THE EFFICIENCY ISSUES ON THE ANIMATION PRODUCTION STAGES

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The Efficiency Issues On The Animation Production Stages

by

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LIST OF AMBBREVIATIONS

APAC	Asian-Pacific
2D	2-Dimension
3D	3-Dimension
CCI	Creative Cultural Industry
KOFIC	Korean Film Council
MIMOS	Ministry of Science, Technology and Innovation
MOSTI	Ministry of Science, Technology and Innovation
MPAA	Motion Picture Association of America
PC	Picture Controller
US $b	United States Dollar in Billion

Isu-Isu Kecekapan Terhadap Peringkat-Peringkat Penghasilan Animasi

ABSTRAK

Penghasilan animasi pada dasarnya dibina pada asas visual yang kukuh dan teori visual dan amalan dalam pembuatan animasi tradisional dan animasi digital. Process penghasilan animasi mempunyai pelbagai kaedah dan bergantung kepada keperluan operasi penghasilan. Proses mencipta animasi pada mulanya adalah sama tetapi perbezaan apabila berlaku pengurangan proses dan penambahan proses dan ia sebahagian daripada faktor belanjawan sesebuah pengeluaran. Tesis ini mengemukakan proses penghasilan animation. Tesis menjalankan satu kajian kes mengenai proses pengeluaran dalam menyiapkan filem animasi. Kajian kes menyediakan maklumat mengenai pembangunan pengeluaran animasi. Kajian mendapati bahawa kualiti dan siap mengikut jadual bergantung pembahagian tugas yang tersusun dan juga dibantu oleh kemahiran dan alat-alat dipakai. Kajian ini mengkaji hasil pembahagian tugas-tugas tersusun yang memberi kesan kepada hasil kerja. Hujah rujukan adalah produksi studio dan institusi di rantau ini dan disokong oleh 24 kaedah yang disenaraikan dari tinjauan literature. Kajian kes adalah penghasilan animasi dipraktiskan di Malaysia. Ia menunjukkan bahawa beberapa studio produksi perlu untuk menyesuaikan diri dengan peralatan terkini dan pengalaman baru untuk bersaing dengan studio antrabangsa. Pelaksanaan pendekatan kajian kes, temu bual dengan pakar-pakar digunakan pada tesis ini dan juga perundingan beberapa laman sesawang dan klip video. Dengan proses konseptual dengan penjelasan pakar untuk menyokong penilaian digunakan dalam menggariskan penghasilan animasi. Kajian ini menyumbang dengan ketara kepada pengatahuan dalam bidang industry animasi dalam kontek ekonomi kreatif. Akhirnya tesis ini membuat cadangan bagi penggiat dalam membantu posisi yang lebih baik dalam industri dengan mengurangkan penggunaan masa dan belanjawan pada masa yang sama mengekalkan kualiti dan kuantiti.

The Efficiency Issues on The Animation Production Stages

ABSTRACT

Animation production is in essence builds a solid foundation of visual and animation theory and practice in the development of traditional and digital animation. Animation production process had variety methods and rely on production operate requirement. The process of creating animation start out the same but the difference when make a disposition and additional of process and it is a part of cost production factor. This thesis addresses the development of the animation production process. The thesis conducted a case study on production process in completing an animated movie. The case study provides information on the development of animation production. The study found the quality and completed on schedule rely organized a division of tasks and also assisted by skill and tools were applied. The study examined the outcome of organized tasks division are affect to production works. The reference points here are production studios and institution in the region and supported by 24 methods listed from literature review. The animation production case study was practiced in Malaysia. It showed that some production studios need to adapt latest tools and new experience to compete with other international studios. Applying a case study approach, the thesis made use of interview with experts, as well consulting numerous web sites and clip videos. By conceptual the process with clarification of experts practice to endorse assessment applying in outlined the process development. This research contributes significantly to the existing body of knowledge in the field of animation industry within the context of creative economy. Finally the thesis makes recommendation for practitioners to assist a better position in the industry by reducing time consumers and budgeting while retaining quality and quantity.

CHAPTER 1

INTRODUCTION

1.1 Overview

In this chapter will explore a foundation on the subject of animation. Parallels, it will follow by problem discussions and on overall purpose of the thesis. This chapter also will address the research questions and objectives the study be stated and the end of the chapter will recount the significant of the study. This study will focus on animated production, animated features, a product of a complete „coming together" of modern machine technology, traditional way and edutainment, as well as coming together and riffed spread worldwide during production process.

1.2 Background of Study

The survival and growth of the animation industry in the late 1950s was attributed to the transition to mass tel evision, conditions have clearly changed, where animation interests still survive in advertising and mass programming. Yet new adaptations have been made in instructional, scientific, editorial, and entertainment forms, incorporating a mixture of media (Hoffer 1981). There are many examples where the form has been used to promote serious content is be

important to study about animation, such as political propaganda, clinical procedure and economic forecasting (Selby 2009). Computer simulation technology as an animation medium is considered to be scientifically-predicated and has utilized in science and engineering to simulate authentic-world physical processes and phenomena without building an authentic-world physical model, the latter of which can intricate, hazardous, extravagant, and time consuming in many situations (Ha and Fang 2013). Complete animation films are still produced by the cinema industry and it is the greatest media which can easily portray a country, its population, ideas, philosophy and cultures (Islam, Shamsuddin et al. 2013). Animation not to act solely as a way to gain aesthetic attraction, it can designed in order to aid learning processes (Musa, Ziatdinov et al. 2013).

The authoritative ordinance for animated regalement has expanded with the incriminations in broadcasting hours by cable and satellite TV along with the growing popularity of the cyber world. In the past, animation series were aimed at children aged nine below. In recent years however, TV stations have been engendering animation series for teenagers, adults, and the whole family. Animation series like The Simpsons and King of the Hill have been prosperously aired on primetime TV. Ecumenical animation revenue is expected to reach USD 50 billion next year and USD 142 billion by 2008. The major markets include the Amalgamated State, Canada, Japan, France, Britain and Germany (Tschang and Goldstein 2004). In 2013 the size of the global animation industry increased to USD 222 Billion. Most of the segments in the

animation industry are growing at the Rate of 7% per years. The outsourced computer animation production market is increasingly being tapped by North American and European film and television program producers (2014).

In Malaysia, locally produced animation series are still in the process of growth. According to Omar and Ishak (2011) references Muthalib (2008). The development of technology in computing and multimedia has allowed creative content developers the space to be creative and assist in developing the industry towards maturity and global acceptance. Regime has denoted animation as another sector to be developed, judging from the sizably voluminous potential ecumenical market for animation films, the regime through MDEC (Malaysian development Cooperation) is providing infrastructure and other incentive. Other agencies like MIMOS (Malaysian Institute of Microelectronic Systems), an agency under the purview of the Malaysian Ministry of Science, Technology and Innovation (MOSTI), is actively providing assistance to incipiently established engenderment houses in the development of animated films (Rosnan and Aziz 2012).

The activity business can be ordered in different ways. In fact, it is separated into two-dimensional (2D) and three-dimensional (3D) activity. 2D is frequently hand drawn, however now days, is for the most part PC supported, which has expanded the efficiency of craftsmen. 3D movement has included a lot of cutting edge PC programming and handling power (Tschang and Goldstein 2004). Engaging overview in animation production to ascertain accomplished a project from creative, financial, and scheduling perspective. Based on the

creative expectations and fiscal parameters of the project, production process pulls together an animation team. During production there are sets up and manages both a production schedule and a budget, aiming to deliver the product at the agreed-upon level quality (Winder and Lowlatabadi 2001).

Producing animation in this moment the techniques persisted growing, from technical manuals to be digital as it is now. There are animations based on 2D animation techniques like animation hand drawn, *stopmotion*, which is commonly known as the clay, and animated 3D computer (Irawan 2012). There have been several systems written to aid in the process of animation. Some of these quite successful and have been used to produce short interesting films (Catmull 1978). Other than various methods production there is also many tool developed in computer animation are designed to allow animators to obtain the expressiveness of traditional animation more easily (Juan and Bodenheimer 2006). With the existence of diversity methods provided encouragement animation production. The method was proposed by Hsu and Lee (1994) and he claims its efficient implementation is favourable for incorporation into windowing systems and page description languages.

Animation industry becomes a part of economy contributor via Malaysia creative industry. In fact it had been chosen medium in delivery a huge and eclectic field, it is a critical structure in effective conveyance. This product towards quality and quantity depend on methods production management. Nevertheless, it is unfeasibly if not dealt into account the factors process and supporting aspects to facilitate the production. This requires a practical solution

by practitioner parallel the forms of animation have proliferated of advances in digital technologies (Power 2012). The approach can be formulated through the comparison of consisting methods to assess each methods compared.

1.3 Statistic Industry Creative Content

The term creative industries did not only referred as solely entertainment it is much wider productive set, including goods and services produced by the cultural industries and those that depend on innovation, it an overarching policy with deciding basic principle industry creative development including many types of research and software development (United Nations Development Programs, 2013) . This industry attracted attention by running globalization, digitalization, and the shift to a service-oriented economy is proceeding (Kakiuchi & Takeuchi, 2014). The Creative Industries were defined in the Government‟s 2001 Creative Industries Mapping Document as generating and exploitation of intellectual property has a potential through industries which have their origin in individual creativity, skill and talent (Department for Cultural Media and Sport, 2016).

In 2013, cultural and creative industries across the world revenue US $ 2.25 billion (3% of world GDP) and provided 29 million people employment opportunities. In CGI, there are 11 sectors involved in creative industries.

CCI sectors	Revenues (2013, US$b)	Employment (2013, number of jobs)
Television	477	3,527,000
Visual arts	391	6,732 000
Newspapers and magazines	354	2,865,000
Advertising	285	1,953,000
Architecture	222	1,668,000
Books	143	3,670,000
Performing arts	127	3,538,000
Gaming	99	605,000
Movies	77	2,484,000
Music	65	3,979,000
Radio	46	502,000
Total (before removing double counting)	2,285*	31,524,000*
Total (minus double-counting)	2,253	29,507,000

Figure 1.1: Television tops the charts CCI sectors, EY, 2015 (Lhermitte, Perrin & Blanc, 2015).

Figure 1.1 showing involved sectors in global industry creative within two patterns stands out both are Mass versus Nimbleness and Revenue versus labor intensity. Visual arts and television are the heavyweights, accounting for more than a third of the economic value generated by Cultural Creative Industries (CCI) revenues US$ 391-477b and 3.5-6.7 million employed. Radio and music are the smallest CCI sectors with revenues US$ 99-46 billion just employed 605,000-502,000 but are evolving in dynamic markets. Meantime patterns of revenue versus labor intensity for advertising, newspaper and magazines, and architecture returns with great revenues US$ 222-354b employed 1.6-2.8 million. The other parts music, movie, the performing arts and book revenues 65-143 million and employed 2,484,000-3,979,000.

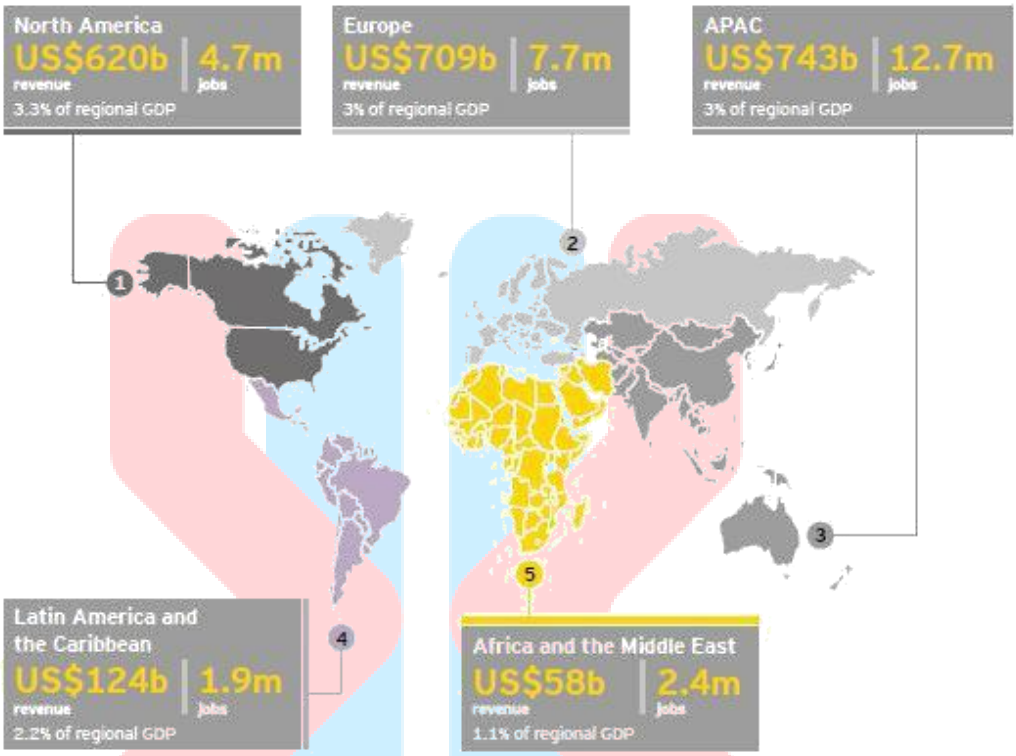


Figure 1.2: The first global map of cultural and creative industries, EY, 2015 (Lhermitte, Perrin & Blanc, 2015).

