadow movements are not a priority in their animations but they are translated into the forms of 3D digital mediums such as lighting, background or facial expressions. In *Cintailah Sungai Kita,* it uses the identical approach but with more depth mainly focusing on 3D puppet character animation.

The animation for Mak Dara and Pak Seman works as digital actors that are able to respond with personality and look convincing to the audience. In order to complete this process, the character animation models need to be prepared through character controls known as rigging (See Figure 4.12).
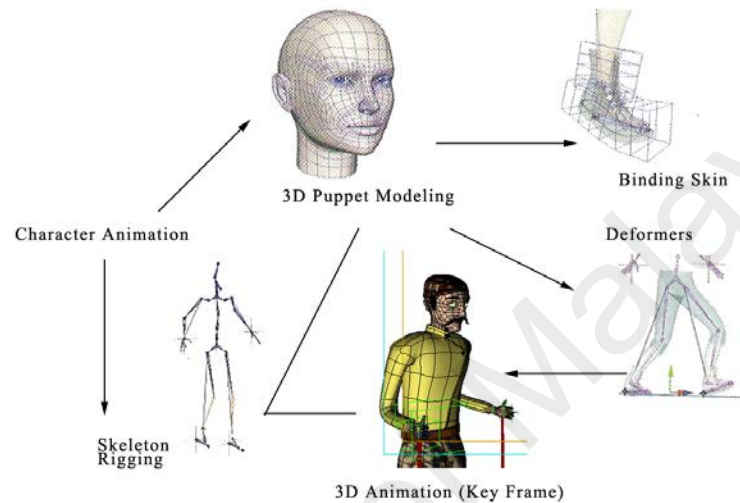
Figure 4.12   3D puppet character animation model and rigging process

The rigging process allows the animator to focus on animating the 3D puppets. This process is similar to the traditional Wayang Kulit process, especially in articulating a puppet's joints between its hands, arms, hips, face and body. According to Tim H. Brown (2000), there are eight steps in a rigging setup in order for a 3D puppet character to be animated properly. This includes *skeleton joints, character controls, constraints, selection handles, facial animation, kinematics, bound surface and deformers* (see Figure 4.13). Rigging is the most complicated and tedious process in 3D character animation as it involves an understanding of physics and the human anatomy of movement required for each 3D model puppet.

For example, in order for Pak Seman's movements to resemble the similar articulated

movement of a shadow puppet character such as Seri Rama or Wak Dogol in Wayang

Kulit Kelantan, forward and inverse kinematics are employed; this allows the joint to be

rotated and the Inverse Kinematics (IK) handler to control the rotation of joints that

allows single or dual articulation of movement. Again, similarities can be found in

traditional Wayang Kulit Siam in the sense that once carving is completed, a handle

made of bamboo and split to the puppet's dimensions is attached to the puppet itself. A

thinner rod is also attached to the hand of the puppet's articulated arm, creating joints at

the elbow and shoulder of pivot points and tightened at both ends using strings threaded

through holes (Amin Sweeney, 1992).
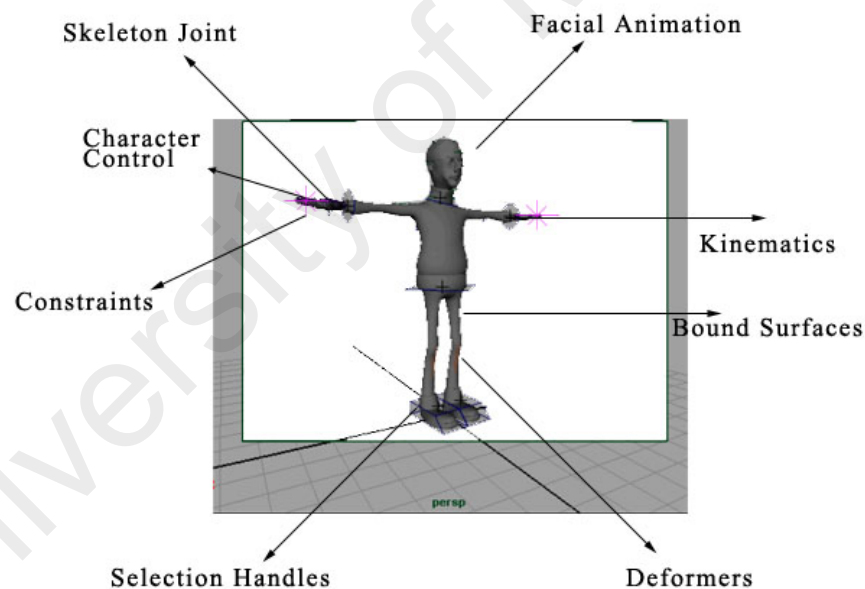
Figure 4.13   3D Character Rigging in 3D Wayang Kulit Component Setup

Key frame procedure animation and computer hardware require greater attention. 3D Wayang Kulit may require a large amount of memory which affects the overall computer performance and quality of the end product.

Three steps are required to animate Mak Dara and Pak Seman using key frames (procedure animation). First, motions performed by the parameters are simplified as characteristics related to each frame movement. Take the puppet hand for example: the motion (key frame) includes hand length, movement and timing factors. Here, Disney's twelve principles of animation are useful as a guide. Principles such as *timing*, *slow in-slow out*, *staging* and *anticipation* are some basic animation fundamentals that were used to overcome certain obstacles in this experiment related to the appearance, movement and mood of 3D Wayang Kulit.

According to an interview with Mr. Nizam on 26th April 2012 at 10.00 am at AnimonStar animation studios in Cyberjaya, a former animation Director for *Upin & Ipin* and currently the animation director for Malaysia's famous full 3D television series *BoBoiBoy* in 2011, he describes Disney's Twelve(12) principles of animation as important in today's modern 3D animation entertainment. He added that although Disney's twelve principles of animation were based on cel or traditional hand drawn animation (Frank & Ollie, p.14). Their philosophy and approach are the same in terms of frame-by-frame movement. In fact, they are still popular among international animation production houses such as Dreamworks, Pixar, Disney and many others. For example, timing makes a movement witty, touching or relevant and functions as a central form between live action and animation. In *Cintailah Sungai Kita*, the puppet timing was divided into movement, facial expressions and lip syncing.

Despite the lack of totally dominant or flexible shadow motions with translucent effects similar to the traditional Wayang Kulit style, efforts were made to ensure that the shadows are still relevant in the 3D animation visual style. The 3D animation puppet shadow forms are projected behind the white background overlapping the physical forms of the objects representing Mak Dara and Pak Seman characters.

Another interesting approach in the procedure animation for *Cintailah Sungai Kita* is the walk cycle process for 3D character animation. The walk cycle refers to how a character walks. It is similar to walking on a treadmill with the background moving past with two strides showing thoughts and action. This experiment relates the visual style in traditional Wayang Kulit and 3D animation puppet movements. In the traditional style, it would be difficult to animate puppet legs forming a convincingly human form. However, in 3D the Mak Dara and Pak Seman walk cycles were animated with two strides though the leg movements were not shown on the screen. Second, key frames that are separated into several phases according to motion parameters in 3D are disintegrated. Lastly, interpolation or segregation between key frames is defined as hierarchies or groups. This process requires understanding between each component. Each group is placed in a set of series that transform to the object's coordinates. For the second group, each individual component of the object that moves relatively (Mak Dara & Pak Seman) with the whole component is defined. For example, when Mak Dara's 3D puppet arm was being animated, the individual arm had to be moved without moving the other arm (single articulated) and when Mak Dara's hand was completely moved, it affected the arms altogether.

To support such animation, the objects were constructed with geometric hierarchy. This hierarchy allows the identification of individual components, easy navigation of groups as well as the entire structure not only for the overall puppet object but other components such as lip syncing, eyes and facial expressions. The Mak Dara and Pak Seman 3D puppet model geometry hierarchy consists of 80 to 90 components with more than ten (10) thousand polygon counts. This was very difficult to animate especially the eyes, arms or any other related component as they are bound to skin (3D puppet) with Inverse Kinematics (IK) for rigging. Once the rigging for the puppet model's anatomy and facial poses are complete, the animation is played in real time for the lip sync process where the audio recording from the pre-dubbing process is done. Lip syncing and facial animation allow 3D puppet characters to communicate with the audience and express a wide range of emotions. It is important to set the tempo and mood for a plot or story development. Using morph deformers allows the Mak Dara and Pak Seman 3D puppet characters to apply several target shapes in 3D software to reshape a natural 3D face puppet model using 3D Studio Max (see Figure 4.14).
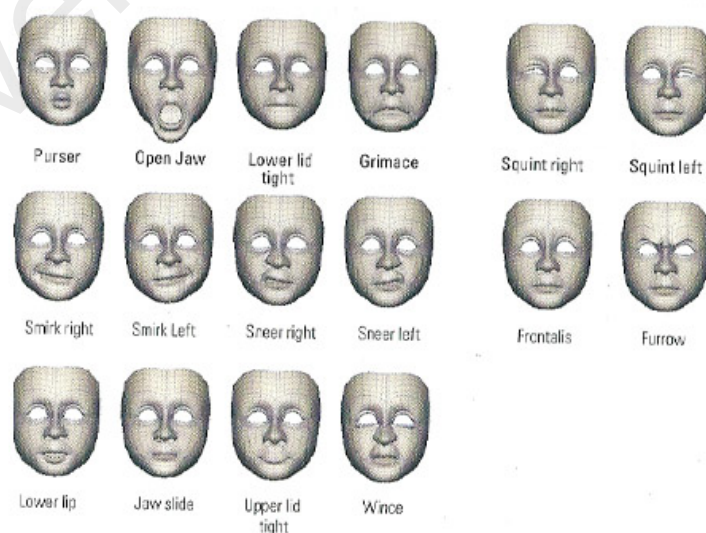
Figure 4.14 Morph function to describe 3D puppets' face expression using 3D Studio Max software (Tim H.Brown, 2000)

Once the morphing process is applied, a set of series for each facial target and key frame setting helps the slider to animate the 3D puppet face in coherence with facial muscles, eyes and lip syncing. During the lip sync process, the 3D puppet characters undergo several facial pose tests using morph target attributes and phonemes. The audio recording or dubbing in MP3 format is brought to the 3D software and added to the timeline for preview purposes. The process of synchronization between lip syncing, phonemes and facial expressions for both 3D puppet characters are done in real time mode. The language used for audio dubbing in the lip sync process is Malay. The language pronunciation involves vocal and consonant phonemes. As the traditional puppeteer uses sharp vocal chords and narration intonation together with rhythm accompanied by music, it can be quite difficult at times to understand the overall plot of a story. In *Cintailah Sungai Kita*, a male voice and female voice were used to represent the Pak Seman and Mak Dara characters, performing as *Dalang* or puppeteer narration.

4.3.4   Post Production

3D wayang kulit key frame animation or the traditional visual styles of wayang kulit allows the audience to understand straightforward story dialogue communication with the characters as they impart a moral message. Once the lip syncing process is completed, it is time to move on to the final stage in 3D animation: the rendering process. The rendering process involves two stages which are the preview and final render composition stages. Preview rendering enables many iterations of animation output including modeling, lighting, texturing and animation. The art of rendering can be a balance between visualization and complexity to deliver a story and rendering speed that determines the quantity of frames rendered in a specific time.

The term 'rendering' correlates somewhat with the traditional shadow play puppet development process. The latter's use of cow hide, drawing and tracing, cutting and carving and colouring can be described as rendering. It combines all of those processes to produce the puppets and perform the shadow play to the audience. In 3D animation, the animator conducts the final render or batch rendering process to produce output through files, resolution (aspect ratio) and quality of the animation. The concept of *panggung* in traditional Wayang Kulit is similar to that of a cinema or television screen in animation. According to Shahrum Yub (1970), the *pangggung* performance by Dalang Pak Hamzah in Kampung Chichar, Kota Bahru in 1968 was made from 19 components. In *Cintailah Sungai Kita,* the final 3D animation was rendered in TV Phase Alternate Line (PAL) broadcast form with a width dimension of 720 x 576 pixels. The animation rendering also includes the ray tracing function which enables shadows and reflections, especially for the Pak Seman and Mak Dara 3D puppet models. John Vince (2000) notes that ray tracing reveals casting shadows, transparency and refraction through glass or water which in turn produce depth for photorealistic images. Finally, an AVI (Audio Video Interlace) uncompressed file format can be used to preview the 3D puppet character animation through mobile phones, TV, cinema, Internet or any other new media entertainment platform.

4.4   Summary

Overall, this chapter has provided an in-depth analysis of the 3D puppet Wayang Kulit animation process for stylized 3D computer animation version of *Cintailah Sungai Kita,* a moral value story for the young generation to preserve rivers from pollution based from suggestions from research scholars and puppeteers of Wayang Kulit. Using three common processes including pre-production, production and post production, a clear understanding of the work process flow to develop standard 3D animation has been provided.   A CD which contains the development prototype version of 3D key frame Wayang Kulit animation is also attached in this research.

Though there are many computer animation techniques and products that capture the visual aesthetic and performance (Tok Dalangs or puppeteer movement) in Wayang Kulit including Motion Capture (MOCAP). This experiment utilizes 3D key frame software animation as it is advantageous for researchers, animators and film producers to understand and apply the concept of key frame animation, especially in relation to Wayang Kulit or other cultural performances in the country. The next chapter will discuss perception analysis from respondents related to traditional and digital puppetry visual approaches to identify several key points between these two domains.

CHAPTER V

ACUITY ON WAYANG KULIT VISUAL ART DOMAIN

5.1   INTRODUCTION

An interview session was carried out in order to judge the respondents' opinion using 3D computer animation on Wayang Kulit Kelantan; or Kelantan Shadow puppetry. Here, the respondents are provided with questions that are related to traditional and computer animation which are divided into four main visual art forms, namely; *Puppet Design, Light and Shadow, Animation and Storytelling*. The sampling data consists of groups of respondents divided into two main groups – experts and non-experts. The expert group includes experienced computer animators, 2D cel or traditional hand drawn artist and illustrators, while for experts related to Wayang Kulit, *Tok Dalang* (or puppeteers) as well as experienced Wayang Kulit researcher were identified. The non-expert group includes Wayang Kulit fans mainly in or from Kelantan. This group consist of regular spectators of Wayang Kulit Kelantan (Siam), which experienced Wayang Kulit Kelantan; mainly from childhood up to present. During each interview session, the respondents are presented with a sample of 3-Dimensional (3D) computer animation Wayang Kulit, as part of an experiment to provide a better understanding and discussion between the researcher and respondents. A total of twenty six respondents were involved during the interview, with five animation experts including animation directors and animators, six experience *Tok Dalangs* (or puppeteers) and research scholar Wayang Kulit, mainly from Kelantan, and fifteen Wayang Kulit fans with knowledge and vast experience related to Wayang Kulit entertainment. The data later were compiled and analyzed using QSR Nvivo 8.0 qualitative software.

5.2 Visualization of Tree Model
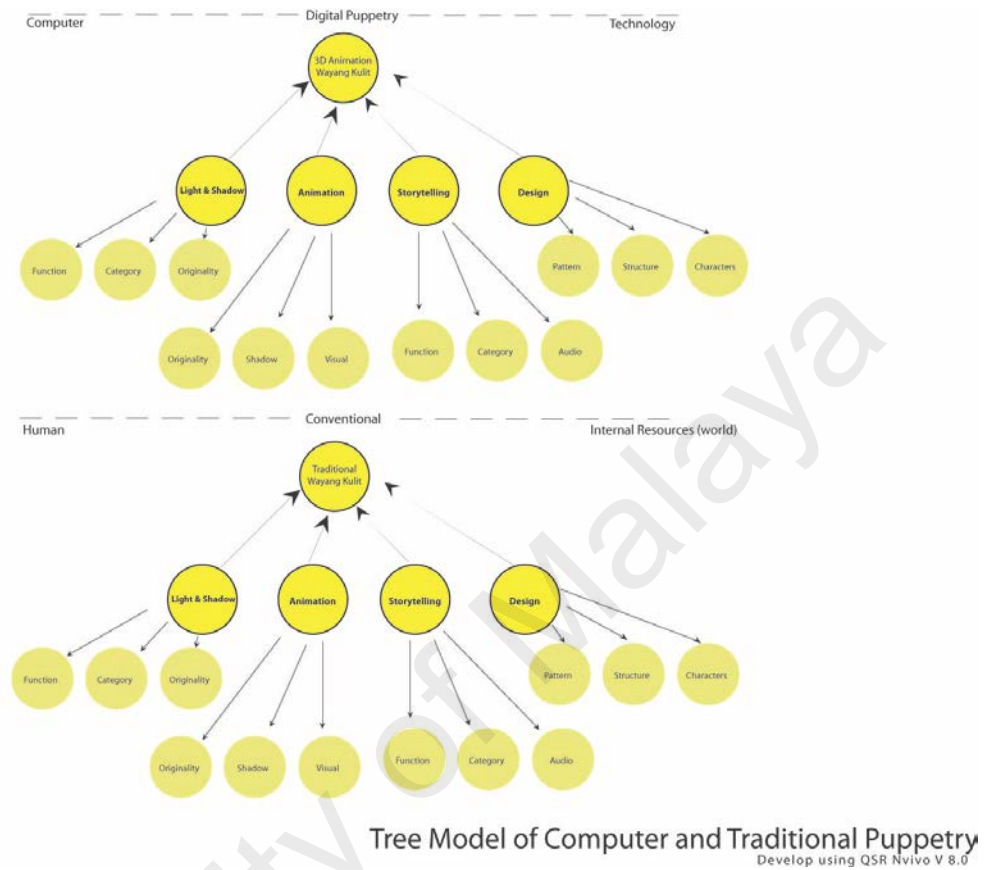
Figure 5.1 Tree Model Nvivo Data Analysis on Traditional and
Computer Animation Puppetry

Figure 5.1 shows a tree model structure of questionnaire design process using QSR Nvivo 8.0 qualitative data software. The overall research objectives clearly states that it focuses on three main aspects such as traditional qualities in Wayang Kulit, significance of 3D computer animation and study of design (modelling) and study of 'expressitivity' related to animation or movement in Wayang Kulit performances. The idea of the tree model is to basically provide a clear visualization process of questions and domains related to the research objectives. The tree model is divided into two main domains which consists of traditional and digital (computer animation) puppetry.

The animation expert focus group respondents consist of 5 individuals, which are identified as EX1, EX2, EX3, EX4, and EX5. As for the puppeteer and academic researcher, the respondents are identified as TK1, TK2, TK3, TK4, TK5 and TK6. Finally, for the labels of Wayang Kulit Kelantan fan group, due to huge amount, are based on their short name representing their findings.

The questions are designed based from literature studies and interviews, with focus on imperative elements related to traditional and 3D computer animation on Wayang Kulit. The respondents are provided with relevant questions and segmentation (traditional and 3D animation) on Wayang Kulit, except for animation group where several key-points questions (including Disney's twelve principals of animation) are slightly different from other group respondents, as the researcher had begun to analyze and highlighting several talking points based on their knowledge and skills which requires their input in relation to Wayang Kulit and animation studies. Next, we will discuss the research findings and discussion from each questions based on the tree model describe earlier.

5.3 Design

5.4 Pattern Studies Related to 3D and Traditional Wayang Kulit
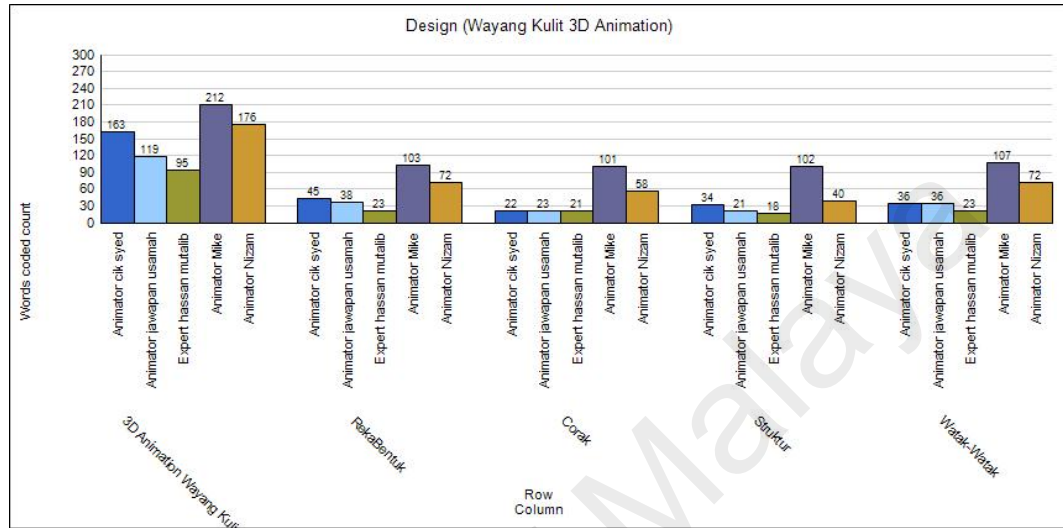
Figure 5.2   Matrix Query Design chart on 3D animation Wayang Kulit

Figure 5.2 shows the proportion of animation and Wayang Kulit research experts and overall words were counted or coded during the interview sessions. This matrix query (see Figure 5.2) summarizes the word count or coded during the interview session related to 3D animation Wayang Kulit. Meanwhile, respondent EX4 recorded 212 times as the highest words coded counted in this segment, which describes the importance of 3D computer animation in Wayang Kulit design. On the contrary, Malaysian pioneer animation expert, the respondent EX3, was slightly low with 95 times source coded reference in particular to 3D animation in Wayang Kulit. Overall, the significance for the reason of highest word count from EX4 respondent point of view proves that concept art and identity of visual design and characters in Wayang Kulit traditional can be adapted into 3D computer animation.

For instance, in Malaysia, concept arts (digital art and informative *the making of*... from pre-production to post production) on film or TV production are not documented compared to international animation production such as Pixar or Disney. Also, respondent EX4 were optimistic in the content of animation, referring to the stylized puppet of Wayang Kulit with new characteristics names such as Mak Dara, Mak Minah or Pak Seman characters with different visual arts of structure (identity), texture and pattern that the young generation today would find it easy to adapt with 3D computer animation. It represents a local identity within the society which the young generation especially would find it much more comfortable to accept. It means, since the past, the audience were synonymous with characters such Wak Dogol, Seri Rama or Sita Dewi in Wayang Kulit Kelantan. Therefore, new puppet characters can also be introduced to create another style to represent new or modern characters or Wayang Kulit. Next, we will look on the results of each component related to visual design element on 3D computer animation in particular to Wayang Kulit visual arts.

5.4.1 Pattern Visual Style
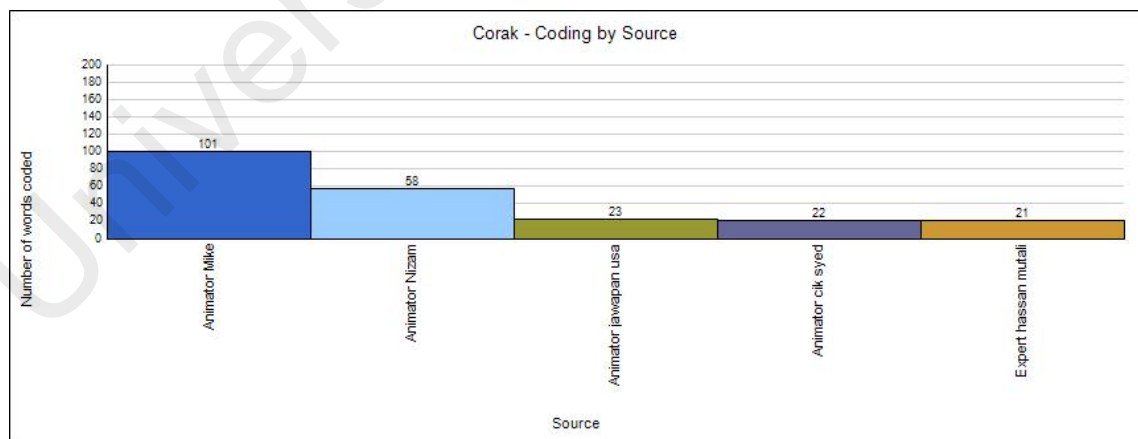
Figure 5.3 Pattern result **3D animation** based on animation experts

Figure 5.3 shows the number of words coded among the animation experts in relation to the pattern studies in Wayang Kulit 3D animation. Figure 5.3 shows the differences and slightly close number of words coded during the interview session.   One of the respondents, EX4, highlighted more than 100 words coded with highest word frequency count of 3.36% relating to the significance of puppet characters in computer animation which represents their psychical appearance and characteristic.   Also, there were between 0.22% to 0.23% relation to words frequency cited by respondent EX4 on 3D computer pattern design puppets mainly focusing on traditional Malaysian styles such as batik or other modern features based on the response to question 1, 4 and 7. Thus, the usage of batik, songket, floral or any other Malaysian visual culture styles will be an added value of artistic symbol by providing different styles or looks to the current existing Wayang Kulit puppets in 3D animated styles. The context of realism in puppet animation signifies the capability of 3D computer animation to capture the similar visual essences of existing traditional Wayang Kulit's qualities and patterns such as colour, lines, articulated shapes and others.

On the contrary, it is obvious from this figure that respondent EX3 are among the lowest, by gaining 21 words coded among the other animation experts on computer animated puppetry related to pattern. This is due to his perception of puppet design and texture in traditional Wayang Kulit, which had much more visual attraction and aesthetics values compared to 3D computer animation, which focuses more on photorealism. It is interesting in particular to respondent EX3 that the word frequency percentage used such as realistic (0.19%), symbolism (0.15%), photorealism (0.08%) and archetypes (0.04%) are important elements that separates the domain of traditional and modern visual styles of shadow puppet design.

It also important to highlight that several respondents highlighted the issue of hardware and software to develop detailed model textured and virtual models of puppet design. It might be difficult to model hundreds of puppet 3D model using key frame animation software which might utilize high capacity of hardware and software appliances which in turn involved detail modelling and rendering.
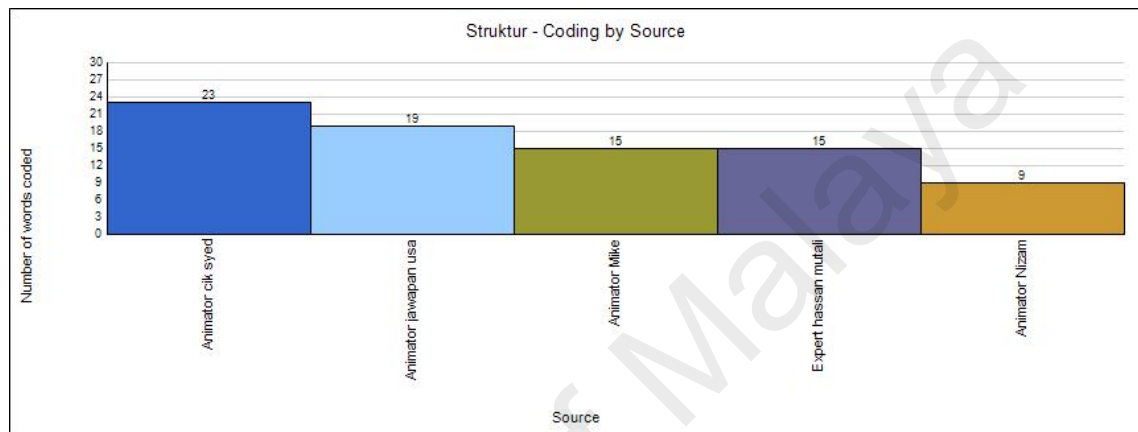
Figure 5.4 Pattern result **Traditional Wayang Kulit** styles based on
Animation Experts

The purpose of this part is to highlight the respondent's point of view on Wayang Kulit's traditional styles, mainly Wayang Kulit Kelantan visual arts. Figure 5.4 shows the most coded reference word with EX1 providing the highest (23 words) and EX5 respondent with only 9 words. It is obvious from this table that very few respondents had basic knowledge or general information related to traditional Wayang Kulit. It might be related to their background, commitment and passion on traditional performing arts.

What is interesting in this finding from Figure 5.4 is that detail pattern craft of each puppet by the Tok Dalangs and hand-made original are the essence in Wayang Kulit arts. Passion, observation, time and detail during production process, are some factors that allow the master puppeteer (Tok Dalangs) to design this unique puppet pattern with colourful textures.

The colours are vibrant, attractive and dynamic that allows the audience to focus their attention on the shadow pattern projected behind the screen. It also helps to provides coherent performance in terms of puppet size, costume, props and puppet characters role (antagonist and protagonist) in Wayang Kulit. On the aspects of facial puppet expression, some respondents describe that traditional Wayang Kulit's expression are created through emotional silhouettes or known as "characteristic of shadow play" as describe by respondent EX3. Overall, the traditional Wayang Kulit from the animation experts feels that it is a unique traditional performing arts with its own style and practices.
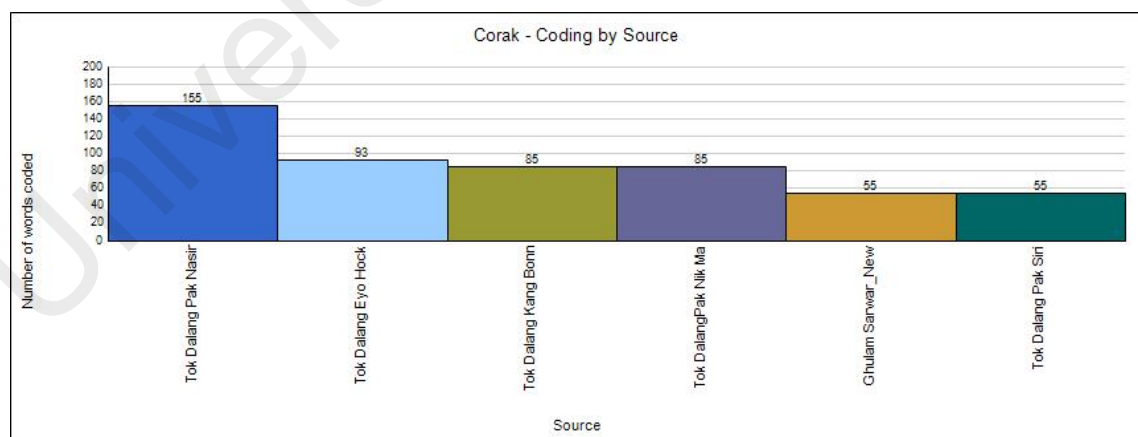
Figure 5.5   Pattern result from **Wayang Kulit traditional** based on Tok Dalangs and Academic expert

Figure 5.5 shows the detailed percentage of words coded between Tok Dalangs and Wayang Kulit academic experts, with respondent TK1 signifies the highest words coded, at 155. As for TK5 and TK6, both respondents cited 85 coded words. From the example, TK1's first significant reason for the increase in words coded from the interview is based on perception that the shadow puppet animated in 3D animation is much more artistic, with vibrant colours, new characters; costumes with Malaysian culture pattern (flowers, batik, songket) can be added in 3D computer animation shadow puppetry to attract the audience.

5.4.2 Artistic and Visual Composition
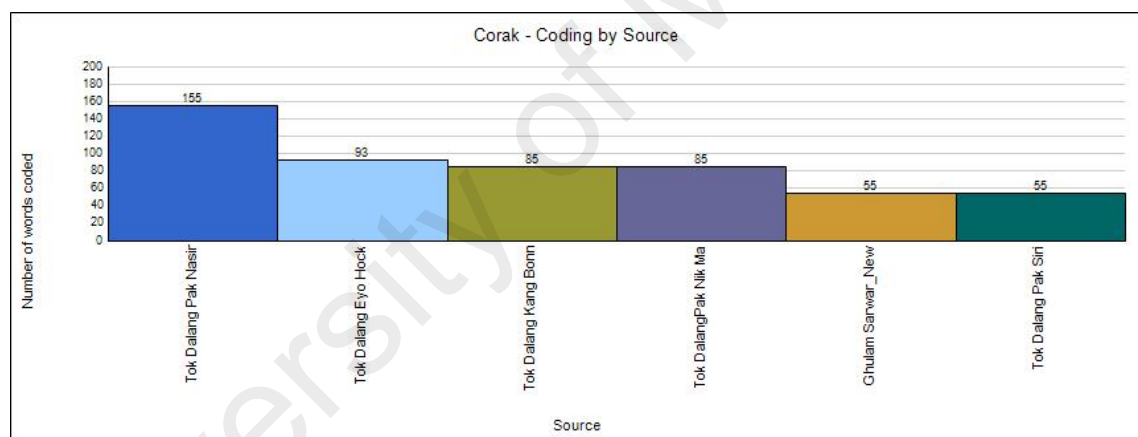
Figure 5.6 Artistic and Visual Composition
result **3D animation Wayang Kulit** based on Tok Dalangs and Academic expert

Figure 5.6 shows the detailed percentage of words coded between Tok Dalangs and Wayang Kulit academic experts, with respondent TK1 signifies the highest words coded, at 155. As for TK5 and TK6, both respondents cited 85 coded words.

From the example, TK1's first significant reason for the increase in words coded from the interview is based on perception that the shadow puppet animated in 3D animation is much more artistic, with vibrant colours, new characters; costumes with Malaysian culture pattern or crafts (flowers, batik, songket) can be added in 3D computer animation shadow puppetry to attract the audience.

Secondly, TK1 feels that characters and roles within the puppets life in traditional shadow puppet can be transformed to computer animated 3D puppetry. He was impressed with the 3D *Pohon Beringin*, (Cintailah Sungai Kita) prototype done by the researcher that was modelled and animated in 3D computer animation that looks almost similar to a traditional Wayang Kulit style. Overall, from the bar chart above, we can see that the factors contribute towards lower words coded related to shadow puppets pattern are mainly on realistic visual appearance such as texture, value, artistic and others.

In the Example, respondent TK5 explained during the interview that computer animation will not be able to achieve as accurate or similar qualities with traditional shadow play puppets. This is due to the audience's experience to identify between original or computer animated puppetry in context with visual design or artistic approach. The most important findings appear from this data is the respondents (Dalangs or puppeteers) mostly agreed that new puppet identity with different visual patterns can be applied in computer animation puppetry based on the countries' socio-lifestyle, culture, and target audience.

There was a positive connection between the pattern and culture, especially in Malaysia, as technology has dominated the people's lifestyle especially the youth today, and Wayang Kulit or shadow puppet needs a new breed. The computer animated 3D shadow puppets should be designed with simple, not too complex pattern. The context of shadow or silhouettes, with 3D images or model, distinguished the context of medium of entertainment. Shadow puppetry belongs to the world of performing arts but 3D computer animation belongs to world of animation.

Computer animated puppetry can be designed creatively with various themes and colours, texture, visuals that could be adapted from the Malaysian culture. It is advised that new 3D computer animated shadow puppets name or identity created should be remained in use throughout in order for easy remembrance as similar concept used in traditional shadow puppetry. Thus, use of computer animation in designing pattern related to shadow puppet styles creates a value of paradigm that signifies between the importance of technology, human and creativity. An interesting point that respondent TK2 discussed is the concept of patterns use in designing or developing Wayang Kulit traditional puppets, whether should it be perceived from a perspective or keeping the traditional aesthetics. It is up to the producer and animation director to decide the puppets' concept art, either to stylize or preserve the existing Wayang Kulit style. From this aspect, TK1 and TK5 respondent also describe that traditional Wayang Kulit puppets pattern are constructed based on a hierarchy system among the Kingdom and the society which makes it necessary to define each puppet character with detailed handcrafted patterns including colour, dress, weapon and texture.

In the example, TK2 and TK4 respondents both obtained 15 percent of their words which signifies their observation and point of view on traditional Wayang Kulit puppet, especially on pattern with similarities with other influence culture such as Siam, Hindu or Java. Overall, majority of the respondents described that the conventional stories or repertoire in shadow puppet or Wayang Kulit are basically folklore or Hindu epics (mainly Ramayana & Mahabharata) that influenced the puppet design (pattern) in Malaysia. TK5 respondent described that time and effort put by the puppeteers to design traditional shadow puppets involved much detail and crafting for each pattern applied.

This point is important as it relates to the second research objective, which is developing 3D computer animation Wayang Kulit. Also, they added that the identification of puppet characters (heroes, villains, kings) through patterns and silhouettes created in Wayang Kulit on the screen were able to create both physical and emotional affects including mesmerizing, look-up, and life-like. TK4 respondents also added that audience who watched the traditional Wayang Kulit puppets were unable to define the puppet's pattern of emotion through visualization. It depends more on expressive narration and tone of voice of the puppeteers in fantasizing each repertoire of a story.
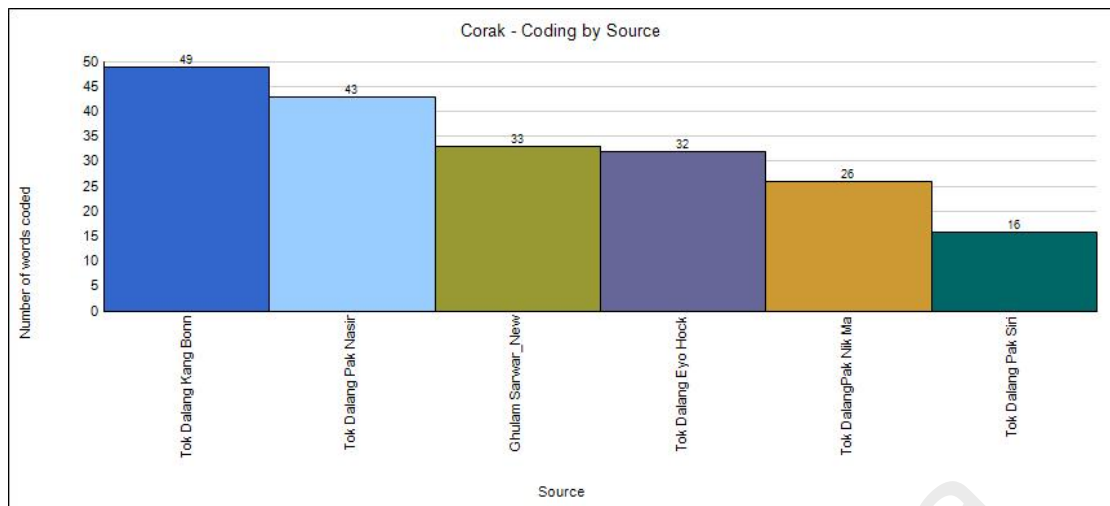
Figure 5.7 Artistic and Visual Composition
result **Traditional Wayang Kulit** based on Tok Dalangs and Academic expert

Figure 5.7 represents the number of frequent words coded by Tok Dalangs or master puppeteers and academic researcher that signifies the concept of design and pattern puppets in traditional Wayang Kulit As can be seen, TK3 respondent obtain the highest word coded with 49 words while TK6 with 16 words cited.   TK3 respondent coded several points relating to importance of colour for puppet design in traditional Wayang Kulit and should be considered carefully in the development of computer 3D animation. Colours that are used in traditional Wayang Kulit should also look more vibrant and identical in 3D animation puppetry for the audience to be able to appreciate and also as part of symbolism and iconography to the puppet of Wayang Kulit. Even though TK6 respondent highlighted 16 coded words related to traditional Wayang Kulit pattern that signifies one of the most important findings clearly stated is the importance of colours within pattern for each puppet design to attract the audience towards the whole concept of the story.

If colours are not applied in 3D computer animation, it will be non attractive because the audiences are watching solid 3D puppets model computer animated that looks almost too cartoonish or non-realistic image. A traditional shadow puppet looks physically strong and the projected silhouettes or shadows appearance are basically dynamic and versatile based on the colours and texture applied. He also added that the height and size of each puppet in traditional Wayang Kulit should also be followed in computer animated style. Majority of the respondents agree that traditional shadow puppets in terms of pattern or design puppets are unique and imaginative. Computer animation are more advanced piece of technology and what is interesting in this findings from Figure 5.7 is the respondents feels that it will not be the same to use computer animation to develop a basic puppet similar to traditional styles especially when it comes to visual , articulation, design or pattern of the puppet models. Even though computers were used to create a full adaptation of Wayang Kulit animation, it will still not be the same quality or style exists from the conventional style.

5.4.3 Design Simplicity & Audience Attraction
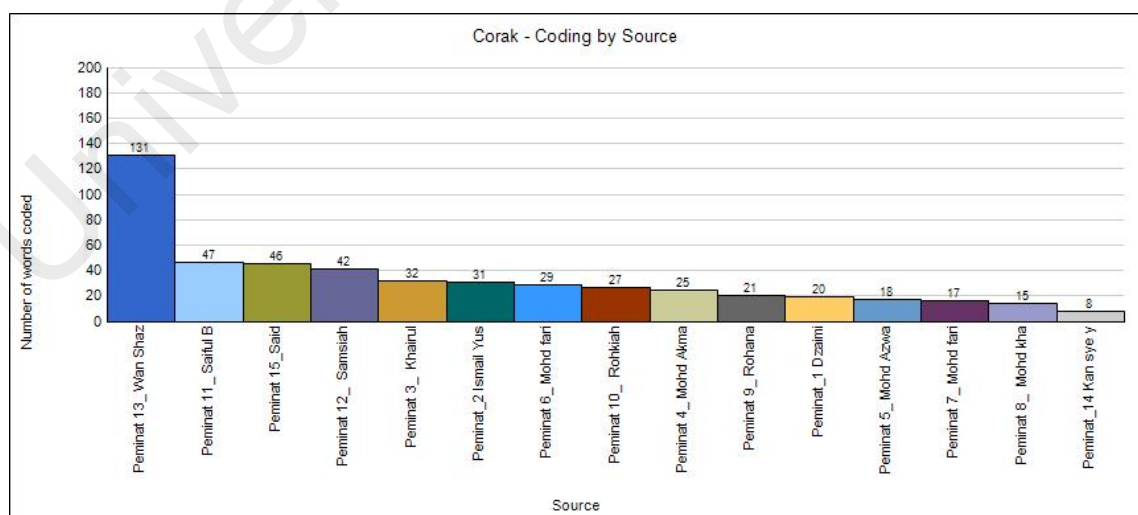
Figure 5.8 Design Simplicity & Audience Attraction result **3D animation Wayang Kulit** based on Wayang Kulit Fans

Figure 5.8 shows the detailed percentage of words coded between Wayang Kulit Fans, with respondent F13 respondent signifies the highest words coded, at 131. As for F11 and F15, both respondents cited average of 45 coded words related to computer animation Wayang Kulit. From the example, F13's respondent first significant reason for the increase in words coded from the interview is based on perception that the shadow puppet animated in 3D animation is much more stylish, with vivacious colours, variety characters; using influential Malaysian culture pattern (stylish flowers, batik, and songket) can be added in 3D puppet models to attract the audience. Secondly, F5 respondent feels that characters and roles within the puppets life in traditional shadow puppet can be transformed to computer animated 3D puppetry. He also was impressed with the 3D *Pohon Beringin*, 3D puppets characters Pak Seman and Mak Dara for "Cintailah Sungai Kita" prototype done by the researcher that was modelled and animated in 3D computer animation that looks almost similar (realistic) to a traditional Wayang Kulit style.

Overall, from the bar chart above, we can see that the factors contribute towards lower words coded related to shadow puppets pattern are mainly on realistic visual appearance such as texture, value, artistic and others. In the Example, respondent TK5 explained during the interview that computer animation will not be able to achieve as accurate or similar qualities with traditional shadow play puppets. This is due to the audience's experience to identify between original art of Wayang Kulit or 3D computer animated visual qualities in context with visual design or artistic approach. The most important findings appear from this data is the respondents mostly agreed that new puppet identity with different visual patterns can be applied in 3D computer animated Wayang Kulit based on the countries' socio-lifestyle, culture, and target audience.

There was a positive connection between the pattern and culture, especially in Malaysia, as technology has dominated the people's lifestyle especially the youth today, and Wayang Kulit or shadow puppet needs a new breed. The computer animated 3D shadow puppets should be designed with simple, not too complex pattern. The context of shadow or silhouettes, with 3D images or model, distinguished the context of medium of entertainment. Shadow puppetry belongs to the world of performing arts but 3D computer animation belongs to world of animation. Computer 3D animated puppetry can be designed creatively with various themes and colours, texture, visuals that could be adapted from the Malaysian culture. It is advised that new 3D computer animated shadow puppets name or identity created should be remained in use throughout in order for easy remembrance as similar concept used in traditional shadow puppetry. Thus, use of 3D computer animation in designing pattern related to shadow puppet styles creates a value of paradigm that signifies between the importance of technology, human and creativity.
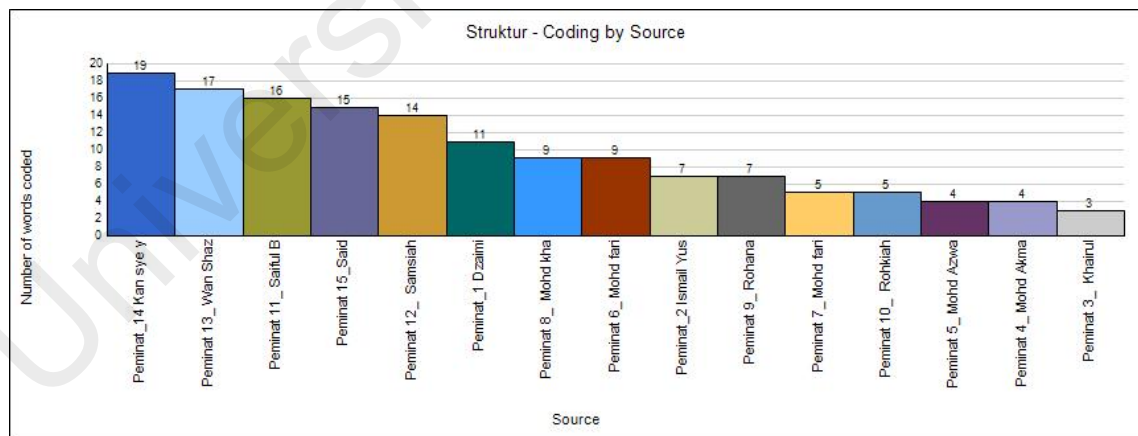
Figure 5.9 Design Simplicity and Audience Attraction result **Traditional Wayang Kulit** based on Wayang Kulit Fans

From the chart figure above, it reveals that out of 15 respondents related to Wayang Kulit fans, F13 respondent from Pasir Mas, Kelantan, coded the highest source related to pattern studies with 19 in creating 3D Wayang Kulit animation. F3 respondent from Pasir Mas Kelantan also, cited only three times in her opinion using 3D computer animation for Wayang Kulit. The first significant reason for WS respondent increase on pattern studies is based on her optimistic view that using 3D computer animation towards creating the pattern puppet design visual arts of Wayang Kulit could be beneficial in terms of new approach and technology for the survival of the classical art form.

From figure 5.9 related with puppet pattern and design costume construct in traditional Wayang Kulit style, one of the respondent F12 from Kota Bahru, cited the most words during the interview session, with another respondent F3 from Kota Bahru as well coded the less frequent points related to pattern subject matter. In general it can be seen that in Figure 5.8 that the response is much more positive due to their knowledge and experience watching traditional Wayang Kulit compared to 3D computer animation. What is interesting in this finding is that some respondent stated that by providing modern texture, dress-code, and weapons to 3D computer animated puppets it would give an extra dimension or variety of visualization to the audience compared to current style of Wayang Kulit. Also, another findings from the respondents is the puppets can be seen physically but untouchable in 3D computer animation, compared to traditional Wayang Kulit the puppets are touchable and able to manipulate behind the screen by the puppeteer himself. In response to the question 5, majority of respondents revealed that the comparison between 3D computer animation and traditional hand-made puppets in Wayang Kulit are two totally different approaches or medium.

Animators instruct the computer (software) to create an animation, but puppeteers create the puppets' patterns based on creativity, observation, notion and sensitivity. Again, most of the respondents interviewed suggested that colours play a significant role in developing the puppets' features and qualities that the audience would find appealing to view, especially young generation or kids that are fascinated and attracted to colours. Also, small number of respondents suggested that by using the traditional colours, or classic craft shapes (known as "Kerawang") in the design of 3D computer animation puppets model as texture could add a "sentimental value" and metaphor that Wayang Kulit puppet appearance are appreciated and known for.

What is interesting in this finding related to tools used to design 3D virtual puppet from Figure 5.8 is that 3D computer animation context with the tools and functions are able to provide a dimension towards the personality of the puppet characters for the survival of Wayang Kulit itself. For example, using variant patterns or vivid colours with (cartoonish style) generated to 3D puppet models, can be cache (attractive) that will attract the audience mood and attention towards it. Also, some respondents described computer as only tools that provide solutions. The puppet design, texture, craft, stylistic requirements, concept, and stories comes from the creativity inside each individual; either a film director, animation director, or puppeteer himself. Plus, adding Malaysian culture iconography arts and dress such as batik, Baju Melayu and Sari using computer animation, will help especially the younger generation to appreciate and support Wayang Kulit entertainment, as there might be no end to historical and heritage of the origins of Wayang Kulit such as Wayang Kulit Kelantan, but there could be an end or extinction on its performances.

Over two thirds of the respondents indicated that computer animation could achieve the similar quality or stylistic pattern that appears in traditional shadow puppetry. Overall, only a small number of respondents disagree that puppet pattern (colour, texture, craft) could be achieve in computer animation and it is not realistic compared to traditional Wayang Kulit style. Most respondent feel that the audience, especially in the village, may find it unpleasant, scared or uncanny to watch 3D computer puppet Wayang Kulit. Here, the most important finding is the context of shadow or image projected from 3-Dimensional (3D) computer puppetry. Using 3D computer animation to create the exact quality of Wayang Kulit's traditional visual arts will still create a doubt factor, whether shadows or silhouette is required. If computer animation is used to develop or stylize Wayang Kulit, the respondents feel it is not necessary to maintain the art of silhouette or the need for the shadow to be projected.

Computer animation 3D puppetry would allows the audience to no longer focus on the shadow but are able to view 360 degree 3D model puppet with detailed pattern designs. It would be quite difficult to identify either it is a computer generated or an original traditional performance using replicated style. In response to question no 8, majority of the respondents revealed that facial expression can provide more mood, emotion, and realistic facial that allowed the audience to be much closer with the characters and story.

5.5 Structure Concept in 3D and Traditional Wayang Kulit

5.5.1 Variable Shapes and Sizes
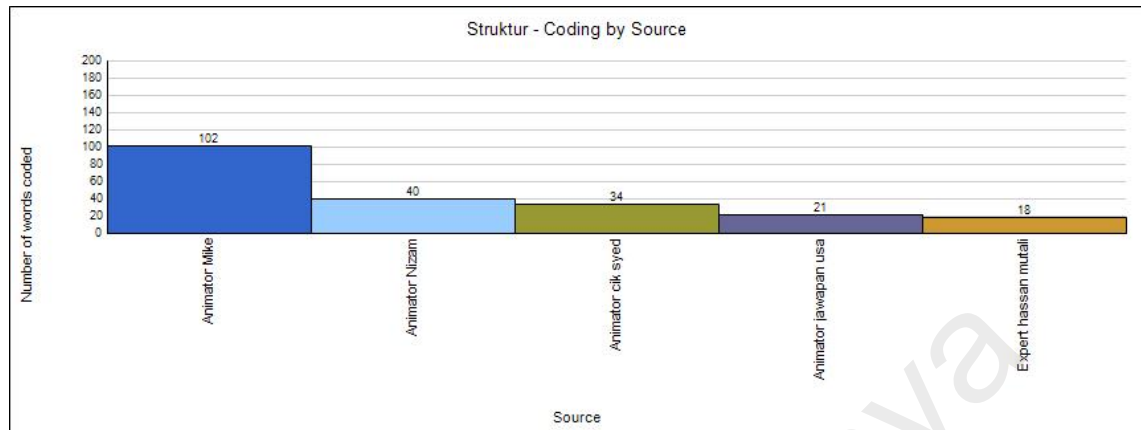
Figure 5.10   Structure of Variable Shapes and Sizes **3D animation Wayang Kulit** based on Animation Experts

The graph bar in figure 5.10 shows majority of the respondents preferred Wayang Kulit constructed using 3D computer animation. The first significant reason for the increase is due to the point of view related to puppet design that requires it to be designed with various structure including various size and shape. Also, variable shapes and sized defines significant characteristic towards each role in plot or storyline. This is important for the audience to identify the protagonist and antagonist characters involved in the story as well as different momentum of mood and expression. What is interesting in these findings from Figure 5.10 is the phrase "Stand out" in terms of puppet structure coded by majority of the respondents with percent of 0.23. The significance here is the role of colour that helps to create "stand out" visual appearance of the puppet characters in animation that lead to the audience's enjoyment.

Colours not only provide visual artistic style or mood but it also enhances the visual appeal of the characterization in each puppet design, especially in 3D computer animation. There was a positive connection between colour and costume or props used in developing shadow puppets in digital computer puppetry. For example, according to Mike, colours and costume in 3D computer puppetry must be inline that allows creating flavours in a story. Here, In response to the question 6, the respondents identified the role of different puppet structure in terms of shapes and sizes, are the known character identification that each character design are mainly conceptualized and illustrated based on characteristics.

In the example, EX3 respondent coded the lowest amount of word (18) which mainly focused on the puppets' structure between traditional and computer animated style with 0.15 percent number of words coded, mainly related to colour and symbolism in context with puppet structures. He explains the importance colour and symbolism in terms of puppet character archetypes, colour, photorealism and also facial expression that would able to create iconic characters that are memorable and believable. Puppet character structure must come in different variety of size, shape, or colour that helps to create variety of characters and charisma that the audience will not be bored with in the case of repetition of the existing characters in a story line. It had to have emotional factor that the audience are able to appreciate the charisma in it. Overall, to simplify from this findings, it can be described that majority of the respondents are providing point of view in the context of creating new structure of 3D key frame animation by using two(2) methods such as *stylized* (3D puppetry) or *replicate* (traditional shadow puppet) visual arts.

They feel that it could be done but it needs to understand certain qualities that exist between traditional puppetry and digital puppetry (structure of colour, articulated shape, proportion, gesture and many more). Overall, in evaluating the findings in Figure 5.9, most of the animation expert feels that visual structure of computer animation should be versatile, with proper understanding of visual art elements such as colour, props, costumes, shapes and sizes, emotions and charisma that fulfil the needs in a story and importantly has a great amount of significance towards the audience.
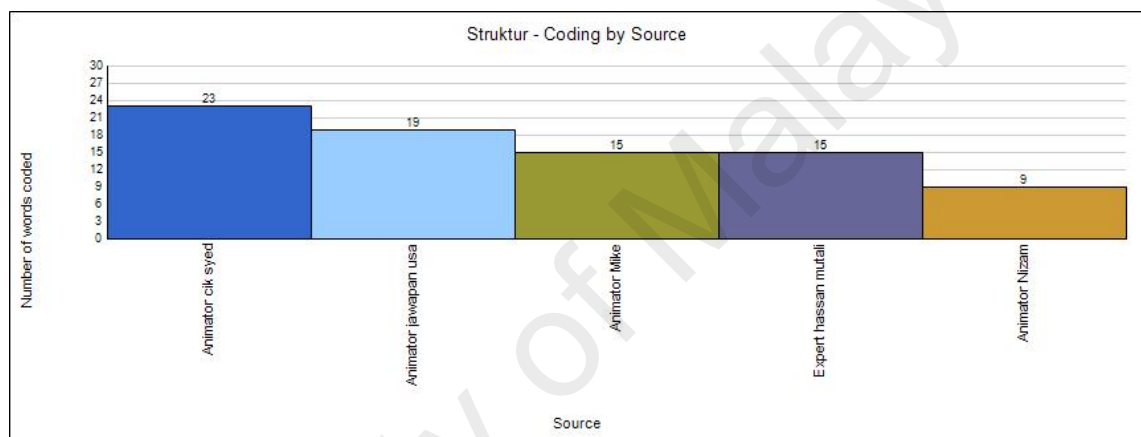
Figure 5.11   Structure of Variable Shapes and Sizes **Traditional Wayang Kulit** based on Animation Experts

This part will present the respondents' view in terms of puppet design and structure, based on traditional Wayang Kulit visual arts. In general, it can be seen that in Figure 5.11 most of the respondents are fascinated with the concept and structure of puppet design in Wayang Kulit especially the vivid colors and crafted design. The first significant reasons for the increase related to traditional Wayang Kulit puppet structure are the visual details and appeal factor of the art form.   Strong evidence was found based from the literature studies of Pak Hamzah's presentation of Wayang Kulit at international countries, especially Belgium and Netherlands in 1969 that indicates international audiences' acceptance of traditional shadow puppets performance.

Also, what is interesting in this finding from Figure 5.11 is concentration or focus towards developing each puppet model structure from design using articulated and stylish patterns base on culture patterns especially Siam influences. From the respondents view, the animator needs to concentrate on constructing the puppet in virtual environment regarding form modelling, texture, rigging, and animation and rendering techniques. The puppeteer implies the same style as the animators does by in traditional method and tools in real life environment.

Also, there is a strong significance between the traditional Wayang Kulit puppet structure and computer animation visual appearance which is the factor of "scared". This belief has being around for many years in traditional shadow puppets or Wayang Kulit visual arts (puppeteers) and also among the audiences. In 3D computer animation, the scared factor does not exist, with the 3D puppet models are more "virtually" viewed and does not exist physically (touched) in the real world. Further analysis of data from the respondents revealed that satisfaction of handmade craft on traditional puppet design is the key points that segregate the puppet icon and identity. Variety of puppet characters such as *Wak Dogol, Seri Rama, Wak Long, Sita Dewi, Hanuman, Ravana* are examples of shadow puppet traditional visual arts with designs based on the role of each characters, with different scaling or size, colours and stylish crafts that represents their own identity.

Majority of the respondents thought that it would be quite difficult to develop an exact puppet model of Wayang Kulit's puppet characters structure, even though it is still not impossible. This is due to the complexity, cost (technology) and visual appeal among audience that could easily differentiate between handmade or computer software puppet structure design, which is highlighted in question 5. In question 6, most respondents were highlighting the aesthetics expression of puppet structure (physical). Whether it is virtual or non-virtual, it should consist of profound (dominant), character outline and archetypes that create the personas of each puppet characters.   These findings are important in that it relates to the final research objectives focusing on expressivity (puppet physical model appearances) of a 3D animation prototype. In fact, the puppet model structures are designed based on the traditional visual arts of Wayang Kulit performances.

5.5.2 Stylistic and Personifications
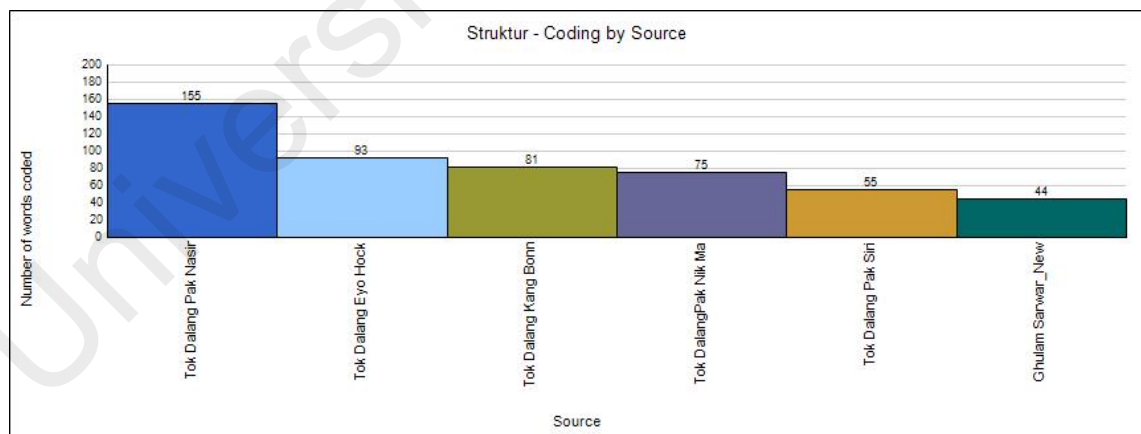
Figure 5.12 Stylistic and Personifications
result **3D animation Wayang Kulit** based on Tok Dalangs and academic expert

In general, it can be seen in Figure 5.12 that TK1 respondent shows the highest number of words coded from the interview session with 155. The different reasons that lead to this significant increase is the amount of word known as 'modern' with 0.44 percent in relation to puppet structure design. In the example, TK1 respondent coded several points related to question number 1 and 2 (**See Attachment C and D)** on puppet characterization, and colour are essential especially in developing 3D computer animated Wayang Kulit.

Strong evidence on characterization and colour were found when he was explaining his experience during his performances on Wayang Kulit at several functions in the local and international level. TK1 respondent added that beautifully articulated 3D computer puppet virtual models are important to create the stylistic and appealing factor among the audience. Children in particular are tend to be attracted to vivid colours applied to characters and background as shown in cartoon TV programs. In particular to questions number 6, several respondents also highlighted the importance of puppets structure using computer animated to visualize different background, status or scenario of each puppet design. Overall agrees to modernize traditional Wayang Kulit either by replicating it or developing new versions of Wayang Kulit but still maintaining some original styles. For example, during the interview session, TK1 also was impressed with the experiment of 3D Wayang Kulit animation shown during the interview known as "*Cintailah Sungai Kita*", some Wayang Kulit's traditional qualities were still implemented such as 3D Pohon Beringin puppet structure and also the use of background music of "Lagu Bertabuh".

Majority of the respondents totally supported the modernization of Wayang Kulit, especially in terms of puppet structure. In the example, 0.20 percent word frequency were recorded among three respondents (TK2, TK3 and TK4) stating the same word "stand out" that refers to puppet design in computer animation which should be almost the same styles implemented in traditional Wayang Kulit. What is interesting in these findings from Figure 5.12 is the majority of the puppeteer or Tok Dalangs including TK5 respondent agrees that puppet design can be developed using 3D computer animation. Like TK1 respondent mentioned, if traditional Wayang Kulit are the responsibility of the Dalangs or puppeteers (puppet design, storytelling, movement), and therefore in computer animation, the director or animator should be responsible as well.
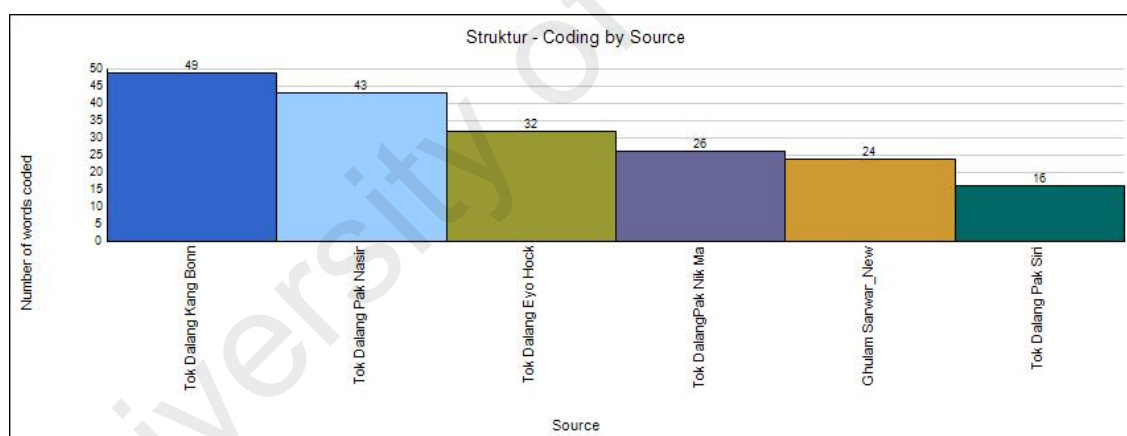
Figure 5.13 Stylistic and Personifications
result **Traditional Wayang Kulit** based on Tok Dalangs and academic expert

The graph in Figure 5.13 presents the respondents' results towards Wayang Kulit traditional puppet structure related to styles and puppet characters personification. In general, the Dalangs or puppeteers including academic experts are aware of the structure importance in Wayang Kulit performances, and most of the respondents indicates that Wayang Kulit traditional puppets should consist of various structures to the puppets that provides different style, rhythm and emotion for the audience.

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It is obvious form this graph in Figure 5.13 that majority of respondents described the importance of structure puppet model understanding in traditional Wayang Kulit that helps to bring out and encourage the characters' personas. As can be seen, the percentages between each respondent are not far, indicating that importance of structure in puppet character design and storytelling should be in line. Furthermore, traditional shadow puppets performances are focusing mainly on the 2-dimensional (2D) translucent shadows rather than the physical 3D models puppet (stylized) computer animation which are based on virtual domain. The puppets' physical structure are defined as "flat" or 2-Dimensional(2D) in traditional Wayang Kulit that allows the puppeteer to manipulate the puppets smoothly in and out on the screen(Kelir), compared to computer base are model in 3-Dimensional(3D) which is more rigid or computerised. What is interesting in this findings from Figure 5.13 is the philosophy between two visual arts in terms of it presentation appearance. The puppet design and structure in Wayang Kulit or shadow puppet performances are suitable for older generation and they still appreciate it today. Digital animation puppetry is more suitable for children that love cartoon visual art with vivid colours and effects.

This findings is related to positive connectivity with Wayang Kulit fans' perception on puppet structure using 3D computer animation as discussed earlier. The majority of the respondents felt that traditional puppet designs in Wayang Kulit are more dynamic and specific (variable). The puppet model structures were influenced from Hindu and Siamese visual arts. Also, this key point is related to the final research objectives that highlights the expressiveness of 3D computer animated shadow puppetry. In summary, the uniqueness of puppet structure in Wayang Kulit traditional performances contains two significances, which are the shadow and the puppet.

5.5.3 Versatile Pattern Visual
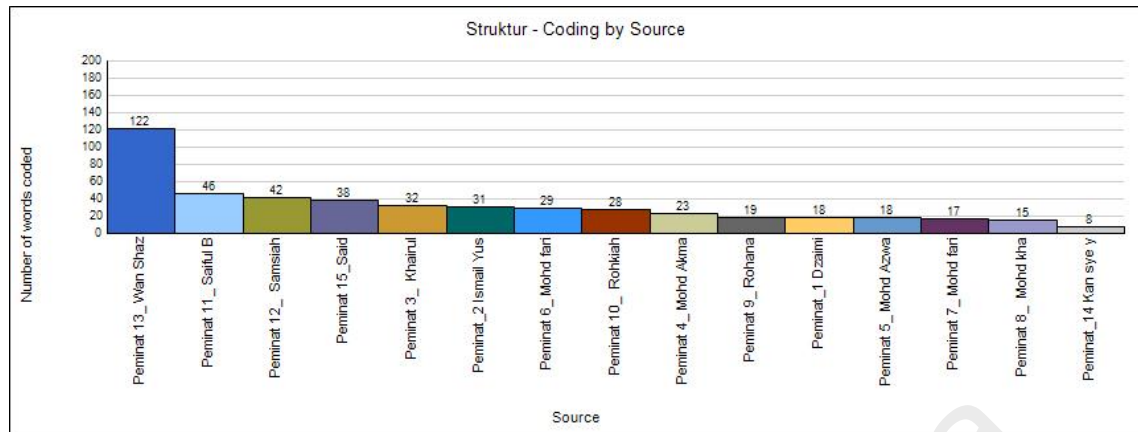
Figure 5.14   Versatile Pattern Visual result **3D computer animation Wayang Kulit** based Wayang Kulit Fans

Figure 5.14 shows the overall respondents frequency words coded during the respondents interview related to puppet design focusing on structure. Figure 5.14 findings results clearly show majority preferred Wayang Kulit to have various design and structure using computer 3D animation. In response to question 6, most respondents feels that 3D computer puppetry should have various colours, style, shape, sizes and visual appeal to the puppet model. Colours for example are able to be used to differentiate the structure of the puppets physical appearance. It is obvious from this table that very few respondents coded related to digital puppetry due to their lack of understanding or knowledge in computer animation. Furthermore, some of the respondents feel that Wayang Kulit should have the original structure and looks of traditional Wayang Kulit puppet (to remain its original concept and identity), which also signifies to the research objectives of exploring traditional visual arts in emerging computer technologies and also developing 3D animation Wayang Kulit visual arts.

What is interesting in this findings from Figure 5.14 is that even though the traditional Wayang Kulit fans has insufficient knowledge specifically on 3D computer animation, but they always describe Wayang Kulit puppet structure as "*cartoonish*" looks, compared to visual arts of traditional Wayang Kulit that looks more realistic, versatile and artistic. Even though the virtual puppets are photorealistic visuals in 3D realm, but majority of the respondents feels that computer technology are able to enhance the creativity of traditional Wayang Kulit visual arts and also providing an alternative to the presentation style of a new medium for the survival of Wayang Kulit. Only a small number of respondents indicated that structure of Wayang Kulit puppet development in computer should not be implemented as traditional styles or should not be replicated. The traditional Wayang Kulit visual styles are the origins of the ancestors, and the puppet crafts structure are describe as scared with different size, colours, and identity. Some respondents even suggested to not to change the original structure of the puppets in 3D computer animated Wayang Kulit. Using computer animation is not an issue, but stylizing it had to be based within the original Wayang Kulit performances.

A comparison on the two results reveals that in terms of puppet structure, the variety of puppet designs are basically almost the same fundamentals applied in traditional style.   3D Computer animation are more alike tools with advantages and disadvantages capable to produced various advanced features to develop a creative animation output with fascinating visuals, effects and animation, but also most importantly the audience are able to appreciate it. Next we look into the perception of focus group on traditional Wayang Kulit puppetry.
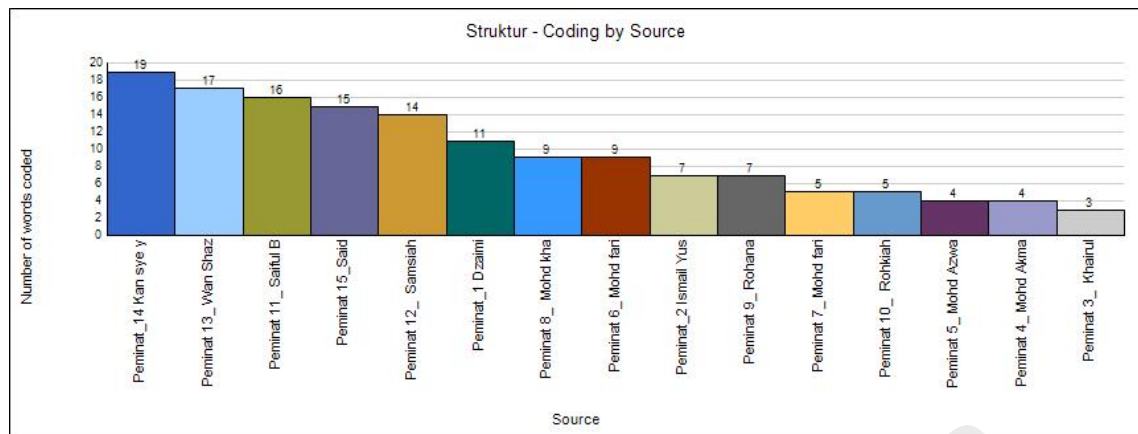
Figure 5.15 Versatile Pattern Visual result **Traditional Wayang Kulit** based Wayang Kulit Fans

The purpose of this part is to provide the focus group known as the non-expert, Wayang Kulit fans respondents' feedback in relation to traditional Wayang Kulit visual arts, with focus on puppet design and structure. Figure 5.15 shows the percentage of coded words from the respondents, and we can see that majority of the respondents agreed that each puppet design and structure in traditional Wayang Kulit performances are vital.   In general, the graph in Figure 5.15 the most important findings presents the majority of the respondents described traditional Wayang Kulit as handmade craft, artistic puppets (colour and texture), and quality(long lasting). Majority of the respondents felt the puppeteers or Dalangs are sentimental (emotion and value), focused and creative in designing each structure of puppet. On average, the respondents felt that puppet design in Wayang Kulit 3D animation will not have the same effect or qualities as traditional visual style of Wayang Kulit in terms of expression and style especially the shadows, silhouettes and movement. A small number of respondents felt that Wayang Kulit puppets should not be digitalized as it is a symbol of heritage and a classic art performance.