CCI by five regions in figure 1.2 as a complex and colorful canvas results in revenue and job employed. Asia-Pacific (APAC) is the world‟s biggest CCI market, generating US$743b of revenues (33% of global CCI sales) and 12.7 million jobs. Europe is the second-largest CCI market, accounting for US$709b of Revenues and 7.7 million jobs. Europe also remains a trendsetter on the global stage with UK is a leader in the art market that especially due to its contemporary art, and French company Publicis is a key player in the global advertising industry. The European cultural economy also relies on a well-structured ecosystem with the presence of big CCI players (WPP Group,

Pearson, Axel Springer, Universal, Ubisoft and others). North America is the third-largest CCI market with revenues of US$620b and 4.7 million jobs by leading cultural and entertainment players. North America is also at the forefront of the digital transformation, with the largest number of consumers of digital cultural content. While Africa and the Middle East achieves US$58b in revenues and 2.4 million jobs. Today, African societies contain cultural riches that are bubbling up to embrace the opportunities offered by new technologies and commercial markets. With striking successes such as the rise of Nollywood, the Nigerian film industry, which is now reckoned to directly employ more than 300,000 people.

County	**US$b**
US/Canada	10.4
China	4.8
Japan	2.0
France	1.8
UK	1.7
India	1.7
South Korea	1.6

Table 1.1: Top 10 box office markets in 2014 (US$b) (Motion Picture Association of America, 2015).

According to the MPAA 2014 (table 1.1), U.S. / Canada box office was US$ 10.4 billion as the highest of all. Admission or tickets sold 1.27 million more than two-third of the U.S. / Canada population went to the cinema at least once in 2014. Following by China, it also began to stamp authority on the film

industry with a turnover US$ 4.8 billion as the audience increase rapidly (Lhermitte *et al.*, 2015). Chinese box office receipts now rank a second worldwide. While mainland China‟s movie industry is thriving; aided by the international reputation and skills of Hong Kong movie makers. Domestic and collaborative international productions are gaining art-house audiences, while popular films, such as the Detective Dee series, have now won showings worldwide (Lhermitte *et al.*, 2015). Japan industry revenue US $ 2.0 billion, which third rank worldwide. Production, distribution and box office are mainly managed by three major companies, where these major companies have respective chain of movie which show their productions (Emiko & Koyoshi, 2014). According to Masnick and Ho (2012) French movie theaters have been consistently high in 2014 achieved US$ 1.8b admissions US$ 169 million for the first ten months of the years. While 14 new released were hitting screens, although among them were several movies that have the critics on their side. UK‟s gross value added (GVA) was US$93.8b in 2014 and US$1.7b box office markets. Between 2013 and 2014 GVA of the Creative Industries increased by a larger percentage than any of the Blue Book sectors, with the exceptions of Construction (Department for Cultural Media and Sport, 2016). India is the third-largest cinema market in Asia after China and Japan, and sixth-largest globally, with annual box office revenues of US$1.7b. And it is still growing, aided by the opening of 150 new movie theaters every year. However, Bollywood the most exportable, they are very popular in Asia-Pacific countries (Lhermitte *el al.*, 2015). Additionally, India‟s directors have won acclaim at

international movie festivals. South Korea movie theaters receipt ranks seventh worldwide with revenues US$ 1.6b including exports film as well as services and domestic location sales. According to an industry analysis report released by Korean Film Council (KOFIC), the industry saw growth on the previous record. Korea‟s industry creative backed by grown the Digital online markets like IPTV and digital cable TV VOD (Oxford Economics, 2011).

1.4 Issues of Animation Production

Animation is an expeditious-growing and exhilarating area of ICT. In the past, animation was mainly utilized for television cartoons and animated movies, but it can now be found on the Internet, mobile phones, in advertising and computer games. Animations created for a wide variety of applications because usable tools are available and the expertise to apply them will become more widespread among the new generation (Badler 2000). Animation industry involves creative and conceptualization stage of creative production for global markets.

Each production studio every creation studio is liable to have a custom pipeline controlled by the kind of venture they are as of now undertaking. Additionally, activity generation is an extremely planned procedure where distinctive groups of specialists cooperate while using ideal assets and accomplishing the starting objective in the time accessible. A 2D creation pipeline begins with exercise manual and goes completely through last checking,

treating the soil and film yield, whilst the 3D CGI generation process underlines the outline, displaying and apparatus and liveliness stagesis. Techniques tool primarily within pipeline process are not much study of the problem of re-using traditional animation to create new animation by providing components of a system to re-use the image (Juan and Bodenheimer 2006). Most systems don‟t offer a surplus value and hence it difficult to convince animators to make the shift to computer assisted animation in retaining the natural way of drawing and editing (Fiore and Reeth 2002) in offers additional functionality such as rapidly creating approximate 3D models and deforming animation objects.

Most animation today has begun to utilize computer animation rather than use the traditional animation process. The process 2D animation techniques tend to focus on image manipulation and 3D techniques is building a virtual worlds where characters/objects can move and interact in. By itself, 3D is not sufficient it display of data is not a new concept (Wright 1995). Process rendering of any 2D animation is usually much faster than 3D since there are no complex geometric calculations involve. Through manipulate single drawings giving them the appearance of classical animation. 2D animation look flat and 3D animation can create images that seem real to the view

Animation production as technology is becoming more powerful and user-friendly. Instead in animation industry the technological development in particularly embody barriers to entry and requires a combination of artistic talent and technical skills (Yoon and Malecki 2010). Animation involves teamwork, creativity and innovative as animators in outsourced countries such as Southeast

Asia develop their skills with US as one of the most significant market in the world (Islam, Shamsuddin et al. 2013).While present day liveliness programming may be less direct than the great methodology, they give the artist an essentially more hearty arrangement of instruments to work with, permitting artists to investigate more mind boggling and point by point styles without a whole group of specialists sponsorship them up. Where whole groups of specialists used to drudge for quite a long time to breathe life into a solitary scene on the screen, a solitary illustrator can now basically swing to the numerous 2D movement apparatuses available to him.

Technology driven animation equipment could use as evaluable for more effective animation production. Evolution of animated cartoon through time by followed latest technologies throughout the years (Reichart, Arnberger et al. 2007). There are various tool can be applied in animation production. Juan and Bodenheimer (2006) says tools as primarily focus on the problem of creating new animations from models. These tools allow the incorporation of traditional animation can be re-used. Align with alteration the technology of 3D computer absences to aid animation production. 3D computer techniques work useful during animation process of the production (Gursac 2001). As such, numerous studies have utilized pictures or PC controlled still pictures to survey social conveying limits, while data about the impact of movement on the assessment of trail situations is inadequate (Reichart, Arnberger et al. 2007). Although a number of local animation titles have been produced until today, there is still a

lack of available quantified information to be used as reference for this study (Omar and Ishak 2011).

1.5 Problem Statement

To further enhance animation industry, emphasizing of this study will review the various methods of animation as facilitate guide. Study in techniques works usefully during the process of the production (Gursac 2001). This study will coordinate the gap between existing methods entry the industry. The methods of the producing will be concern with both good in animation produced terms of quality and quantity. Clarifies the concepts and defines the procedures view of the final result (Popkonstantinovic, Krasic et al. 2012). This study will lead on the most convenient methods and appropriate with entrepreneurs‟ factors, it includes technologies, labors and technical skills which will molded in animation production.

1.6 Research Questions

1. How to identify the ideal animation production process suited for Malaysia context?
2. What is assesment to improve animation production processes for Malaysia practitioners in industry?

1.7 Research Objectives

1. To determine common animation production methods from literature.
2. To propose the recommendation toward the improving methods for local production house.

1.8 Significant of Study

- Provide empirical finding as points of references for animation production industry and key players to manage animation efficiently.
- Comparative analysis of various animation production methods and processes.
- The study on practical methods for animation production process in Malaysia industry through qualitative approach.
- Comparative analysis of common animation production process in various methods of theoretical aspects from literature and practices from industry in Malaysia.

The proposed research results can be enormous benefits to local animation companies and this project can benefit to practitioner involved by urge quality to international standard. The animation film maker in particular, will be able to produce more efficiently creative film through an appropriate animation production practices suggested from finding with their skills to overcome weaknesses in film production process, especially to those competencies produce and deploy costly.

Finally could also assist an animation production company to choose the right product development style for an animation project. Animation studios are an established base of understanding differ business circumstances demands where each comes by distinct barriers and challenges.

- To highlight some significant comparison of process and method which applied in animation industry especially Malaysia perspective.
- The Finding could as use as a point of reference expert to practitioner and researcher toward the improvement of animation production.

1.9 Research limitation

Although there is much remains to be done, the study generates important finding in the field of production house and comparative by methods sample. In other works, having acknowledged the limitations of data processing, nevertheless there are some limitations of this study. The study was in the critical care setting producing process in the animation production where the structure of the phases, stages step, and the tasks department. Additionally, the managing of the production working there may different to the company in industries set up. Thus, a great deal of caution should be addressed as to the transferability of this study to other studies with different study settings. Two productions could only do obtained by data collection, therefore secondary data were examined. Also, only directors were interviewed hence, the opinions clients, audiences, and other stakeholders were not included in this study.

Doing this study was obtaining a reliable data, particularly about the Malaysian animation production. Despite this, the study approach in this research obtained an effluent data set of production involved. Data relating this topic are significantly limited in the literature. The limited data from this study restricted this project‟s ability to generalize about wider trends or build new theories. The finding of this thesis is based on the experience of two production companies, and offers greater knowledge about the producing of a animation product for local and aboard markets. This study will add to the significant gap existing in regards to this topic in industry and academic. As one of the first research studies examining the issues of the Malaysia industry, this research makes a significant contribution to an emerging field of academic inquiry.

1.10 Structure of thesis

First chapter roughly illustrated about animation in general and animation production. The related animation issues discussed due to difficulty to animation industry will follow problem statement. This chapter also mentions research questions linked to objective questions and become a guide to research methodology. Next of this chapter emphasize the significant of research to basic concentrators in field. The end of the chapter recounts the overall structure of the research.

The second chapter focuses on subjects related literature review study that involving fundamental concepts and animation keys principle. For gains

clearly elaborate views against this study a detail parsing is argued on animation development and evolution of animation. All animation production methods are explored in this chapter encompasses 2D, 3D animation medium and a few associate stop-motion techniques. Every single methods enlisted are briefly elaborate each stage processes organized from pre-production, production, and post production. The enlisted methods were admitted in this chapter will be secondary data on research methods design for executing a comparative.

Third chapter in this study describing the design methodology form using comparative integrate. Researcher particularized the comparative against existing process in every enlisted chosen method. Furthermore, as executed a finding result the researcher also recommended animation production methods

Forth chapter the researcher has reported the research finding that compared methods by referring at molded dimension of processes in each method. Apart from that this chapter recommended the animation production methods. The animation production method effects on an animation product. However, practitioners have to emphasize the limitation a project conduct for preventing failure to complete.

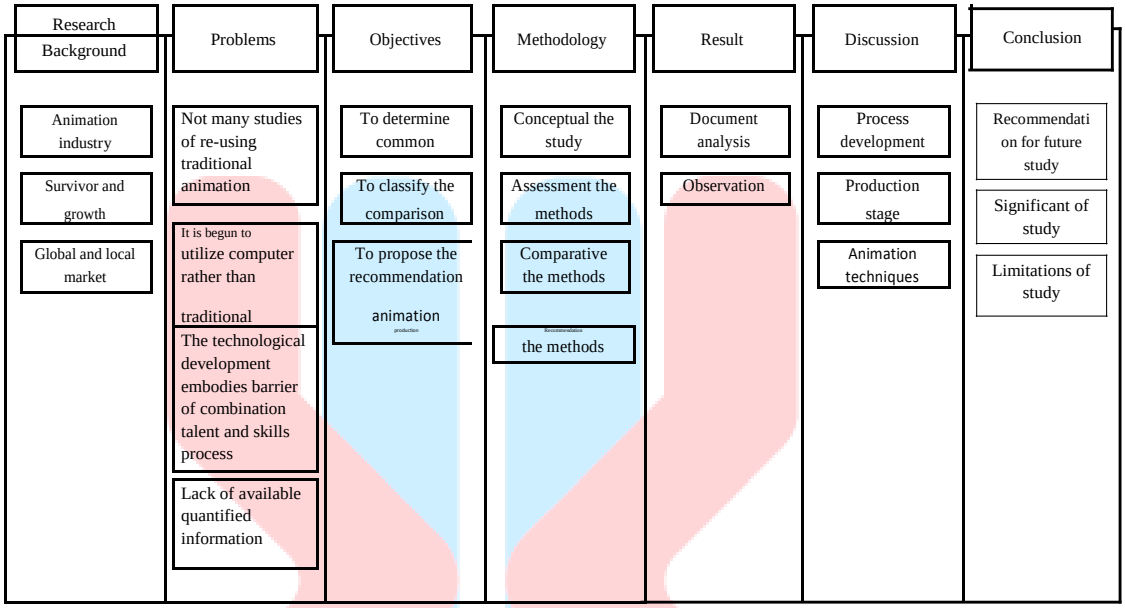
Chapter 5 discussed the finding results from undertakes study by conduct the comparative with conceptualized cover animation production methods from grounded theory. Based on findings showed the process been a major role in deal method with composition. The discussion in this chapter was highlighted about differences primarily process, organized process and additional process. Based on rated respondent‟s feedback the animation production method due be

given additional action in processes method so that production house able to increase the productivity in this field.

1.11 Summary

This chapter explained the problem statement where animation production directly affected grant to industry. The chapter also stated objective clearly and research questions. The research objectives to compare the methods of animation production through observation present researches and several past researches. Then a recommendation results from the comparative methods for assisting animation production. Hence, the absence of this empirical study is important to practitioner, academics, and animation learners in order to improve the local animation quality which capable increase national economy via expectation creative industries sector. The focus of the study had been summary through table 1.2 the study overview.

Table 1.2: Research structure.



CHAPTER 2

LITERATURE REVIEWS

2.1 Fundamental Concept and Keys Principle

This literature review chapter will focus on fundamental concept and key principles of animation process. To get an understanding of how animation produced is there will first review on animation development and evolution cross time periods. Then literature that covers the first research question, the process of animation production will be presented. In order by structuring this chapter, animation production fragmented to three stages following third animation form 2D, 3D, and Stop Motion. The animation production process, especially for animated TV series, is fairly mature by now. There are actually multiple activities embedded in each stage, according to (Malaysia, 2015); Tschang and Goldstein (2004) sometimes in sequence, and there are also concurrent activities, *e.g.* character model generation, background generation being done in tandem etc.

2.1.1 Operational Background

Animation will be connected with drawing as a visual by visualize the writing (Wright, 2005). Definitions of "animation" that limit the subject to either

photography shot a frame at a frame or to movements created frame by frame do not have sufficient breadth to accommodate all of the rich and varied forms (Hoffer, 1981).

Table 2.1: Contents citation

	Content	References	Authors
1.	Animation connected by visualize the writing	Animationwritingand development. Burlington, USA: Taylor & Francis. (2005).	• Jean Ann Wright
2.	Animation is a photography some shot movements created frame by frame	Animation a reference guide. Michigan, USA: Greenwood Press. (1981).	• Thomas W. Hoffer

2.1.2 Definition of Animation

Animation is means derived from the classical Latin verb *animus* past participle of *animare,* meaning, to make a live or to full with breath ‟, animated film is created by the illusion of movement over time using various techniques, effectively animation infuses the inanimate with spirit‟ (Solanki, 2013; Wright, 2005). Nicole, Peter, David, Paul, and William (1996)stresses animations are created form a sequence of still images. The images are displayed rapidly in succession is fooled into perceiving continuous motion. In animation it can restructure traces back in full reality. By taking sketches, clay, puppets, or forms on a computer screen, and make it seem real, would be merely appear live. From the diversity childlike dreams or the wackiest world that imagine bring it alive.

Pure fantasy look real in animation realm of creative interpretation, according to Hirento make it happens the portrayed animated fantasy world must be true to him with it unbroken uniformity rules to be reliable.

Betrancourt (2005) refers Baek and Layne (1988) defined animation as " *the process of generating a series of frames containing an object or objects so that each frame appears as an alteration of the previous frame in order to show motion*". Gonzalez (1996) proposed a broader definition of animation as "*a series of varying images presented dynamically according to user action in ways that help the user to perceive a continuous change over time and develop a more appropriate mental model of the task* ".

Solanki (2013) stated the animation has particular ways of telling stories using image, sound, and narrative, separating itself from live-action and other mediums, possessing its own vocabulary so to speak. Since the drawn of humankind, it has tried to preserve culture and way of life through of stories. Initially, these stories were passed down orally from generation to generation, until alphabets and writing allowed to document history on stone, wood, and animal skins (Till, 2006). Steven adds an effective way they had to tell their tale was through the use of pictures.

Mayer and Moreno (2002) claimed an animation refers to the simulated motion picture reflects depicting the movement of drawn or simulated object. Pictorial design is one of the most exciting in expresses the presentation is animation. Mayer and Moreno (2002) refers to Mayer and Moreno (2002) has mention the main feature of this interpretation is as follows: (1) picture-an

animation is a kind pictorial representation, (2) motion-an animation that clearly depict reflects the movement, and (3) simulated-an animation consists of objects that exist artificially through drawing or missing other simulation methods. In distinction, the video refers to the motion picture that reflects the movement in the real object. Similarly an illustration is static picture of drawn or simulated (similar) objects where photo is static picture of real objects.

According to Till (2006) the actual concept of animation has been evolving since 1824 when Peter Roget introduced the idea of "persistence of vision". This theory states that the brain and eye (more specifically, the retina in the eye) will look at a broken image and the retina and brain will attempt to fill the gaps in the broken image (R. P. Butler, 2008; Nicole et al., 1996; Parent, 2002; Till, 2006). This is why the sequence of image from a filmstrip or video as one continuous motion. More accurately, the illusion of movement on film is created by a physiological phenomenon called the persistence of vision, as mentioned earlier (Laybourne, 1988). The concept of animation can be characterized using three different levels of analysis: Technical, semiotic and psychological (Betrancourt, 2005; Wolfgang & Richard, 2003) stresses the technical level refers to the technical devices used as the producers and carriers of dynamic signs.

An animation produced by the illusion of movement through generate a series of frame, this techniques from sequence of still image and itself simulated by pictorial movement reflect depicting the movement of drawn and object to make a life. This refers on concept of movement by idea persistence of vision.

The complete animation produced particularly tells a story through combined from image, sound and narrative.

Table 2.2: Contents citation.

	Contents	Titles	Authors
1.	*Animare*,meaning, to make a live or to full with breath.	The distinctive of animation. Stone Bridge Press. (2006).	• HirenSolanki
2.	Ordering to show a motion by frame.	The animation and interactivity. Cambridge University Press. (2005).	•MireilleBetra ncourt
3.	Develop a more appropriate mental model	Does animation in user interfaces improve decision making? in Proceedings of Computer Human Interaction, CHI‟96 (Vancouver, April 1996), ACM Press, 27–34. (1996).	•Cleotilde Gonzalez
4.	The simulated motion picture reflects depicting the movement	Animation as an aid to multimedia learning. Plenium Publishing Corporation, 14, 87-98. (2002).	• Richard E. Mayer • Roxana Moreno
5.	“Persistence of vision”	Exploring 3D animation with 3Ds Max 8.Clifton Park, NY: Delmar Learning. (2006)	• Steven Till

2.1.3 Animation Forms

There are several form of animation, according to Hoffer (1981) animation was defined as four basic classes: cel-animation, object-animation, drawing-on-film, and computer animation. Till (2006) claimed that the majority of the industry agrees that there are twelve principles of animation. It is

important to keep in mind that these concepts are applied to all animation, whether it is stop-motion, 2D cel, or even 3D CGI animation.

Animation through the Disney model, whether aesthetic, narrative or technique centered has been an important factor in the documenting of cel and drawn animation and is one that came to define the form (Selby, 2009) creating enclaves of both ardent admirers and staunch activist.

The field of professional 2D animation has not profited much from advances in computer-assisted animation. Most professional studios still animate by hand, using a process that has changed little since the 1950‟s. Wright (2005) stressed in striking contrast to related fields such as commercials, art and 3D animation, 2D animation studios use computers in a supporting rather than a central role. Walt Disney Feature Animation is the exception; they have been using a computer assisted systems since 1987. (Reichart, Arnberger, & Muhar, 2007) added a wide variety of techniques are used in the process of creating a complex computer animation such as Disney and Pixar‟s *Toy Story*(Reichart et al., 2007). These techniques can be grouped into two main classes: two-dimensional (2-D) and three-dimensional (3-D). Although there is some overlap between the two classes, 2-D techniques tend to focus on image manipulation while 3-D techniques usually build virtual worlds in which characters and objects move and interact.

In computer animation developed 2D animation techniques based on traditional animation. Techniques such as storyboarding, key/tame animation, *inbetweening*, scan/paint, and multi plane backgrounds attempted to apply the

cel animation process to the computer (Lasseter, 1987). Two-dimensional (2-D) animation techniques to complement the use of distributed tools of the role sprite-based animation, blending or morphing between images, embedding graphical objects in video footage, or creating anchor abstract patterns array of mathematical equations. The impact of 2-D techniques can be as spectacular as the addition of the film character E.T., to a shot of the moon, or as subtle as the erasing of lines around matte boxes for the TIE Fighters in *Stars Wars*(Hoffer, 1981).

Three-dimensional animation involves the construction of a generated virtual world where characters and objects interact to grab move and touch (Reichart et al., 2007). When it‟s working animators must model, Animate and render the 3D scene. It is a modelling involves the elements of a scene and placing subsequent decisions an appropriately. Animating in particular ways objects motion should have been moving in the 3D world. Rendering is about this order in the scene exchange on the motion of objects and images. According to Lasseter (1987) early 3D animation systems were script based, followed by a few splice-interpolated key/rome systems. But these systems were developed by companies for internal use, and so very few traditionally trained animators found their way into 3D computer animation.

Stop-motion is the technique that perhaps best embodies the subject of craft in animation Selby (2009) stresses „Stop motion‟ could apply to any animation, as the progress is basically the same. Used primarily for the capture and recording of three-dimensional models, stop-motion requires degrees of

patience, rigor and understanding at least comparable to *cel* or drawn animation. Something is manipulated, moved incrementally by hand, and the image captured. Three-dimensional models may be made of malleable material, such as clay, or are "jointed" models or puppets known as armatures, a pencil drawing, a pile of sand, some clay, a computer image or paper cut-outs, although equally they can be inanimate objects (Purves, 2008; Selby, 2009). When the images are strung together at an appropriate speed, the eye is fooled into thinking something has moved in a continual manner.

Table 2.3: Contents citation.

	Contents	**Titles**	**Authors**
1.	Four basic class animations.	Animation a reference guide. Michigan, USA: Greenwood Press. (1981).	• Thomas W. Hoffer
2.	Two main class animation techniques.	Animation a reference guide. Michigan, USA: Greenwood Press. (1981).	• Thomas W. Hoffer
3.	Stop-motion technique best embodies the subject of craft in animation.	Animation in process. London, UK: Laurence King Publishing Ltd. (2009).	• Andrew Selby
4.	In computer animation developed 2D animation techniques based on traditional animation	Principles of traditional animation. SIGGRAPH. (1987).	• John Lasseter
5.	3D models made of malleable material.	Stop Motion: passion, process and performance. Elsevier Ltd. (2008).	• Barry J. C. Purves

2.1.4 Animation Contents

Animation, like all expressions of the visual arts, exists in an assortment of contexts. These have offered opportunities freedoms to expand the form and have also shaped the direction, growth and impact of the genre over the last century. The arts are continually under threat from other subjects and interests, which is perhaps ironic given that one of animation‟s prime drivers is its ability to engage with an audience and promote the virtues of these other subjects (Selby, 2009). To counterbalance this threat, animation has continually sought to be an apparatus for content. Although some might more readily associate animation with flippant, comical or light entertainment, Andrew says there are many examples where the form has been used to promote serious content, such as political propaganda, clinical procedure and economic forecasting. Such variety shows the true diversity and functionally of the subject, ensuring that it always remains relevant.

Towards a theory of animation was divided in two categories which are Orthodox animation and Experimental animation. Orthodox animation commonly most toons highlighted "figures" i.e. identifiable individuals or creatures who compared to what gathering of people would comprehend as a universal person or animal regardless of whatever bright; or offbeat outline idea was identified with it (Wells, 1998). Orthodox‟s condition consisting; Specific continuity, Narrative form, Evolution of content, Unity of style, Absence of artist, Dynamics of dialogue. Solanki (2013) stressed that customary liveliness

for the most part alludes to movement that successfully appears to be more routine and attractive than its partner. With more notable portrayals of characters, items, and area, it depicts the kind of liveliness you could for the most part hope to see on TV or in the film.