In response to question 8, referring to facial expression, small number of respondents suggested that virtual puppet should not be implied with facial expression as the audience in traditional Wayang Kulit are used to utilized their imagination and visualize the shadow puppets on screen, also as the philosophy of shadows are unique trademark of Wayang Kulit style and presentation. Majority of respondents thought that by preserving the qualities in Wayang Kulit traditional puppet design, one should explore more with digital computer technology such as puppet characters, costumes (batik, floral patterns), detail craft, articulated shapes, colours and others visual art expression. By exploring more, it will help provide different spectrum in terms of technology and cultural heritage, especially for the younger generation to preserve this art from dying. In conclusion, the puppet design or structure in virtual or non-virtual environment is vital in establishing and contributing quality story structure and most importantly gaining the audience's attention. Each puppet structure can influence directly or indirectly the genre or repertoire of stories presented to the audience.

5.6   Puppet Character Archetypes

5.6.1   Puppet Aesthetics and Functionality
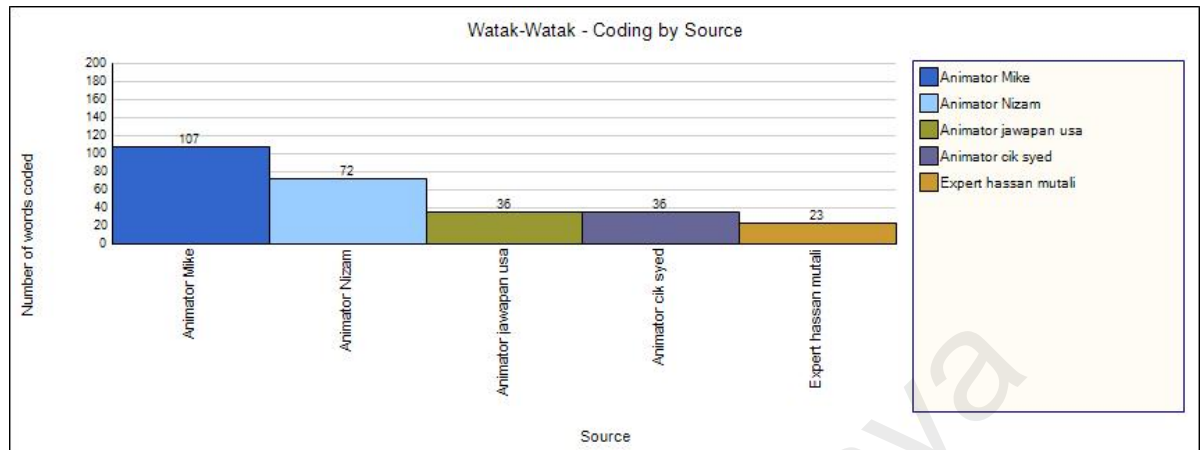
Figure 5.16 Puppet Aesthetics and Functionality **3D Animation Wayang Kulit** result based on Animation Expert

These sections discuss the perception of the animation expert respondents in relation to puppet characters, in terms of importance in relationship with computer 3D puppetry. In general it can be seen in Figure 5.16 that majority of the respondents had positive views related to puppet characters in computer animation. The first positive aspect for the increase in puppet characters is the importance of puppet characters' role in plot or story development. Majority of the respondents highlighted the aspects of *protagonist* and *antagonist* characters should be included in animation that affects the entire momentum of the story for the audience. This also provides different flavour or mood in the art direction and content of the story for the entertainment of the audience. Some respondents even suggested that 3D animated puppet models should also reflect the visual appearance in Wayang Kulit style of various segments. Here, the argument is based on the factor of realism or cartoonish visual appearance that the target audience will be able to relate with the Wayang Kulit traditional visual arts. This includes puppet characters in terms of identity, visual form (size, shape, colour) and expression.

Strong evidence was found in several respondents' description that puppet characters should be based on *'Characters Archetypes'* with several key points such as characters background, personality, functionality and others.   Also, what is interesting in this finding is the relevancy of uniqueness of puppet characters' identity based on creative names such as Wak Dogol, Wak Long or Seri Rama exists in traditional Wayang Kulit epics that brilliantly pronounced with Kelantanese ascent. Majority of the respondents agreed that by applying 3D computer animation for Wayang Kulit, the puppets' name or identity could be changed based on local style or background of the story and not necessarily the classic repertoire of Wayang Kulit epics.

Only a small majority of respondent feels that the puppets' identity or names should still remain with adding new characters together, based on the existing characters in traditional style of Wayang Kulit, if computer 3D animation of Wayang Kulit were being introduced especially stylized version. If Wayang Kulit animation is not being stylized, meaning replicating the exact same visual as the original Wayang Kulit, then it would be important to maintain the existing characteristic design and names. This is important in terms of preserving the essence or aesthetics of Wayang Kulit. A small number of respondents suggested that the number of puppet characters in standard performance of traditional Wayang Kulit should be almost the same with 3D computer animation Wayang Kulit. It would help to provide the same concept of visual stories used in traditional styles and repertoire, through episodes or series for the audience to follow and be entertained.
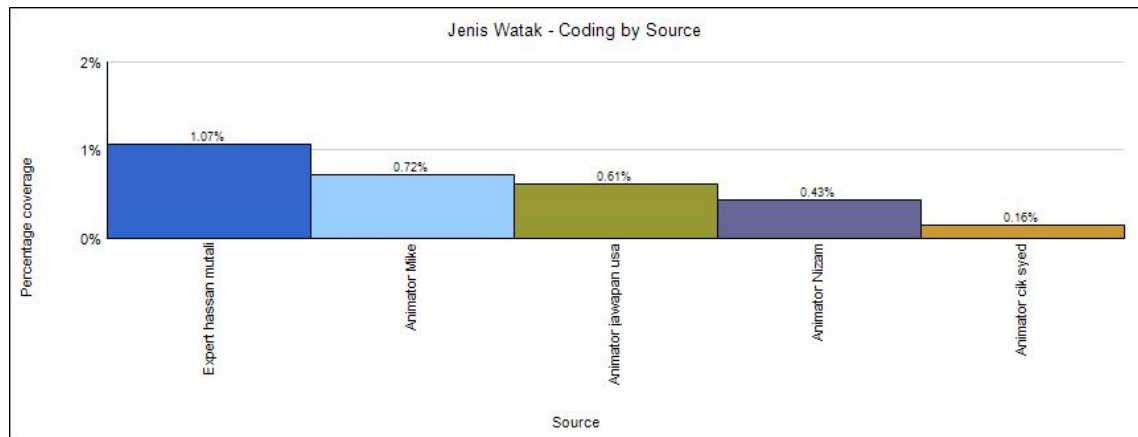
Figure 5.17 Puppet Aesthetics and Functionality **Traditional Wayang Kulit** result based on Animation Expert

The purpose of this part it to provide the respondents point of view related to traditional Wayang Kulit visual art. In general, it can be seen in Figure 5.17 that EX3 respondent obtained the highest percentage coverage with 1.07 percent with EX1 respondent lowest coverage of 0.16 percent. On average, the respondents seemed to have the same common point of view, stating that the original Wayang Kulit puppet characters had its own aesthetic style including craftsmanship, shadow, texture and unique identity especially iconic names and puppet designs. What it is interesting in this finding from Figure 5.17 is the puppet characteristics in Wayang Kulit are known as character archetypes (variations). This again refers to question three (3) which EX3 respondent highlighted the distinctive collection of characters in Wayang Kulit defining as "set" of iconic figures with various archetypes. For instance, comical characters' puppets with iconic names such as Wak Dogol or Said, pronounce with Kelantanese dialect had its own unique identity and style that belongs within Wayang Kulit Kelantan family. In summary, this understanding is important for the implementation of 3D computer animation Wayang Kulit puppet characters in future as part of references.

5.6.2 Stylizing and Visual Culture
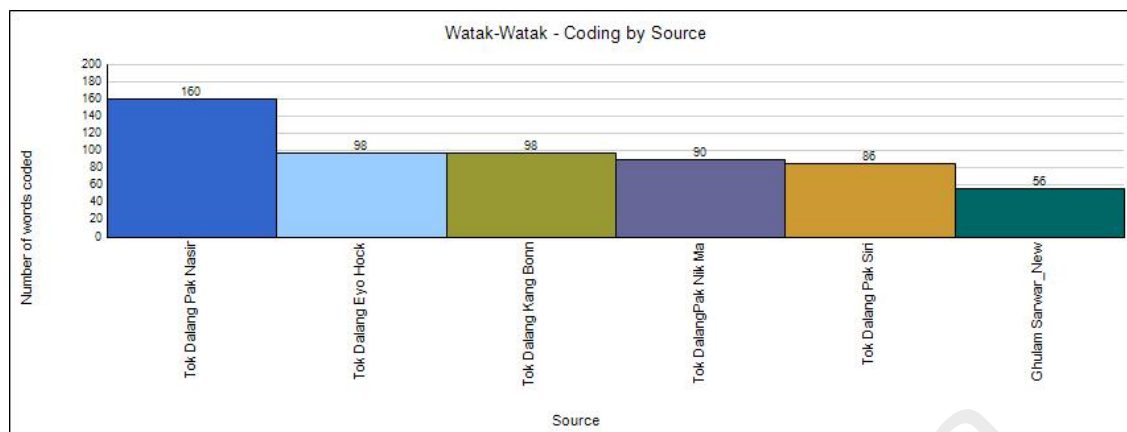
Figure 5.18 Stylizing and Visual Culture perception on **3D animation Wayang Kulit**
result based on Tok Dalangs and Academic Expert

To investigate the perception of the Tok Dalangs and academic experts in Wayang
Kulit, several questions related to puppet characters were addressed to the respondents.
Figure 5.18 shows respondent TK1 again coded the number words with 160 words
coded pertaining to the importance of puppet characters being modernized using 3D
computer animation for Wayang Kulit.   Meanwhile, TK5 respondent stated the lowest
frequency words coded during the interview session with only 56 times. The first
significant reason for the increase in response to puppet characters using computer
animation for Wayang Kulit is the response from the audience. This is the most
important finding to appear from the data, in that the audience especially the young
generation today welcomes innovative changes related to new media technology. 3D
Computer animations are describe by some respondents as technology, able to create
fascinating visuals. Also mentioning the fact that few attempts had been done especially
in Malaysia to create 3D computer animated versions of Wayang Kulit.

In response to question two (2), respondent TK6 came out with an interesting finding, describing that the puppets characters could be modelled with various characters, shapes and sizes using computer animation as long as it still remains some traditional values of the existing characters of Wayang Kulit. Also, some respondents highlighted that several visual expressions are unable to be performed in traditional Wayang Kulit, which could only be implemented using 3D computer animation, such as facial expression or special effects. However, a respondent TK4 seems to be more sceptical against the use of computer animation especially pertaining to puppet characters. He defines that Wayang Kulit using computer animation will not have the same qualities as traditional Wayang Kulit. He highlighted that the young generation today admires computer animation especially with new modern approach to design the puppet styles, but the earlier generation will still appreciate the original of art of Wayang Kulit due to its richness of aesthetics and culture value in it.

In the evaluation of this finding, it can be understood that computer animation especially the puppet characters may has its advantages based on the needs of the audience and technology advancement, even though traditional Wayang Kulit performances is already at an endangered level. Therefore, it is not the issue of replacing or stylizing it, but instead suggesting alternatives for the survival of Wayang Kulit art form.

5.6.3 Preserving Puppets Identity
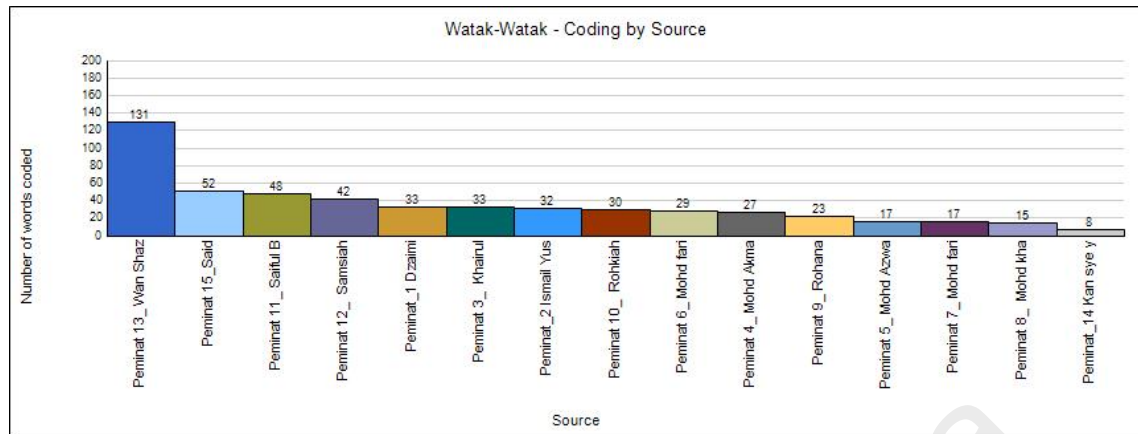
Figure 5.19   Preserving Puppets Identity **3D animation Wayang Kulit** result based on
Wayang Kulit Fans

This section will present the result from the Wayang Kulit fans in relation to 3D
computer animation for Wayang Kulit's puppet identity and characters. The result
analysis from Figure 5.17 shows that majority of the respondents supports the idea of
having new puppet characters from design and character's names.   What is interesting
in this finding from Figure 5.17 is the word '*Survival*' of Wayang Kulit entertainment in
the future. In response to question three(3), it was highlighted from F13 respondent,
having the highest words coded with 131 stated that 3D computer animation Wayang
Kulit could provide interesting puppet characters with various designs or forms (aliens,
trees, animals) and most importantly the puppets model must be attractive and appeal.
There was a positive connection between the structure, pattern and texture related to
puppet characters described as should always be attractive or appeal and having some
similar design qualities in existing Wayang Kulit traditional styles. Small number of
respondents implied that if using 3D computer could bring into question the originality
of Wayang Kulit.

Furthermore, to some puppeteers or fanatic fans of Wayang Kulit for instance, altering the style or characters' names from the existing Wayang Kulit will destroy the value of the original art of Wayang Kulit itself. In short, modelling puppet characters using 3D computer animation should be look at from a positive aspect, which refers to the current audience, inclination, and technology that allows new characters to be introduced without neglecting the original visual arts of Wayang Kulit or preserving it for future generation.
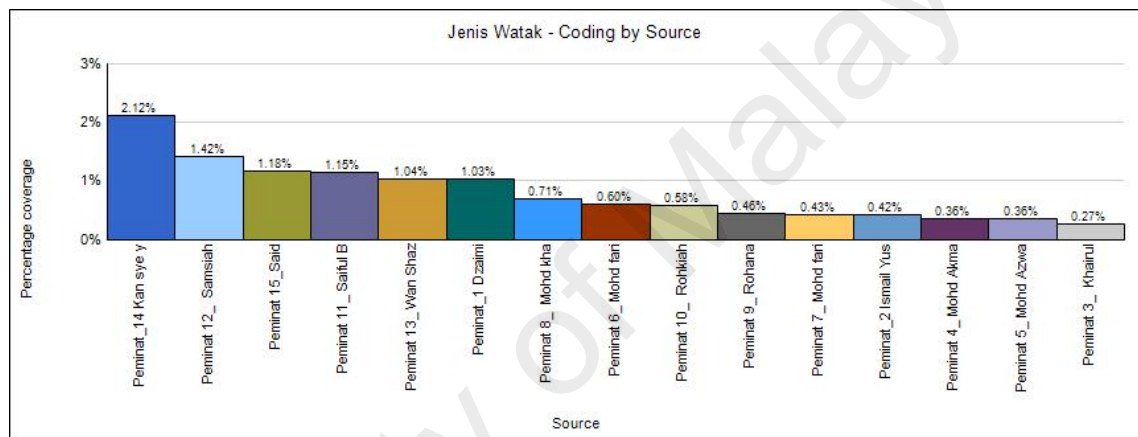
Figure 5.20 Preserving Puppets Identity on **Traditional Wayang Kulit** result based on Wayang Kulit Fans

Figure 5.20 explains the findings of perception from respondents of Wayang Kulit fans in relation to traditional Wayang Kulit. F14 respondent cited the most percentage with 2.12 percent compared to F3 respondent with only 0.2 percent. Overall, the respondent feels that puppet characters in Wayang Kulit Kelantan are again exceptional based on the artistic style and characteristic that audience found it to be interesting to watch the projected translucent shadows appear on the screen. Several respondents described that the puppet characters in traditional Wayang Kulit are rich with semiotics that suits the classical epics stories (Ramayana), accompanied with music and narration.

In response to question 6, an interesting point highlighted by F12 respondent in particular to puppet characters the puppets are design not mainly representing humans, but also other forms such "Dewa-dewa" (demigods), ogres or symbol and most importantly it has semiotics meanings behind each characters involved.   For instance, the *Pohon Beringin* represents the cosmic universe of mankind, and the significance at each beginning of Wayang Kulit performances, the non-figurative puppet of *Pohon Beringin* will be in placed in the middle in front of the screen or 'Kelir' and later would be animated by the puppeteer before introducing other characters.

Therefore, even if stylized of replicate version of 3D computer animation of Wayang Kulit, the "Pohon Beringin" should always be introduced at the beginning of each scene. The use of computer animation could provide many solutions in terms of puppet design and characters to develop Wayang Kulit digital puppetry. But the most important aspect of it is to determine either the digital Wayang Kulit animation should be stylized or not. It is up to the art director or producer to finalize it. Therefore, from the point of view of animation expert, this key point should be highlighted for further discussion. Next we will look into shadow and lighting aspects that were considered important aspects in Wayang Kulit performances.

5.7 Visual Light & Shadow Significance

Light and shadow are two important elements in Wayang Kulit original performances. With current technology, computer animations are capable of manipulating the original lighting styles of traditional Wayang Kulit or even adding lighting effects for mood enhancement. The next findings will be discussed from three main respondents, involving three (3) main areas that consist of *originality, types and functionality* based on traditional and computer animation for Wayang Kulit.

5.7.1 Mood and Realistic
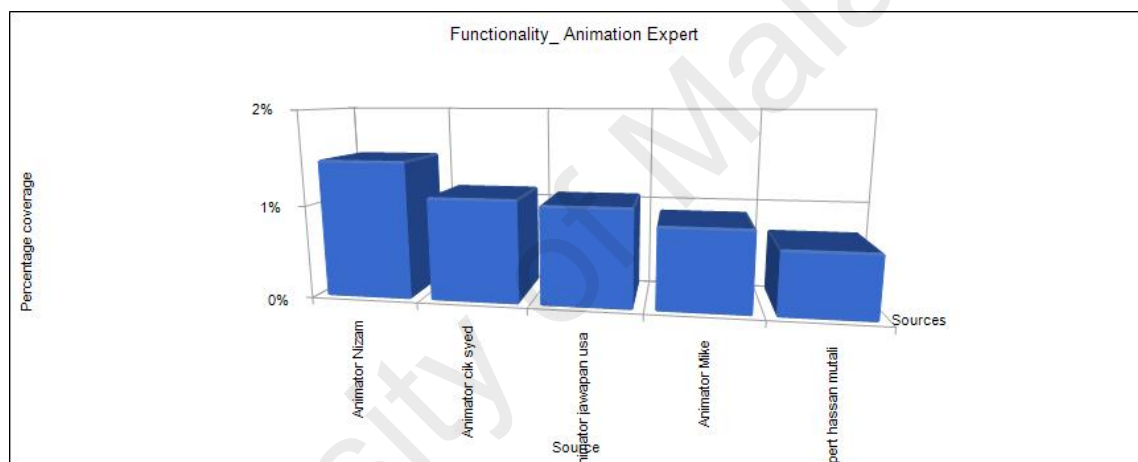
Figure 5.21 Mood & Realistic perception **3D Animation Wayang Kulit** result based on Animation Expert

Figure 5.21 describe the animation experts response towards light and shadow using 3D computer animation for Wayang Kulit This part presents the importance of light and shadow in computer animation and how it affects Wayang Kulit visual arts. EX5 respondent cited the most reference related to light and shadow with 1.48 percent compared to EX3 respondent with only 0.68 percent.   On average, the respondents seemed to agree that light source are important both in animation and traditional Wayang Kulit to create mood and brightness that will help the audience to clearly visualize the image onscreen.

One of most important findings appears from Figure 5.21 is that the connotation between light and silhouettes created in 3D computer animation can have similar qualities to traditional Wayang Kulit styles. This is explained based on question four(4) describing that the lighting technique in computer animation are more artificial or virtual compared to the traditional light source using paraffin lamp or electrical source.

In addition, an interesting point was also highlighted that it involves a similarity concept of lighting between 3D computer animation lighting technique or traditional Wayang Kulit lighting styles which are described as "motif". Also, on the aspect of position of light including various types of light (spot light, ambient light), it is suggested that the light source positioning should be placed at different and flexible angle compared to traditional Wayang Kulit light that were hanged or suspended from the top, in order to obtain a more realistic, vibrant and entraining mood through a technique known as "simulation effect".

In response to question five (5), concerning the concept of animating overlapping shadow or opaque black silhouettes behind 3D computer animated puppet model or stylizing it, majority of the respondents find it to be quite disturbing. It feels like watching two characters animating or moving together simultaneously. This might disrupt the audience's focus. In fact, in traditional Wayang Kulit, the puppet characters are projected based on light and shadow by one controller (puppeteer) behind the screen, providing room for the puppeteer to manoeuvre the puppets in and out (vertical and horizontal).

Therefore, using 3D computer animation to create stylizes puppets and shadows based on Wayang Kulit qualities could be considered difficult in terms of audience acceptance relating it to realistic features. On the other hand, 3D computer animation are able to design and animate 3D puppets with various colours , textures and light effects including ray tracing or shadows that would be an advantage compared to traditional Wayang Kulit in order to develop intricate puppet characters, though it would be subjected to certain criteria including hardware, manpower, budget and many more.
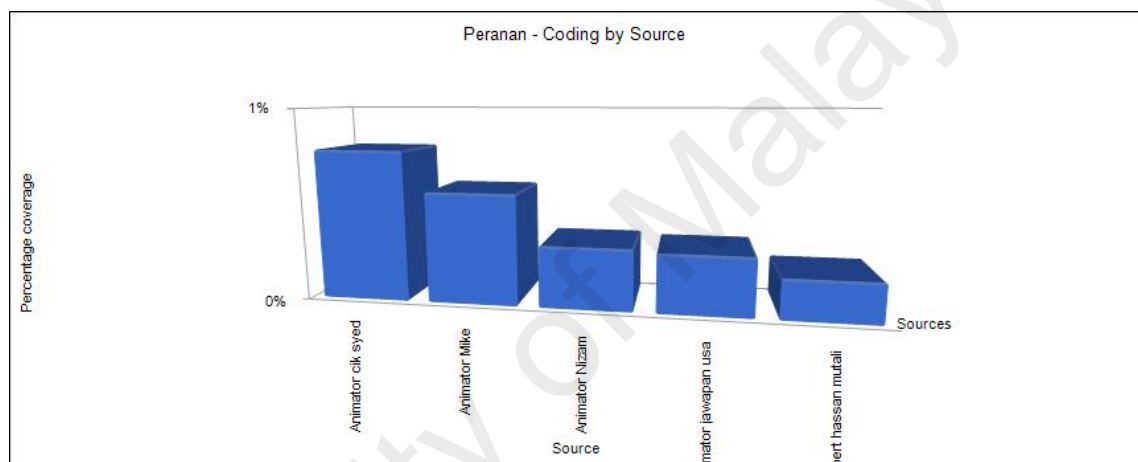
Figure 5.22 Mood & Realistic perception **Traditional Wayang Kulit**
result based on Animation Expert

As can be seen, in Figure 5.22, the animation expert respondent has their own perception towards traditional Wayang Kulit's lighting and shadow concept. Figure 5.24 shows EX1 respondent with the highest percentage coverage with 0.78 percent, with EX3 covered the lowest with 0.21 percent. This result shows that the respondent has different perception between traditional and 3D computer animation in the context of lighting and its functionality.   From the result shown in Figure 5.24 most of the animation experts still has less detail knowledge in terms of Wayang Kulit lighting concept, with mostly highlighting related to creating aesthetic mood .

What is interesting in this finding is that most of the respondents described Wayang Kulit's traditional light and shadow techniques as functions that are unique, with suitable mood for audience to enjoy especially at night time. For example, EX1 highlighted some interesting point related to shadows projected in traditional Wayang Kulit, in which it is defined as an element of "fantasy". Here, EX1 explains that traditional Wayang Kulit involved imagination, non-reality and creativity that made the shadow believable to the audiences. According to respondent EX3, a very interesting point that he highlighted in this finding was that traditional Wayang Kulit functions by using front and back light technique to create mood that allows the puppeteer to animate the shadows projected effectively. The audience at the front or back will have a clear view of the shadow effects that moves lively on the screen with proper lighting mood surrounding it. In short, this fundamental understanding will provide better points for execution to stylized or replicate the light and shadow qualities from Wayang Kulit using computer animation technique.

5.7.2   Variety of Features
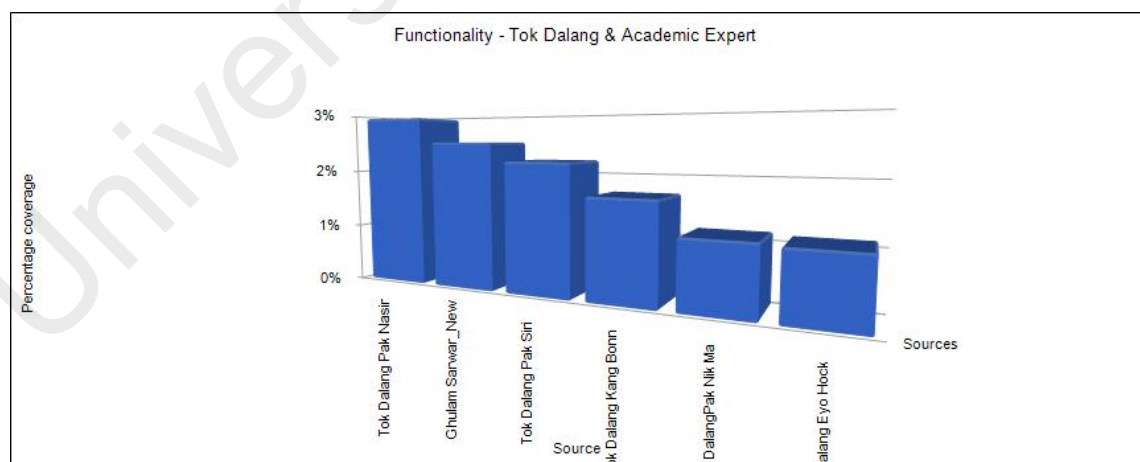
Figure 5.23 Variety of features with 3D lighting
3D Animation Wayang Kulit result based on Tok Dalangs & Academic Expert

This section presents the findings from Tok Dalangs or puppeteers and academic expert related to studies on light and shadow using 3D computer animation on Wayang Kulit. Figure 5.23 shows respondent TK1 achieving a total of 2.95 percent, with lowest percentage obtain by respondent TK2 with only 1.10 percent. Majority of the respondents agreed that computer animation lighting are not realistic, compared to traditional Wayang Kulit styles.

Again, an interesting point that was highlighted on importance of computer animation lighting system is that it allows various colour, texture, tone and contrast for certain scenes, background and most importantly providing mood for the whole story. Also, an interesting point of view mentioned by respondent TK5 related to shadows or silhouettes projected are in terms of appearance. From his observation, he pointed out that silhouettes or shadows projected using 3D computer animation are referred as to "solid" compared to Wayang Kulit traditional shadows which are projected more smoothly in terms of contour, shape and gesture. In short, the lighting technique in 3D computer animation for Wayang Kulit could provide functions with many features, adding more artistic mood or values and continuity within the whole digitally stylized version of Wayang Kulit while also able to capture or replicate the similar lighting and shadow qualities of traditional Wayang Kulit performance.
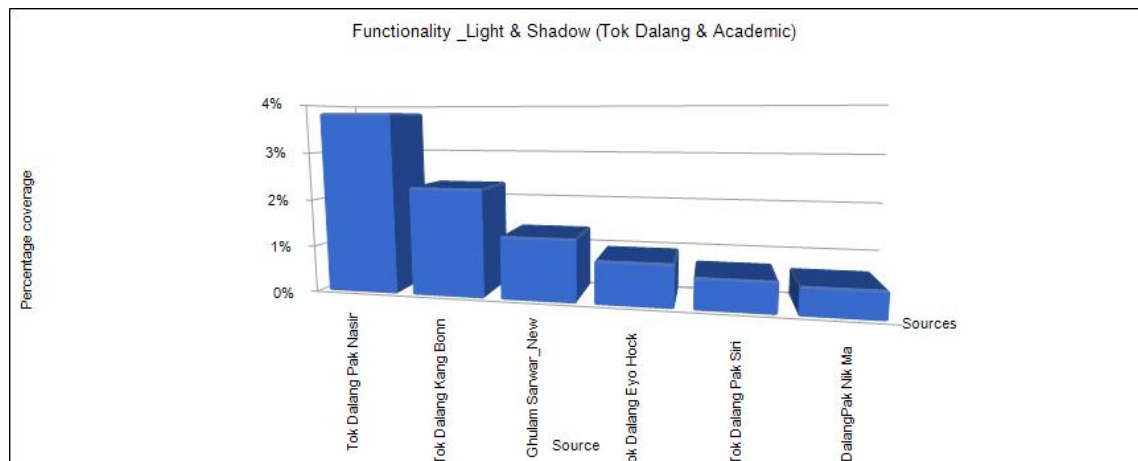
Figure 5.24   Variety of features with 3D lighting
Traditional Wayang Kulit result based on Tok Dalang & Academic Expert

Figure 5.24 reveals the significance of the respondents related to functionality of light and shadow for traditional Wayang Kulit. Figure 5.24 indicates that respondent TK1 achieve the highest code of reference with 3.83 percent. Only three (3) respondents achieve less than one (1) percent which includes TK2, TK4 and TK6. It is obvious from this graph that majority of puppeteers agreed that features and functionality of light and shadow in Wayang Kulit traditional is to provide mood and diversify of emotions. This means that each audience who watches Wayang Kulit will sometimes have passive mood, superstitious, or even goose bumps as well as being influenced by the light atmosphere surrounding the stage. What is interesting in this finding from Figure 5.24, the meaning of light in traditional Wayang Kulit is defined as representation of sun that shines and provides ray of light and energy to each living or non living organism. This response to Question two (2), that respondent TK1 describe the light in Wayang Kulit as "Nur" (describe in Islam religion) or light that shows human the path to seek blessing from the creator (Allah SWT).

5.7.3 Nobility and Originality
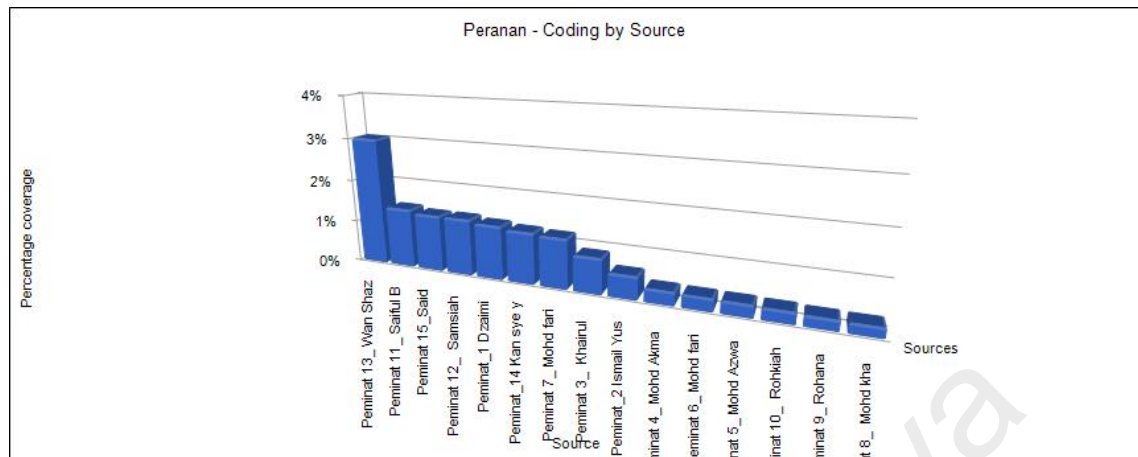
Figure 5.25 Nobility and Originality 3D lighting perceptions
3D animation Wayang Kulit result based on Wayang Kulit Fans

Figure 5.25 presents the percentage of respondents of Wayang Kulit fans towards light and shadow using 3D computer animation for Wayang Kulit. In general, it can be seen in Figure 5.25 that respondents had mixed opinions towards using virtual animation lighting technique to achieve similar or stylized Wayang Kulit performances. F13 respondent achieve the highest percentage coverage from the interview with 3.01 percent and F8 respondent with 0.22 percent. Most of the respondents felt that the lighting qualities using computer animation are not similar with traditional Wayang Kulit visual arts. An interesting point revealed by F11 respondent with 1.40 percent coverage, responding to question 2, explains that if various lighting techniques are used in computer animation for Wayang Kulit, identically the origins of Wayang Kulit would be lacked of its nobility or principle in it, providing opportunity for experiment or replication on such a valuable art.

In response to question 5, the qualities of shadow projected using computer animation and traditional Wayang Kulit are totally different, as F13 respondent describe that shadows generated using 3D computer animation lighting system are not imaginative, compared to traditional Wayang Kulit shadows which are much smoother, organized, able to be scaled, attractive, and controlled by highly skilled puppeteers. In addition, if Wayang Kulit is to be stylized using 3D model character, the shadows or silhouettes are not necessarily needed to be overlapped or projected. Again, it might confuse the audience and make them unable to focus on the storyline or characters role. According to respondent EX3, a very interesting point that he highlighted in this finding was that traditional Wayang Kulit functions by using front and back light technique to create mood that allows the puppeteer to animate, manipulate the shadows projected effectively. The audience at the front or back will have a clear view of the shadow effects that moves lively on the screen with proper lighting mood surrounding it. In short, this fundamental understanding will provide better points for execution to stylized or replicate the light and shadow original qualities from Wayang Kulit using computer animation technique.
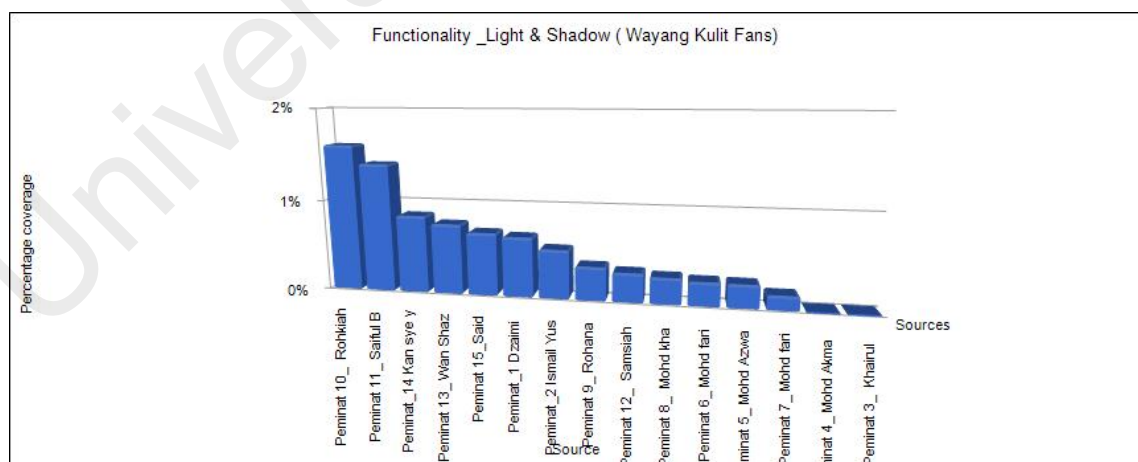
Figure 5.26 Nobility and Originality 3D lighting perceptions
Traditional Wayang Kulit result based on Wayang Kulit Fans

This part presents the findings based on the respondents point of view in relation to light and shadow on traditional Wayang Kulit. Figure 5.26 overall indicates that majority of the respondents agree that light and shadows works simultaneously in Wayang Kulit performances to create interesting mood, colour and style for the audience. Only F10 and F11 respondents obtain more than 1.00 percent coded source reference with both highlighting the concept of reflection, fertile and uncanny mood that exist from light and shadow in Wayang Kulit. An interesting point related to question one (1), that light source projected to the screen in Wayang Kulit , creates a figurative shape of translucent vibrant silhouettes or shadow puppets effect with vivacious appearance. The reason people admire Wayang Kulit is because of vibrant shadows cast from the light source (paraffin lamp) that is able to create contour, line and texture surrounding the shadow movement, providing depth and life into it. In conclusion, light and shadow in traditional Wayang Kulit or 3D computer animation, both has its own significance or style. The reason people admire art of Wayang Kulit is because of vibrant shadows cast from the light source (paraffin lamp) that is able to create contour, line and texture surrounding the shadow movement, providing depth and life into it. In conclusion, light and shadow in traditional Wayang Kulit or 3D computer animation, both has its own significance or style.