Experimental animation implicate a kind of animation tends to resist configuration in the way audiences most often see it (Wells, 1998). Wells (1998) adds an experimental animation either redefines „the body" or resists using it as an illustrative image. Abstract films are more concerned with the rhythm and movement in their own rights as opposed to the rhythm and movement of a particular character. Experiment consist specific non-continuity, interpretive form, evolution of materiality, multiple styles, presence of the artist, and dynamics of musicality. To some degree all animation is, by definition, experimental (Selby, 2009). There is uncertainty in even the most bolted-down scripts, the tightest production schedules and the most fraught filming sessions simply due to the presence of the natural element of chance. Selby (2009) says Even the term „alternative" can be misleading, as it assumes are all conditioned or experienced in the same way, regardless of background, gender, race or class, as a subject with such a relatively short history, animation positively explodes with expectancy, on the part of both creator and audience, and the term „unorthodox" here attempts to provide a framework around how works that connected with this description might be defined.

Figure 2.1 speaks to a meaning of universal and test activity as restricting yet related structures. Formative activity works as a method of expression

consolidating of selecting components of both methodologies, speaking to the stylish and logical strain between the two obvious extremes.

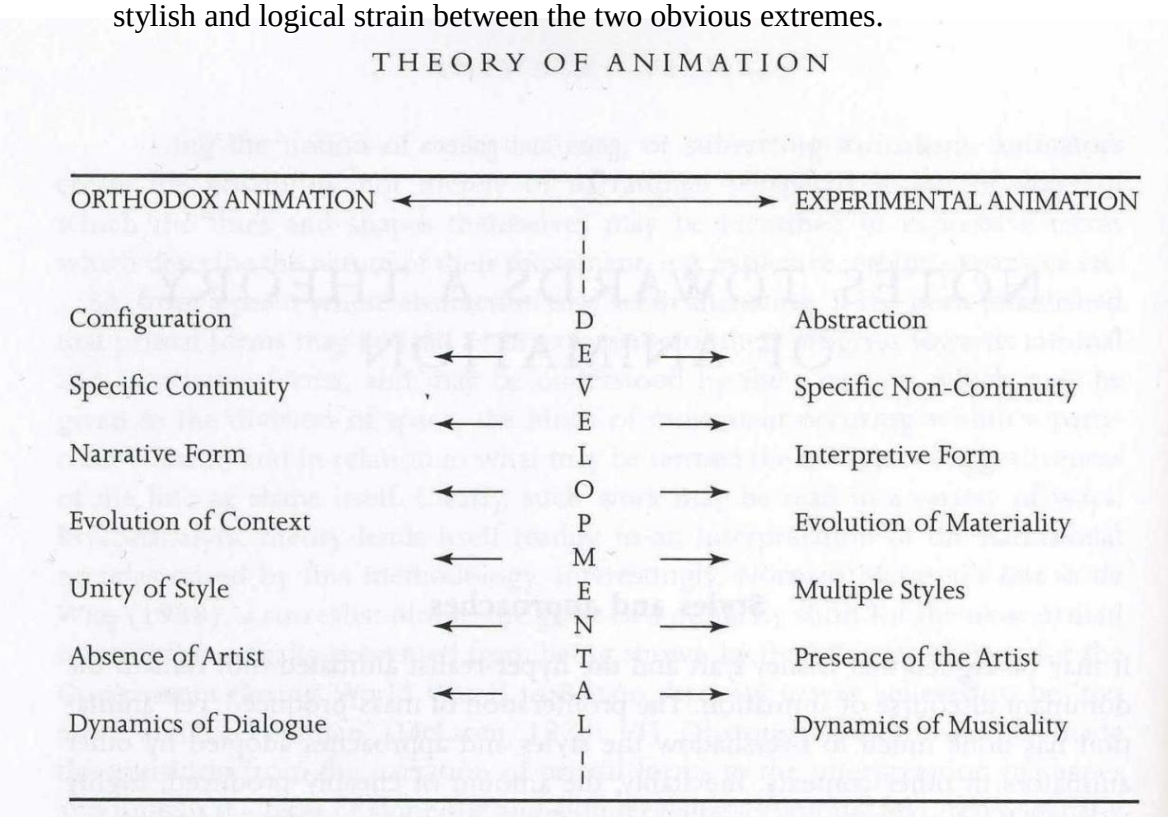


Figure 2.1: Theory of animation (Wells, 1998).

Which make animation more perfect and professional between the late 1920 's and late 1930 's a new drawing interdisciplinary approach is needed to increase the level of animation range it is valuable to first comprehend their relationship to the movement standards utilized as a part of hand drawn activity. In an article by Lasseter (1987) the principles of animation as articulated by some of the original Disney animators. These principles are squash @ stretch, timing, secondary actions, slow in @ slow out, arc follow through/overlapping (Parent, 2002). Meanwhile Nicole et al. (1996) discuss the following basic

techniques, which make your animations more professional, life-like, and believable; Onion-skinning, Cut-outs, Ease-in/ease-out and velocity curves, squash and stretch, Cycling, Secondary action and overlapping action, Hierarchical motion, Anticipation-action-reaction, Line of action, Exaggeration. While the talk every guideline as far as how it may be actualized utilizing PC activity strategies, the standards are sorted out here as per the kind of issue they add to significantly. Since a few standards identify with different issues, some rule show up under more than one thing.

The Three Little Pigs (Brenner, 1972). It turns into the essential standards of conventional movement: Squash and Stretch - Defining the distorting so as to unbend nature and mass of an item its shape amid an activity. Timing - Spacing activities to characterize the weight and size of items and the identity of the characters. Reckoning - The readiness for an activity. Arranging is showing a thought with the goal that's it is unmistakably clear. Complete and Overlapping Action - The end of an activity and building up its relationship to the following activity. Straight Ahead Action and Pose - To-Pose Action - The two differentiating Approaches to the making of development. Moderate In and Out - The dispersing of the inbetween edges to accomplish nuance of timing and development. Bends - The visual way of activity for normal development. Embellishment - Accentuating the substance of a thought through the configuration and the activity. Optional Action - The activity of the outcome objects from another activity, Appeal - Creating an outline or an activity that is appreciates viewing the crowd.

Table 2.4: Contents citation.

	Contents	Titles	Authors
1.	Orthodox and Experimental animation are two categories of animation theory.	Understanding Animation.New York, US: Routledge. (1998).	• Paul Wells
2.	Orthodox animation generally refers to seems more conventional and marketable than its counterpart.	The distinctive of animation. Stone Bridge Press. (2006).	•HirenSolanki
3.	Experiment consisted degree all animation.	Animation in process. London, UK: Laurence King Publishing Ltd. (2009).	•Andrew Selby
4.	Principles of animation.	Computer animation: Algorithms and techniques. San Francisco, US: Elsevier Science. (2002).	• Rick Parent
5.	The fundamental principles of traditional animation	Principles of traditional animation. Siggraph. (1987).	•John Lasseter

2.2 History and development of animation

This section explored the history and development of animation early discovered of Paleolithic cave paintings till 21th century. Major social and technological movements and the effects they had on animators working at the time will be discussed such as animated film derives from the old 'magic lantern' shows. This section also will be examined to see how animation has developed as an art form to the first film cartoon, then started developing children's stories into cartoons. The discussion read related texts and view historic and contemporary animation work. The influential essay to stimulated interest in

'magic lantern' technology, and was followed by several technical developments. Later came the first movie projector and present the new generation of animated cartoon graphics.

2.2.1 The evolution of animation

The early animation‟s retrieval was in Shahr-e Sukhteh (Heinsohn, 2011), Iran about 3,200 years old. A wonderful cup was found which catches for the first time the Ibex in movement (Biscione & M. C. Bulgarelli, 1983). Drawings on the bowls and walls showing the course of action as an attempt to illustrate the phenomenon of the moves using the sequence of the five images only recently identified as being sequential (Figure 2.2).

Figure 2.2: Cup (diam. 8cm, height 10cm) with five representatives of an Ibex from Period I of Shahr-I Sokhte (Gunnar, 2010).

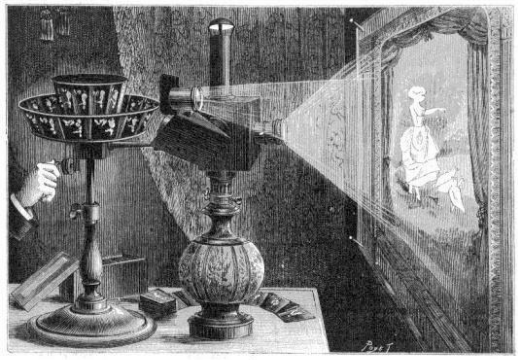
The progressing of cartoons as today would not be possible if it weren‟t for the technology behind the scenes (Michelsen, 2009). There are a couple of

gadgets which are a bit of the early history of movement and these gadgets do a reversal to the nineteenth century. The primary gadget is the Phenakistoscope (figure 2.3) imagined in 1831 by Joseph Plateu, a researcher and previous craftsmanship understudy (Beckerman, 2009; Michelsen, 2009). Drawings were animated in parlor toys and other gadgets such as John Aryton‟s Thaumatrope at Paris in 1825 or the Phenakistiscope in 1832 (Hoffer, 1981). The initials phases in moving illusion resulting from equipment invention known as "Zootrop" device originating in China in the 2nd centuryin the new era (Rick, 2002:4 ref. Ronan, 1985). According Popkonstantinovic, Krasic, Dimitrijević, and Popović (2012) early animation devices is the Zoetrope (figure 2.4) designed by William George Horner in 1834 and was named “Daedalum” or the wheel of the devil. However according to Michelsen (2009) it did not become popular until the 1860„s when it was patented by makers in both England and America. The next following device is the Praxinoscope comes after the zoetrope and was invented in France by Charles-Émile Renaud (Crafton, 1993; Michelsen, 2009). According R. P. Butler (2008) the praxinoscope (figure 2.5) theatre was an updated version of the Zoetrope. Patented by Emile Reynaud of France in 1879, this optical toy essentially was a moving image framed with a painted stationary image. The following big technological advance came with Thomas Edison‟s of the kinetograph (figure 2.6) in 1888 (Manley, 2011). The Kinetographs was a type of camera that was able to take up to 10 photographs per second. It was a device designed for films to be viewed individually through the window of a cabinet housing its components (Manley, 2011; Nicole et al., 1996). The huge

developed by his employee William Kennedy Laurie Dickson around 1890 and in April 1894, the first Kinetoscope Parlors were opened in New York City (Burns). Early twenty century, the rotoscope was patented in the 1910s by Max Fleischer (J. G. Butler, 2012), It is a genuinely basic gadget by which a solitary edge from a real life film is back anticipated onto a light table. The illustrator places paper on the light table and follows the picture cast by the real to life film. At that point the film is progressing to the following edge and the procedure is rehashed.

Figure 2.3: Disc for Phenakistoscope (Michelsen, 2009).

Figure 2.4: Replica of a Zoetrope (Dunn, 2004; Michelsen, 2009).



Nouveau praxinoscope à projection de M. Reynaud.

Figure 2.5: A Praxinoscope (Michelsen, 2009).

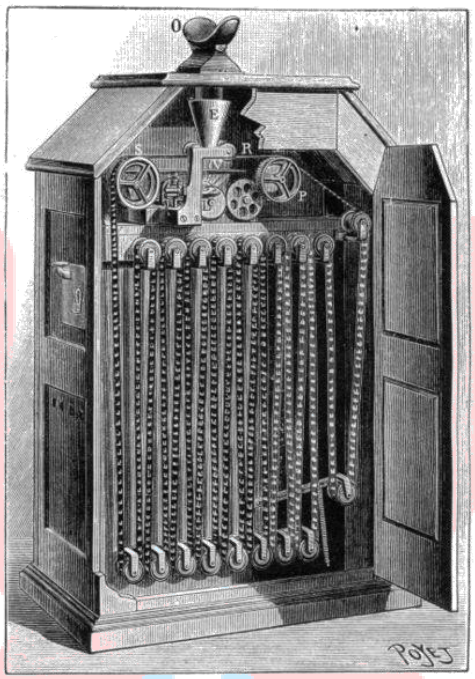


Figure 2.6: Interior view of Kinetoscope (Manley, 2011).

Foundation of animation inherent has long existed however the actual concept of animation has been evolving since 1824 when Peter Roget introduced the idea of “persistence of vision” (Till, 2006). When a person is presented with a sequence of closely related still image at a fast enough rates, persistence of vision induces the sensation of continuous imagery (Burns, 2000).

Figure 2.7: Film "Escamotaged"une dame chez Robert-Houdin" ("The Vanishing Lady") in 1896(Manley, 2011).

Figure 2.8: Winsor McCay"s*Gertie the Dinosaur* (Parent, 2002).