5.8 Puppet Characters in 3D Animation Wayang Kulit

In this section, the findings are based on the respondents' perception in relation to animation or movement approach of Wayang Kulit, both traditional and computer animation. The animations findings are divided into three main segments which consist of originality, shadow movement and visualization. The questions are slightly different, especially for Wayang Kulit animation experts which the researcher indentified in them interesting hypothetical questions related to Disney's twelve (12) principals of animation and relationship in accordance with Wayang Kulit traditional styles.

5.8.1 Key Frame and Disney 12 Principals
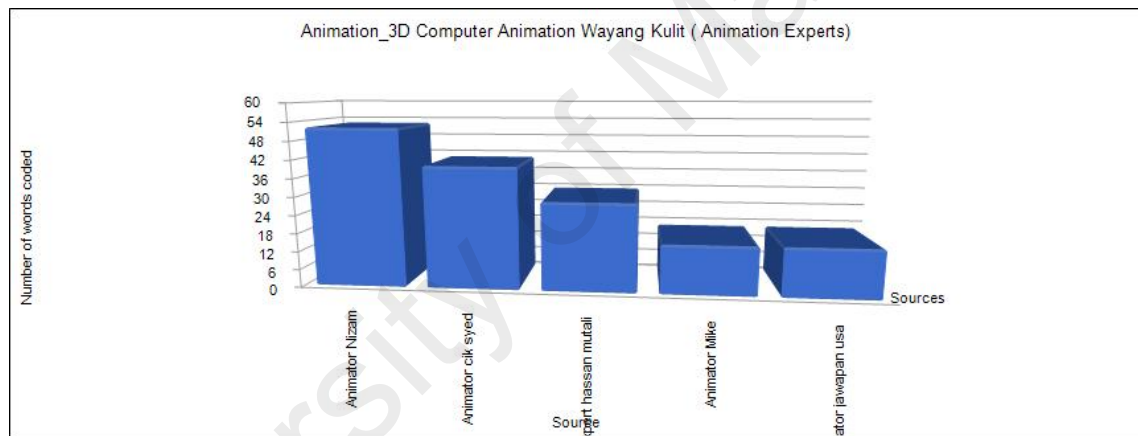
Figure 5.27 Key frame and Disney's 12 Principals perceptions
3D Animation Wayang Kulit result based on Animation Expert

This part presents the findings using Nvivo QSR 8.0 version software to quote the response from animation experts in particular to originality of animation styles using computer animation in Wayang Kulit. Figure 5.27 indicates that EX5 respondent quoted the highest words coded with 52, compared to EX2 respondent with 16 times only. Referring to question 1, EX5 and EX3 respondents highlighted the important element of puppets '*characters existence*', referring to animating or moving puppet characters with two articulation in virtual or computer environment which does not affect the philosophy of traditional Wayang Kulit visual art.

Traditional Wayang Kulit puppets, especially Wayang Kulit Kelantan animated puppets, are based on single articulated movement, except for comical puppet characters (Wak Long and Pak Dogol) which uses both articulated styles. It also depends on the medium and target audience. In response to question 2 and 3, the movement using Motion Capture(MOCAP) technology can be essential in providing realistic movement performed by Tok Dalangs or puppeteer in traditional Wayang Kulit, by integrating live performance by the puppeteer and capturing each motion into 3D computer animated puppet models. But MOCAP technology involves high cost infrastructure, man power, and conducive environment to invest compared to key frame animation software. In pertaining to question 4, again EX3 highlighted an interesting findings in section which describe the camera virtual movement for Wayang Kulit could provide a concept known as "*diagesis*" and "*non-diagesis*" involving visual, narrative and audio.

For example, in traditional Wayang Kulit, the audience will hardly get a chance to view titling, or credit of each performer including main or supporting actors and also technical crew names that were involved in the entire production. There are also no camera shots or angle offered in traditional Wayang Kulit, except the audience finds a comfortable position to watch, either distant or close to the stage. Wayang Kulit, in terms of camera angle, is more referred as typical, providing the visual angles stage similar to a medium shot only. It is all entirely narrated by puppeteer himself or sometimes an introduction by voice over narrated by the organizer. Most of the respondent describes that virtual camera movement or animate brings the audience more closely to the story, by creating mood or depth in it. In summary, stylizing the characters, movement and enhancing it with visual shots will provide more variety, diversity and dynamic features to the modern version of Wayang Kulit.
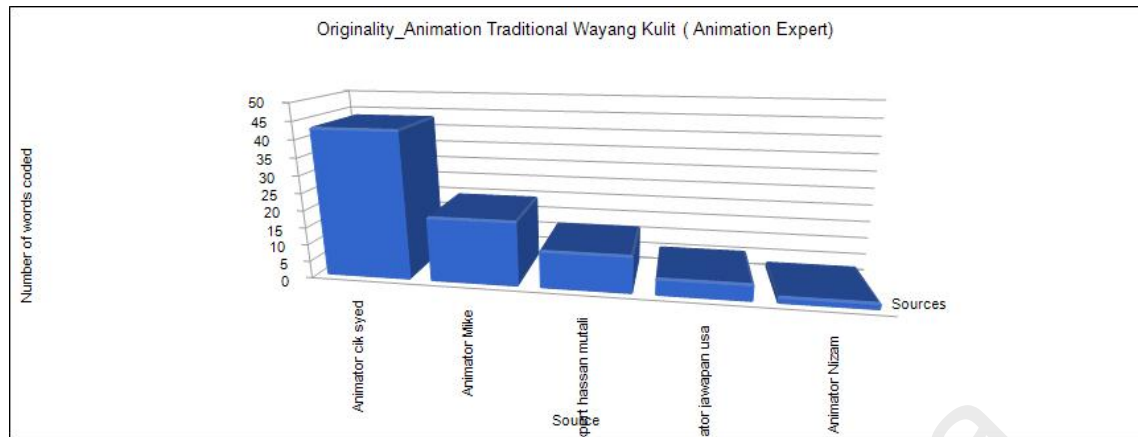
Figure 5.28 Key frame and Disney's 12 Principals perceptions
Traditional Wayang Kulit result based on Animation Expert

Figure 5.28 shows the perception of Animation Experts related to animation and originality in Wayang Kulit traditional styles. EX1 respondent stated the highest coded words from the interview session with 43 times, compared to other respondents citing an average of 20 words coded and below. The reason for the increase for EX1 respondent is observation by analyzing the traditional Wayang Kulit styles, compared to other respondents who provided more generalized observation only. In context with the philosophy of animating the puppets, majority of the respondents felt that traditional Wayang Kulit had rich values of meaning and philosophy especially the Dalangs or puppeteers, which also responded to question two(2) that puppeteers are highly skilful to craft and animate the puppets, compared to computer animation which EX4 respondent described as "*virtual animator*". An interesting finding related to question 3 was that majority of the respondents agreed that key frame animation technique (software) are much easier to manage and reasonably cost. In traditional Wayang Kulit, the movement of puppets and illusions of shadow are based on "destructive animation". Each movement are vital to produce a sequence of animated images.

It is much easier to eliminate frames using key frame (software based) compared to destructive animation that requires tedious effort to rectify any errors for each frame or in between. Also, most of Malaysia's successful animation industry uses this key frame 3D software such as Les Copaque's "Upin & Ipin", Silver ant's "Seefood" and MDEC's "Saladdin". This animation is done not only for TV series but also cinema level distribution as well. In addition, key frame animation is still the most popular 3D animation technique compared to other animation technique. The most important finding to appear from this data is that Wayang Kulit had the Disney's twelve (12) principals of animation, and apparently most of the respondent agreed that the traditional Wayang Kulit styles has some relevant element of Disney's twelve (12) principals, such as appeal, squash and stretch, and overlapping related to translucent shadows projection on the white screen.

5.8.2 Dimension and Flexibility
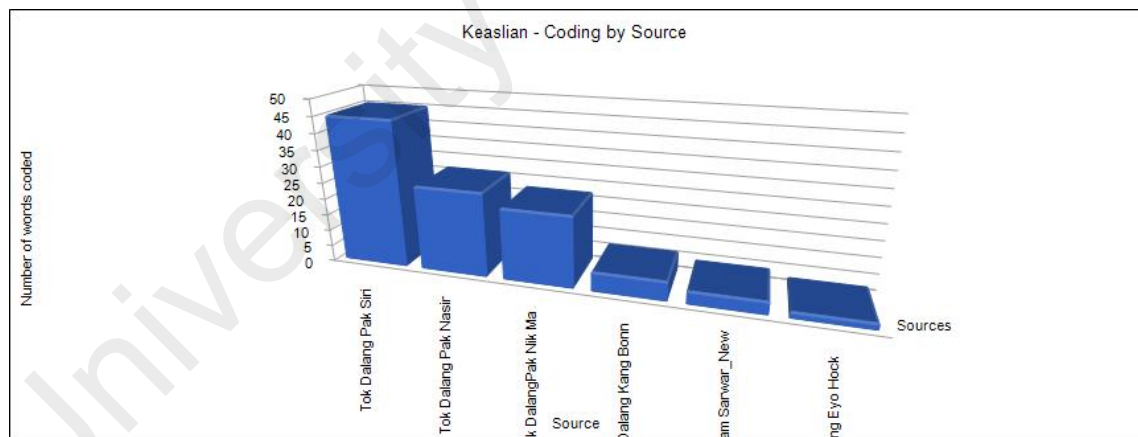
Figure 5.29 Dimension and Flexibility perceptions
3D Animation Wayang Kulit result based on Tok Dalangs and Academic Expert

Figure 5.29 explains the findings based on originality in animation or movement, from Tok Dalangs and academic expert. From the Figure 5.29, it shows that most of the respondents agreed that puppets characters for Wayang Kulit in 3D computer environment will not jeopardize the original art of Wayang Kulit. This is referring to the term 'flexible'; that allows 3D computer animation to provide more dimension and flexibility to animate 3D models or objects. Example, TK6 respondent coded the highest words in particular to animation originality, explains if Wayang Kulit are done in stylized or if replicated using 3D computer software, the puppets movement for example, hand, eyes, leg can be animated. This finding was supported as well by respondent TK5. Most importantly it does not destroy the philosophy of original Wayang Kulit styles. An interesting point highlighted in this findings especially referring to question 2 is that by introducing computer virtual animated camera angles, it would enhance the quality of new Wayang Kulit styles.

This refers to traditional Wayang Kulit as having limitations, especially in terms of technology. But this does not mean that by introducing technology, the whole artistic or aesthetics idea of Wayang Kulit is totally forgotten. Pertaining to question 3 and 4, majority of the respondents felt that animated puppets movement by professional master puppeteer are much more original or unique, compared to attempts made to stylize or replicate using computer software. In addition, the overlapping shadow in stylized computer animation for most of the respondents, are positive by describing that it is an enhancement using technology, and therefore stylizing it would be beneficial for younger generation to appreciate it.
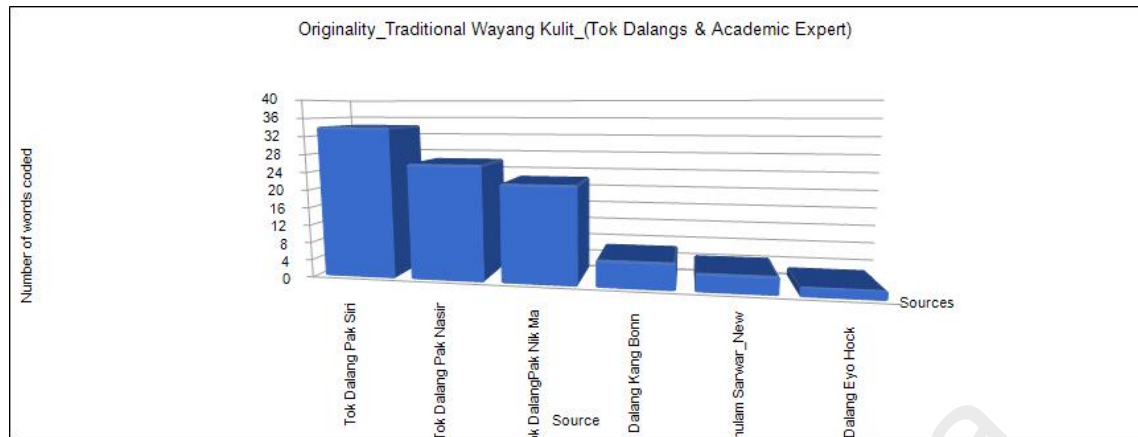
Figure 5.30 Dimension and Flexibility
3D Animation Wayang Kulit result based on Tok Dalangs and Academic Expert

The aim of this section is to present the findings perception of Wayang Kulit Tok Dalangs and academic expert related to animation and originality in Wayang Kulit traditional styles. Figure 5.30 shows that respondent TK6 recorded the highest words coded with 34 compared to TK2 respondent with only two (2) words coded. What is interesting in this findings is that majority of the respondents agreed that traditional Wayang Kulit has its own strength and richness of culture values, but what is more concern for most of the respondents is preserving some aesthetics values of traditional Wayang Kulit in computer animation, to allow the younger generation to appreciate the origins of Wayang Kulit. In traditional Wayang Kulit , the puppeteers controls the puppets as it is, and are unable to change (morph) or add non-human visual puppets in real-time, such as Seri Rama character changes to Pak Dogol, except through narration only.   One interesting point highlighted from respondent TK6 was that in response to question 1 and 2, is adding real time "*personification*" or "*anthrophomonism*" (adding human characteristic to animals or objects) to 3D computer animated puppets (human or non-human characters) or morphing the characters are recommended and should not be an issue.

This is due to the current audience today being used to exposed to entertainment with advanced technology using CGI (Computer Generated Imagery) such as *Avatar, X-Men* or *Transformers* feature film, which could be a reference point for augmenting Wayang Kulit's computer animation approach. Also, this refers to adding movement of visual shots or angle to provide more options for viewers to be entertained with modern Wayang Kulit styles. In summary, the respondents in this finding could be described as pragmatic in terms of computer animation and Wayang Kulit visual arts. They are not rigid, but more concerned in preserving the values of original Wayang Kulit.

5.8.3 Cinematography
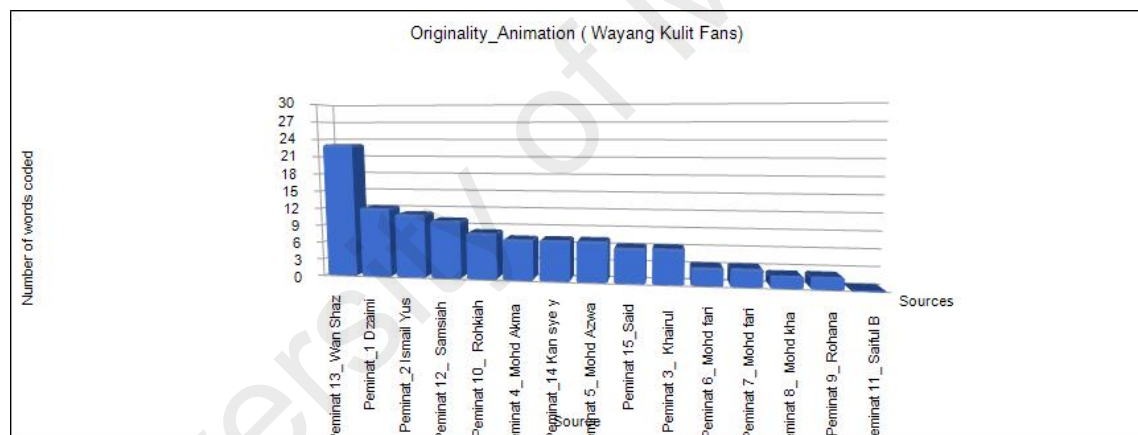
Figure 5.31 Cinematography
3D Animation Wayang Kulit result based on Wayang Kulit Fans

The purpose of this section is to analyze the findings related to the originality of using computer animation for Wayang Kulit, based on result by Wayang Kulit fans. Figure 5.41 shows that most of the respondents in context with animation for 3D computer animation Wayang Kulit are encouraging. The highest coded reference is F13 respondent with 23 words cited, while less then eleven (11) respondents, not more than 10 words reference were coded in relationship between the philosophy, virtual camera, and overlapping shadows.

The first significant increase is related to respondents' view that computer animation is technology driven, and therefore if it is being used to enhance Wayang Kulit, it would not affect whole philosophy or concept of the original styles of Wayang Kulit. For example, F13 respondent was responding to the researcher's attempt of stylized effort for Wayang Kulit using 3D computer animation, and felt like providing a new dimension into Wayang Kulit. This was also highlighted in the context of virtual camera animation or movement that provides audience with options to view at different angle and bring the audience even more closely to the storyline itself. An interesting point was highlighted in this finding that in Wayang Kulit performances, puppeteers and musician are mostly static in their position during their performance, only animated translucent shadows appears on the screen. Thus, 3D computer animations are more dynamic and versatile in that it could provide various animated visual and illusionistic effects to enhance the attractiveness of Wayang Kulit. In addition, the concept of overlapping shadows or silhouettes behind 3D computer animated puppet models are not necessary as again it disrupts the audience focus between the visual and shadow itself. Only a small number of respondents did not agree using computer animation to animate puppet or stylized Wayang Kulit.

In response to question 1, F12 respondent described that if Wayang Kulit computer animation were to introduce virtual puppet characters of such as Wak Dogol, for example designing it with three (3) hands and later animating it, would certainly affects the philosophy, tradition and culture of Wayang Kulit's original style. This statement is probably referring to certain sensitivity among mainstream fanatic audience of Wayang Kulit. An interesting point from this finding was that Wayang Kulit are natural or typical in design and performed by human puppeteers, where else computer are animated using computer mouse instructed by human.

Even the ideas of having variety of camera angles or movement are not convenient, only creating more confusion to the audience. In other words, only small minority totally rejects the idea of having Wayang Kulit in 3D computer animation styles including the whole concept of 3D virtual camera movement.
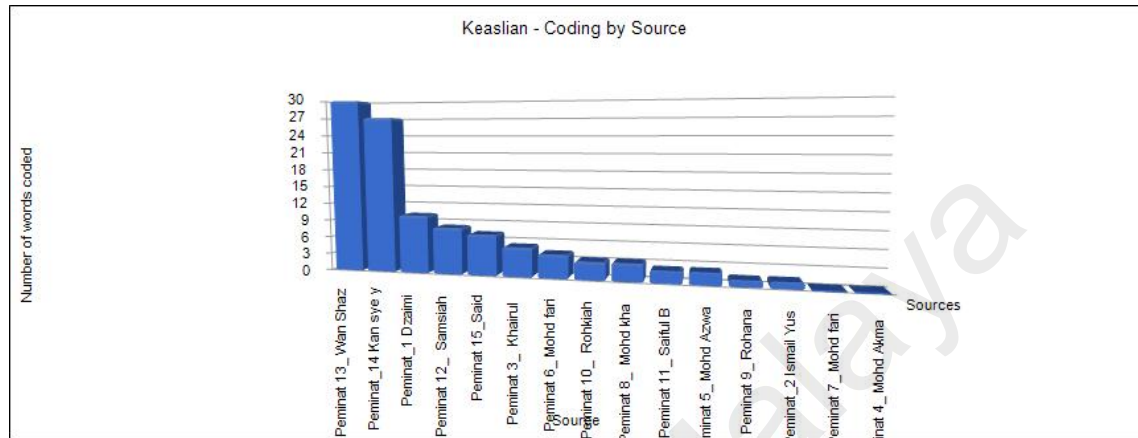
Figure 5.32 Cinematography
Traditional Wayang Kulit result based on Wayang Kulit Fans

This section presents the findings in particular to traditional Wayang Kulit originality of movement from Wayang Kulit fans' respondents. Figure 5.32 shows that F13 and F14 respondent provided among the highest coded words with 30 and 27 during the interview session. An interesting point from this finding related to traditional Wayang Kulit movement was that the puppets' hands were not animated both or simultaneously due to attempt to avoid motion distraction from the translucent shadows to the audience. It is also a sign of respect between the puppeteer, shadow and audience itself. Most of respondents agreed that puppeteers are highly skilled and concentrated, which allows them to manipulate the puppets' movement intricately. Therefore, most of the puppet movement in traditional Wayang Kulit, for example Wayang Kulit Kelantan are unique, stylish, and uncanny within their own strength typical cultural performance.

5.8.4 Artistic Shadow Movement
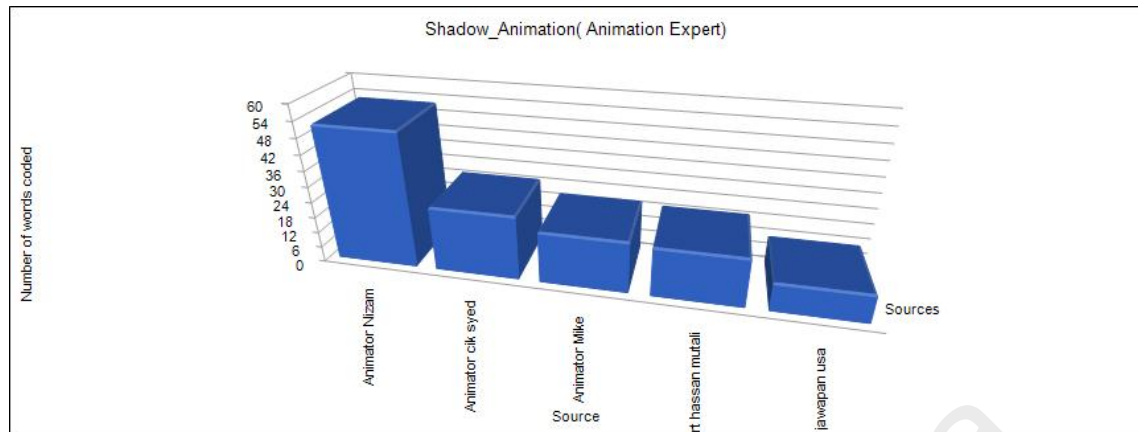
Figure 5.33   Artistic Shadow **3D Animation Wayang Kulit** perception result from Animation Experts

Figure 5.33 shows the animation experts respondents' findings in relation to shadow animated figures using computer animation. Figure 5.33 indicates that EX5 respondent coded most the highest reference with 52 words, while the other respondents with an average of 25 words. Strong evidence was found in relation to the findings from Figure 5.33 in context of shadow animated puppet figures using 3D computer animation, the word most frequency among the respondents was the word "virtual" with percentage of 0.21 percent. On average, the respondents seemed to discuss the aspects of shadow animated from the virtual perspective in computer animation compared to traditional styles. In response to question 1, most of the respondents felt that the shadow movement design in computer or virtual environment will not jeopardize the philosophy of Wayang Kulit. Indirectly, it enhanced the quality of projected shadow using computer animation.

Using computer technology such as MOCAP (Motion Capture) technology are able to capture the exact animated shadow performance (movement) by the puppeteer and later transform it into 3D animated puppets. But again, this involves high cost and maintenance. This is where key frame 3D computer animation comes in handy by providing much more flexible, cost effective and quality for animation industry to experiment with 3D Wayang Kulit animation. In addition, it allows the inclusion of various features using visual camera angle, virtual camera movement scene such as (horse or car chasing a character with speed motion camera effects) using computer animation Wayang Kulit. Only a small number of respondents highlighted the issue of realism with virtual shadow projected using 3D computer animation. EX1 respondent highlighted the issue of using 3D computer animation to stylized or replicate Wayang Kulit. If it is stylized, most respondents feel that it is not necessary to include shadow or overlapping silhouettes behind a 3D animated puppet model. In contrast to replicated styles, it must be able to generate similar animated visual arts of shadows from the existing Wayang Kulit.
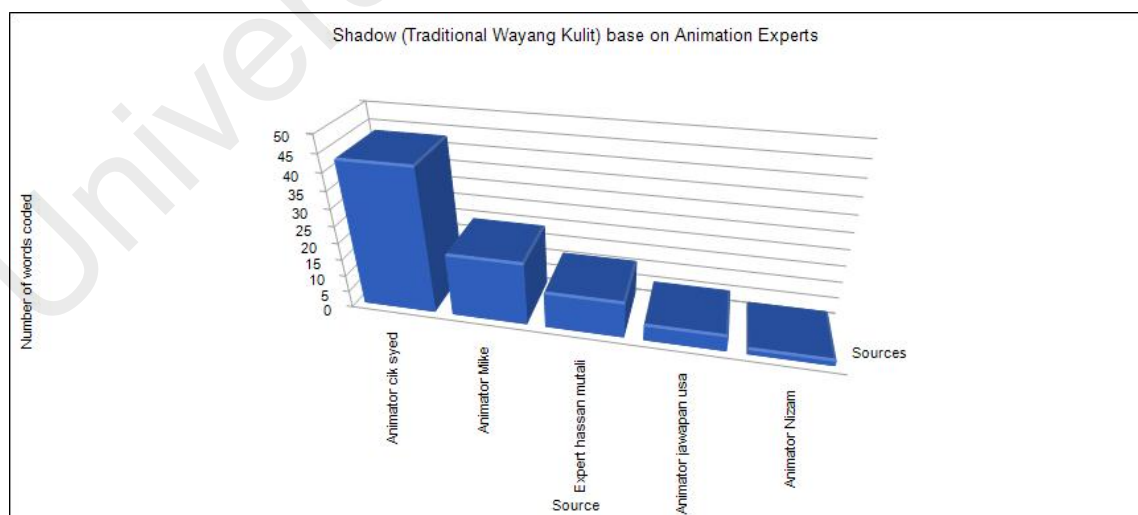
Figure 5.34 Artistic Shadow **Traditional Wayang Kulit** perceptions
result from Animation Experts

The purpose of this part(Figure5.34) is to provide a finding that relates to shadow movement or animation in traditional Wayang Kulit which may be beneficial for computer animation development of Wayang Kulit. EX1 respondent obtained the highest words coded with 43 words, while EX5 described 2 words only. 0.22 percent from Figure 5.48 shows the importance of based on the frequency of words, "mood" is portraying as significance between establishing the mood of animated shadows and the audience view. In particularly responding to question 2, strong evidence was found describing the puppeteer as a "one man show", orchestrating the art of animating the shadowy projections, using both quick hands to control the puppets and the instinct of a natural performer to provide mood for the audience, especially on long repertoire of epic stories.

There was an interesting point highlighted by EX3 respondent, in response to question 2, that traditional Wayang Kulit has no "*Cinematic Apparatus*", camera angle and shot sizes which are the limitations in cinematography of Wayang Kulit. Thus, using computer animation can provide the solution to this limitation for Wayang Kulit. Also, an interesting finding based on the majority of the respondent thought that in pertaining to question 5, the animated translucent shadows of traditional Wayang Kulit had several Disney principals of traditional animation which include appeal, staging, timing and exaggeration. Furthermore, understanding traditional Wayang Kulit's shadow movements will allow young computer animators to understand basic fundamentals of animation before implementing it using computer software.

5.8.5 Shadow Qualities and Characteristic
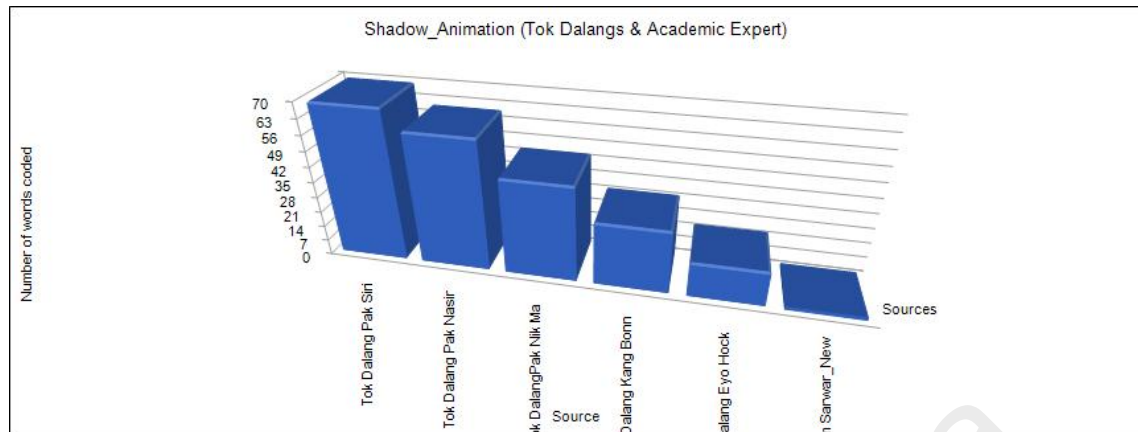
Figure 5.35 Shadow Qualities and Characteristic **3D Animation Wayang Kulit**
category result from Tok Dalangs and Academic Experts

This section presents the findings on animated shadows in Wayang Kulit using computer animation from Tok Dalangs and academic expert respondents. The result shows some of the respondents have lack of knowledge in technical aspects of 3D computer animation, but they are still able to provide some comparison studies related to shadow movement based on basic understanding of 3D computer animation.   From Figure 5.46 findings, several key word frequencies were identified from the respondents during interview related to questions on shadow movement using 3D computer animation for Wayang Kulit arts. Words such as *attractive* coded at 0.80 percent, modern with 0.36 percent, *art* with 0.27 percent which relates to context animation shadow movement and its significance in Wayang Kulit. From Figure 5.35, TK6 respondent coded the most with 69 words, while TK5 respondent cited the lowest coded reference with less than 2 words.   What is interesting in this findings from Figure 5.35 that the shadow or silhouette movement using computer animation will give an interesting new dimension for Wayang Kulit in terms of realism or realistic visualization. The most important finding to appear from the data is that the shadow movement using computer animations are different in terms of qualities.

Majority of the respondents feels that the qualities movement of shadows may not be the same in traditional Wayang Kulit styles, but in terms of visual expression it might differ especially on colour, motif (message), texture, or shape. Furthermore, the traditional shadows in Wayang Kulit are animated with semblance and vibrancy, providing the audience space for imagination, wisdom and realism. Thus, watching 3D computer animation projected silhouettes or shadows are much more of replication of artificial shadows of Wayang Kulit based on 3D virtual light effects.
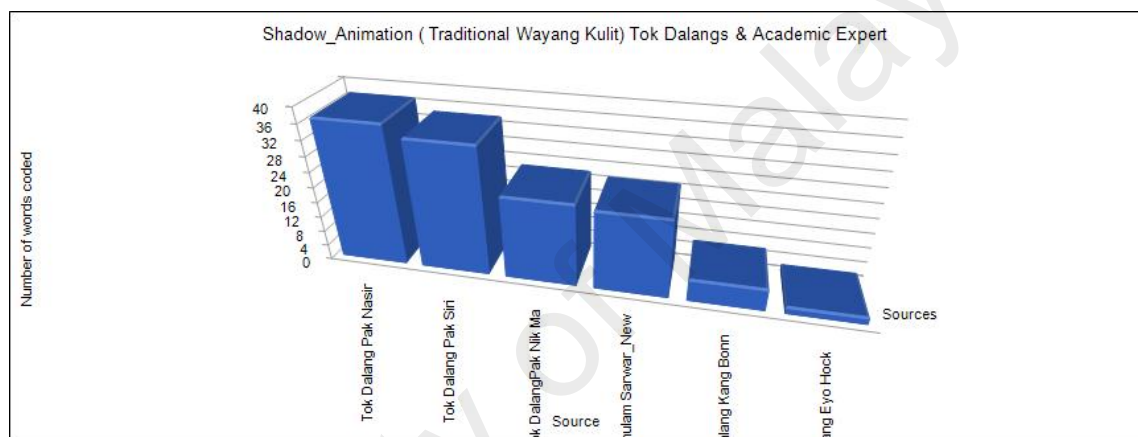
Figure 5.36 Shadow Qualities and Characteristic **Traditional Wayang Kulit** result from Tok Dalangs and Academic Experts

Figure 5.36 reveals the findings carried out on shadow animated qualities in Wayang Kulit traditional styles from Tok Dalangs and academic expert group. The Dalangs especially described much relevant point of view in particular to respondent TK1, which coded the highest number of words with 37 or 1.95 percent coded words referenced. The shadow movement are controlled by the puppeteer based on narration with its own puppet identity or style. For instance, strong evidence was found in the description by respondent TK1 that characters such as Seri Rama or Sita Dewi, the hand behind the puppet is defined as 'dead' and also the mouth does not move.

Therefore, majority of the respondents define the puppeteers in terms of animating the shadows with limited control (hands and space), and using computer animation could overcome this limitation. TK5 respondent also highlighted the importance of rhythm of music that goes well together with the intricate shadows of Wayang Kulit. With each movement of shadow controlled by Tok Dalangs or puppeteer behind the screen, the puppets are described as life without notion or soul, that each time the puppeteer presses the puppets onto the screen, a life is about to appear. In response to question 2 and 3, the most important factor is not to forget the original Wayang aesthetics, even how much of technology effort is being put into in terms of surviving Wayang Kulit , the classical heritage will always remains in people's heart.
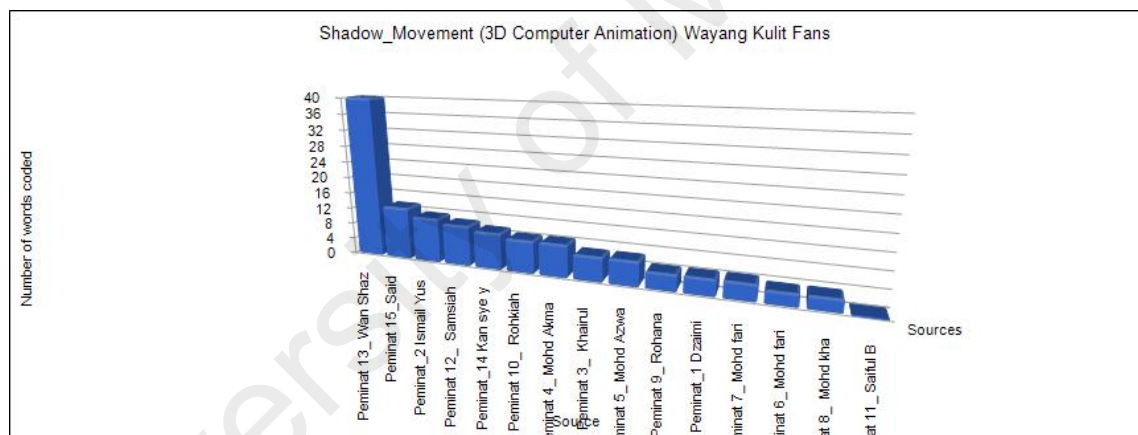
Figure 5.37   Shadow Qualities and Characteristic **3D Animation Wayang Kulit** result from Wayang Kulit Fans

This section discus on the perception of Wayang Kulit fans respondents in relation to shadow qualities and characteristic with 3D animation for Wayang Kulit. Again, as not many respondents provided technical answers related to 3D computer animation, instead more on opinions and suggestions in context with Wayang Kulit and computer animation technology.   Figure 5.37, in general it can be seen that F13 respondent provided the highest words coded from interview with 40 words, stating the most frequency word "modern" of 0.36 percent.

The word 'modern' is referred as animated shadows using computer animation as a positive approach. Majority of the respondents suggested that shadows animated using computer animations are basically providing new improvement for the traditional Wayang Kulit. In response to question 2, for example, F15 respondent described that by providing visual camera angles it would allow the audience to have more variety in watching animated shadows, with views such as close up, medium shot and long shot. Also, animating shadows in computer for Wayang Kulit allows exploration using virtual light source to create black opaque silhouettes or colourful shadow effects. From Figure 5.37, most of the respondent implied that the effects are not similar to traditional shadows in Wayang Kulit. A small number of respondents rejected the idea of having animated shadow using 3D computer animation, as it jeopardize the whole artistic heritage art of Wayang Kulit. In another words, improvising or having new visual style using technology such as computer animation are basically replicating or killing the traditional styles. Next we look at traditional Wayang Kulit translucent shadows and its perception within the focus group.
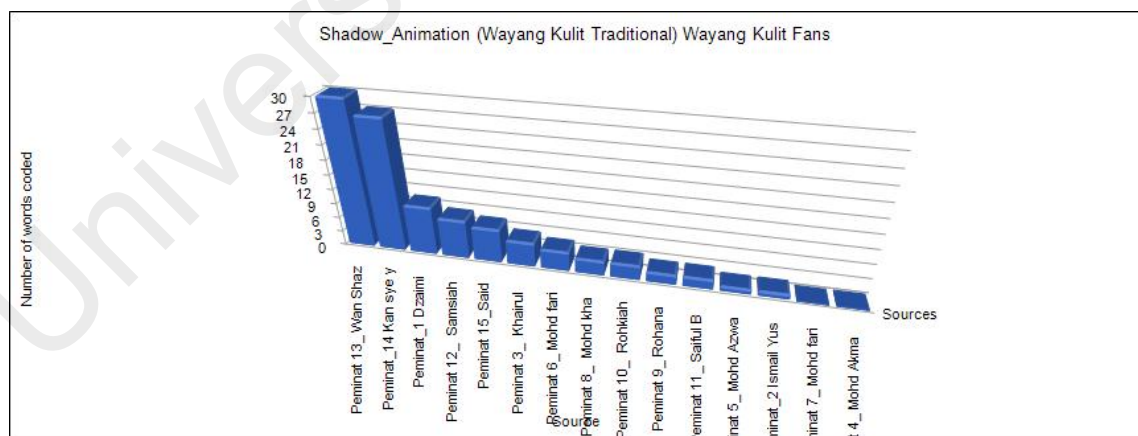
Figure 5.38 Shadow Qualities and Characteristic **Traditional Wayang Kulit** result from Wayang Kulit Fans

The purpose of this segment is to highlight the findings related to shadow movements, in particular to traditional Wayang Kulit performance, mainly by Wayang Kulit fans. F14 and F13 respondents highlighted among the highest number of words coded with percentage of 2.08 percent and 1.77 percent. Figure 5.38 indicate that majority of the respondents are aware of traditional animated shadow play styles, describing that the puppeteers skill of handling in moving or animating the puppets are natural, organized and structured. In addition, the Wayang Kulit fans still admire the artistic styles of animated shadows; even a small number of respondents rejected the idea of having computer animated styles of Wayang Kulit. The respondents suggested that the animated shadows in Wayang Kulit styles can be given more depth and realistic effects through computer animation but it would not be the same animated shadow qualities or characteristic as visualized in traditional Wayang Kulit.

5.9   Storytelling

In this finding, another important study related to computer animated Wayang Kulit is the art of storytelling. The respondents focus groups will discuss on the issues pertaining to functionality and categories (genres) which refers to the types and importance of storytelling, while the element of audio are referred to voice over, music, and sound effects   based on modern computer animation and traditional Wayang Kulit visual arts.

5.9.1 Genre and Functionality
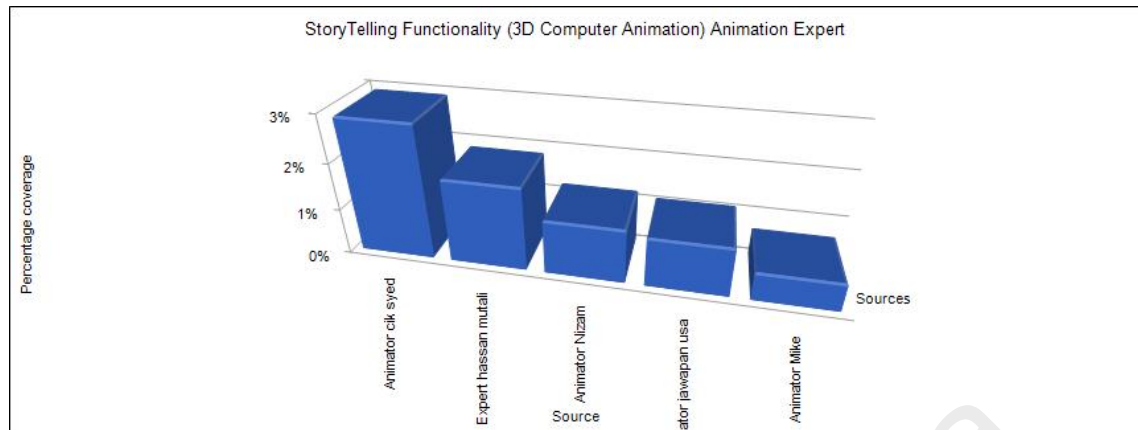
Figure 5.39 Genre and Functionality Storytelling **3D Wayang Kulit animation**
from Animation Expert

This section presents the findings related to functionality of storytelling using 3D computer animation for Wayang Kulit based on animation experts respondents. Figure 5.39 shows that majority of the respondents are positive in terms of the types of stories and role used in computer animation Wayang Kulit styles. EX1 respondents quoted the highest reference with 2.89 percent while EX3 coded 1.82 percent. Only EX4 respondent coded the lowest source reference with 0.61 percent, as he explained less on the important points related to storytelling for Wayang Kulit animation. One of the most important findings related to this part is using 3D computer animation and introducing folklore or "Cerita Rakyat" stories (replacing epic repertoires), which would be able to have an impact towards society, especially for young generation to overcome moral issues. In response to question 1 and 2, it would be interesting if Malaysian famous folklore stories like *Si Luncai, Pak Pandir, Musang Berjanggut,* to use the concept of stylized 3D computer animation with Wayang Kulit visual approach. The virtual puppets using 3D computer are animated with additional lighting, camera angles, and visual effects to enhance the mood of the story.

This explanation supports the respondent EX3 description of archetypes that are suitable to explain the role and identity of each character in a story or plot development. For example, in Star Wars, characters like Luke Sky Walker and Princess Amidala adapts the similar visual styles of Wayang Kulit, mainly Wayang Kulit Kelantan with the famous characters of Seri Rama and Sita Dewi defined as king and princess adapted from Rama epic. One of the most important findings highlighted is that any characters that are introduced in any genre of a story, must be memorable and standout. In addition, animated Wayang Kulit either stylized or replicated, could still offer versatile characters for diverse genre including science fiction, Islamic values or history, though research had to be done properly to ensure the quality of the story.
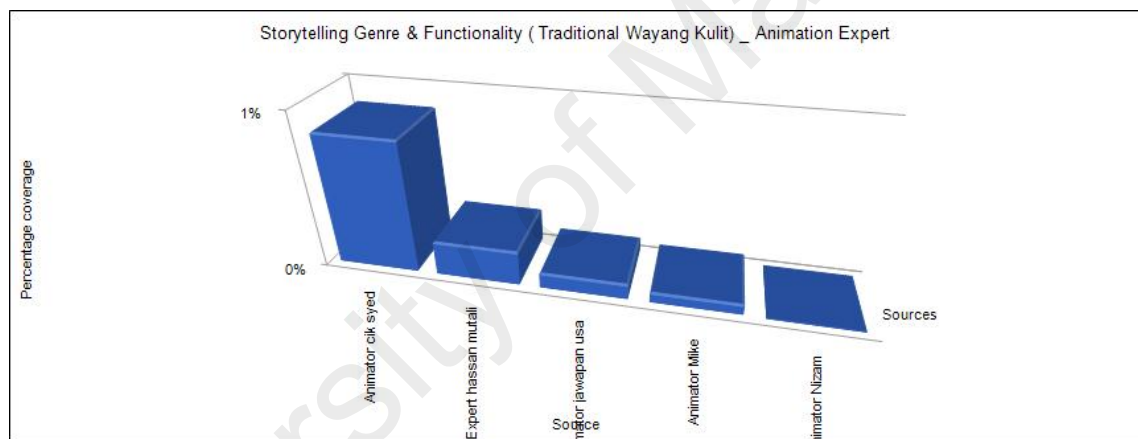
Figure 5.40 Genre and Functionality Storytelling
Traditional Wayang Kulit from Animation Expert

Figure 5.40, shows that majority of the respondents in particular to traditional Wayang Kulit has less knowledge in particular to the art of storytelling. Again, an only EX1 and EX2 respondent has more relevant or significance point of view compared to other respondents. This increase is due to both of this respondent has some experience and knowledge (research and technical studies) of Wayang Kulit and also being sometimes used in their field of work.

In general, EX1 and EX2 highlighted an interesting point in response to question 1 and 2, describing that traditional Wayang Kulit stories are basic classic repertoire adapted from Hindu (Rama), symbolising love, kingdom, patriotism and society, making it an exceptional masterpiece stories that unquestionably mesmerize the audience. The audience during the early days of Wayang Kulit can be considered having different in a sense of background, mindset, passion and exposure with limited medium of entertainment (passionate only creative and imaginative arts such as folklore, literature) compared to today's society lifestyle. In Malaysia, according to EX2 respondent, the value of classical epics or literature is highly rich with aesthetics and cultural semiotics especially to the old generation. But unfortunately, the today generation (especially the young generation seems to forgotten this valuable identity. The unique part is the audience are willing to come every night to follow each plot of repertoire with different concept or theme. In short, using 3D computer animation to portray Wayang Kulit arts could adapt the similar practice of Wayang Kulit repertoire stories, using the concept of "TV or feature film animated series", but having slight improvement on the concept, content and most importantly target audience.

5.9.2 Local Content
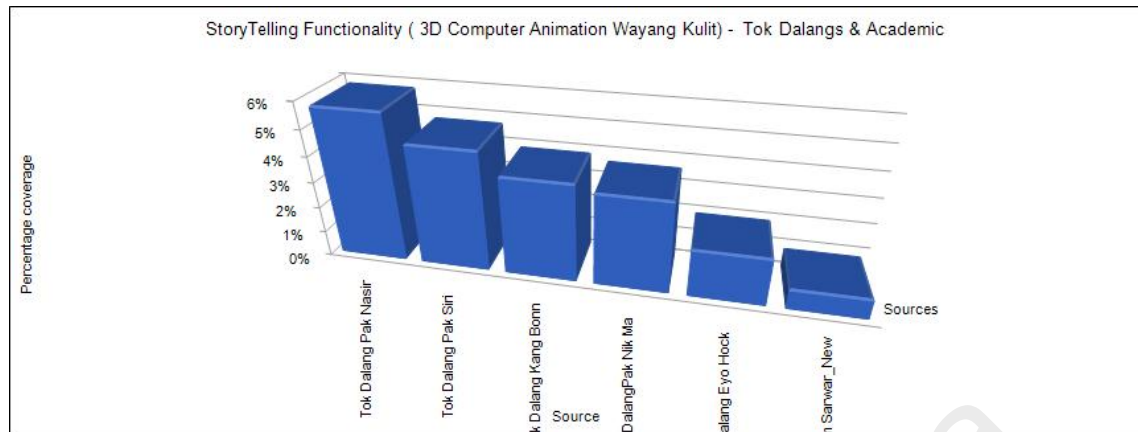
Figure 5.41   Local Content Storytelling
3D Animation Wayang Kulit from Tok Dalangs & Academic Expert

This part explains the findings related to storytelling for 3D Computer Animation based on Tok Dalangs and academic expert. TK1 respondent shows the highest coverage with 5.77 percent, while TK5 respondent with only 0.81 percent. From Figure 5.41, it shows that most of respondents were able to provide more feedback or suggestions due to the subject matter being much broader which focuses on storytelling issues related to computer animated Wayang Kulit. The respondents are well versed in terms of Wayang Kulit story structure and functionality, but when it comes to using computer animation, several points were addressed.

In response to question 1, 2 and 3, an interesting finding was highlighted. When referring to using computer animation for Wayang Kulit, majority of the respondents felt that modern stories with various genres should replace old epic styles of narrative. This is based on the current or the younger generation audience today that has much interest in modern stories using cyber, electronic, or technology terms or concept as the main theme, which is consistent with mainstream genres such as love, melodrama or war.

Also, another interesting finding was mentioned by majority of the respondents stating that stories with moral values are very important should be included into 3D computer Wayang Kulit animation because today's younger generation are facing immense challenges especially related to moral issues.

Nevertheless, even though new stories or genres are introduced in computer animated Wayang Kulit, it is always important not to forget the inclusion of roots or original essence of Wayang Kulit styles. For example, characters name, role (superhero) and music should be incorporated in Wayang Kulit in order to maintain some similar qualities suitable with word "Wayang Kulit" itself. Again, as mentioned by TK6 and TK4 respondent, names that are represented as "icon" and "superhero" will easily be memorized and admired by children, which would pronounce it, buying merchandised items and much more, just like the famous cartoon characters of Disney's Mickey Mouse or Marvel's Ironman . Some respondents even describe 3D computer animation puppets had a slight "cartoonish" look, that would be an advantage to introduce characters like Seri Rama or Wak Dogol with superhero fashion styles and relates to modern or folklore stories. Also, genres related to Malaysian history, for example, stories on "*Hang Tuah*" ,*Tok Janggut* or *Malaysian Independence*, can be visualized using computer animated Wayang Kulit , that will not only indirectly promotes local animation content but also preserving the art of Wayang Kulit itself.   In other words, the respondents find it much more positive to promote Wayang Kulit arts using computer animation technology not only in the context of visualization but also most importantly the content or story inside of it.
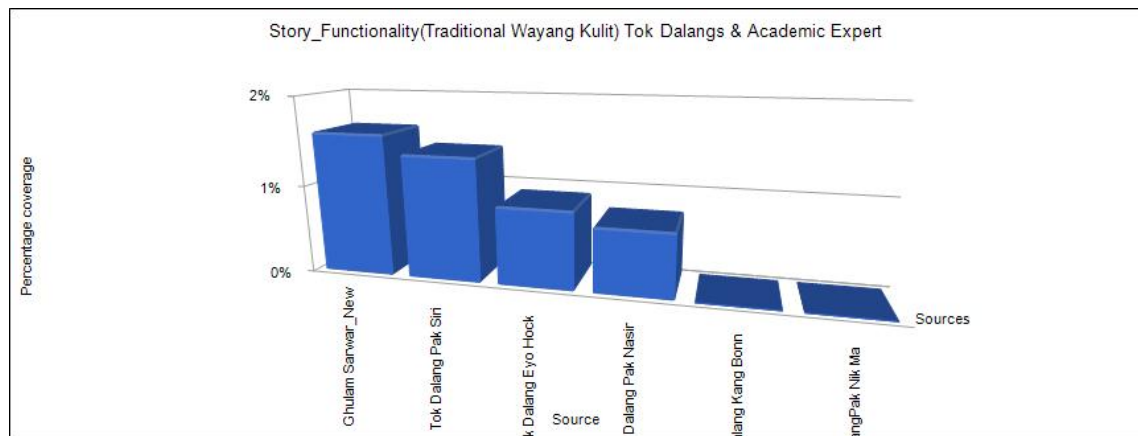
Figure 5.42 Local Content Storytelling
Traditional Wayang Kulit from Tok Dalang & Academic Expert

This part explains the findings from animation experts related to art of storytelling in traditional Wayang Kulit based on genre and functionality. The highest percentage coverage is respondent TK5 with 1.56 percent while TK3 and TK4 did not provide any significance coverage. The respondents agreed that Overall, from Figure 5.42 the most of the respondents describe traditional styles of Wayang Kulit stories are collection of stories from Hindu myth and classic legends or lores. Epic stories based on Ramayana are not encourage to be developed for computer animation, as it is much more complex and could considered outdated with today generation, but rather creating Malay epic stories such the legend of *Hang Tuah* or *Hang Jebat*.

Thus, the interesting point highlighted from respondent TK6 in this finding is the convergence between traditional puppet characters and modern characters using computer Wayang Kulit would be an interesting approach based on modern genre. For example, Aliens from outpace, invade the earth and battle with Wak Dogol, Wok Yah, Samad and Said adapted from Wayang Kulit Kelantan puppet characters), signifying modern genre with existence styles of Wayang Kulit performances.

In additional, special effects with modern props will also fascinate the visual context between CGI and art of Wayang Kulit This would help to create a more attractive perception among audience especially the young generation to appreciate the values of Wayang Kulit. In brief, the art of storytelling in traditional or computer animation has its own values.

5.9.3 Epic and Local Folklore Style
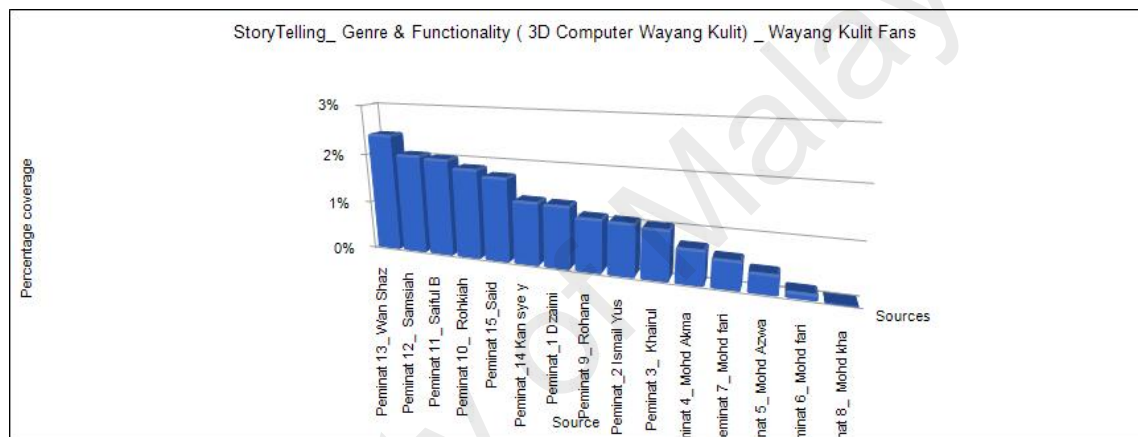
Figure 5.43 Epic and Local Folklore Style **3D Animation Wayang Kulit**
from Wayang Kulit Fans

Figure 5.43 explains the findings from Wayang Kulit fans related to stories or narrative using computer animation for Wayang Kulit styles. The graph above shows that most of respondents have positive view on the approach of using modern genre or folklore stories in computer animation Wayang Kulit approach. Figure 5.43 shows that F13 highlighted the most significance source related to storytelling with 2.41 percent while only six(6) respondents obtain less than 1.00 percent source coded.

Majority of the respondents welcome the idea of having modern stories using 3D computer animation Wayang Kulit, with several suggestions prefer to have more relaxed genre stories such love or family compared to history or science. In response to question 1 and 2, majority of the respondents agreed that epic stories from the original Wayang Kulit performance should be replace folklore types, suitable with current audience exposure and needs. Only small group of respondents rejected the idea having modern or folklore stories, as Wayang Kulit was raise with classical epic, local lore, legends influence. An interesting point was raised by F13 respondent in response to question 3, that using 3D computer animation could provide more nostalgic moments especially with new stories, puppet characters, narration and applying some classical Wayang Kulit music. In addition, this supports the scenario of Wayang Kulit, especially in Malaysia is believe the popularity is slowly extinct.
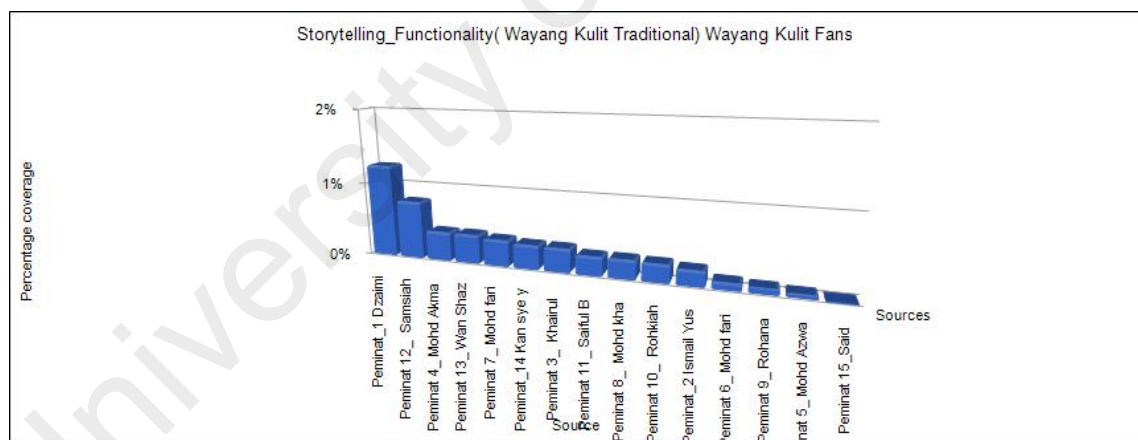
Figure 5.44   Epic and Local Folklore Style Traditional Wayang Kulit
from Wayang Kulit Fans

Figure 5.44 provide the findings related to storytelling in traditional Wayang Kulit based on Wayang Kulit Fans perception. Overall, majority of the respondents signifies that traditional Wayang Kulit content are not similar to any modern stories approach. As shown in Figure 5.44, F11 respondent recorded the highest source reference of 1.54 percent, highlighting very interesting point relating to the whole epic stories in Wayang Kulit can be summarize as imaginative and artistic(narrative), which provides the audience to mesmerize long night narrative with husky puppeteers voice and music melodic. This is a challenge for computer animation to adapt the similar story approach for the new generation audience to appreciate the values of Wayang Kulit or perceiving it only as entertainment. In addition, no matter what concept or genre stories introduce in Wayang Kulit computer animation, proper research especially in terms of theme, target audience and content should satisfy the audience which requires enjoyable, valuable and memorable quality in entertainment. It would be encouraging to include some traditional Wayang Kulit element used in narrative styles for modern approach, in order to preserve Wayang Kulit art from totally forgotten. Next we would look at some findings related to audio context between traditional and 3D computer animation Wayang Kulit.

5.10 Audio "Live Performance" and "Digital Recorded" styles

5.10.1 Original Voice and Dubbing Voice Over
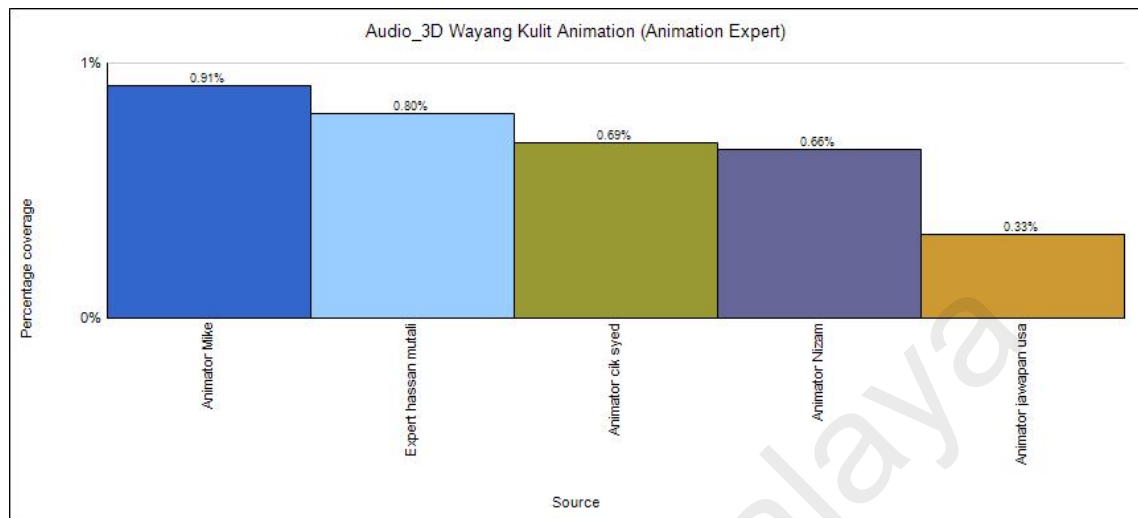
Figure 5.45   Original Voice and Dubbing Process **3D Animation Wayang Kulit** result from Animation Experts

Figure 5.45 shows the perception of animation experts related to audio approach in 3D computer Wayang Kulit styles. Overall, majority of the respondents were positive towards introducing new approach to current existing styles of traditional Wayang Kulit. Respondent EX4 achieve the highest significance answers towards this finding with 0.91 percent, while EX2 respondent only contributed the lowest with 0.33 percent. The majority of the respondent thought that experimenting with concepts in audio would be considered enhancing the features in Wayang Kulit based on the current needs of the audience. There is an expected relationship between audio and storytelling, as majority of the respondents describing as vital, compliment each another in each establishing a quality story structure. The most important findings response to question four(4), that most of the respondents felt that using "dub" (recorded) audio in computer animation Wayang Kulit , are much more effective in terms of cost and technicality.

From perspective of cost, the respondents describe as cost measure effective, with able to edit and add on sound effects, which indirectly could benefit in terms of production time. An interesting point was also highlighted using recorded original voice of "Tok Dalang" and "lip-sync" it with a virtual 3D computer animated puppet. Through this process, would reduce unintentionally errors or mistakes done by "Tok Dalangs" during live performances. Interestingly, for those senior respondents felt that there concept recorded audio and live performance defines two different world of virtual and reality.   In relationship with question 5, again majority of the respondents felt that by adding different voice over from different gender, sound effects, human or non-human sound will add a different style towards the presentation of computer animation Wayang Kulit.. An interesting point was discovered that different voices over are represented by different characteristics, and therefore applying computer animation such as for Wayang Kulit needs to introduce many characters in order to create a variety for the audience to entertain the storyline and not to feel bored.

In addition, this shows the important relationship between narrative and variety of characters to established mood for audience to excite the new approach in entertainment. Characters in each plot or narration act out to resolution and fulfilment issues indirectly with human needs and aspiration that they engage the attention of each audience. Audience should be able to identify, vision and understand clearly with each particular character in a plot especially their archetypes and goals
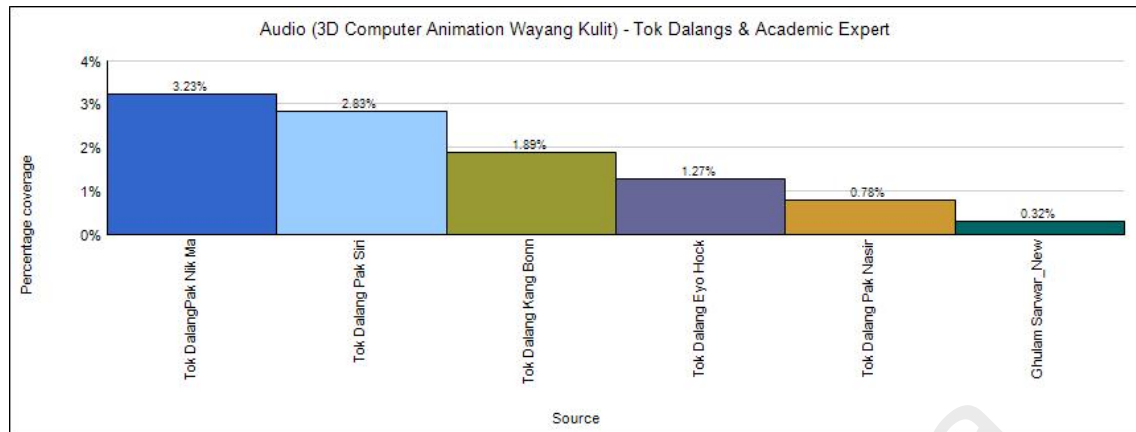
Figure 5.46   Original Voice and Dubbing Process **3D Animation Wayang Kulit** result from Tok Dalangs and Academic Expert

This section presents the findings related to audio on 3D computer animation Wayang Kulit from Tok Dalangs and academic experts' perception. As shown in Figure 5.46, most of the respondents do not support entirely the idea of having a different approach to the audio concept for 3D computer Wayang Kulit. For example, TK4 and TK6 respondents with highest source reference of 3.23 and 2.83 percent disagree with the approach for using computer recorded "voice-over" with animated 3D puppets. The explanation is justified by relating puppets lip-sync which does not have the similar qualities (non-original) to traditional shadow animated puppets. Even though technically the Tok Dalangs and academic experts had less knowledge related to 3D computer animation, this are based on their observation including researcher's prototype development. This is reflecting especially towards experimenting stylized puppets using 3D computer animation. Stylized puppet appears physically (3D models or cartoonish), and the audience would be able to watch from various position including audio narration through computer lip-sync, where else in traditional Wayang Kulit, not all characters performs lip sync except for certain characters that makes the shadows with enough strength and depth for audience mesmerize by the performances.

Also, in response to question 5, most of the respondents described the usage of non-Tok Dalangs voice audio could jeopardize the entire concept art of Wayang Kulit   The art of stylish narration with melodic and rhyme accompanied with musical orchestra are the true ingredient of Wayang Kulit arts.   Only a small majority of respondents felt that using computer recorded dubbing process including non-puppeteers (Tok Dalang) voice over audio, are much more effective and unique, defining the whole concept of "modern" or new approach for Wayang Kulit. For example, using recorded voice of characters such as for mother, son, horse, or even aliens, plus adding background sound effects or music-score, such as wind, explosion, could add-up as a unique balance in entire whole process of a new look of Wayang Kulit. In brief, the respondents had mixed opinions when it comes to originality, comparing themselves in real environment and observing it in the context of virtual dogma.
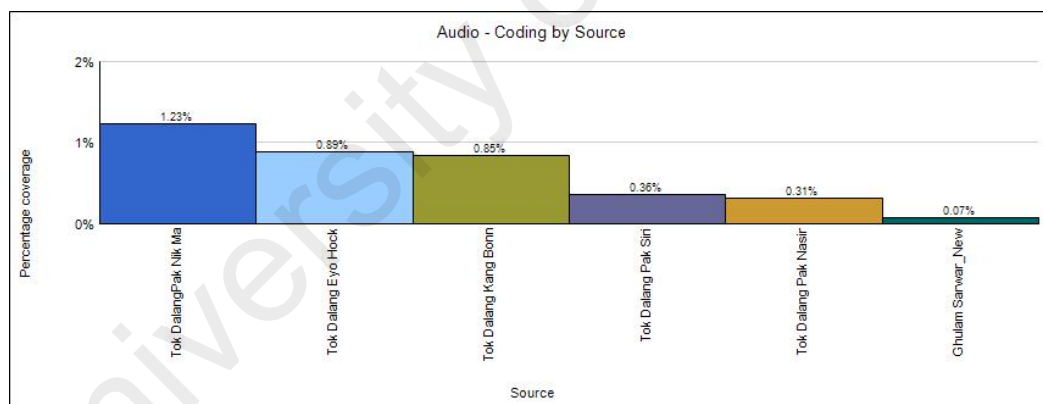
Figure 5.47   Original Voice and Dubbing Process **Traditional Wayang Kulit** result from Animation Experts

This section presents the findings based on audio for traditional Wayang Kulit from the respondents of Tok Dalangs and academic experts. Figure 5.47 has presented the related source code that signifies questions related to audio studies in traditional Wayang Kulit, with TK4 respondent quoting the highest source reference by 1.23 percent, while TK5 with only 0.07 percent.

The reason for the increase is based on the knowledge and experience of traditional Wayang Kulit performances or research conducted. An interesting findings was highlighted relating it to voice over or audio narration of Tok Dalang or puppeteer must only be represented by a man (male) icon only. Female voices as Tok Dalangs are not convincing and could be controversial as well. Overall, this had been practiced for many years and majority of respondents still acknowledge puppeteers icon in traditional style performances as "live" and "inimitable". By including adding non-voice of Tok Dalangs, female, sound effects, or any other technology driven effects, it would be hard to replace the exact qualities especially original rhythm or melodic narrative skills and to animate manipulating the puppet shadows in and out of the screen.

5.10.2 Innovative and Preserving Originality
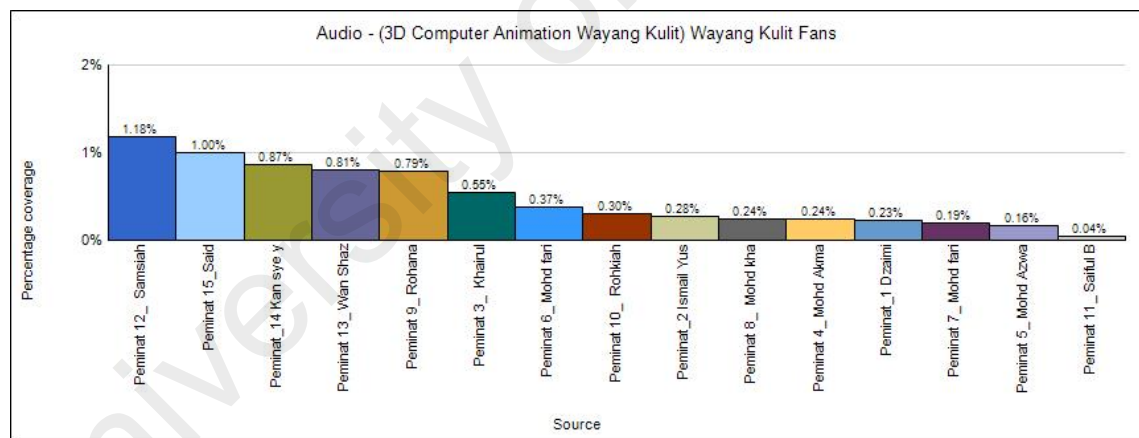
Figure 5.48 Audio Innovative and Preserving Originality **3D Animation Wayang Kulit** result from Wayang Kulit Fans

Figure 5.48 shows the findings related to audio concept use in 3D computer animation Wayang Kulit perception based on Wayang Kulit fans. The graph above shows a balance of mixture between agreeing and totally differing the approach on audio for 3D computer animation Wayang Kulit F12 respondent quoted the highest reference with 1.18 percent while F11 respondent with only 0.04 percent.

Majority of the respondent felt that the idea of using pre-recorded voice-over of Tok Dalangs is not acceptable as it shows non-originality. The respondents describe enjoying energetic performance of "Tok Dalangs" or puppeteer with rasping voices representing each character on scene are true identical of Wayang Kulit. Using computer audio software to record can be describe as "simple" ignoring the proper values related to traditional Wayang Kulit performance.   The respondents are fascinated with mesmerizing stylish narration with melodic and rhyme accompanied with music orchestra reflects the original styles of Wayang Kulit arts. In addition, responding to question five(5), the respondents are not keen to have non puppeteers or Tok Dalangs voices audio, and by replacing with normal characters describing as ineffective.