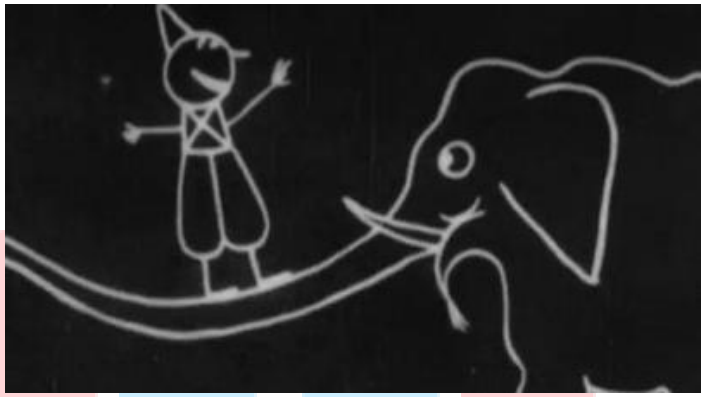


Figure 2.9: Fantasmagorie 1906 produced by Emile Cohl (Beckerman, 2009).

All through the vast majority of the nineteenth century, the thought of moving pictures remained grounded in the usage of static photographic stills expected quickly. The idea of making constant cutting edge did not happen until 1872 when British picture taker Eadweard Muybridge was contracted by California representative Leland Stanford to win a wager that every one of the four hooves of a race horse left the ground when it ran (Manley, 2011). Muybridge kept consummating the procedure, mounting the photos on a Phenakisticope and anticipating them through an enchantment light. The earliest use of a camera to made lifeless things appear to more occur in 1896. Georges Méliès, a French magician and director of the Théâtre Robert-Haudin (Ezra, 2000; Michelsen, 2009), discovered a technique now known as stop-motion animation by accident when his camera broke down (Michelsen, 2009). Manley (2011) stresses Méliès begans incorporating special effects through his use of editing based on his stage illusions. In such films as "Escamotaged"une dame chez Robert-Houdin" "The Vanishing Lady" (figure 2.7) in 1896. In 1900, J.

Stuart Blackton in Edison‟s The Enchanted Drawing drew a face of a fat man who smiled off-and-on again with the animation created by stop-action technique (Hoffer, 1981; Nicole et al., 1996). About the same time, Windsor McCay created some of the first cartoon characters, *Little Nemo* the *Clow* and *Gertie the Dinosour* (figure 2.8). The Enchanted Drawing, turned out six years before Humorous Phases of Funny F pros, or in 1900 and was created by the Edison Motion Picture Company (Beckerman, 2009; Michelsen, 2009). Beckerman (2009) adds soon after the first two animated films in 1900 and 1906 comes *Fantasmagorie* (figure 2.9) which is considered the first fully-animated film, produced by Emile Cohl, a French caricaturist. This new industry persistence define was Winsor McCay who was a funny cartoon artist and representation craftsman at New York Herald. He was the first to set up the specialized technique for enlivening representation (Eva, 2009). His first effective toon character was a brontosaurus named Gertie in Gertie the Dinosour which turned out in 1914 and comprised of 10.000 drawings (Bukatman, 2006; Michelsen, 2009).

Table 2.5: Contents citation

	Contents	Titles	Authors
1.	The early animation‟s retrieval was in Shahr-e Sukhteh.	Thrice burded: Shahr-I sokhte in the sistan basin. In Sesto CongressoInternazionale di Egittologia. (2010).	• HeinsohnGunnar
2.	The first device is the Phenakistoscope invented in 1831 by Joseph Plateu.	Animated cartoons, from the old to the new: Evolutionfor the past 100 years. Haskolinn I Reykjavik. (2009).	• Eva Run Michelsen

Table 2.5: Contents citation

3.	Early stereoscope from 1859.	3D storytelling: How stereoscopic 3D works and how to use it Burlington USA. Taylor & Francis. (2013).	• Bruce Block • Philip Captain
4.	Rotoscope and Zoetrope capitalized on the phenomena of the persistence of vision.	Design web animation. Indianapolis, USA: New Riders Publishing. (1996).	• Nicole, Brown • Peter, Chen • David, Miller • Paul, Van Eyk •William E. Weinman
5.	"Zootrop" device originating in Chinain the2nd centuryin thenewera	Computer animation: Algorithms and techniques. San Francisco, US: Elsevier Science. (2002).	• Rick Parent
6.	Praxinoscopeinvented in France by Charles and Émile Renaud	Before Mickey: The animated film, 1898 - 1928. Chicago: TheUniversity of Chicago Press. (1993).	•Donald Crafton

2.2.2 Malaysian animation

The first local animated series among Malaysia markets started in 1995 by produced Usop Santorian (Omar & Ishak, 2014). Increasing animated series produced under Kharisma Production that led to other such as Anak-anak Sidek, Keluang Man, and Badang. Muthalib (2008) claims development innovation by MDEC (Malaysian Development Corporation) produced 3D animated teaser for a TV series called Saladin. Then, in 2007 emerge Upin & Ipin animated series in

3D form which divulge for platform other animated series such as Boboiboy and Dunia Eicak (Omar & Ishak, 2014).

In 2001 Putih is the first length animation theater in 2D form produced by Fine animation production deliver the moral value in human life cycle base on folklore " Bawang Putih Bawang Merah".The new phenomenon in local industry started when the success animated film titled „Geng: Pengembaraan Bermula" become a blockbuster with gross collection RM 6.2 million. According to Rosnan and Aziz (2012) the achievement made by Les" Copaque production, government optimistic by capability animation sector gains benefit to industry.

The government has recognized activity as another segment to be created. Based on the enormous potential worldwide business sector for movement movies, the administration through MDEC (Malaysian Development Corporation) is giving base and different impetuses At the mixed media improvement company (MDeC), the leader of the MSC, a virtual reality focus is a messenger without bounds of computerized innovation in Malaysia Government (Muthalib, 2008; Rosnan & Aziz, 2012). According to Hassan the Multimedia Super Corridor (MSC), set up in 1996, has been the vanguard of changes that have added to the ascent of the rising media. This has been in conjunction with the section of numerous outside organizations that bring mastery and innovation, a lot of which are still new to local people. Other agencies like MIMOS (Malaysian Institute of Microelectronic Systems), Rosnan and Aziz (2012) adds an agency under the purview of the Malaysian Ministry of

Science, Technology and Innovation (MOSTI), is actively providing assistance to newly established production houses in the development of animated films.

In Malaysia, animation industry film has come a long way. From humble beginnings decades ago, the local animation industry has seen various phases of growth. Particularly in development of animation products, that consists of a process involves in obtaining animated knowledge and several functional related areas and presents a high degree of complexity and iteration in its execution.

Table 2.6: Timeline Chart of Malaysia History in Animation (The National Film Development Corporation Malaysia, 2014).

Year	Malaysian animation milestones
1700	A traditional theatre form of 2-D shadow puppet
1949	Filem Negara Malaysia (FNM) produced the first animation, a stop-frame animation sequence for the documentary, *The Kinta Story*
1978	FNM produced *Hikayat Sang Kancil*, the first animated short film
1984	*Sang Kancil&Monyet*, second animated film was made by FNM
1995	*UsopSontorian* was on aired on RTM as the first local animation series produced by Kharisma Pictures with characters designed by Ujang
1998	*SilatLegenda*, produced under Peninsula Pictures, became the first full-length local animated feature shown in cinemas
1999	*Kluang Man*, the first television series to include 3-D elements in combination with 2-D animation
2009	*Geng-PengembaraanBermula* was produced by Les'Copaque become the first local 3-D feature film screened in cinemas. It was also the first to break into the international market in Asia
2012	*SeeFood*, *War of the Worlds: Goliath* and *Bola Kampung the Movie* were on screen in international and local cinemas.

2.3 Animation production discussion

Several aspects involved in production animation to attain an animation production. It is a work prepared by an organization to set up an animation project. There are also several different types of animation and the cost depends on many factors. The animation industry can be classified in various ways. Technically, it is divided into two dimensional and three-dimensional animation. 2D is often hand drawn, but nowadays, is mostly computer aids, which has increased the productivity of artists by six-fold or more. 3D animation has involved a great deal of advanced computer software and processing power (Tschang & Goldstein, 2014). A computer graphics (CG) production is generally the combination of many artists' work to create one final entity, regardless of whether it is a video game, film, TV episode or commercial (Curtis, 2014). The production of animation is an important part of the creative economy. There are many sectors of the creative like in including TV, film, advertising, new media, and computer and video games [3]. It also provides entertainment including animated feature films, television series, and live entertainment for audiences around the world (Bharul *et al*., 2013). Producing animation is based on the ability to think logically, proactively, and creatively. It is cerebral act that combines a technical knowledge of the animation process with individual style, experience, and gut instinct (Winder & Lowlatabadi, 2001). Price is influenced by how much of it needs to be produced, how many people contribute to the production, how expensive the technology is to help produce it and the

production experience of the individuals involved. Children‟s cartoons are produced differently from prime-time animation because of the huge variation in budget. Television shows are not produced the same way as feature films. Director videos are something of a hybrid of the two. Independent films are made differently from films made by a large corporation. Shorts for the Internet may be completed by one person on a home computer, and games are something else altogether; 2D animation is produced differently from 3D; each country has its own twist on the process (Wright, 2005).

Throughout the animation industry, there is no single definition of what a producer does. And the role animation producers play on each project changes constantly. A producer‟s domain varies from production to production, as well as from studio to studio. The positive side of this variation is that producers are often able to shape the production to fit their own experience and expertise. On the flip side, it can lead to untested modes of production that can result in costly overage and frustration for all involved (Winder & Lowlatabadi, 2001). The role of each artist throughout the production is pivotal in meeting deadlines and ensuring the success and exceptional visual quality of the product. The work in a CG production is separated into several different departments, and responsibilities are divided among artists. Typically an artist will only contribute to one, maybe two, distinct areas in a production. This creates the opportunity for groups of artists to focus on different components of the production and create highly detailed and functional assets throughout the production process (Curtis, 2014).

2.3.1 Describing the animation production pipeline

Production required a system production pipeline to produce a smooth an animated feature film or animated product. According to Curtis (2014)the production pipeline can be loosely described in two ways. First, more concretely, the production pipeline is the set of processes used to transform a concept into a final product. Figure 2.10 presents a simplified view of the entire production workflow. The company organizational structure has departments based on budget for a project.

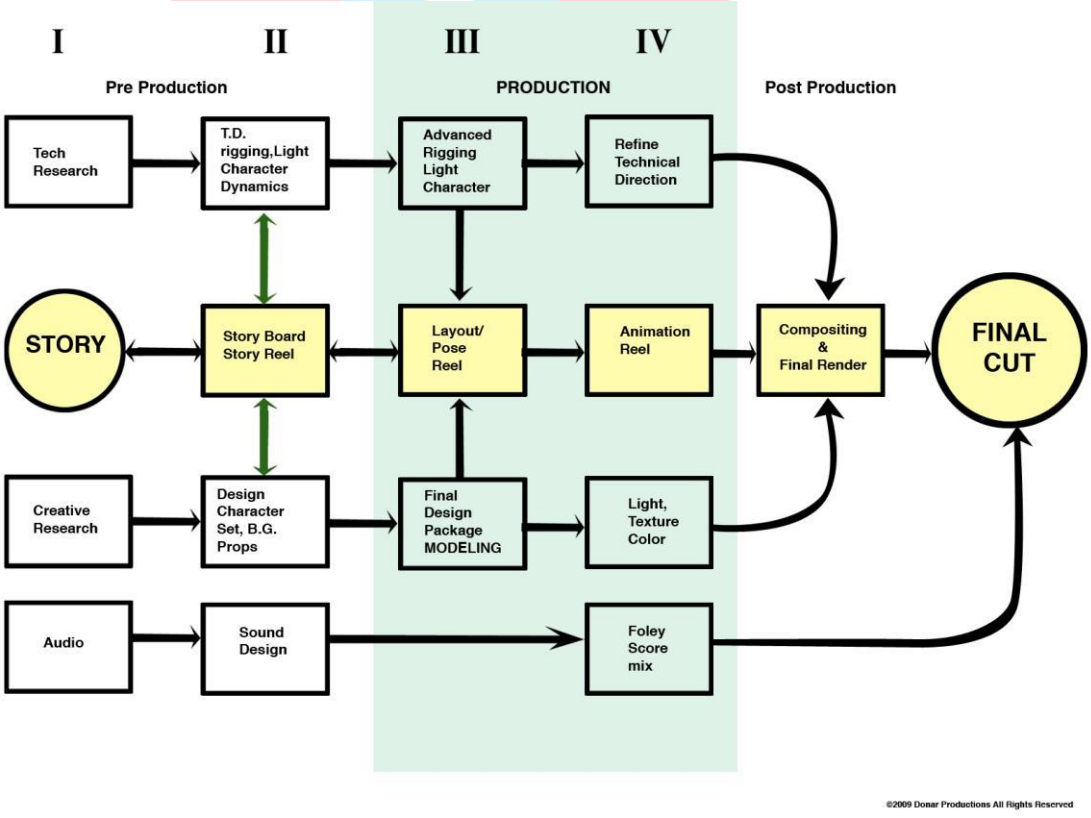


Figure 2.10: A view of the production pipeline and typical workflow (Curtis, 2014).

In animation production pipeline, the pipeline organization encompasses employment basis, department distribution, and stages. However, every company has its own pipeline for completing their animated product, according to Tschang and Goldstein (2014) the animation industry can be classified in various ways. Production pipeline will change for each animated product (Curtis, 2014). This change following varying of need as money saving, technology or to increase the quality of the animated movie. No matter what the situation is, though, the process of creating animation always starts out the same. Therefore, how to reduce story development time in animation pipeline has been an important issue. This research will examine a new method of story creation which could save time and arouse new story ideas (Mou, 2015).

There are many departments in a production to ensure smooth task distribution to employees. Jaynat (Sharma, 2014) divided to 14 departments or process in four different stages. There are actually multiple activities embedded in each stage, sometimes in sequence, and there are also concurrent activities, character model generation, background generation being done in tandem (Tschang and Goldstein, 2014). Animation production services in any production industry can be classified into three stages (Winder & Lowlatabadi, 2001). There are found pre-production, production and post-production in stages that must pass in a certain process.

The conceptualization stage starts with an idea to capitalize on an early stage script or property, or to develop something new. This is eventually fully fleshed out as an idea and script (Tschang & Goldstein, 2014). Planning is also

done at this stage, in stage has to develop a concept or idea, and from that concept or idea we collect more information related to it and start developing a story for our animation film/clip. The second stage is pre-production that involves story departments, editorial, art, and casting. This stage breakup a story in multiple scripts then prepare thumbnails of each script separately and next step is to prepare following from each thumbnails involving character designing and also background. For animated features, pre-production may be more elaborate and iterative (Tschang & Goldstein, 2014). 3D process such as Pixar‟s, the content pipeline is started by laying out the various aspects that ensues in production as modeling, rigging, surfaces and various tests of animation and other software systems (Tschang & Goldstein, 2014). A third stage is production which is involving departments modeling, shading, rigging, set dressing and also at this stage are going to animate movie. During creating a geometric model of environment, props, characters by keeping in mind the ultimate purpose of the model. For character animation a setup internal skeleton and animation handles appropriately for that character‟s behavior. This phase tends to start out slow and then snowball toward the end (Curtis, 2014). Fourth stage is post-production where involving departments lighting and rendering. This is the last stage for animation movie / clips that cover following. An understanding of rendering process being an essential basic which is frame per hours to render, render farm. In designing sound / music process, have to match a video theme and character voices against characters. Post-production is the third and final step in film

creation, and it refers to the tasks that must be completed or executed after the filming or shooting ends (Tschang & Goldstein, 2014).

2.3.2 Files management and workflow in the animation production pipeline

As journey an animation project manage file and workflow something of a top-level thing. To gain some top level grant business going and really on plan. In this level everything would deal with is going to be an abstraction or data entry for real stuff. In manage file is need to emphasize on asset and task management while workflow is structuring the production team.

Assets and tasks are a handy ways to think of what a project is, element emphasizing on assets is often broken into things like shots, models. Tasking is things to be done on any assets to make it complete. Assets are nouns, tasks are verbs. Then a shot (an asset) needs to layouting, animating, shading, rendering, compositing to be completed. Assets are independent with a shot asset may need several models, shalders and rigs their own sub assets. Tasks are independents with animation cannot begin without rigs, shading cannot begin without modeling, further, tasks on one asset are dependent on tasks in another. An asset / tasks manager in the abstract can be considered to be a combination of an asset database and a dependency graph. That graph can be designed as task-based, or it can include asset-to-asset dependencies. I‟m a bit more in favor of the former, as it allows for more flexibility but seems to be still „doable‟ in the abstract. It might be necessary to simplify this when dealing with actual files.

There have a 12-step flow chart for the process of film making with can aligned to an animation project. Start with The ideas and following by Development finance, Production companies, Script Development, Packaging, Financing, Pre-production, The shoot, Ligting and sound, Post-production, Sales, Marketing, Exhibition and end with other windows (Dahl, 2011). As a result, start dates and end dates are staggered in concert with the production plan. The staff‟s work is typically segmented in figure 2.1, as each asset and/or shot proceeds from one department to the next. The producer paces the production in terms of the number of artists and production staff needed based on the budget, schedule, and creative requirements of the project, which is more easily said than done because projects are always in a state of flux (Winder & Lowlatabadi, 2001). On higher-budget productions, artistic leads are selected from each department to guide the team and oversee its work called as Department supervisor / lead. A producer‟s management crew or production staff performs a vital part in keeping the project together and moving it forward. Using subcontractors is a very common practice within the animation industry. Subcontracting occurs in all formats of the business.

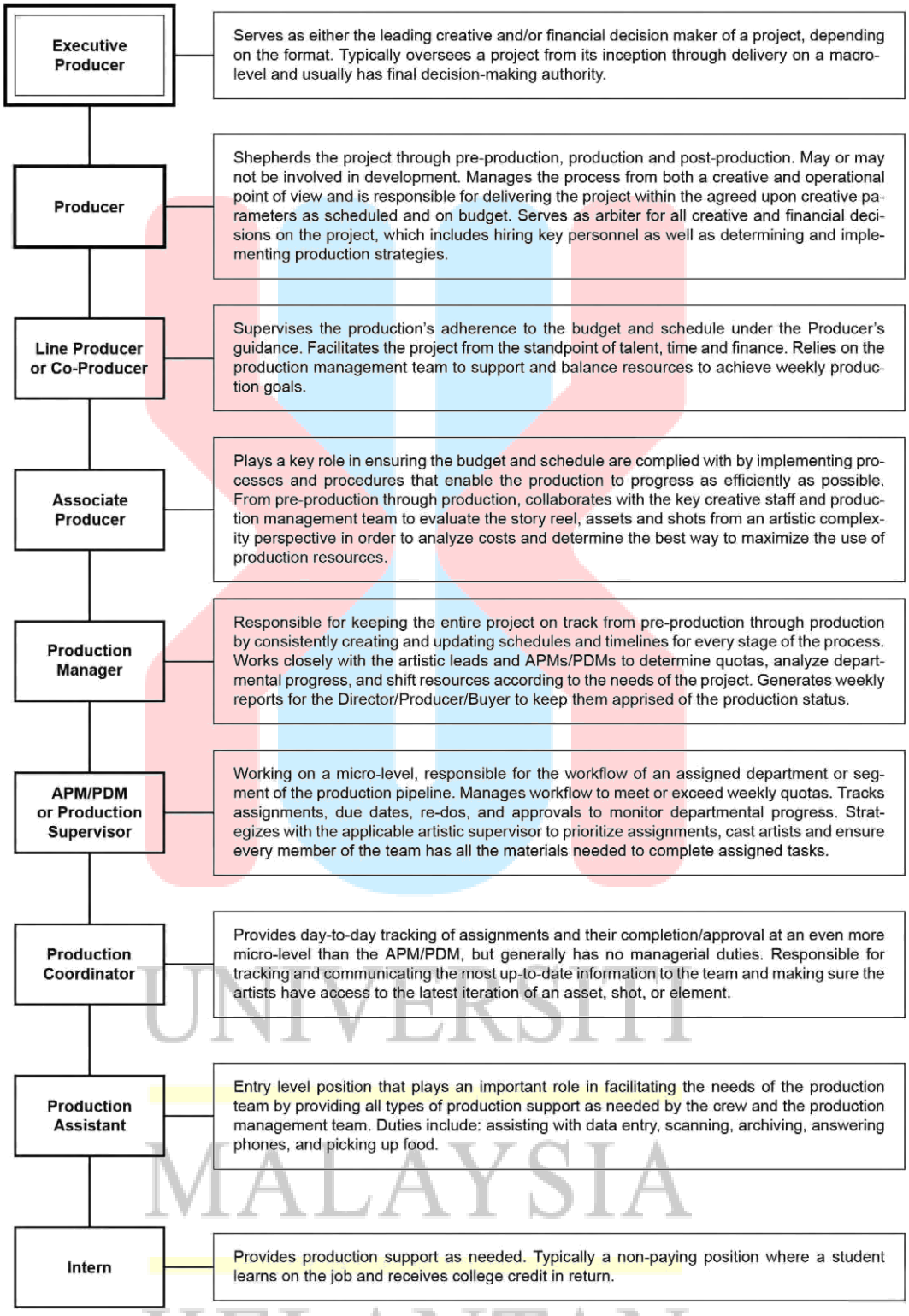


Figure 2.11: The Procedure"s Team (Winder & Lowlatabadi, pg 154, 2001).

With so many stages of production, it‟s clear that a team of people will be needed to get the job done (figure 2.1). While every studio and film may have different requirements or procedures, here are the most likely players in a production (White, 2006). Crew sizes on independent projects tend to stay quite small. The benefit of being small is having more control over every aspect of production. The problem with being small is that are responsible for doing almost every aspect of production, which is almost always bigger and more time-consuming than anticipate. As productions get bigger, the different aspects of production are split between more people of different skills in order to spread the burden as well as get the job done more quickly. Every production house deal with animation job titles and duties a little differently (Simon, 2003).

Table 2.7: Production teams and workflow.

Departments	**Tasks**	
	2D	**3D**
Director (2D and 3D)	Responsible for the creative vision and interpretation of the project may include design approval, storyboard and animatic creation and approval,	
Producer (2D and 3D)	To keep a tight rein on the administrative side of the production, ensuring that the budget and scheduling are being kept under control	
Production Manager (2D and 3D)	Doing the daily chores that relate to animation film making, such as checking the progress of each of the artists on a daily basis and generally supporting the producer in any way needed.	
Character Modeler (3D)		Responsible for creating, rigging, and weighting all the 3D characters the animators will be working with in the film.
Production Designer (2D and 3D)	Involvement when the characters, backgrounds, and overall concept art is created, remain on start to handle all the smaller design decisions that inevitably crop up as the production progresses.	
Animator (2D and 3D)	To bring the concept to the screen in many categories such as performance and personality to the characters, animate everything that is not character animation, specialize more in the movement of graphics and titles and do all the things to achieve the required effect.	
Assistant Animator (2D)	Has almost as much capability and responsibility as the main (key) animator.	
Inbetweener (2D)	Would work with the assistant animator to get all the lesser inbetween drawings completed for the key animator.	
Clean-Up Artist (2D)	Draw the characters in pencil,to the best of their ability. It can be a certain difference in the animated character design, sometimes subtle, sometimes gross.	

Table 2.7: Production teams and workflow.

Environmental Modeler (3D)		Create a background, whether they are interior settings or exterior locations to both design and model them
Background Artist (2D)	Working for background of what the audience sees.	
Checker (2D)	Checkers go through everything related to each scene"s production folder and dope sheet to make sure that it is all there and as it should be before a final commitment to scanning, coloring, and compositing is made.	
Scanner/Rostrum Cameraman (2D)	To shoot by using a sophisticated rostrum camera mounted vertically over an animation table and raised or lowered on a sturdy metal tower known as a rostrum.	
Inker (2D)	To inked and painted animation drawings by scanning	
Colorist (2D)	Paint the appropriate colors onto the backs of the inked cels. The kind of paints used had to be opaque to keep the background colors, or other layers of animation underneath, from showing through the coloring.	
Texturer (3D)		Create a final color and surface textures that will be placed on each 3D character model, actually substitute for the lack of detailed surface modeling capability
Lighting Artist (3D)		To give realistic and often subtle effect to the 3D characters and environments. The lighting specialist in 3D production often has to bring mood, color, and atmosphere to a scene.
Compositor (2D and 3D)	To bring together all the elements, scene by scene. By adding the animation to a background, or combining 2D animation, 3D animation, live-action film, model animation film, and an assorted selection of text and graphics.	
Sound Editor (2D/3D)	Supervise any additional sound elements are created, edited, and merged in with the existing dialogue and new music tracks, through to the final dubbing session, which will result in the production of a finely balanced soundtrack.	

2.3.3 Discussion of animation variety techniques and applying them to actual animation production

Initially planning must define a type of animation, then technique will use later in animation production. Movement creation techniques incorporate the convention traditional animation, stop motion animation, animation techniques of two and three-dimensional figures (Webneel, 2016). Movement as the base of

all animation, different styles of animation techniques can be used to create the animated sequences, frame by frame or cut out.

According to webneel (2016) post included several different types of animation and styles, and the famous which are traditional animation, digital 2D animation, digital 3D animation, stop-motion animation and motion graphics.