Wayang Kulit was develop with from history practices and puppeteers or Tok Dalangs should always appears as symbol of leadership and respect, where else using voices from non or Tok Dalangs or puppeteers are suitable to seeing as "purely" entertainment without considering any culture added values.   Only a small majority of the respondents agreed with the idea using recorded voice-over and non Tok Dalangs audio including sound effects from their perspective has the similar relationship idea with other focus group respondents, describing as new style or method in medium of entertainment related to Wayang Kulit.   In general, the respondents looking from the perspective of today's audience, are not much looking backward or appreciating history values, but more ahead in terms of style, creativity, content and technology. Thus, providing new alternative in context of audio styles (recording, sound effects, mixing, editing, music score,) are considered innovative for new medium approach for digital Wayang Kulit puppetry style.
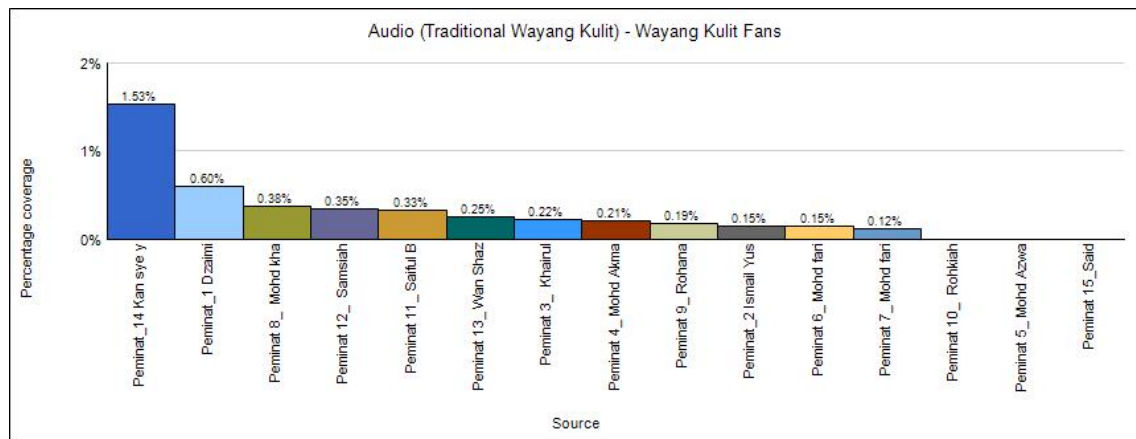
Figure 5.49   Audio Innovative and Preserving Originality **Traditional Wayang Kulit** result from Wayang Kulit Fans

Figure 5.49 shows the findings results based on audio in traditional Wayang Kulit from Wayang Kulit fans. Also, Figure 5.49 shows that the majority of audience prefer traditional Wayang Kulit audio from the perspective of originality of Tok Dalangs tone without adding sound effects or non-Tok Dalangs or puppeteers' voice over as well. The majority respondents highlighted important substance in preserving the originality of traditional Wayang Kulit. This includes not performing recorded or replacing the puppeteers voice with non-puppeteers, which is portrayed as ineffective within the principles of Wayang Kulit. For years the Tok Dalangs are required to learn "ilmu Pendalangan" before being recognized as "Tok Dalang" or master puppeteer. Therefore, using computer technology to replace such a strong visual culture arts would be described as irrelevant to the identity of Wayang Kulit's origins.

5.25   Summary

Based on the comment and suggestions by selected target group respondents in this area, it shows that indeed Wayang Kulit is possible to be designed with computer 3D animation while considering the similar concepts, technique and visual qualities from the traditional visual styles of Wayang Kulit that could be adapted. The most important key points from this finding is basically the ability of using 3D computer animation to stylize or replicate Wayang Kulit visual arts especially the vital areas such as puppet design, lighting, or the art of storytelling. Overall, if Wayang Kulit is to be developed in 3D animation, certain qualities such as puppets' name, music, shadows and others from the existing conventional Wayang Kulit styles should remain. This is to preserve the identity and aesthetics of Wayang Kulit originality. Also, from this finding, several discussions on Disney's twelve principles in traditional Wayang Kulit were also highlighted by the respondents, providing a strong relationship between the art of animation and Wayang Kulit. Thus,   knowledge from this finding would be vital for future animation development studies in order to preserve the concept and roots of Wayang Kulit.

CHAPTER VI

DISCUSSION: THE ART OF CONVERGENCE

6.1   INTRODUCTION

As mentioned in the literature review, the art of Wayang Kulit is known as a unique symbol of traditional performing arts symbol and it is slowly becoming extinct. From the research question, this discussion will focus on comparing traditional styles and 3D computer animated Wayang Kulit consisting of four components such light and shadow, puppet design, movement and narrative or storytelling. Very little was found in the literature on the question of effort in preserving this art from facing extinction. From animation, computer science, algorithms and computer hardware, experiment is part of a small initiative to provide a new method for the survival of the art of Wayang Kulit. Applying digital computer animation as a tool to survive or an alternative in entertainment for Wayang Kulit performances has provided a lot of positive feedback which allows a different spectrum of opinions between two different realms (virtual and reality). The convergence of visual puppetry especially tangible and non-tangible puppets, puppet personas and identity are related particularly to the research objectives from historical and technology, the art of developing 3D animation Wayang Kulit and visual 'expressitivity' (puppet design and movement), which will be discussed further.

6.2   The Convergence of Visualization Shadow Puppetry

Unfortunately, very little was found in the literature on the 3D key frame animation in relation to Wayang Kulit art. Even though some efforts such as illustrations, computer algorithms, motion shadows in digital experiment including 2D animation from Malaysia's "Jala Emas Jala Perak" ,"Lotte Reinieger Prince Achmed" or Nina Paley's "Sita Sings The Blues" a 2D feature animation film based on Wayang Kulit Rama epics, there is still a lack in the effort of using 3D key frame animation production for Wayang Kulit in particular. As discussed in the previous findings chapter, the styles or technique of Wayang Kulit or shadow puppetry covers several implicit and non implicit analysis related to visualization art process from the perspective of puppet design, lighting, movement and storytelling. Below are several discussion key points based on the discussion related to the context of convergence between traditional and digital (computer animation) visual puppetry. Therefore, this study sets out with the aim of assessing   the importance of 3D visualization based on 3D key frame animation software from theoretical, historical, animation and 'expressitivity' point of view from the focus group respondents that is hoped to provide tacit knowledge related to the world of virtual puppetry visual styles.

6.2.1 Tangible & Non Tangible (Virtual)

Overall, a majority of the respondents from the animation focus group who took part in the interview have indicated a positive approach using computer animation for Wayang Kulit. The results were anticipated as were all animation experts in traditional and computer animation, and the using of computer key frame animation in shadow puppetry or Wayang Kulit seemed to have several discussion points related to puppet design, character types, role, and others. Meanwhile, some respondents (animation experts) still have some opinions in terms of approach or artistic values related to animation for Wayang Kulit performances. There are several factors that contribute towards the positive approach using computer animation in Wayang Kulit. The most obvious factor was the utilization of the 3D computer animation technique. In fact, there has been a lack of effort to preserve Wayang Kulit using animation as mentioned by Khor & Yuen(2009) in their previous research in digital aesthetics art of shadow puppetry.

In context with puppet design, a majority of the respondents agree from the perspective of using computer animation to replicate and or stylized the Wayang Kulit itself. It means that using computer 3D key frame animation software such as Maya or 3D studio Max are able to create solid 3D model or replicating the existing traditional Wayang Kulit visual styles based on light and shadow. It creates a domain in the world of puppetry between tangible and virtual (non-touchable). The fundamental point to highlight is traditional Wayang Kulit puppets design are produced from tools such as cow skin, wood, and paint. Most importantly, they are tangible compared to computer animation software which are "virtual" and also as a 'tool' to create a diversified approach between humanities and technology.

It is possible even though, the computer virtual puppet structure are designed based from polygons, shapes or lines (curves) compared to traditional Wayang Kulit which uses only human physical and inner touch (observation, focus and passion) are different, but it still applies the level of creativity. These present findings seem to be consistent with Steve Tillis (1999) previous research explaining the existence world of shadow puppetry expressed by factors surrounding physical , spiritual and emotional. Therefore, it is possible that Wayang Kulit traditional visual art are more pragmatic and computer 3D virtual animation puppetries are described as "photorealistic" or "cartoonish" visual art. This is much related to the context of the second research objectives developing focusing 3D animation Wayang Kulit that clearly distinguished two different realms between virtual and non virtual puppets.

6.2.2 Puppet Identity, Form and Personas

As for the Tok Dalang and Wayang Kulit Fans, most of the respondents felt that using computer animation can be benefited as a different medium or style to promote Wayang Kulit. Hence, the puppet design related to identity and personality can be described as important in the context of character design between traditional and digital shadow puppetry. A majority of the respondents felt that in shadow puppetry, protagonist and antagonist characters in each form of storyline or story structure should be included. There are several possible explanations for this result.

Firstly, some of the respondents especially the puppeteer or Tok Dalangs and Wayang Kulit fans felt that the original essence in Wayang Kulit performances should be preserved. This context is related and supported in the previous research in an interview with Malaysia's famous puppeteer, AidGuru Mohd Nasir, in 2011 from ASWARA (The Academy of Arts & Culture Malaysia) who believes that the influence of the three elements of Hindus, Siam, including Javanese and Malay (Islam) culture into shadow play puppet character especially in Wayang Kulit Kelantan is of strong significance in performing arts culture in Malaysia. Example, in Wayang Kulit Kelantan, the stories are based on Hindu epics, the puppets are influenced by Thai and Javanese design crafts and finally the Puppeteer or Dalangs are mostly from Malay society with Islamic background. This findings also support the research done by Jeune Campbell (1959) highlighting the existence of Javanese influence in Seri Rama Wayang Kulit Kelantan puppet based on studies involving coordination structure, articulation, gesture, and characteristic of nobility.

Even though computer animation is a new dimension of modern or digital entertainment approach, the original stories concept or repertoire epic of Hikayat Maharaja Wana used in Wayang Kulit Kelantan or visual icons including puppet design should be part of the ingredients to allow the audience to have a different flavour of stories or approach in computer animated puppetry. For example, each puppet character identity is important for the audience to recognize and be fully immersed in the role and it will affect the whole concept of the story. If the animation shadow puppetry neglects certain characters identity or symbols from the current and existing Wayang Kulit arts, the respondents were afraid that it might not be known as Wayang Kulit performance.

In contrast to the earlier findings, there is no evidence that using new puppet characters or identity will harm or destroy the value of the current traditional Wayang Kulit itself. A possible explanation for this might be that we can preserve the existing characters identity from the traditional styles of Wayang Kulit such as *Wak Dogol, Seri Rama, Siti Dewi* and others or stylizing again using modern characters or Malay villager characters name such as *Mak Dara* and *Pak Seman*.

Most importantly, the characters' names for stylized version of 3D computer animation Wayang Kulit are in line with the culture and values of the traditional Wayang Kulit styles. For example, the original extraction outlines from the existing Wayang Kulit or stylizing the new characters were done. This findings support the idea raised in other research conducted by Art Media Studios in Kelantan in the year 2008 that develop the first 2-Dimensional (2D) animated series known as *Jala Emas Jala Perak*. Characters like Wok Yah, Samad, Said, and Seri Rama are basically stylized with new identity and added with cartoon animated visual styles. The process of Wak Dogol Wayang Kulit Kelantan character original reference being stylized and animated for *Jala Emas* animated series is clearly visualized. Thus, the audiences, especially the younger generation will be mesmerized with the colours and effects that will be an added advantage or they will even compare it with the original Wayang Kulit performance. It is also possible that the audience especially the new generation will appreciate Wayang Kulit art by observing, understanding and most importantly appreciating the characters role with effective storyline (moral values). According to Husni & Maila (2012),the art of narrative is a method to disseminate knowledge of culture's history, educating the younger generation the meaning of values in the context of entertainment.

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Therefore, using 3D computer animation for Wayang Kulit can be a more dynamic or versatile method to develop Wayang Kulit animation but it always needs to refer to the art direction of the whole concept and seeks approval before proceeding for the final animation development. The personas or personality of each character from the respondents' point of view are slightly different between roles and types. This result may be explained by the fact that it is the relationship between the character's identity and personality that must exist in traditional or animation Wayang Kulit. These findings suggest that character archetypes must exist in traditional Wayang Kulit or even computer animated as it is the key to produce quality repertoire stories or series for the audience to understand them.

Another point that relates with identity and personas of the puppet character between traditional and computer animated for Wayang Kulit is the element of artistic values in puppet design related to texture, colour or attire to be used in each puppet design. Most of the respondents including animation experts, puppeteers and Wayang Kulit fans have mixed thoughts in terms of stylizing the puppet characters based on various design or artistic styles especially in creating new stylized 3D computer animation Wayang Kulit. There are several possible explanations for this result. Most of the respondents felt that traditional Wayang Kulit has its own unique and historical sense in terms of visual art and aesthetics values related to craft, texture and pattern of each puppet. For instance, in a typical Wayang Kulit Kelantan, the shape of good or improvise characters including heroes and heroines including Sita Dewi and Seri Rama, Sirat Maharaja are slender and height(tall) while aggressive(coarser) characters belonging to the antagonist characters(villains).

A majority of respondents especially the Tok Dalangs and animation experts group highlighted on the importance of colors in 3D computer Wayang Kulit. Colors are used as imagery for the puppet design, with face and body described for most of the main figures, although imagery in the use of given colors symbolism is not visualized or described by the puppeteers or Tok Dalangs who creates and orchestrates the puppetry motion. Colors are able to attract the kids' attention with vivid colors, and color contrast within the characters style. This is particularly the case of protagonist characters such as Seri Rama who is at all times painted in green; Laksamana in vibrant orange; Sirat Maharaja are yellow while puppet characters of Hanuman are colored with white.

These findings support the idea raised in literature studies by Mr Hamzah Awang Mat, the famous Tok Dalangs or master puppeteer in Kelantan, who is familiar with Wayang Kulit Kelantan visual styles, who claimed that the puppets have been attractive(flourished) in the state of Kelantan for a long time and the puppetry are colorfully or tastefully designed, and their vibrant colors reflected on the 'Kelir' or white screen (Hamzah Awang Mat,1994). From the point of view of the respondents, especially Tok Dalangs and Wayang Kulit Fans, they felt that the traditional art of Wayang Kulit should be appreciated with more reverence from culture and artistic style perspective, and by using 3D computer animation, similar visual artistic such as texture, color or fashion(attire) visual appearance should also remain. Furthermore, Wayang Kulit has been treated with respect for years, considered as sacred and uncanny by the previous ancestors or people.

These findings support the previous Barbara Wright (1970) explanation who described Dalang Hamzah as the heir to the classical tradition of shadow play or Wayang Kulit entertainment who is also a typical classical performer of Wayang Kulit who totally rejects any new techniques or visual styles. Even from some of the previous traditional puppeteers from this findings who totally disagree with several points of view such as not willing to accept changes, lack of knowledge, or being overly protective with their own sense of belief and culture.

However, this study is unable to demonstrate the relativity within the context of paradigm shift, era and technology society. The question here is for how long will the classical Wayang Kulit visual form continue to survive in the era of communication, technology, popular cultures and globalization? In contrast with previous findings which agreed with literature review by Sharon Bakar(2005) who described the famous puppeteer in the state of Kelantan, Dalang Dollah Baju Merah's contribution to the puppet theatre by introducing modernized stories and puppet characters like Macbeth with dynamic performance by injecting some sense of humor in his performance.

From the above discussion, another aspect that would be highlighted in relationship with identity and personas is the fashion or attire used by the puppet designed with computer or traditional Wayang Kulit style. Here, an important factor which needs to be taken into consideration is the visual art form of the puppets style. The respondents felt that stylizing Wayang Kulit with 3D computer animation puppets using traditional Malaysian costumes for example *Baju Melayu,* with batik or songket pattern or styles can attract the younger generation to appreciate the culture of different races in the country and indirectly strengthen unity among the people in the society.

According to an interview in the previous research with one of the famous Kelantanese Chinese Dalang Eyo Hock Seng@Pak Chu in 2011, stating that the attire or clothing in Wayang Kulit Kelantan arts, for example the puppet character of Seri Rama must be royal, and applied with vibrant colors and he must always hold a special bow to symbolize dignity, power and respect. Thus, the shape of "kerawang" or curly crafts should still exist in 3D computer animated puppetry context with Malaysian fashion arts such as flowery batik designs with vibrant colors.

They also portray stylized human metaphors forms or combination (amalgam) of human and animal form. The visual expression facial characteristics include the jaws(mouth), nose or forehead which have various resemblance with Javanese visual styles puppets and the general notion conforming to the perfect Malay artistic visual styles. The shadow puppet designs or concepts used in Wayang Kulit Kelantan, or sometimes referred to as Wayang Kulit Siam iconography and the visual arts of the Malaysian Wayang Kulit, and the relationship with cultures beyond the Malaysian coasts are noticeable. Perhaps modern attire or fashion for computer animated puppets can be appealing especially to attract the younger generation to admire and appreciate the Wayang Kulit puppetry aesthetics value with modernized visual appeal in the form of Wayang Kulit animation.

6.2.3 Hardware and Software

There were some limitations in terms of software capabilities to design Wayang Kulit puppet using 3D key frame computer animation. Some of the respondents highlighted on the amount of hardware and software capacity to provide enough memory for processing and storage for detailed and complex texture related to the pattern of each 3D puppet models. It would take additional computer memory to model, animate and finally render complexed puppet that will have limitation in terms of the number of 3D computer virtual Wayang Kulit puppet models to appear (film or TV series per episode) which involved high cost and hardware appliances. To develop 3D computer animation (feature film or TV series) requires a high production cost especially from pre-production, production to post production. With computer animation producing production automated in-between-ing and animation itself remains a slow, and lengthy process. For production, it requires highly skilled animators equipped with powerful computer workstation to complete a production of animation.

It would be difficult to design 3D virtual puppets using computer software as it might be difficult to model, animate and finally render. It involves a huge amount of memory to a huge amount of 3D objects with complexed polygon count. For example, the prototype stylized version of "*Cintailah Sungai Kita*" with three (3) animated models including the non-figurative of 3D "Pohon Beringin" is estimated to involve around 7000 polygons structure.

This study finding seems to confirm the findings described by Ghulam Sarwar & Syed Jamal (2007) on Wayang Kulit Kelantan, an estimation of collection 65- 120 puppet and the characters measured approximately 71 centimeters in length and its width does not exceed 30 centimeters with detailed carved and colored features. Moreover, in Wayang Kulit Kelantan for example, the puppets are divided mainly into profiles characters icons (gods, warriors, and kingdom) that are constructed and carved from cowhide or buffalo hides based on Ramayana epic with absolute balance of puppet which are divided into main groups such as *dewa-dewa* , (demigods), *Satria*(warriors), *raksasa* (genies&gnomes), *orang betapa* (hermit), *monyet*(monkey*)*, *Kayon* and *Haiwan*(animals) where each character has its own unique identity. These findings support the previous by Siew Lian Lim (2012) stating that Dalang Eyo Hock Seng performs with a minimum of 20 varieties icon puppet characters in Wayang Kulit Kelantan performances.

Thus, to develop a variety of 3D computer animated puppets for Wayang Kulit would require much utilization of hardware especially on storage and processor(memory) to render the final animation output. In the previous research study of Lotte Reinieger 1926 famous "*Prince Achmed*", adapted shadow puppetry visual styles using silhouette cut out animation base was adapted, and has less than five (5) characters involved in the entire short animation. Thus, it would much involve costly computer hardware and softwares including manpower in order to create 3D quality visualization of Wayang Kulit animation based on identity, characteristic, and capability.

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Therefore, this result has not been described in detail by other studies related to the amount of puppets used in computer animated (in terms of memory or storage) related to Wayang Kulit experiment. In addition, the computer hardware and softwares that requires more capacity for rendering animation video output are vital in developing video animation products.

6.2.4 Puppet Visual Expression

Very little was found in the literature on the question of puppet expression. This is basically referring to facial expression that involved emotional and physical appearance. In traditional Wayang Kulit, most of the puppets are physically crafted with shapely facial segments (eyes and noses) which signify such qualities as dignity, tolerance, simplicity, resoluteness, dynamism, faithfulness, clownishness or intelligence. The puppet figures are engraved with faces in profile, with the puppet anatomy situated directly frontal and both base representing foot are facing within the same direction. In Wayang Kulit Kelantan for example, the puppet designs are visualized physically from the aspects of size (bulkiness), refined or uncouth alike based on the phsyical visual appearance (size or shape) of facial looks (eyes, mouth or nose), length of fingernails and stances (postures).

There are mixed responses towards this result with several possible explanations. Some respondents especially the Wayang Kulit puppeteers or Tok Dalangs define Wayang Kulit as light & shadow performance, and therefore facial expression or emotions with body gestures from the puppets are difficult to be visualized and it is based on the libretto or dialogue narrated from the puppeteers.

This findings support the previous research conducted by Richard Swirderski (2012) describing that the performances by the Dalangs or puppeteers projecting translucent puppet visuals with light and shadow provides a foundation of edification, knowledge , moral values or fantasies with strong influences.

Wayang Kulit is a traditional historical art culture by itself with human touch and emotions through aesthetic value using light and shadow as part of the metaphors. The screen or 'Kelir' in Wayang Kulit performance provides imaginations of life. This finding agrees with Jan Mrazek (2005) who stated that the most important object representation of the shadow play or wayang theatre is the human being. In traditional Wayang Kulit puppetry, visualizing the shadow figures and understanding the storyline is the key factor towards the success of quality entertainment.

Using computer 3D computer animation software to replicate the traditional Wayang Kulit visual styles would not be much of creating exact puppets styles or projecting animated silhouettes , but stylizing it such that the puppet characters form are visible in 3D qualities which would create a certain anomaly between the traditional and modern audience of wayang puppetry. This explains the introduction of new characters, physical 3D sizes (small, bulky, or tall), with dynamic animated features (running, talking, jumping, having superpowers, and etc.). On the other hand, visualizing Wayang Kulit in 3D computer animation from a majority of the respondents described that it has a unique or different approach to the whole concept of Wayang Kulit.

This result may be explained by the fact that Wayang Kulit in 3D computer animated looks more photorealism or "cartoon" visual style by portraying it in 3D graphics, it would be beneficial for the audience especially the young generation to be able to "feel" more engaged with the storyline. Expression or emotion such as sadness, grudge, and revenge can be more clearly visualized using 3D computer software in Wayang Kulit visual styles.

These findings support the idea raised in previous research literature that according to Charles Solomon (1987), George Pal's detailed work especially in creating 'Puppetoons' include detailed facial expression from various forms, with 3-Dimensional looks, including color, repertoire of fantasy film and stop motion photograph prologue and epilogue in 'Puppetoons' which are merely incredible and still remains a merit to puppet entertainment. This is an advantage for the audience to be able to watch the computer animated or Computer Graphics (3D computer animation) puppet facial expression up close which delivers a clear mood of expression in contrast to the traditional technique which is based on soft edged silhouette shadow both black or translucent color effects controlled by the puppeteer behind the stage. In addition, 3D computer animated puppet figures are not touchable, meaning that the audience has no tangible elements within the 3D animation world.

6.3   Art of Cinematography

6.3.1   **The Significance of Light source**

This study sets out with the aim of assessing the importance of light source and functionality used in the computer animation of Wayang Kulit. Past studies showed that in traditional Wayang Kulit, the light plays a significant role to create an emblem of vision, emotion, and imagination. The light in Wayang Kulit defines juxtaposition of meaning (semiotics) and art of shadow theatre especially to veteran spectators. The projected light is able to form a delineate (outline) of the human visuals from a selection of personalities characters and imaginative legends and myths creates silhouettes or translucent shadows or skin visuals which are adopted by the Tok Dalangs or master puppeteer.

A possible explanation for this might be that it has virtues of a rich aesthetical culture. These findings supports Ghulam Sarwar(1997) previous studies which described that the light effects using paraffin oil lamp in traditional Wayang Kulit creates contrast and mood, and is rich with aesthetical culture values. The concept of watching traditional shadow play theatre is considered similar to watching modern cinema today, where the lights are dimmed and only bright visual contexts are shown. The concept of 3D computer animation Wayang Kulit, the light source does not represent any semiotics culture or meaning. It mainly uses four light source; ambient, spot, parallel, and area. The main objective is to create visual appeal, focusing on mood and contrast as part of film language or animation style. Computer 3D animation light provides versatility and dynamics between the visuals and audience.

When compared to traditional Wayang Kulit, the performances are much more dynamic with superior ambience and more realistic than watching the "live" traditional performances. Furthermore, in traditional Wayang Kulit, there were no recording devices to record or playback performance on other platforms (TV or video) for audience to view. The advantage of 3D computer animation is it allows direct entertainment quality such as watching it on portable devices, TV or cinema. Using a display of light, the normal perception is that it is simple to brighten a scene and create realism visuals using variety light sources, but the reality is 3D computer animation virtual lighting provides as a basic function of positioned in and out, depth, or moving reverse the pattern or shape of objects illusion or view point from the camera's vision.

The theater of realistic are not to be obtained simply by placing several computers virtual animated light sources as it needs the computer to visualized the characteristics of brightness in the world of 3D which then provides a flat 2-Dimensional figure surface on the computer display with depth of illusion images of the photo-realistic effects. These findings seem to be consistent with other research such as Desnlow (1997) who mentioned that bringing an object to life is the concept and the heart of animation. Moreover, lighting technique in 3D computer animation can be positioned from various directions as long as it provides sufficient light, depth (X, Y and Z axis), contrast, tone, texture and most importantly mood for each object or environment in a scene. Compared to traditional Wayang Kulit, the light source is mainly single direction (top facing in-front of the puppeteer).

From the Father of Animation in the early 19th century, such as J. Stuart Blackton created an experimental animation title "*Humorous Phases of Funny Faces*" (1907) using stop motion shots of drawings on a blackboard to the first full 3D computer generated animation feature film of Pixar's "*Toy Story*", including Malaysia's successful feature film "*Geng Pengembaraan*" applies similar photorealism (photo realistic) styles using 3D lighting technique. The characters, objects, scenes, props design and colors used are much more vivid, solid, with detailed textures creating suitable mood for children and adults to be fascinated, and influenced from the lighting technique.

It is therefore most likely that such connections exist in traditional and computer animation lighting which reflects the aspects of aura or mood which is considered as vital in the context of entertainment. These findings of this research are consistent with those of Kenneth Gross(2011), relating to Soren Kierkegaard's philosophy of shadow puppetry or '*Schattenspiel*' as an illusion of art substance in which the audience or individual can feel the mood or aura, simulated environment and unique shapes of objects communicating among themselves. 3D Computer animation especially virtual 3D lighting sometimes can be very rigid and complex, as it is not possible to provide the proper light qualities needed to the level of realism in real-time range. Also, with proper composition of visuals, lighting and series of moving images (3D puppets) will provide a huge impact on the entire concept of storytelling in 3D Wayang Kulit animation. 3D lighting cinematic technology cues such as motion-blur, depth of field, or lens flare provides visual hyperrealist aesthetics, a synthesis of naturalistic and ludic modes. Cues are mainly designed to interpret the dominant culture's visual-sense naturalistic coding with high perception towards aspiring naturalism.

6.3.2 Shadows and Silhouettes

Past studies showed that shadows or silhouettes are vital in traditional Wayang Kulit arts. The results from the respondents indicate that a majority of them find that 3D computer animation lighting is not realistic compared to traditional light and shadow styles. The light and shadows dominates the entire focus of the audience. These findings support the research done by the famous Malaysian classical master puppeteer, Hamzah Awang Mat (1994), describing visual arts of Malaysian shadow play theatre as always filled with lights and shadows. The translucent shadow figures or traditional Wayang Kulit looks more lively, on top of the size scaling ability, turning edges are soft and sharp, with vibrant batik colors that allows the shadows to be more dominant on the screen or '*Kelir*'. Also, astonishing shadow distortion in Wayang Kelantan performances which are commonly used during battle scenes in Dalang Muda repertoire. The original Wayang Kulit arts provides a broader spectrum of experience of shadows with more substance and intelligence including various characteristic such as able to move, grows, reduce in size (shrink) and symbols within the time and space (John Hollander, 1999).

The silhouettes figurative characters that exist in Wayang Kulit such as Wak Dogol or Wok Yah in Wayang Kulit Siam performances compared to other colored characters, uses black opaque silhouettes features animated by the puppeteer or Tok Dalang to create a contrast effect between the white screen and the puppet. Some of the respondents define the silhouettes as mystical with significant black opaque silhouettes or colored design.

The black colored silhouettes are the emblem of uncanny that represents death or struggles of life. According to Frank & Johnston (1995), the implication and importance of silhouette is such that Charlie Chaplin once argued;"if an actor knew the expression of emotion of life totally, he could visualized it in silhouette"

In particular to computer animation or film, the use of silhouettes has some meaningful attributes or archetypes towards the plot in a story such as '*The Hero'* (the main protagonist character which the story is narrated), or '*The Shadow'* (the main villain) or '*The Shapeshifter*', which defines the characters who is not what he or she appears to be or present in context of understood symbol, personalities, or pattern of behaviour (Chris Vogler, 2007). Therefore, for puppet character design of personalities including the perspective of human, emotions and thinking personalities between the puppet, puppeteer and the audience (stylized or replicate versions) using 3D computer animation, it is important to create the silhouettes before modeling and animating in order to provide a better understanding of character archetypes, outline and form use in Wayang Kulit animation story.

This study sets out with the aim of assessing the importance of silhouettes and shadows in computer animation Wayang Kulit. Very little was found in the literature on the question of computer animated shadows or silhouettes. In fact, the shadow or silhouettes in stylized version 3D computer animation Wayang Kulit has several discussion points from the respondents. Firstly, the silhouettes projected behind 3D computer animated model are different from the silhouettes of traditional Wayang Kulit styles in terms of visual qualities.

Using ray trace function in 3D computer animation software does not provide much soft features and turning edges as expected with proper experiment and utilize a huge amount of memory during rendering process as well. The ray tracing function 3D studio max & Maya software in our experiment also reveals the casting shadow output which shows that the silhouettes generated from puppet model still looks hard and not softened enough, unable to create the umbra and penumbra lights similar to the one existed in traditional Wayang Kulit.

These findings seem to support the literature research of Kenneth Gross(2011) in describing Thomas De Quincey shadow in Wayang Kulit are the output projections of umbra and penumbras with shadowy focus and contain menace of thinking with direction, magical emotion and feeling qualities which is the substance of shadow. These also agree with David Curell (2007) stating that shadow have often been regarded as having a magical quality and have strong cultural, religious and scientific dimension.

The shadows projected in digital environment also looks almost similar in terms of flexibility or dynamic qualities with variant illusions of static and animated shadow created using numerous medium including computer animation, video, games, mobile and many others. These findings agree with Ian Grants (2007) research prototype development which depicted the experiment using film shot from Lotte Reiniger's 1926 "*The Adventures of Prince Achmed*" using 2D black opaque with vivid colored background motion silhouettes puppet theatre prototype musical system performance which looks dynamic (visuals and motions) with simple perspective view and extensive effects to work, and also the current silhouette subtly moves, but is not properly articulated.

Even though this study has been unable to demonstrate silhouettes functionality using 3D computer animation virtual models, with 2D visualization, it would provide a perfect experiment to differentiate the qualities that exist between the techniques. Furthermore, overlapping silhouettes (static or animated) behind 3D puppet models, in order to maintain the qualities similar to traditional Wayang Kulit styles would only create distraction, especially when watching two images moving simultaneously on the screen.

Secondly, 3D computer animation concept of replicating shadows or silhouettes can be generated similar to traditional Wayang Kulit using several experiments such as key frame computer animation using three (3) point lighting system, computer graphics (algorithm) and also Motion Capture (MOCAP) technology. The shadows generated can be colored or can be black opaque silhouettes depending on the art direction or concept including the computer application mode approach with more realistic features related to design and movement of the puppets.

Furthermore, Puppet animation represents a "world" of virtue for the audience, a kind of "world" designed with animation techniques and the "world" is a representation of realistic objects and not representational drawings. These findings support the idea raised in other research from Shu Wei Shu & Tsai Yen Li (2005), who designed a Chinese shadow puppet style animation at SIGGRAPH 2005 using motion shadow animated figures with distorted and developed scale size including the experiment of motion plan algorithm with users input and character animation which the system allows to control characters with primary and secondary motions.

In addition, realism or realistic features is another point highlighted to compare or having similar qualities to traditional Wayang Kulit. MOCAP technology would provide the best result to achieve similar shadow movements and shadow effects provided with proper investment, research and practice and are planned properly in order to execute it. MOCAP in general is able to simulate real-life motion of 3D Wayang Kulit puppet characters by recording data joint points from an actual actor and applied it to 3D puppet model which is mainly skeletons. The cleaning up, rigging and lip sync and facial expressions are some of the complex process in MOCAP which requires a lot of time and experiment.

These findings supports Manovich (2006) research in describing realism which is the ultimate objective of most technological development in 3D computer animation software from modeling the texture, lighting physics and color, and more recently particles and visual effects (character or objects) including facial looks and expressions are efforts at 'recreating realistic features from basics or Pre-production level. Overall, 3D computer animation provides shadow and lighting effects, photorealistic or cinematography alignment and control, with 3D stereoscopic that provide quality of depth and photorealistic visuals.

6.3.3 Camera Angle

As mentioned in the literature review, 3D computer animation provides better options to what traditional Wayang Kulit could not perform. The majority of respondents preferred to watch 3D computer animation Wayang Kulit with various camera angles or shots that makes the audience or viewers feel closer to the characters in each scene including film, drama or movies, animation or others.

Traditional Wayang Kulit as "True Cinema" has limitation in terms of distance for audience which give insufficient space or depth for the audience to have different visual angle or to be closer to the story itself. Camera angles such as Established Shot(ES), LS (Long Shot), Birds Eye, and Worm Eyes including LA(Low Angle) or HA(High Angle) provides a lot of meaning in terms of cinematography quality visuals used especially in film productions. Furthermore, while the camera is positioned in space or 3D virtual environment (software), the camera can be animated dynamically to track an activity such as the puppet (3D) is being chased by moving cars, enables the camera to accelerate away from positional and decelerates towards a new point with proper visual clarity.

In other words, each position or camera movement is reflected visually and emotionally to the audience who are able to gain the experience in the art of visual in film or animation scene. These findings agrees from literature review studies with Amid Hamidi & John Laseteer (2009), who stated that Pixar's creative team had several ambitions in 3D computer graphics including portraying articulated character animation with understanding cinematic techniques (camera angle) for future development of feature films including the success of *Toy Story* animation film. By having cinematic animated features, 3D computer animation of Wayang Kulit will be much more entertaining with new features and enhancement. It can thus be suggested that camera angles and shots provide better viewing options with more meaning and rational between the story, characters, props and environments used in Wayang Kulit 3D animation or also known as *the art of film*.

6.4   Animation "Expressitivity" Factor

6.4.1   Puppet Design (model)

Very little was found in the literature prior to questions related to 'expressitivity' based on puppet models using computer animation. Overall, from the survey of the respondents, they still favor shadow puppetry in its traditional concept (with the usual colorful pattern textured qualities and carved puppet) compared to a 3D model puppets lacking realism features. From the review, it was identified that in terms of the structure physical puppet apperance, the conventional human touch (manmade) puppet represents harmony, aesthetic and heritage (culture) importance to the society and it is quite difficult to convince the respondents in terms of using 3D computer animation to substitute the traditional method.

The art of aesthetics in Wayang Kulit are relevant with the research conducted by Ellen Dissenayake (1990), stating that Wayang Kulit as art making, a process involving human behavior, artistic which includes attention to physical structure or form, shape, such as rhythm, style, repetition, balance and verisimilitude as well as story including visuals, audio, narrative, and history.