2d animation techniques consist of Classic, hand drawn animation, Cut-outs, Rotoscope and Flip book (Canfi, 2011). To assist animation production in presence of software with the introducing of computers, which allows artists to create digital animations and then use techniques to manipulate the image. Compared to drawing multiple images, using computers is far less time-consuming and effective. The advantages of 2D animation over the traditional way include being able to save and load work. Being skilled in a particular 2D animation program also allows you to make good use of a vast library of visual effects. There are some Notable 2D Animation Programs which are Toon Boom Studio, Autodesk‟s SketchBook Pro, Anime Studio Debut, DrawPlus, FlipBook Lite, Adobe Photoshop, The TAB Pro, CrazyTalk Animator, Motion-Artist, Flip Boom Cartoon and flash studio (Dille & Dlatten, 2016). Computer animation tools that had come to replace pencil, paper and film like Flash animations. Many TV series is now done in Flash, for example, Coloring and layering hand drawn animation using a computer and Drawing directly into an animation software with a Pen Tablet.

3d animation techniques consist of 3D animation, Stereoscopic 3D, Motion Capture, Morphing (Canfi, 2011). 3D animation is the manipulation of

three dimensional objects and virtual environments with the use of a computer program. This form, which is also called computer-generated imagery (CGI), but like other forms of animation, 3D has its own learning curve that involves gaining a firm understanding of 3D software programs. 3d comes in various forms and they differ from each other. There are 3D animation, Stereoscopic 3D, CGI cut-out, Motion Capture and Morphing. But like other forms of animation, 3D has its own learning curve that involves gaining a firm understanding of 3D software programs. There are several Notable 3D Animation Programs Which are Autodesk Maya, Autodesk 3ds Max, Unity, CINEMA 4D, Houdini, Autodesk Softimage, LightWave, Modo, TurboCAD Deluxe and SketchUp Pro (Dille &Dlatten, 2016).

Stop motion techniques consist of Clay or Plasticine, Real Clay animation, Puppet animation, pixilation and cut outs (Canfi, 2011). This technique involves setting an object or character in a specific pose against a background and taking a picture. The involved elements are then slightly modified before taking another frame. This is similar to traditional 2D animation in that having various frames gives the impression of movement (Dille & Dlatten, 2016).

2.4 Discussion and comparison with previous studies

Some previous studies discussed on animation production concerned as reviewing there are issues become a problem of production process. To explain

the situation, must understand a few things about the animation production and why it is so terribly mismanaged. Practices which would seem perfectly reasonable are routinely bypassed to cut costs. Planning is eschewed in favor of miscommunication, mishandling, and misappropriation of resources and funds. The study discussed two main issues both tool and human capital.

2.4.1 Tool handling

An animated image or video may sound like something difficult to create, but technology a tool would assist to create animation. Now days, there are numerous commercially available software and tools for animation process. Using these softwares, animation creators are in position not just to have simpler modeling possibilities but also understandable, detailed, conceivable and photorealistic project representation (Popkonstantinovic, Krasic, Dimitrijevic & Popovic, 2012). The tool helps retaining the natural way of drawing and editing, and offers additional functionality such as rapidly creating approximate 3D models and deforming animation objects (Fiore & Reeth, 2002). Technologies may immerse us in these computer-generated worlds or at least communicate with them using specific devices. It is possible to create applications based on a full 3-D interaction metaphor in which the specifications of deformations or motion are given in real-time (Thaimann, 1992).

Using animation program tool, animation creators are in a position not just to have simpler modeling possibilities but also understandable, detailed,

conceivable and photo-realistic project representation. Although most existing software applications turn out to produce appealing results, still the animator has to cope with many limitations (Fiore & Reeth, 2002). For handling tool, Popkonstantinovic *et al.* (2012) describes three-dimensional modeling and animation of characters using the software package Autodesk 3ds Max. The purpose of this study also is to review the current situation, broaden horizons and finally, the popularization of the application of 3D models and animations in the areas of interest. While from study of Thaimann (1992) presents a new technology in these computer-generated worlds or at least communicate with them using specific devices. This layout is a Computer aid device (CAD) system where, in particular, an engineer might want to create fairly smooth and regular shapes and then acquire some quantitative information about his design. Without proper workflow and asset control cause of potential for extraordinary time waste and user error without a system to track and manage the files had produced. Curtis (2014) discussed core concepts behind the implementation to present an organized and efficient system to manage assets. The introduction of this system has given artists the opportunity to iterate more within their workflows and produce more functional and appealing assets as a result.

Some studies conducted for managing a presence tool with suitable and quality result. Juan and Bodenheimer (2006) discussed two semi-automatic techniques that allow the re-use of traditional animation that help incorporate the animation into re-usable libraries. This paper presents two necessary components of a system for building image libraries of traditional animation and

then re-using them. To get more general applications for interactive use make it suitable as a basic drawing primitive in drawing programs. An introduced the combined usage of the hierarchical higher level stroke definition and the general anchoring mechanism by Hsu and Lee (1994) to create *pseudo*-3D models with an arbitrary number of independent controls over different features of the model. In the other part Fiore and Reeth (2002) successively described how to create drawings by using free–form strokes, how to rapidly create approximate 3D models and how to perform high–level operations such as free–form deformations. This study presents a sketching tool that assists the animator throughout multiple stages of the animation process. However, there are advantages and disadvantages of two types of computer tools, Fekete, Bizouarn, Cournarie, Galas, and Tailefer (1995) then discusses the relative advantages and disadvantages of TicTacToon. Then describe TicTacToon and evaluate it based on how well it addresses specific technical issues, handles user interface concerns and fits within the social organization of an animation studio.

2.4.2 Insufficiency skill and talents

A core skill is a body of knowledge associated with either a professional degree and or long term association with a specific body of knowledge. A glitz skill is a specific set of abilities for a specific software package on a specific piece of hardware. Core is basics and fundamentals. For example full understanding of the “Principles of Animation” and their used in CGI. Glitz is

software specific Issues. For example setting up the skeletons and sliders for expressions in order to animate in CGI. Embodies barriers to entry and requires a combination of artistic talent and technical skills that are so far found in relatively few locations worldwide (Yoon & Malecki, 2010).

Lasseter (1987) described the basic principles of traditional 2D hand drawn animation and their application to 3D computer animation. After describing how these principles evolved individual principles, Lasseter (1987) adds the animator must have two things, firstly a clear concept of exactly what will entertain the audience and secondly the tools and skills to put those ideas across clearly and unambiguously.

A successful artist should possess some extraordinary skills in order to produce some innovative and exciting works in the field of animation. Converting the existing movies into 3D movies takes a lot of time and experienced experts, then Min (2013) applied is designed based on mean shift algorithm, and for an efficient abstraction, extend the mean shift algorithm into a hierarchical structure that produces a multi-scale abstraction results. In the other skill of creating simulation, Parenthoen, Jourdan and Tisseau (2004) proposed a new approach for the real time simulation of the sea, he uses ocean of graphical results both from theory and experiments for modeling autonomous entities, interacting in a multi agent system without any predefined grid. For the sound designing, a taken advantage of graphics hardware to achieve interactive computation rates for fully dynamic which complex environments by Tsingos and Gascuel (1997) a new sound rendering approach in a computer animation

environment which allows fast simulation of mobile sound sources in a fully dynamic environment with occlusions.

2.4.3 Lack of workforce

In addition, the industry needs to develop more staff who are able to adapt to new technology**,** styles/trends and the needs of a more diverse range of clients. Typically an artist will only contribute to one, maybe two, distinct areas in a production (Curtis, 2014). The profitability of animation production companies is low and, because young people are not joining the industry, the human resources needed to support future growth are not being fostered.The industrialization of existing animation production systems, which are highly labor intensive, is as yet insufficient, but, thanks to the increasing sophistication and falling cost of personal computers and software, personal animation and web animation, produced by individuals or a few people working together are coming to the fore.

The animation production system is distinct from film production, relying on different technologies and labor skills. Yoon and Malecki (2010) discussed the upgrading path from subcontracting to feature films by combining two conceptualizations that bear on the animation industry. This study illustrates how the major studios and their networks of subcontractors have responded to demand from new markets. Subcontractors gain experience from this outsourcing just a little known learning. For the demand of animated entertainment has expanded, Tschang and Goldstein (2004) focused on

outsourcing in the creative industries and, more specifically, for the case of selected parts of the animation industry. He found when labor intensive production processes mature, along with substantial mechanisms for coordination and specifications, production can be located almost anywhere. There is the hope that if the more front end work is to be outsourced, or if can find its own properties that have a global or regional sales appeal. While Wallace (1981) also discussed is the actual method for merging any two adjacent levels. He presents several computer methods for assisting in the production of cartoon animation, both to reduce expense and to improve the overall quality. This will reduce the total number of merges by retaining merged groups consisting of individual levels which do not change over successive frames.

2.5 Common Process of Animation Production

Animation production pipeline is needed for solid structure to bring the creative process from conception to final. Due to logical organization of the steps required to produce an animated feature film keep track of progress and versioning, and ensure your game stays on schedule. Production pipeline circumvents from overlaps with the company organizational structure encompass departments and budgets. As a result, every movie changes the pipeline consequence requirements are changing, save money, increase the quality of the movie.

2.5.1 2D Production Process

Production processes and procedures on advanced 2D preparations, an advantage library is made simultaneously with storyboard endorsement and the array of the animatic. It incorporates every single character form to be utilized as a part of expansion to props and impacts plans (if appropriate). When successions are affirmed for creation, the group can investigate every individual shot's substance and work together with the most proficient method to full fill its aesthetic goals. Catherine persistent the reasons of clarity in book, they have separated 2D liveliness into two fundamental classes: customary 2D and computerized 2D.

According to Winder and Lowlatabadi (2001) traditional 2D is the fact on digital 2D, the artist creates hand-drawn animation in selected departments such as layout, animation, cleanup animation, and effects.*Cel* animation is a most popular traditional animation technique which involves bringing drawing to life (Ernest, 1998).

There are 12 references will be compared to explore animation production in 2D animation. The methods of animation production generally discussed encompassing parts of process in pipeline contained. These methods include digital 2D techniques and also traditional techniques are parallel present conditions. These refer methods listed are counted based on they become a convergence as references by academic and industry field in animation producing and learning. Table 2.8 contained about animation production books.

Table 2.8: 2D sources method list.

No.	Titles	Authors	Years
1.	The Illusion of Life	• Frank Thomas • Ollie Johnston	1995
2.	Character Animation Crash Course	• Eric Goldberg	2008
3.	Acting for Animators	• Ed Hooks	2013
4.	Animation Studio	• Helen Piercy	2013
5.	Experimental Animation (Da Capo Paperback)	• Robert Russett	1988
6.	Directing the Story: Professional storytelling and storyboard techniques	• Francis Glebas	1988
7.	Animation Development: From pitch to production	• David B. Levy	2009
8.	Producing Animation	• Catherine Winder • Zahra Lowlatabadi	2001
9.	Producing independent	• Mark Simon	2003
10.	Animation from pencils to pixels	• Tony White	2006
11.	Computer animation	• Rick Parent	2002
12.	The Process of Animation	• Disney	2001

Total process used table 2.9 for 54 processes were grouped from twelve methods 2D production processes. This encompasses the entire process from beginning to finish the animation movie. Its applied of both traditional animation and computer animation.

Table 2.9: The 2D process used.

No.	Process	No.	Process
1	In-house pitch	28	Rough layout
2	Script	29	Enhanced animatics
3	Budget	30	Rotoscoping
4	Crewing up	31	Key frames
5	Dope sheet and production folders,	32	Scene planning
6	Model Sheet	33	Shot setup
7	Exposure sheet	34	Layout turnover
8	The route sheet	35	Backgrounds
9	Design, art direction and Character design	36	Inbetweens
10	Directing Dialogue	37	Scanning
11	Audio Recording and Editing	38	Animation breakdowns, slugging, or timing
12	Soundtrack	39	Cleanup layout
13	Track breakdown	40	Background painting
14	The voice track	41	Clean-ups
15	Audio breakdowns	42	Animation Effects
16	Assigning production work	43	Photographed
17	Detailed story	44	Camera Moves and Special Effects
18	Storyboard	45	Animation check
19	Storyboard present	46	Color styling, Painting and Inking
20	Revisions of storyboards	47	The final edit and Dub
21	Preparing a shipment	48	Composite and Export of Individual Layers
22	Songs	49	Final Image/shoot Composite Final
23	Title sequence and end credits	50	Final check
24	Animatic,	51	Music
25	Pencil tests	52	Audio post-production
26	Pose test	53	Picture post-production
27	Rough sketches	54	Final delivery

From twelve methods on 2D production processes has obtained the use of production processes base percentage adopted. According to table 2.10 the percentage process using based on comparative methods. Catherine& Zahra methods usage show 22 processes (44%), Mark Simon 25 process (46%)as

higher method usages, Tony White 35 process (28%), Frank & Ollie 12 processes (22%), Eric Goldberg, Francis Glebas, Robert Ruseett and David B.Levy 11 process (20%), Ed Hooks and Helen Piercy 10 processes (19%), and Rick Parent, Disney have an equal with 8 processes (17%). Although the usage percentages found that is unequal utilized.