Therefore, 3D computer animation provides an alternative by using two (2) main approaches from the previous results. Firstly, the puppet models can be visualized also known as "stylized" by using 3D solid model characters, creating a cartoonish effect, with some similar texture details including facial looks (eyes, mouth, ears, and nose) and expressions. The puppets are also able to be viewed by the audiences from a virtual environment of 360 degree with depth from various angles.

The important factor here is that it signifies as virtual puppet which is also the animated movement that requires similar qualities from puppetry styles. The challenge is that the stylized virtual 'expressitivity' puppets model could look similar to other 3D cartoon models such as the characters from *Shrek*, *Toy Story* or *Upin & Ipin*, as these characters are animated with actual human senses capability in it (known as 'anthropomorphism'). This means that the characters in 3D computer animation for Wayang Kulit are able to act based on human movements such as running, jumping, and talking that traditional puppet Wayang Kulit would not be able to perform.

This supports the findings of Tan, Abd. Zawawi and Md. Azam (2008) which described a successful method of constructing shadow puppetry of Wayang Kulit using advanced computer programming and graphics techniques using OpenGL in order to allow immersive and interaction animation in computer digital puppetry environment as well as producing puppet shadow motions of Wayang Kulit including modeling and lighting effects. Also, these findings supports the research done by Richard Taylor (2007) who explained that the Russian animator, Youri Norshteyn, prefers his animation technique, stretching from robust gag-based action to something very delicate and experimented with animals and with human styles and foggy background to established mood.

However, the concept of stylized has to also include some traditional Wayang Kulit values (puppet design) in order not to be dominated by its modernization. Secondly, the replicated visual styles of original traditional Wayang Kulit puppet structure are also capable of using 3D computer animation.

Here, the puppets are modeled exactly with the original visual art characters in traditional Wayang Kulit such as Wak Dogol or Wok Yah (with no solid model surface or flat from perspective view) , with applying new or original texture and later on animating it with the same quality movement of Wayang Kulit. If the 3D modeling and animation is not executed properly, it would be difficult for the audience to know whether the puppet model qualities were done using computer programs or original human performances. The question now is how to identify the qualities of the two animated models adapted from Wayang Kulit Kelantan style characters of Wak Dogol and Wok Yah animated with black opaque silhouettes puppets with similar light source? The answer to this question lies on the observation between the audience and the animation output in terms of expressitivity or realistic feeling.

This concept supports the result from case study through experiment of using a cough syrup TV advertisement *Mother and Child Brand* not too long ago that uses the techniques of Javanese puppet character model performances to attract consumers. Apart from using the puppets as the theme for the advertisement, it also included a message to be conveyed to the consumers. For animators, the construction of virtual puppet characters, animated objects and scene has to be almost realistic with Wayang Kulit styles, able to move each frame, modelled and painted, and can be visualized or rendered in the context of a visual form. Furthermore, animation is, necessarily, a technologically mediated art form that requires the animator to manipulate the representation of objects in space and time to communicate with an audience.

It is possible to hypothesize that based on these two (2) approaches in modelling "expressitivity" of virtual puppets using 3D computer animation, it could provide a better dimension to project animated Wayang Kulit visual sense to the audience especially for the younger generation to admire, appreciate and be entertained. Thus, the puppet animated characters in 3D must be well developed, providing unique identity or personas, and have a clear concept of aspiration or needs that motivates their characteristics and actions relevant with Wayang Kulit visual arts styles performances. Stating each response in which the puppet characters moves, reacts to different situations, and how the main character puppet relates to other variety puppet characters could help to define the most important archetypes or charactersistic of the puppets personality.

6.4.2 Key Frame Animation

Movement in puppetry are mainly intrinsic referring to creating a notion of life for the puppets. Past studies showed that using key frame animation is probably the best option to create motion 3D computer animation Wayang Kulit due to several factors. Firstly, there have been a lot of findings in the literature on the questions of key frame animation. Almost all major animation respondents (animation experts) including major animation companies in Europe as well as Malaysia preferred to use key frame animation including Pixar, Dreamworks and also Malaysia's Les Copaque animation studio. Key frame animation from many respondents (animation experts) point of view, was found to be more convenient in terms of control and function, fully created on a computer (3D software) and also cost effective especially using softwares such as 3D Autodesk Studio Max or Maya character animation.

These findings support the literature review by Usamah Zaid (2011) in describing Upin & Ipin (Geng) 2009 as the first 3D Malaysian feature animation film done using *Key Frame* technique and Maya animation software, describing it as a much easier technique to be managed and produced quality results in terms of visualization and audience needs. Also, this statement supports the literature review based on research conducted by Burn Snider (1995), where John Lasseter mentioned that, if Toy Story was done in 2D Cel animation, it would have much difficulty. He was referring to the movement or animation of arm, body, lip sync or facial expression that requires precise frames and if any mistake occurs, the production needs to head back and erase all the animation and redraw it. But in computer 3D key frame, it requires just single key frame movement and efficiently.

Furthermore, most of the animations produced are currently running on 24 or 25 frames per second that has the advantage to control the timeline within the software for each movement. Some respondents even claimed that 3D key frame animation could provide alternatives to traditional animation styles of destructive animation technique. Destructive animation technique such as stop motion, sand animation or cut out animation requires detailing, precision, and passion to animate each frame by frame to provide the illusion of movement. These result of the study seemed to confirm the research or case studies from the previous study related to Tim Burton 1993 *Nightmare Before Christmas* stop motion , Kseniya Simonov *Ukraine Got Talent 2009* sand animation and also 1926, Lotte Reineger's, *Prince of Achmed*, using black silhouettes figures and coloful backgrounds cut out animation style.

Animating puppets in Wayang Kulit using key frame animation is described by most respondents as a positive approach towards providing different visual art of Wayang Kulit to the audience especially the younger generation. Moreover some respondents even stated that key frame animations are not recommended to create realistic animation. Therefore, 3D computer animation mimics the realism and traditional photo-realistic or film techniques including creating 3D Wayang Kulit puppetry.

These findings agree with Mohd Izani et al.(2003) which showed that key frame & Motion Capture(MOCAP) techniques are known to be the two(2) common techniques used in animation industry even though Motion Capture are best known for its *"Realistic Motion"*. This refers to 3D computer animated puppets which can be animated based on the puppeteers or Tok Dalangs movement by capturing each movement and recording or transferring it to 3D model data.

It allows to imitate the Dalangs movement and to be transferred to 3D computer animated puppets with emotional reactions. Although this process is tedious and complex, the realistic motion added to the puppets could provide a better and more realistic movement for the audience. The reality is that the animators will spend as many days, months, or even years in bringing life or realism visual ideas expressed from the art direction or art concept of Wayang Kulit. Furthermore, realism in computer animation could be positive in terms of the audience perception to relate to what they view, and gaining excitement, comfort from what they know.

It is possible to hypothesize that key frame animation is suitable to create animation content with "cartoonish" concept and is suitable for kids, but the challenge is really great especially for the function of character rigging (to assign bone , pivot point and inverse kinematics) to animate the puppets or 3D objects. Rigging in 3D computer animation are at their best when they are optimized creating detailed character animation related to characteristic, identity and movement of the character. Whereas, MOCAP technology are more proper for animation in between target audience (adults and kids) for achieving realistic movement such as in the movie of Peter Jacksons *LOTR*, *Cameron's* Avatar or Rise of The Planet of the Apes. Capturing the real data from human actors and transferring it into 3D computer animation models are simply astonishing in context with realism. Therefore, animating Wayang Kulit using 3D computer animation (stylized or replicate) versions can be performed from stylized (using cartoonish) qualities including key frame method and in future applying MOCAP technology to produce the first Wayang Kulit feature animation in Malaysia. In brief, computer is a fantastic tool for the creative mind and will always develop animation technology.

6.4.3 Stylized Version of Wayang Kulit

In terms of animation 'expressitivity', the respondents suggested that in the context of animation, the survey indicates that people are still in favour and prefer animating the puppets in a traditional way compared to using 3D computer animation. Factors including the rapid motions, shadow deformation(distort) and story narration played by the Puppeteers or Dalangs using his attractive characters (puppet) and lights which are believed to be more believable and realistic compared to the 3D computer animation technique.

The puppets in stylized 3D computer animation seem to be more limited in terms of movements are created by key framing, lighting, visual effects(FX) and the camera techniques which make it inferior compared to the traditional way of the Wayang Kulit itself. On the approach of using 'stylized' version, the respondents mostly described the puppets movement as stiffer, rigid, and artificial and some also added the looks of "cartoonish" or photo realistic character animation. These findings support the research by Elliot et al. (1999) in explaining that the advantage of using 3D computer animation using modeling (NURBS or Polygons) is to provide photo realistic character animation movement (human or non-human form) by providing clear explanation of shape essential to bring character animation (referring to 3D puppets) to realistic world or life. However, there is a small limitation in terms of capturing or animating the similar movement from the Tok Dalang or puppeteer. These findings also confirms the research by William (2002) in portraying the master puppeteer as the pivot point controller of the art direction, narrative, animation and music in shadow puppet theatre (invisible entertainer) although some Wayang Kulit fans are able to watch his real performance behind the screen.

Compared to computer animation, the animator controls or animate the puppets in virtual computer software, in real time and finally rendered and distribute it in film or video format. Another point of discussion highlighted from the findings is related to Wayang Kulit traditional styles of animating puppets using 3D computer animation. Most of the respondents provided positive response that using 3D animation; describing the puppets should be animated without any Wayang Kulit guidelines or philosophy rules or styles.

In other words, it should be free form, especially when the younger generation today are not keen or be obligated with rules or rigid visual approach which especially refers to cartoon or animation visual arts. These supports the research described by Walt Disney stating that, in cartoon animation you can do anything, stating that the human mind has no limits in the world of imagination and creativity (Frank Thomas & Ollie Johnston, 1981). Using 3D computer animation can provide more enhancements especially animating the puppets for Wayang Kulit design using stylized approach (3D characters) with body and facial animation controlled on proportion including articulated arms, legs, eyes, and mouth. In context with movement, it involves two fundamentals movement which is the gestural animated in 3D computer animation Wayang Kulit refers to the movement of structure or body of the puppet figure and spatial or proxemic motions, consist of entire or whole figure from one virtual source to another using Inverse Kinematics(IK).

The proxemic and gestural motions of puppets facial expression such as sadness (tears), guilt, pain , anger, happiness can be expressed with visual effects and be animated using computer key frame 3D animation (polygonal mesh with physical muscle structure of human anatomy to be applied on the 3D virtual puppets models). Furthermore, most of the thoughts and feelings of the characters in 3D computer animation are expressed on their facials (faces) with IK that provides gestural motion and coordination mechanics in 3D animation virtual puppets are analogous to traditional Wayang Kulit rods of puppets. Shadow puppets or Wayang Kulit provide an open selection of potentials portraying as object or metaphors for elucidation and response while capturing the essential features of influence, nuance and meaning that suggest human storyline propensities and emotional reaction.(Kenneth Gross,2011).

In addition, assigning 3D computer style bamboo stick rods to stylized Wayang Kulit, in order to achieve the similar puppet and animated aura in traditional Wayang Kulit styles (applying a small bamboo rod to the puppet's arm end positioned) are not required or necessary. The characters movement animated in key frame 3D real time software are much more identical to actual puppets, based on halt of frame by frame movement. In traditional Wayang Kulit styles, the bamboo rod stick must be sufficiently long   for the puppeteer to control or operate his arms from below without showing his hand in the projected shadows on the "Kelir"(screen), including moveable mouth for characters of Wak Dogol or Maharisi (Mary Beth Osnes, 1992). By using 3D computer animation technique, the puppets animated movement have strong presence to create a similar concept of Wayang Kulit with additional designs materials (including texture, light, and colour) and many others.

The respondents especially the Dalangs or puppeteers describe that these are the limitations in traditional Wayang Kulit arts which are lacking and not providing such detail or integrated animated and live performances features. These findings supports the result of Hasnizam (2007) research that 'Wayang Virtual' experiment, explore and combine traditional Wayang Kulit qualities as well as conventional music original performance with the 3D puppet and animating it using visuals of the Wayang Kulit puppets (shadows) which are combined with a 3D puppet basic model (lack of proper design, characteristic or articulation) and controlled by an actual Puppeteer or Dalang using pointer from computer mouse device on Silicon Graphics Workstation computer and later projected to the white screen. Therefore, it can be suggested that any approach of using 3D computer animation or digital technology to animate new features of Wayang Kulit visual styles, can be considered as "something new" towards the cultural survival of traditional arts of Wayang Kulit.

6.4.4   Disney Twelve Principles in Wayang Kulit

The study sets out with the aim of assessing the existence of Disney's famous traditional twelve principles of animation in Wayang Kulit. Minimal content research was found in the literature on the question of existence of Disney principles in the art of Wayang Kulit. Furthermore, it relates to this research framework especially focusing on exploring key frame 3D animation and visual 'expressitivity' on Wayang Kulit. Even though 3D key frame animation is considered a new and modern animation technique, but Disney's traditional hand-drawn animation principles and technique have being introduced for many years and have been used by animators around the world as a source of reference to develop animation. Overall, the respondents who are mainly animation experts agreed that there are several principles of animation that exist in the traditional Wayang Kulit style which include staging, appeal, timing, arc, exaggeration, squash and stretch. This principle indirectly contributes towards the personification or expressitivity level related to the research objectives especially design and movement of the puppets or silhouettes in 3D Wayang Kulit animation, which will be elaborated further.

These principles were introduced in Disney's era of popular traditional animation including successful animated cartoons such as *Mickey Mouse, Snow White and the Seven Dwarfs*, with detailed research, observation and execution qualities. The visual appearance or style of Walt Disney's traditional animation is hyperrealism cartoon. Paul Wells (1998) suggests that classic Disney is the benchmark for hyperrealism in animation. Even though his cartoons are capable to arouse all sorts of hyperrealism visual expression or emotions (being perceptually realistic, it is referentially unreal), but the reality is these visuals are a series of frame by frame drawings or illusions.

Therefore, this theory supports the research done by John Vince (2000) who suggested that the domain of computer animation can consist from anything, from flat 2D cartoon characters to 3D models that distinguish them from the actual thing. Furthermore, when the visuals or images are rendered for final preview, the natural preview is much closer towards photo realistic features. In context with Disney traditional principles of animation, some of this principles are still relevant to 3D computer animation Wayang Kulit puppetry including staging, follow-through and overlapping action, timing and appeal which are used by famous animation industry including Pixar animation studio.

These findings seem to support Walt Disney's statement based on Ollie Johnston and Frank Thomas research in 1930, stating that "When a new project(animation) has been indentified, it is analyzed on concept art direction and details, and not just focusing on the main idea. The art direction and creative approach by Disney are often regarded as hyperrealism and manifestation of animation between the audience and visual expression of realism (silhouttes, anthropomorphism, length, structure and depth).

The puppets using stylized or replicate types that need to be animated based on art direction of Wayang Kulit, according to some respondents (animation experts) needed to give more attention on animation principles especially in animating the characters. The principles of Disney animation are much relevant to 3D computer animation. Even though not all hand-drawn animation principles of Disney exist in Wayang Kulit, there are relevant principles that contribute towards the success of the whole concept in the story especially relating it with puppet (model, silhouettes, shadow or non-shadow) character design for computer animation.

Timing, exaggeration, appeal, squash and stretch are Disney's animation principles that seem relevant or exist in 3D computer animation and Wayang Kulit concept. For example timing, which refers to the exact moment, tempo and the total of duration that the character used on a particular motion or action, it is noticeable that each animated illusion of translucent shadow or silhouettes in Wayang Kulit appearing in and out of the screen, with a variety of slow or fast tempo controlled by the puppeteer including the puppet characters timing movement including articulated arm or mouth. Also, in 2D Cel hand drawn animation, the animator is the person accountable for the motion of an object or cartoon figure.

Whereas, in Wayang Kulit, the Puppeteer or Tok Dalang is mainly responsible for puppet structure designs , engraving and colouring, orchestra amalgam of sound and narrative or narration and most importantly, animated puppets including the shadows projection and direction. These findings support the previous research in relation to Wayang Kulit arts and cel animation. As described by Lena and Brian (1997), Disney's most renowned animators, Thomas and Johnston in 1937 stated that shadows and silhouettes were used in hand drawn (2D Cel animation) since the very early days because they positioned the characters (figurative or objects) to the ground and provide gestures with illusion of movement. Therefore, the art of animation and Wayang Kulit can be categorized to be having some common similarities especially in character animation style. It can be assumed that Disney could have used the concept Wayang Kulit from Chinese or Hindu visual styles before designing the traditional twelve principles of animation.

This supports the research done by Gotot Prakosa, an Indonesian animation film experimental director and artist, during the Animation Film Festival 2003 in Jakarta, who described in generic that some world class animation experts in the early years have been inspired by shadow puppets including a theory stating that Disney had done some observation and studies on the Chinese or Hindu shadow puppets before he created the art of animation. Thus, these findings suggest that the first animation in the world is Wayang Kulit. This is based on the illusion of movement of shadows and Disney Principles of animation, that adding up to it could be hypothesized that indeed shadow play or Wayang Kulit is the first animation in the world.

Disney vision in animation realm increasingly aspired notion of cinematic mimesis, the art and expression virtues for more naturalistic orientation are far more prominent (such as feature full length, perspectives, shading silhouettes or shadows, character archetypes, Anthropomorphism, vivid colors, and more realistic sound in the world of 2D animation). These findings support the research findings from literature review with Abdul Rahman Ahmad (2010), stating that Hassan Muthalib (Malaysia film and animation expert) acknowledged that the first animation in the world is Wayang Kulit or shadow puppetry. According to Hassan Muthalib (2003), Wayang Kulit uses imagery and moving shadow illusions based on frame by frame with the help of Tok Dalang and music together. Disney's style of art and creativity have often been described as fictional between hyper-realism and manifestation of animation via projected reality involving notion of shadow, anthropomorphism, depth and structure or perspectives. Also, Walt Disney experimented with Silly Symphonies cartoon as a domain or platform to create realistic human animation, distinctive character animation and visual effects. Thus, understanding and applying these principals in 3D animation will provide a better understanding and producing more quality and photorealistic output.

6.5 The Art of Storytelling (Imaginative and Reality)

6.5.1 Modern and Conventional Narrative

As mentioned in the literature review, the stories are the cores in a form of entertainment. Past studies showed that a majority of the respondents preferred to have various concepts of storytelling especially related to moral values or *"Cerita Rakyat"* folklore styles compared to epic approach. This is to replace the traditional storytelling in Wayang Kulit that uses epic classical stories which is described as long and complicated.

This result explained the fact that epic stories are classified as outdated, long repertoire and complicated stories that are not suitable for future generation or young spectators. For example, Wayang Kulit Siam represents stories from the original classical epic of Ramayana which consist of episodes based on folklores and legends. Also, these finding agrees with the literature review by Amin Sweeney (1992), that most of the branch stories (*Cerita Ranting*) are basically idiosyncratic, with long and intricate repertoire. The young generation audiences today are influenced or exposed to various types of cultures and technologies, thus, making it difficult for them to accept or appreciate the classical stories of Wayang Kulit. The challenge from this scenario is the moral issues that may affect the lifestyle. With the introduction of 3D computer Wayang Kulit, it could provide different concept, genre and most importantly moral values for the young generation to learn from. The findings also suggested that the use of 3D photorealistic puppet characters and story content in the context of Wayang Kulit will provide many opportunities especially for the producers and film directors, to embark into producing TV series of feature animation based on Wayang Kulit visual styles.

These findings support the research done by John Lasseteer (1987), in describing the art of mainstream cartoon animation and computer graphics as not mainly to complete an object or character, but most importantly to contribute towards a complete story process. Additionally, to support towards findings based on relevant folklore stories computer animation Wayang Kulit in Malaysia, Hassan Muthalib (2010) in an interview stated that Malaysia's animation pioneer was *Hikayat Sang Kancil* created by Anandam Xavier, in 1984 which was a success with using 2-Dimensional(2D) cel animation drawings with hundreds of frames (it was filmed at 25 frame per second (FPS) with colors applied.

The animation moved frame by frame which focused on "*Cerita Rakyat*" stories to educate the children. Only a small group of respondents would prefer to have Wayang Kulit to preserve its identity with classical epics stories but it would be rather difficult to adapt with creative styles and audience acceptance. These findings support the idea raised by Usamah in literature review describing the success of *Upin & Ipin*(TV series and feature film) due to the storyline approach that relates to Asia's culture and lifestyle, which makes it among the best animation in Asia in terms of providing local flavor or content , culture and animation standards (Nik Marzuki, 2008).

Even some of the respondents' reactions were positive about introducing various genre of stories using 3D computer animation Wayang Kulit like using science fiction, history, love, parody, fantasy, humor and family, that are relevant to the people's lifestyle (common both to Wayang Kulit and animation). These findings are more towards allowing creative expression through the use of visual arts such as puppetry.

To support this finding, a case study from a literature review related to an influential Russian puppeteer, Sergei Obraztsov in year 1937 performed hand puppet entertainment where he used it as a manifestation towards educating the Russian society during the 19th century. Sergei uses his expressive hands and wooden balls in the famous 1930s *Attitude to a Lady* where the wooden puppets characters were given life to the gesture of love, passion, and violence with abstract emotions. In particular to history or sciences, it provides knowledge especially to the younger generation on certain issues related to sacrifices, independence, survival, politics and many more.

These findings also agrees with research done by Nasuruddin Ghouse (2008), where Islamic heroes and legends depicting the feats of Islamic warriors such as *Hikayat Amir Hamzah* became part of the repertoire in shadow theatres. Computer animation Wayang Kulit could adopt the similar story concept to be visualized and narrated using 3D computer puppet animation scenes. Science can be used as a part of the storytelling process in Wayang Kulit as compared to the epic styles. Even some respondents have suggested that the science genre would interest the younger generation which would make it easier for them to adapt to Wayang Kulit. These findings support the previous literature review of Professor Hashim Yaakob (former Vice Chancellor of University Malaya), who was also known as a Tok Dalang before. As an esteemed *Dalang* (puppeteer and storyteller), he performed a special shadow play performance with the title '*Sir Issac Newton and The Fallen Apple*' related to science in the early December 2010 at the Museum of Asian Arts in Kuala Lumpur. As an academician and educationist, he understands the needs to introduce modern and educational content for the younger generation to learn and at the same time be entertained through shadow play performances.

Besides, with 3D computer animation the concept of Wayang Kulit stories can be in the form of imaginative or reality narrative using human or non-human forms such as Pixar's and DreamWorks's which provide animated feature film stories related more towards experimental or creative imaginative such as *Toy Story* (Toys that can talk and act), *Shrek* (Monsters), *Ratatouille* (Rat), that really catch the attention of kids especially with its attractive characters design and storyline. Pixar has vision using 'short films' from strength to strength because of their use of likable personas of characters, engaging narratives and visual aesthetics. Thus, "Short films are often seen as the `research and development' branch of the animation industry, providing a test bed for new ideas, approaches, styles and techniques (Pilling, p.7)

During Wayang Kulit traditional performances, the protagonist personalities such as Seri Rama or Hanuman are synonym with green and white coloured, respectively symbolizing the character traits of a prince and portraying them as noble character to the audience and the silhouette color indirectly provides an exceptional expression effect or mood on the surface of the *'Kelir'* or white screen during the shadow play performance. Therefore, in 3D computer Wayang Kulit animation creating characters with colors, texture or silhouettes are important, especially with adding or identifying protagonist and antagonist characters that creates an interesting plot for the audience to follow and appreciate, defining the climax or anticlimax in the entire story structure. Some suggestion from the respondents in the findings was for Wayang Kulit 3D computer animation could also include genre related to socio-political or historical content.

These findings seem to be consistent with other research such as described by Ugur Guduk Bay et al. (1992) portraying Karagoz and *Hacivat characters* in Turkish shadow play reflecting the creative art that manifests communication and unity towards social civilization matters related to politics and humanities of the Turkish people and European shadow play styles.

Some of the respondents suggested the use of Wayang Kulit 3D computer animation with similar concept of Sesame Street or any other TV educational programs that allow the children to learn and enjoy the visual arts of animated Wayang Kulit. As described in the literature review earlier, children's attention is more drawn visually to colorful puppets and attractive characters on television and stories by using hand puppet approach than to regular adult actors especially in edutainment (Eileen Blumenthal, 2005).

It is therefore likely that such connections exist between the art of storytelling in traditional Wayang Kulit and computer animation styles. In traditional Wayang Kulit, the audience listens to each word narrated by the puppeteers with animated colourful translucent shadow movements, with no replays but surrounded with "live" aura of atmosphere. Compared to modern 3D computer animation, audiences are able to listen to each word in a plot and most interestingly it can be viewed as many times with different devices but unable to experience aura of live performances. There is no doubt that those similarities of imaginative approach are the strength in both arts narrative style which just makes the audience simply enthralled and admired the quality of the graphics and storytelling. It separates between the paradigm shift of knowledge and experience from non-technology and technologically diversified society.

6.5.2 Audio (Between Puppeteer and Computer)

This study stresses on the importance of audio utilization in 3D computer animation Wayang Kulit. Very little was found in the literature on the question of the importance of digital audio for computer animation Wayang Kulit. Some of the respondents have mixed point of view referring to live performances audio or digital recorded based on software with digital audio (voice over recording of the puppeteer). The respondents especially the veteran fans and puppeteers, described the voice of the puppeteer in "live" performance as a unique phenomenon that exists including pulsating tone and rhythm with punctuations and phrases.

The shadow appears to have more of their own distinctive sound world (life) including sound that represents integrated scenes, rhythms and often portray the intensity of illusion of puppets' movement especially in battle scenes. The music itself (original Wayang Kulit) can be described as complexed with insistent mode including the battle scenes which provide scary viewing experience. These findings also support prior literature that music is an integral element of shadow play theatre that brings the repertoire, puppets and spirit of shadow play puppet to life (Ghulam Sarwar, 2008).

These findings also agree with Colin Mcphee(1970), where each audience or spectator that watches Wayang Kulit, would find that the music itself provides an extensive aura assembling motions that creates sound voyage that reckons up the night with the shadows movements of flimsy arabesques representing translucent puppets or so called "characteristic of music". Even the static puppets in Wayang Kulit scenes are perceived with their alert postures and for not communicating with the audience, portraying them as attentive and astonishing.

The audio software presence can be described as an "advanced" method to provide enhancement to the linear style audio performance in Wayang Kulit. Some respondents see it as a new method that allows adding a variety of digital audio features such as mixing, sound effects, voice-over, editing and a lot more options used in 3D Wayang Kulit animation. For example, once the 3D model puppet characters are completed, in the stage of modeling and rigging (animated), the audio engineer will record the voice of the Tok Dalang or puppeteer and later adding it in the 3D software for "lip-sync". Thus, saving time for production and if any error or slip-up occurs, the puppeteer (narrative script) can be edited easily and efficiently.

These findings support the literature studies on successful feature film animation including Pixar's *Toy Story*, Malaysia's Upin & Ipin Geng Pengembaraan, and also *Jala Emas Jala Perak'* 2D animation series. In *Jala Emas Jala Perak*, the art of narration (voice over) recorded using Puppeteer or Tok Dalang Che Md Saupi was used for 2D cartoon characters adapted the basic physical looks or concept art of Wayang Kulit puppets styles, and the entire narration approach which was originated from classical epic styles of Ramayana used in Kelantan shadow puppetry (Khor et al., 2009).

Another study from the literature based on experimental approach in 2008, Nina Paley, an American cartoonist and experimental film Director, created the first 2D animated feature film with musical based on shadow play visual style called *" Sita Sing The Blues"*. Using vector graphics (with Rotoscoping dance performance and choreographing) , she managed to produce the two(2) hour film based on Ramayana episodes with seven(7) characters voice over based on Ramayana epic. The film itself can be considered as rarefied, which could probably be defined as more appealing.

It creates a domain of communication via emotional connectivity between characters personalities and characteristics with audience emotions, more convincing to the adults viewers compared to children.

6.5.3 Audio (Voice Over)

Very little was found in the literature on the issues related to Tok Dalang voices or audio in traditional or computer animation. In relation to audio, for the voice of Tok Dalang or puppeteer, most of the respondents suggested that it should be from a male with skill, knowledge and experience that can be added in 3D computer animation Wayang Kulit. Whether it is a stylized or replicated version using 3D computer animation of Wayang Kulit styles, the audio narration should be from the Tok Dalang. Even though some of the respondents were supporting the utilization of different audio for voice over (dubbing) for a variety of characters including aliens, women, children, animals and many others, they also highlighted that the lead or the main storyteller should at least be from the Tok Dalang. For example, in Wayang Kulit Kelantan, the husky or vibrant voice of Tok Dalang with artistic rhythm and tempo (Kelantanese dialect) with narratives is simply astonishing. The narrative or dialogues produced are corollary not only from their own feelings but also the feelings of society. It can be suggested that additional new characters in 3D computer animation with different voice over characters (non-Tok Dalang) could provide the direction and mood of the story to be more appealing with a variety of characters archetypes rather than the typical or usual Tok Dalang controlling all the voices in the story (having 12 to 20 different voices in each performance).

Furthermore, despite these determines the possibility of extinction still exists due to the lack of talented and skilled personnels related to storytelling practitioners' communication, geographical, accessibility or economy. These findings support the literature studies on the total number of practitioners or skillful master puppeteers; that in Malaysia the number of *Dalangs* or puppeteers in the country has slowly decreased. For example, for Wayang Kulit Kelantan, the number of Dalangs or practitioners of Wayang Kulit Siam(Kelantan) has dropped from 37 in 1982 to 11 in 1999, even though at one time there were almost 300 Dalangs in 1960 (Amin Sweeney, 1992). Therefore, it is important for the industry of performing arts such as Wayang Kulit to undergo some kind of transformation in order for new practitioners of Wayang Kulit with new approach, style, and medium to consider .

In terms of audio, Wayang Kulit melody or music is directly connected with the performance and provides vital perspectives in narrative or dramatization. Certain element and sudden changes in particular audio sense such as rhythm, tune and cadence indicate thespian or suspense mood, battle, emotions, and fast movements. The use of music for Wayang Kulit performances is unique from one another. Famous customized musical instruments for Wayang Kulit Kelantan such as gong, (tetawak), drums, geduk, gedombak, cymbal, serunai and many more are exceptional with artistic and values in providing proper tempo and rhythm. It is basically difficult to create the same music atmosphere of Wayang Kulit in the traditional method as compared to 3D computer animation. The music played by the orchestra in traditional Wayang Kulit are unique and the audience are able to feel the actual environment or be mesmerized by the rhythm (serunai), tempo and melody every time the shadow puppets appeared on the theatre screen. For example, *Lagu Berperang* or *Lagu Tukar Dalang* comes in various rhythm and tempo, accompanied by the puppets motion going in and out of the screen.

Whereas in 3D computer animation, the audio is in a style of presets and controlled by audio or sound engineer and the music or audio are mostly recorded, separating the mood and aura factor compared to traditional styles. The audio playback output devices such as amplifier or subwoofers mostly done in audio room and later on is being translated back into computer animation production or post production, vice versa. It involves time and effort in order to produce the complete final output (animation, video and audio). Therefore, the use of music in 3D computer animation for Wayang Kulit can be define more or less as a requirement to fulfill entertaining needs (real-time video) as compared to traditional styles that involves meaning, significance and motifs from live performances.

6.5.4 Audio Challenges

Not much was found in the literature on the question of audio challenges or limitation in Wayang Kulit particularly computer animation. The limitation of audio equipment for computer animation that requires additional cost is related to software and audio appliances including mixer, microphone, amp, and many others. Animation production house with proper investment and portfolios are able to develop TV series or feature animation to be broadcasted. With proper investment (hardware and software) audio effects or background music can also be added to 3D computer animation of Wayang Kulit, which provides a more unique audio style or traits to the scene. These findings concur with research from literature review Ghouse Nasuruddin, (2009), who described the music of shadow puppet, serves as unique, ritualistic, dramatic and structural functions between the audience and performers.

If compared to traditional Wayang Kulit performances, the audio quality or sound effects has to be done by the puppeteer himself (such as wind, explosion, or footsteps) or during battle scene ('throat voice') with proper timing, dialect, intonation and tempo, and can be performed only one at the time. Audio or music is the most vital components that supports visual animated images. The perception increases for the audience especially when animated visuals and audio combined together. By having digital audio, it has the capability to function simultaneous background music and effects which would be considered as an added value or enhancement to create a more exciting sound atmosphere in Wayang Kulit 3D animation.

6.6   The Challenges Between Traditional & Modernization

6.6.1   Puppeteer and Animator

According to Leslee Arch (2010), human designed stories and myths to describe or explain the nature surrounding them and the fears, desires, and ultimate dreams that will always be carried within, known as 'culture' (Leslee Arch, p.4). The *Dalang* is the puppeteer, writer, leader of the musicians, and the narrator of Wayang Kulit. The puppeteer or *Tok Dalang* or also known as "master" is usually the man behind the entire set. The puppet movement and characteristic demonstrate the capability of a man who is able to manipulate and mesmerize the artistic notion among audience. The animator designs and animate the drawings whereas Computer Generated (CG) with similar approach but behind the scene including utilizing tools and computer appliances. The one thing in common that traditional Wayang Kulit puppeteer or Tok Dalang and 3D computer animator share is the artistic approached using 'human touch' taxonomy.

In other words, the puppeteers uses their hands to organize, design(carved) and manipulate the puppets behind the screen to project translucent shadow effects that the audiences see the magical effects of fluid movement and distorted silhouettes, which heighten the drama whereas the animator is the person that executes the creative idea from key frame modeling to animating virtual 3D objects in computer real time. The most important aspects existed between the puppeteer and animator is the concept of creativity. The main objective of an animator is to design artistic or appealing animated visual concept with the directors concern (especially in film), regardless whether it is produced by human (hands) or computer. The animator should always focus on a clear visual art concept that will be used to entertain the audience, with proper software skills and tools to execute those ideas effectively and unambiguously. Computers are just tools, but what is more important is how the mind thinks creatively (Lasseter, p.43).

The puppeteer can be defined as a "One Man Show", who designs the puppets, animates, narrates the stories with a variety of voices, orchestrates the music, and also performs rituals before and after the performance. Interestingly, the researcher would like to describe the traditional master puppeteer of Wayang Kulit, as a person or individual with a *sixth sense or* aura, providing juxtaposition of communicating with existing (reality) and spiritual world. Compared to 3D animators, they mostly need a creative team (art director, animator, storyboard artist) to develop visual concepts or art concept in order to execute huge tasks (especially feature animated film or TV series) mainly from pre-production untill post production.

The issue of virtual puppeteer or pre-recorded voice over would create an unpleasant atmosphere among the Wayang Kulit fans. This is because for many years, traditionally the Wayang Kulit especially Wayang Kulit Kelantan was found to be very pleasant to watch and to hear the puppeteer clear husky voices narrating while manipulating his voices and puppets on the screen. For example, according to Dalang Eyo Hock Seng, he stated that he teaches the techniques to handle the puppets, and to manipulate the puppets on the screen, to change between 12 to 20 different voices, and designing puppets as well. Puppeteers or Tok Dalang have spunk, generosity of spirit, an infectious joie de vivre and deep commitment to their art (Suzanne Pemsler, 2008). With different background, the puppeteers have unique visions and personal discernment of the world of theatre and create their own distinctive styles. Using 3D computer animation, certain audiences might find it interesting but to certain groups especially the Wayang Kulit senior fans, it would create unpleasant response, as if 3D computer animation is replacing the traditional styles of Wayang Kulit or in other sarcastic words "Killing" it. To further extend, in 1991, The state of Kelantan has banned Wayang Kulit (Ghulam Sarwar,p.6). The reason behind this banning is due to the contradicting elements in shadow puppets which are not in line with Islamic teachings.

According to Siew Lian Lim (2011), the famous Kelantanese Tok Dalang , Pak Dain stated that Wayang Kulit Kelantan should be : "I learned it, I preserved it, and I performed it." He does not accept "*all those animation things*". He added that the origins of Wayang Kulit must include Tok Dalang with the inherited lineage and also master Perdalangan (performance) and Persembahan (religious ceremony), enough musicians, live dalang, musicians, time, and space and audience."

It is important to understand that throughout history, vivid yet inexpensive puppet performances such as Wayang Kulit has brought pleasure to young and old in every strata of society. Therefore, even though it does not seem to be harmed by using 3D computer animation key frame to replicate Wayang Kulit traditional styles, but proper studies or research including referring or consulting the experts such as senior puppeteers should be done properly in order for a smooth convergence of the arts, culture and technology output. In 3D computer animation, there is no limit of the mind and creativity as long as there is proper guidance which would provide a better quality animation output. As Walt Disney once said, 'With animation, it can visualize or clarify anything in the mind of human can imagine'. It cannot be denied that traditional and 3D computer animation puppetry has a strong influence and relationship that always refers to each another but it is totally two different realms. Computer animation is an effective medium to create illusion (unbelievable) to be seemed realistic, compared to puppets which are more effective for making (unbelievable) it more credible to the audience (Barry Purves,1998).

6.6.2 The Essence of Wayang Kulit

Storytelling and Character design are the essence in Wayang Kulit performances. In traditional Wayang Kulit Kelantan and 3D computer animation, stories are vital in order for the audience to understand and accept each performance. Whether it is traditional styles or computer generated (CG), the core of the story and genres are important designed based on the target audiences with different background. In most of the cases, in Wayang performances, the 'Tok Dalang' is less educated. All of the story structure or repertoire in shadow theatre was passed down involving individuals or society (passed down orally), and time factor. Wayang Kulit Kelantan establishes myth lore, legend, reflecting cultures, origins, religion and criticism.

It indirectly contains several moral values especially in the Malay society where the urban and villagers would spend hours mesmerized and admiring the whole artistic value of the puppeteers narration in Wayang Kulit.   In animation, the art of storytelling can be described as a metaphor that is perfect for all kinds of role-play to project different perspectives and ideas about the culture in each society (Paul, p.33). The issue here is epic stories used in traditional Wayang Kulit seems to be obsolete or too boring especially to today's younger generation. It is more advanced than traditional classical or modern 3D computer animated feature film such as Classical Snow White and the Seven Dwarfs , Toy Story, Croods, Shrek, Puss in Boots and much more. The young generation especially kids and family will find it more appealing and entertaining to watch these types of animated film rather than to spend time watching melodrama epic stories of Wayang Kulit. Disney's concept of animation films involve effective messages related to family relationship. The art of sacrifice, love and cheerful mood between human, animals, or objects are symbols of priority of family values, putting others' well being before their own (Tanner, p.367).

Thus, the challenge for the puppeteers or Tok Dalang is to create new modern stories to capture the interest of the young generation to appreciate Wayang Kulit. Also, the local film producers should figure out incorporating modern stories using 3D animation with Wayang Kulit artistic styles. Local content (e.g. Hikayat Panglima Awang, Hang Tuah, Si Luncai) and stories with moral values should be emphasized more using 3D computer animation Wayang Kulit. Even though with negative perceptions and expression from a small group of Wayang Kulit Fans in Kelantan, who emphasized that epic stories should remain as it is (due to its identity, culture, historical and sacred),

but by modernizing it would rather provide a different spectrum related to the art visualization and narrative especially for the new modern generation (kids especially) who would prefer to watch vivid colors of 3D computer animated visuals with exciting stories or plot, especially introducing superhero characters or cache storyline that will capture their interest and attention.

Character designs or archetypes are essential and synonymous with Wayang Kulit and 3D animation. In other words, Wayang Kulit is based on puppets manipulating with translucent shadows whereas computer 3D animations are mostly photo-realistic virtual models animated in 3D real time. Characters such as Seri Rama, Sita Dewi, Hanuman, Tuk Siku Maharisi, Bota, Wak Long and Pak Dogol are familiar characters with their own personal style, identity and character archetypes that can be found in Wayang Kulit Siam. The puppets are designed from animal hide and the form is designed with care and detailed to create each character. Compared to 3D animation, the puppets are basically modeled using polygon and lines and later animated in virtual real time environment. The art of Wayang Kulit puppetry combines the exaggeration, uncanny and levels of abstraction in each storyline with simplified visuals metaphors. This is referred to by Scott McCloud as amplification through simplification, 'natural or less complicated characters and visuals in a narrative media (e.g. animation or comics) are more effective to the audience (Scott Mcloud, p.31).

The issue that the researcher would like to highlight on the aspects of using 3D computer animation is the identical names and design structure. What happens if the 3D Wayang Kulit animation produced the local Malay village characters such as Mak Jenah, Pak Seman, Mak Dara, different from the original Wayang performances of famous character such as Wak Dogol, Seri Rama or Hanuman? Or stylized it with normal characters such as John, Ismail, Mariam or other characters? Would it mean that Wayang Kulit is being "basterize" or modernized which has totally removed the whole identity of Wayang Kulit or in other words destroying it?

According to an interview of a master puppeteer, Pak Nasir, from the National School of Performing Arts(ASWARA) in 2012, he suggested that Wayang Kulit can introduce new characters, designs and names as long as some of the local Wayang Kulit elements (such as music, narration, Pohon Beringin and etc.) are still being preserved. He added that Wayang Kulit should and can be modernized as the current generation of audiences' needs has to be fulfilled and given proper attention. We need to sacrifice (stylized or basterizing) in small volume in order to preserve this art from dying. It's better for an individual to remember the concept of Wayang Kulit rather than totally forget what Wayang Kulit is all about? The use of 3D computer animation provides greater enhancement such as solid cartoon effects or hyperrealism models, facial expression, lip sync, or visual effects by adding creature look or stylizing it, that the audience are able to view a more versatile and get to feel much closer with the storyline or the animation itself.

Compared to traditional Wayang Kulit performances where the audiences are more mesmerized with the shadows motions, narrators (puppeteers) and typical puppet characters create a lack of excitement or empathies. A well conceived character or series will provide the audiences to believe and empathize with them, but only if the audience are able to get excited about a character, or share in their joy or pain. The traditional classical puppeteers and fans of Wayang Kulit in general seems to oblige this approached. For them, puppets are considered as sacred or eerie, should be treated with more respect, able to define the notion of soul from the shadows projected, in accordance with culture, tradition and ancestors' belief.

The puppet characters' physical appearance and identical name or physical design aspects must be retained, without modifying it even an inch. Some even suggested that awful signs would happen if these matters are not being followed properly. Even though Wayang Kulit is being modernized or 'basterdized', the traditional aesthetics values and virtues should always be retained especially with modern technology. Even certain traditional or classical master puppeteers or Tok Dalang Wayang Kulit Kelantan such as Dalang Pak Dain, including some veteran fans of Wayang performances are still pessimistic with the use of modern technology in Wayang Kulit, mainly referring to issues pertaining to originality and also of 'destorying' Wayang Kulit itself.

6.6.3 Realism and Aesthetics

In the context of animation and Wayang Kulit traditional performance, it can be clearly define that it belongs within a specific domain of entertainment. As for animation, it certainly discusses on the aspects of realism whereas, for the traditional performances of Wayang Kulit, the element of aesthetics and originality is predominantly accepted among the Malay society. Characters and objects motion with unique and expressive substance provide the animator full control of the visual appearance art viewpoint (Michael Gleicher, p.51-54). But the combination has to be a final output (video) that is able to manipulate or fool the viewers, which is known as "hyper-realism".

Modern hyper-realism animation such as in Polar Express, Director Robert Zemeckis in 2004, used the art of super real animation with MOCAP or motion capture technology in this film that explores the possibilities of realistic character animation (Michelle Strozykowski, 2007), with the actor Tom Hanks it is immediately recognizable, as the characters together with his performances are captured by motion sensors connected to the artists' bodies, with the spatial data mapped into 3D virtual animation models and later construct the animation motion within them.

However, motion capture or hyper-realism animation in motion pictures have suffered from a theory called The Uncanny Valley. This theory was first introduced in 1970 by roboticist, Masahiro Mori, who explained that when a robot, or in this case referring to a case of rendered 3D animated or CG character, reaches a near exact human-likeness or realistic features we begin to be repulsed by it, in the same way we would when seeing a dead man.

When a robot reaches exact human likeness, the human perception tends to accept it naturally. According to Frank Thomas et al. (1995), 'When Walt Disney was asked between non-realism and realism factor, he wanted a caricature of realism' (p.65).

If Wayang Kulit is being given an opportunity to embark with this realism or realistic animation technology enhancement, it would be quite fascinating to visualize Wayang Kulit with new paradigm concept of visualization and movement. It means capturing the action and reaction from puppeteers or Tok Dalang using spatial motion data of animated traditional puppets and translates it to 3D virtual puppets models in computer animation real time with spontaneity and tactility. Unfortunately, this type of technology involves a high maintenance cost and tedious technicality.

Arguably, Mark Levenson (1992) once suggested that for puppetry (including shadow puppets), technology should not be applied to puppetry entertainment, but should look towards capturing or recording purposes only. Levenson's ground theory on technology and origins of puppet styles are identical although coming from two different worlds, especially on preserving puppetry history, identity and values that should remain. The performance of puppets should always be orchestrated or manipulated by human puppeteers which is described as "real time or live performances"(Mark, p.78).

Levenson's judgments are bias (puppet as an artistic and classical virtue), without taking into consideration about the future challenges ahead of puppetry entertainment. Kaplin suggested that puppetry entertainment in the context of new media or technology, should be divided into four categories, with computer graphics(CG) or key frame animation falling under the category of "Virtual Puppetry"(Kaplin, p.37-39). Kaplin's definition is much more realistic where he takes into consideration the factor of socio-economy, digital natives and media challenges in the new millennium which needs to be applied for the survival of puppetry art such as Wayang Kulit itself. However, it is still important to preserve several related elements or values from the existing arts and the symbolic meaning in Wayang Kulit without jeopardizing or removing it totally or stylizing it, to allow the younger generation to absorb a bit of the essences of the arts and culture of Wayang Kulit with modernization. The author is not suggesting that we should discard the heritage of performing arts and embrace the enhanced digital technology features or modernism cultures, but more to adapting modern technology into Wayang Kulit performances in terms of continuing its survival, and also as an alternative especially for the younger generations to appreciate this art.

On the other hand, Wayang Kulit or shadow puppets aesthetics creates its own realm, identity, tacit culture, satire and originality, providing attractive translucent motion shadows, and epitome of dominance within the audience perception. The shadow puppet with nuance of attractiveness, artistic and creative visuals in shadow is in every way an "object" that is given an imaginary life, that the shadow garners the attention (Steve Tillis, p.101). Also, each Wayang Kulit component such as music, puppets, stage, or narration of classical epics is not typical aesthetic aspects in shadow puppetry play. It is more of composition of the performance that creates the aesthetic and interior beauty which emerges with support from composition or component inside.

Not only the word 'aesthetics' refers to artistic of Wayang Kulit referring to beauty, classics, or tradition but, also it contains charisma or phenomenon that signifies the relationship and establishment between human and arts. Furthermore, Wayang Kulit puppets charisma or personas was to provide the impression of life to an object which has no life by mimicking human behaviour. Wayang Kulit or shadow puppets is in the absolute irony where human and objects, real or unreal, life and dead convene together within the domain of aesthetics shadow environment (Scott Cutler, p.15). No doubt that for certain classical puppeteers or veteran Wayang Kulit fans, might find it quite disturbing or annoying with modern technology (key frame 3D animation) especially thinking that it will 'kill' or destroy the origins of Wayang Kulit. But on the other hand, this technology is more of an alternative tool or media, that could imitate the current personas and visual artistic of Wayang Kulit to fit in or be accepted among the new modernization paradigm generation especially urban community with updated or different thinking and lifestyle.

It is important that 3D computer animation should be able to artifice illusionism each Wayang Kulit visual approach that are able to create a style of "plays within plays" or films within films that condense the entire plot and art direction (Wells, p.33). Thus, Wayang Kulit is an animation (motion) without a computer and 3D computer animation Wayang Kulit is more of "Virtual Puppetry" kind after all. Realistic and aesthetics factors are two types of different visual quality that belongs in Wayang Kulit puppetry domain. The appearance and content of Wayang Kulit will always keep pace with social, technological, economic, media and political development. One should not imagine that there is one universally preferred model for presenting Wayang Kulit in global contexts.

Today, the lines separating academic experimentalism and the popular, the foreign, and the local in South East Asia countries (especially Malaysia, Thailand and Indonesia) and abroad are increasingly blurred (Matthew, p.364).

The prospect of Wayang Kulit is promising at the moment. The aesthetics in Wayang Kulit art consists of evoking absolute illusion, creativity and freedom and in its equally absolute destructions. The meticulous attention to replicating human motion coexists with how that illusion is created as an experience. Most importantly, aesthetics substance of elusive shadows, combining the visible and invisible in Wayang performances, proves that the emblems of shadows are more real or dominant than the puppets itself.

6.6 Summary

The convergence between the arts of Wayang Kulit using 3D computer animation puppetry is a noble attempt to preserve this precious unique art of the country with rich culture and heritage value. Even though the awareness towards Wayang Kulit among the younger generation is slowly dissipating, efforts in terms of digitalizing Wayang Kulit would help to enlighten and preserve the aesthetic value of the performing art icons especially for the younger generation of today and tomorrow.

Wayang Kulit(Shadow play) theatre can be watched from various other places if the knowledge and technology is applied in a beneficial way such as broadcasting it through video or YouTube(internet) , mobile gadgets , TV and cinema and for the current younger generation known as *digital natives*, Wayang Kulit can also be transferred into mobile phones, games and application.

The performances highlighting the arts are workable and will remain popular not only in Malaysia but all over the world. Although 'realism' is the notion that inevitably accompanies the advancement and integration involving 3D animation or digital puppetry and Wayang Kulit performances, the traditional aesthetics visual approach in Wayang Kulit Kelantan is more authentic, ancient, culture symbol and unique since it has existed a long time ago and realism is still an arguable factor between the traditional and CG(Computer Graphics) animation environment. Therefore, we need to preserve the art, by educating the younger generation so that long term benefits can be reaped for the dying art. It is very easy to let traditional pass you by without even realizing its impact in our lives.

CHAPTER VII

CONCLUSION

7.1 INTRODUCTION

This research proposed a study of 3D computer animation for Wayang Kulit, in which primary data were collected based on the focus group of experts and non-experts. As mentioned in the Introduction chapter, Wayang Kulit is in danger of being extinct or forgotten by younger generation, and proper measures should be considered in preserving this heritage performing arts from extinction, especially the efforts related to research and development on digital technology for Wayang Kulit in Malaysia, particularly 3D computer animation. Also, as described earlier in the Introduction chapter, the purpose of this research is to explore the traditional visual arts in Wayang Kulit and emerging computer technologies related to key frame animation through historical and theoretical, and also to design or develop a 3D computer animation Wayang Kulit animation prototype or demo version, and lastly to evaluate the expressitivity of a 3D animation prototype by using expert and non-expert focus groups.

7.2 Research Contribution

This research has successfully contributed to two (2) main key points which are the new medium of entertainment for Wayang Kulit and existence of Disney's twelve principles of animation in Wayang Kulit entertainment. The main contribution based on the research objectives of key frame animation development from theoretical and historical elements of Wayang Kulit by using 3D Computer animation would provide better alternative medium of entertainment especially for the younger generation to admire and appreciate the essence of this heritage of Wayang Kulit.

7.2.1   Visual Qualities

Most of the respondents, especially the animation experts group suggested that key frame computer 3D animations are dynamic which provides frames developed by the computer based on the artist's directives producing photorealistic visuals for Wayang Kulit animation.It might not be the same qualities in terms of visual styles from theoretical or historical elements from the existing Wayang Kulit, but using 3D computer animation would be considered as giving options especially from the young generation perspective to appreciate the art and also as part of the survival of Wayang Kulit itself. From the findings, it shows that four elements of studies related to 3D computer animation elements such as puppet design, lighting and shadow, animation and storytelling (audio) are much more positive, with most of the respondents appreciating the idea of creating 3D Wayang Kulit animation while introducing new features or enhancement.

Even though a minority of the respondents especially the Wayang Kulit Fans respondents, are not keen of having to technologically replace the original arts of Wayang Kulit, but most of them still have positive view of using 3D computer animation. Some respondents (fans and Puppeteers) are particularly concerned in terms of the Wayang Kulit original styles including puppet characters identity, style, shadow, music, narrative which will be replaced totally by 3D computer animation. It was suggested that this needs to be highlighted in order for the qualities (theoretical or historical elements) are still considered similar by the audience.Overall, relating it with the first research objectives, theoretical and historical aspects of Wayang Kulit, an important point that the respondents highlighted is, whether 3D computer animation is suitable to design or replicate the visual arts of Wayang Kulit (Wayang Kulit Siam). It is also important to maintain or preserve some of the Wayang Kulit original qualities (name, puppet design, music, puppeteers or Tok Dalangs voice over) in order for the younger generation to especially appreciate the arts of Wayang Kulit.

7.2.2 Stylized and Replicate (Key Frame animation)

Another interesting contribution from the research objectives perspective based on relationship between visual 'expressitivity' and 3D computer animation technique, in order to provide new alternative entertainment for Wayang Kulit, by using or applying 3D computer animation it can produce two(2) styles of digital Wayang Kulit performances known as stylized and replicate version. This is based on the respondents feedback who are mainly animation experts who described that 3D computer animation are able to produce stylized and replicate version of Wayang Kulit.

Stylized version are referred to as creating new 3D physical puppets model with certain Wayang Kulit qualities such as puppet design involving the texture (puppet design including Baju Melayu, songkok, batik pattern), colour, shadow or music using voice over of the Tok Dalang or puppeteer, narrative modern stories or based on 'Cerita Rakyat' or folklore tales, character archetypes and a lot more new approaches.

The respondents mostly agreed to the approach of stylized version including the demo or prototype version of 'Cintailah Sungai Kita' created by the researcher including creating new characters based on local village names such as Pak Seman or Mak Dara. On shadow and silhouettes, most of the respondents were uncomfortable with the idea of using moving silhouettes or shadows behind an animated 3D puppet model, but most of them suggested that it is not necessary for stylized version of 3D animation Wayang Kulit to include projected shadow or silhouettes as it might disrupt the viewers' attention towards the animation scene.

For stylized version, refering to the process of developing 3D key frame computer animation Wayang Kulit demo prototype, the respondents especially animation experts and Dalangs including academic research expert find it very useful to have the light source in computer animation that it can be placed anywhere, creating special effects with one main objective to provide mood and brightness in the scene. Stylized version of Wayang Kulit will provide an opportunity for the audience to view the animated 3D puppet model with clear and detailed texture and lighting tone. If compared to traditional Wayang Kulit, the physical puppets are placed at the back of the stage and only translucent shadow of motions appears on screen.

The looks of the stylized 3D puppet may not be realistic, accurate or similar to Wayang Kulit traditional design puppets, but with photo-realistic or 3D cartoon effects, it will provide exciting and appealing visual for the audience especially the younger generation to appreciate or enjoy the art of Wayang Kulit in 3D.

An interesting contribution from a stylized version that relates to the third research objective of expressitivity is facial expression. This is one of the most convincing techniques in order for the audience to visualize the narration based on emotion or inner feelings. With 3D computer animation based on key frame, the puppet models facial expression can be viewed clearly such as anger, happiness, or fear including 3D animated tear drops coming down from the eyes (with proper camera perspective) which would allow the audience to view and be more closer(feelings) with the characters in the scene respectively. It also indirectly helps in the development of plot in the story structure. Replicate version are more of developing Wayang Kulit, for example Wayang Kulit Kelantan or Siam with maintaining a majority of its original qualities including puppet design, shadow, lighting, texture, character archetypes and names, music, narrative(recorded using Tok Dalang's voice over) and only a slight change on the storyline with modern or local folklores. Furthermore, using a replicate version of 3D Wayang Kulit could create interesting TV education programmes for children especially to learn and be entertained through the experience of Wayang Kulit qualities, which in Malaysia so far no effort has been done to realize it. One thing for sure is in using stylized or replicate version, it would be interesting for the audiences, adults and younger generation to watch either one of this method of 3D animation for Wayang Kulit becoming Malaysia's first feature 3D animated film.

This will indirectly promote Malaysia's local heritage performing arts culture to the world by sharing the qualities of Wayang Kulit using 3D computer animation, and also creating more local animation content for the country's local animation industry to grow.

7.2.3 Future of Malaysian Wayang Kulit

The future of Wayang Kulit or shadow puppetry seriously needs much attention. It requires a huge effort in promoting this heritage culture from slowly becoming extinct. The traditional and modern Wayang Kulit should be manifested more at schools, official ceremony, online resource (web), TV commercials, film, games, art museum and much more which would help in preserving this art for the younger generation. The traditional styles need to understand the current generation desire or dogma, which requires more moral values, modern stories or genre such as science fiction, compared to the traditional love epic narrative approach. This will hope to attract the younger generation in appreciating and supporting its own valuable piece of art. In addition, advances in technology and globalization that swept the world today should not be a barrier for arts continue to flourish and bloom the heart of each society (Dahlan et al., 2012).

More job opportunities and investments will be developed as many organizations including government and private sectors were involved in stimulating the effort towards promoting the survival of Wayang Kulit entertainment in Malaysia specifically. 3D computer animation of Wayang Kulit can also provide various platforms for audience to view the animation using mobile gadgets and internet sources enable playback and provide dynamic features such as interactivities for the adults and the

younger generation to learn and be entertained through video application of 3D computer animation of Wayang Kulit. The applications are able to support the video by itself or by creating documentary, game apps, augmented reality, and many other that is able to provide digital access for the users to be entertained by the content, features and most importantly to appreciate the value of Wayang Kulit arts.

7.2.4   The Realm of 'Expressitivity'

The term visual expressitivity, which focuses on Wayang Kulit qualities on two main aspects, design and movement, referring to gestural and proxemics or spatial quality(the virtues between cultural and individuals), which can be developed in stylized or replicated version of 3D computer animation Wayang Kulit. As defined earlier, animation is a spatiotemporal art; primary point of manipulation of the spatial arrangement or shape of an object over time to create the illusion of motion. (Chris Charter, 2012). In terms of puppet design, the animator needs to understand the physical acting and visual body language fundamentals to create nuance of physicality to their characters for authenticity, expression, emotional feelings from the audience. Even though it is separated from two different realms, between the mouse (virtual) and the puppeteer (human), but with 3D key frame animation, it provides a more flexible design or structure puppets approach to create realistic visual designs.

With 3D key frame animation, the expressitivity qualities related to pattern or structure of the puppets will provide the similar emblem visual qualities in Wayang Kulit, such as articulated shape, size or texture that can be imitated similar to Wayang Kulit original visuals.

The design expressivity of the virtual puppet figure could provide a unique phenomenon of "aura" that would be unique for the audience to identify the visual qualities differences between traditional or animated styles. The aura here is noticeable in terms of virtues, satire within real time or live performances. In virtual 3D software, the shadows are not totally visible (secondary) compared to the traditional Wayang Kulit translucent shadows, meaning that the 3D puppet physical visual appearance is more obvious with possible overlapping shadows or silhouettes.

The puppet visual personas virtual model in 3D computer animation such as various shapes or sizes provides distinguished level of expressivity between depth and flexibility. The technique of using three-dimensional (3D) of the puppets model is designed in the form of numerous polygons or wire frame, that this puppet models are designed consisted of geometric lines, curves, paths or shapes which can be imported into the computer through 3D shape modelling or capturing (referring to the visual qualities Wayang Kulit original style). The puppets in 3D environment provide more depth or 3D space for the characters to appear more dominant or versatile with visual appeal. This allows more flexibility of establishing the characters or animating it virtually. Furthermore, the shadow visual appearance is more elusive on screen or 'Kelir' in Wayang performances, which is limited between X and Y axis that creates limited characters positioning and movement within the blank white space display. Therefore, 3D space provides more depth with Z axis creating depth "atmosphere" for the puppets to exist in the world, through articulation of visual appearance including camera, lighting or special effects. In other words, the puppeteer with traditional two-dimensional flat cut-out figures are held by a rod or wire behind a translucent white display or screen and later manipulating the shadow puppets, while the animator models (imaginary) the 3D puppets in computer within 3D virtual world.

A 3D computer animator requires proper research and observation in terms of modelling the visual design of the original puppet in Wayang Kulit in 3D computer animation. Pre-production level such as sketching, visual art concept, or even attending and observing Wayang Kulit performance will provide more realistic qualities visual which refers to the expressitivity level of aesthetics of the puppets especially from the traits of modelling, lighting, shading or texturing in real time 3D animation.

Real time here is not referring to modelling or animation but most importantly is the audience acceptance or perception. Computer 3D animation shares the same tacit attribute of shadow puppetry of presenting a variety of characters designed through different domain with signification other than the real life of living human beings. Thus, the researchers were able to define that the expressitivity of the puppet 3D virtual designed puppet models used in the two versions of *'Cintailah Sungai Kita'* which basically involved illusion of space, depth, aura, existent and imaginary.

From the design of modelling and expressitivity as discussed above, the element of movement, referring to controlling the gestural (physical anatomy of the puppet) and proxemics (movement of the puppet as total in real time) can be applied using 3D key frame animation for Wayang Kulit development. In gestural, using a function known as *Inverse Kinematics(IK),* known as high level technique in 3D computer animation that requires an animator to specify a motion from point A to point B in 3D Key frame animation. It would provide a better expressitivity of puppet gestural movement using computer mouse to animate articulated, hinged, or spherical joints body puppet characters such as torso, hand, facial, lip sync or arms and legs (walk cycle process). Thus, the IK aspects for gestural movement of the puppet provide natural or smooth movement.

This is important as the animator would be able to define their variety and stiffness in real time, an example shown in this research based on two experimented (stylized and replicate) versions of *"Cintailah Sungai Kita"* in 3D animation Wayang Kulit.The art of recreating reality motion in computer animation are unlimited due to 3D computer animation in cinematic is becoming a norm.

The enhanced visual realism character movement (fiction or reality), is due to the demand from film producers or directors based on the audience needs, also with the abundance of digital arts technology, computer graphics and imagery becomes much more convenient. According to Steve Tillis(1998), the Proxemics motion is another method that reflects the visual expressitivity in this research which was identified in relation to the movement of puppets in 3D animation world. For instance, in '*Cintailah Sungai Kita'* stylized 3D key frame version, animation paths were created to provide more dynamic and flexibility to the characters visual appearance and appeal factor. As 3D computer animation puppets are in virtual and real time world, projecting puppets characters to be more visible or placing it behind the camera, also as this mass, puppets move towards or distance from the cinematic 3D camera perspective, the outcome here is that they will appear larger, smaller or depth of field, respectively. Also, with proxemics animation, the momentum or quantum in each frame of movement are affected with 'physical qualities' such as mass, gravity, or ricochet features (metal, brick or rubber). The puppet motion is unlimited in a virtual 3D world, that it can be physically dropped, spun or rolled instantly, within the defined characteristics.

Overall, the researcher were able to implement several expressivity motion techniques from articulated hand, arm movement and mouth (lip-sync) of virtual 3D puppets with key frame animation, the kind of imitation basic Wayang Kulit puppeteers performances (motion), defining as new media puppet entertainment. Using key frame 3D animation can be an advantage in order to produce physical models and movement, of cartoon like or realistic virtual puppets, but it would be much more difficult to imitate the expressive motion shadows realistic qualities in Wayang performances.

In order to capture the actual spatial data of the puppeteer, especially realistic expressive movement of controlling puppets and projecting motion shadows (including shadow distortions) especially related to coordination, movement and manipulation notion based on Wayang performances could be explored more using Motion Capture (MOCAP) technology in the future. It could also provide a much more extensive discussion between the aspects of 'realism', relating it to the art of capturing and producing human realistic motion into the world of 3D puppets characters.Ultimately, the virtual puppet character's movement is what creates meaning for the audience. As Chris Carter mentioned, it is motion that defines character because the inner intent of a character can only be made visible through movement (p.32).

7.3 The Existence of Disney's Twelve Principles

The second contribution in terms of 3D Computer animation Wayang Kulit is the existence of Disney's twelve principles of animation in Wayang Kulit performance. Basically, this research would consider this as part of 3D computer animation, as it is the fundamental principle related to traditional hand drawn animation technique.

These principles are still relevant with modern or computer animation including key frame, destructive or motion capture (MOCAP) animation technology. Overall, most of the respondents especially animation experts agreed that Wayang Kulit has several Disney animation principles including the principles of staging, timing, exaggeration and appeal related to the puppet structure, shadows projected and illusion of movement in Wayang Kulit.

There are possibilities that not all of the principles exist in Wayang Kulit. The researcher agrees with Hassan Muthalib's point of view stating that a Wayang Kulit or shadow play puppet is the first animation in the world (based on research from China, India and Indonesia puppetry). According to Khor&Yuen(2009), GototPrakosa Indonesia renowned short film experimental artist described that the art and culture of animation was influenced by Wayang Kulit. He added that even Walt Disney studied from Wayang Kulit before he produced animation.

Furthermore, Walt Disney's and his animators studied all sorts of things, especially at puppetry (Wayang Kulit) as well as automata, but mainly of course they studied human and animal anatomy and motion. This is based on several similarities in terms of animation definition, features and also Disney's principles itself. From this research, it is hoped that the young animators can learn and observe the qualities of Wayang Kulit (puppet design and movement) and relate it with Disney's twelve principles of animation in order to produce good quality or realistic animation.The evidence from this research suggests that there is some existence of Disney's twelve principles in Wayang Kulit or shadow play puppetry.

7.4 Limitation of Research

Since 3D Computer animation is quite new in terms of knowledge and technical skill, it involves a broader spectrum to study and analyze, that the researcher was not able to cover all other topics in 3D computer animation and relating it with Wayang Kulit styles. Topics such as 3D computer animation character rigging, simulation, visual effects, Inverse Kinematics were not able to be concentrated on as it involves more technical aspects related to 3D character and visual animation.

There were also limited resources, particularly to Wayang Kulit studies in Malaysia, and also research experiments related to Wayang Kulit and digital animation especially information or case studies from journals or printed books. Furthermore, the respondents especially the puppeteers or Tok Dalangs and Wayang Kulit Fans were having difficulty to understand the differences between computer animation and cartoon styles, and relating it with Wayang Kulit during the interview session.There is also insufficient data collection especially from Tok Dalangs and animation experts focus groups which is due the limited number of expertise in this area are limited in this country.

Therefore, the researcher would have to rely on identified respondents with vast experience, reputation, and knowledge related to animation and Wayang Kulit. The findings referring to Wayang Kulit fans originated only from Kelantan and cannot be generalized to other states in Malaysia. The same study needs to be carried out with Wayang Kulit fans from other states including various age and genders to assess their perception between traditional and computer animation styles.

On the subject related to Disney principles, the only limitation is to prove that Disney adapted or were influenced by Wayang Kulit to design the twelve principles of traditional animation. Only some theories or assumption were made but due to insufficient evidence, the researchers were not able to highlight this theory in terms of historical facts, journal citation, books and other media. Finally, in terms of 3D stylized animation demo, the limitation of hardware and software were also some of the problems faced during the research especially in modelling, texturing, lighting, animating and rendering that requires sufficient RAM(Random Access Memory) and computer storage.

There were several times that the computer was malfunctioning and rendered images were not at its best quality from the preview, slow in rendering and many other functions, that the researchers were unable to produce high quality 3D rendering images due to this problem.

7.5 Recommendations

The following are several recommendations based on the findings and conclusion of the study, where it is recommended that further research be undertaken in the following areas of Wayang Kulit especially based on convergence approach. Additional studies need to be done to develop a more creative content based on local cultural performances not only from Wayang Kulit, but also many other similar performing arts such Mak Yong, Jikey, Boria and many more in which their identity and performances are slowly becoming extinct or forgotten especially by the new generation of today or known as digital natives.

This research has raised many issues pertaining to 3D computer animation and Wayang Kulit performances and further investigation is needed especially on the qualities of 'expressitivity' between puppet design and animation movement. Further research on 3D animation technology for Wayang Kulit to obtain realism or quality performances related to entertainment, tourism or education industry is much needed for the survival of Wayang Kulit in the digital era. In context with methodological approaches, there are two aspects that can be used by other researchers to compare the visual art of 3D computer animation and traditional hand made puppets in Wayang Kulit, First, based on semiotics studies which focuses on semiotics in shadow puppets as a form of signs with notion of expression with implicit or explicit meanings. This includes comparing semiotics in visual forms of Wayang Kulit such as puppet figures, the "Pohon Beringin", light and shadow, 'Kelir' (screen), colors, musical instruments and ritual performances in relationship between modern and traditional styles of Wayang Kulit.

The semiotics will focus from the context of design, puppet articulate shapes, forms, visual aesthethics, color with specific meaning or expressions between 3D computer animation and traditional Wayang Kulit. For example, Pohon Beringin semiotics in traditional Wayang Kulit symbolized the 'Tree of Life' between human, god and nature which creates a manifested domain of microcosm (Ghulam Sarwar, 2004). Secondly, observation (ethnography) by observing how different audiences of the two performances react to the Wayang Kulit performances in separate situations. It refers to the studies on anthrophorlogy and sociology (rational synthesis or fusion of close-up observation) between 3D computer animated and traditional styles of Wayang Kulit. Further research which includes implications towards the culture and social critique within the society as part of the art and technology paradigm shift.

LIST OF PUBLICATIONS

1**.** **Dahlan Abdul Ghani,** Md Sidin Bin Ahmad Ishak, *A Study of Visualization   Elements of Shadow Play   Technique Movement and   Computer Graphic Imagery*   (CGI) *in Wayang Kulit Kelantan*, International Journal of Art, Culture & Design Technologies   (IJACDT)   IGI-Global Vol.1, No.1, pp: 1-11, ISSN: 2155- 4196 , April   2011 , pp : 54 – 61

2. **Dahlan Abdul Ghani**, *Puppet Animation:* A New Technique in Traditional Wayang Kulit   Malaysia, International   of Computer Graphics and Animation, 2011, Academy & Industry Research Collaboration Centre (AIRCC),   ISSN : 2231 – 3281 , pp; 1- 10

3.   **Dahlan Abd. Ghani** , *Wayang Kulit Kelantan: The Challenges Between Traditional & Digital Puppetry,* Journal *Arte, Individuo y Sociedad*, of Servicio de Publicaciones de la Universidad Complutense De Madrid, Spain in Volume 24 (1) 2012. *ISI Indexed Arts & Humanities Citation Index from Thomson Reuters* ISSN NO**. 1988-2408.**

4**. Dahlan Abd Ghani,** Mohd Sidin Ishak, *Preserving Wayang Kulit For Younger Generations*, IEEE Multimedia & Artful Media Quarterly ISSN: 1070-986X , IEEE COMPUTER SOC, 10662 LOS VAQUEROS CIRCLE. 2011

5. **Dahlan Abd. Ghani**, *Md Sidin Bin Ahmad Ishak : Relationship Between The Art of Wayang Kulit Twelve Principles of Animation, Journal of Research and Social Intervention, Romania , ISSN (print): 1583-3410 ISSN (electronic): 1584-5397, 2012* [Web Of Science Arts & Social Science ISI Thompson Reuters Impact Factor : 0.79]

6. **Dahlan Abd. Ghani** , Mohd Sidin Ahmad Ishak, *3D Digital Puppetry: An Analytical Study in Wayang Kulit Siam and Javanese Wayang Kulit,* Fifth International Conference On Malaysia - Indonesia Relationship (2011) Organized By Faculty Arts and Social Science, University Malaya, 7 – 9th July 2011, pp : 56-61, Issue 2, Vol 4