Table 2.10: Distribution by production process.

	Methods	**Number of processes used**	**Percentages**
1	Catherine & Zahra	24	40%
2	Mark Simon	25	46%
3	Tony White	15	28%
4	Rick Parent	8	17%
5	Disney	8	17%
6	Frank & Ollie	12	22%
7	Eric Goldberg	11	20%
8	Ed Hooks	10	19%
9	Helen Piercy	10	19%
10	Robert Ruseett	8	17%
11	Francis Glebas	11	20%
12	David B.Levy	11	20%

2.5.2 3D Production Process

Animation of three-dimensional objects, such as geometric shapes and forms, has long fascinated filmmaker and audiences (Ernest, 1998). Stories tend to be more concrete and simpler with this technique than with character animation.

There are also 12 references will be compared to explore animation production in 3D medium. The methods of animation production generally discussed encompassing parts of process in pipeline contained. These methods are parallel with present technology usable in games and virtual reality. Refer methods listed are counted based on they become a convergence as references by academic and industry field in animation producing and learning. Table 2.11 contained about animation production books.

Table 2.11: 3D sources method list.

No.	Titles	Authors	Years
1.	Cartoon Animation	• Preston Blair	2013
2.	Animation: From Script to Screen	• Shamus Culhane	1990
3.	Animation Methods: The Only Book You‟ll Ever Need	• David Rodriguez	2012
4.	All About Techniques in Drawing for Animation Production	• SergiCamara	2006
5.	How to Cheat in Maya 2012: Tools and Techniques for Character Animation	• Eric Luhta • Kenny Roy	2012
6.	Stop Starring Facial Modelling & Animation Done Right	• Jason Osipa	2003
7.	Dream Worlds: Production Design for Animation	• Hans Bacher	2008
8.	Producing Animation	• Catherine Winder • Zahra Lowlatabadi	2001
9.	The Art of Maya	• Danielle Lamothe	2000
10.	Animation from Pencils to Pixels	• Tony White	2006
11.	Animation Writing and Development	• Jean Ann Wright	2013
12.	Pixar‟s Animation Process	• Pixel	2013

Total process used table 2.12 for 26 processes were grouped from twelve methods 3D production processes. This encompasses the entire process from beginning to finish the animation movie.

Table 2.12: The 3D process used.

No.	Process	No.	Process
1	Story Idea	14	Animation
2	Text Treatment	15	Final layout
3	Script	16	Materials and Textures
4	Storyboard	17	Environmental models
5	Voice Talent	18	Shade
6	Reels	19	Lights and cameras setup
7	Look and Feel (Colour Scripts)	20	Cinematography elements
8	Layout or shot setup	21	Visual effects
9	Modeling	22	Matte paintings
10	Character design	23	Rendering
11	Character finaling	24	Compositing
12	Sets	25	Editing/Final Touches
13	Rigging	26	Sound effects /Musical Score

Total process usages table 2.13 for 26 processes were grouped from twelve methods process. A number found that the most usage of the processes was applied by Pixar‟s methods with 17 processes. Whilst Danielle, Tony and Jason method are least only 6 processes Jean methods used is 11 processes. Catherine & Zahra and David methods used are 9 processes. Both Sergi and Eric methods used are 8 processes. Preston, Shamus and Hans method usage are 7 processes.

Table 2.13: Distribution by production process.

	Methods	Number of process usage	Percentage
1	**Catherine & Zahra**	9	35%
2	**Daniella & Lamothe**	6	23%
3	**Tony White**	6	23%
4	**Jean Ann White**	11	42%
5	**Pixar**	17	65%
6	**Preston Blair**	7	27%
7	**Shamus Culhane**	7	27%
8	**David Rodriguez**	9	35%
9	**Sergi Camara**	8	31%
10	**Eric & Kenny**	8	31%
11	**Jason Osipa**	6	23%
12	**Hans Bacher**	7	27%

2.6 Summary

This chapter cited the reviews related to the research study. Meanwhile attributed and describes the fact that production process becomes key components of the animation production. The discussion began on fundamental concept and key principles of animation process to get an understanding of how animation produced. There are four basic classes that concepts are applied to all animation, whether it is stop-motion, 2D or even 3D animation. Towards a theory of animation was divided into two categories which are Orthodox

animation and Experimental animation. Developmental animation operates as a mode of expression combining of selecting elements of both theories, representing the aesthetic and philosophic between the two apparent extremes. This chapter also represented the development and evolution of animation as historical background that serve as a platform for individual and company produced, and how producing processes were derived worldwide. Nevertheless the common process animation production pipeline is needed for structure to bring the creative process from conception to final. Production pipeline circumvents from overlaps with the company organizational structure encompass departments and budgets. Thus, this fundamental process method underpins the development of animation production in all its forms. The comparative study approaches through various processes as a suitable alternative effectively. Hence, literatures are smart goals for study animation production.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction

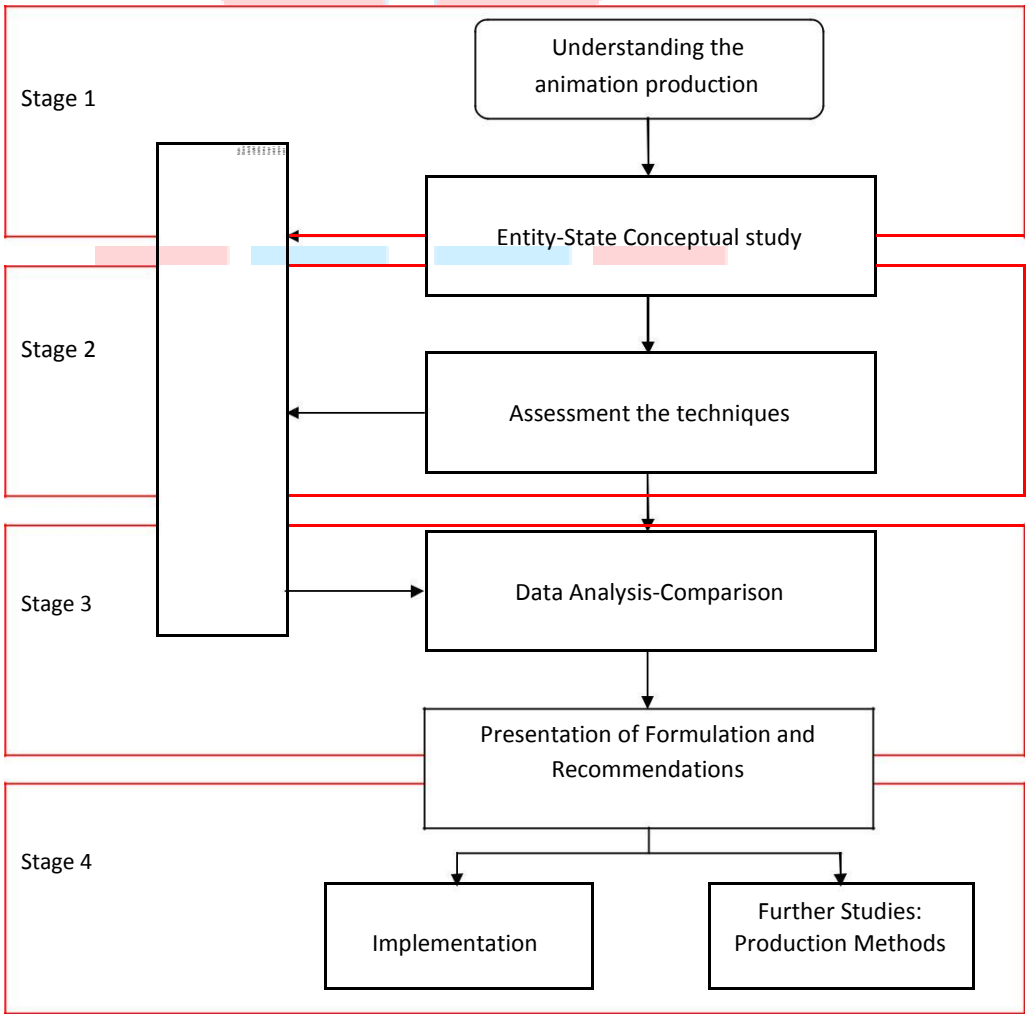
This chapter discusses the methodology of research. This study conducted exploratory and descriptive research on the production of information process common to gain an understanding of how such aproject are undertaken. The first section presents the design of study and includes its purpose, theoretical framework, research questions, selected variables, and sources of data. The following sections on methodology includes discussion concerning the research approach, research strategy and research methods of describing the conceptual study, content analysis, comparative analysis and conclude content analysis result to formulate guidelines and recommendation.

To address the goals of this study, method research strategy was developed that supported the exploratory and descriptive nature of the research. This chapter discuss the overall study design and the study‟s data collection and data analysis activities used to collect sufficient data to answer research questions.

3.2 Research Design

The research strategy provided a framework for designing a deliberate study that would address the study‟s goals and objectives. The section elaborates the overall design concept, an activity, and the data resulting from this approach. The aims of the research and the questions that have emerged, pointed to case study as being the most appropriate methodology.

Figure 3.1: Research conceptual framework.



The study design started the flow from the preliminary activities that initiated the study of the preliminary conceptual model through the data collection and analysis (Table 3.1). Primary activities to justify and initiate the study by conducted an extensive literature review on previous research, theoretical framework and appropriate models. The review in the stand arena that confirmed the need for research on this topic and assisted the researcher in identifying an issue related to study. Development of conceptual model based on a review of the literature to serve as guiding framework for the research. Data collection and data analysis to address the three research questions by using qualitative approach od data collection. Collection and analysis was an iterative process. Findings from the data in framed the context of the systems. From the finding a recommendation based on both analysis results of the procedures provided for collaborative processes.

A single case study was chosen to explore the research questions to ascertain patterns, replication, or contradictions of findings. Yin (2003) noted that using single case studies can consider a holistic case to look in one environment because it is a unique or extreme situation, adding validity to the research, which appears to take a positivist perspective. Intensiveness of the course process within the complexities of the production context, hence the purpose of using case studies is as Stake (1995) puts it: "the real business of the case study is particularization, not generalization".

Purposeful sampling Lincoln and Guba (1985) were an integral component of the study"s evolving design as the research collected and analyzed

data, the research identified additional data needed to refine the emerging understanding. Purposeful sampling is characteristic of qualitative inquiry and is based on “informational, not statistical, consideration. Its purpose is to maximize information, not facilities generalization” (Lincoln & Guba, 1985)

A theoretical framework to identify important influences was developed from the synthesis of the literature. A model (Figure 4) guided the data gathering and analysis of the case studies. Embedded in the model were three research questions. Each research question included variables of interest to ensure that aspects which could be relevant to the study were not overlooked.

In order to verify this understand and acquire more in-depth information about the process of animation production. The analysis assessment focus on formative to improve the process, process oriented on how process is going and diagnostic through identify areas for improvement (Thomas A. Angelo & Cross, 1993). These methods included: Documentary analysis, observation and in-depth semi structure interviews.

3.3 Conceptual Study

This research recognizes that production in animation is not efficient. The thesis focuses on the production process in which they run the project. The processes and organizes that influence their result were investigated, narrowly looking at those that impinge on every single stage. This included the correlation between processes and the department to investigate the type of skill that was

emerging. The model provided a sensitizing framework for approaching the topic standards development. The model organized concepts such as input, output, processes, information feedback, boundaries, and environment that the explored indirectly in data collection (Patton, 1990).

A case study approach was chosen to situate the respondents within the system in which they were implemented. The animators to their task was investigated, thus an interpretive approach allowed consideration of factors that may influence the emergence of development process.

A generic qualitative analysis of each data source would treated independently and the finding reported separately, while a structured qualitative approach allowed for investigate of the structure and processes within a proposition (Baxter & Jack, 2008). Variables of interest focused the research on influences identified by the literature and previous research while the use of semi-structured interviews and think a louds gave the flexibility to investigate. Two animations conventional cel animation (2D) and computer animation (3D) mediums were selected, based both on the reviewed literature dealing with the orthodox animation theory form identifications on television, to video games and full feature- length animations. Each animation form will focus on inclusive production methods from pre-production, production and post- production.

The aim of this research was to investigate how efficiency issues affect the production process by goals of exploration and description took precedence over generalizability and predictability. It is information within the reason why and how the process of production that occur and the correlations, collaborations

and knowledge created as a result that are of management. These aspects are subject to production organized – the organizing of the tasks, skills and tools. Therefore this research is qualitative where the findings are constructed by the researcher and the respondent checked and approved these.

3.4 A case study

Case study is a methodological approach that involves systematically gathering enough information about a particular person or group and situation to 64 permits the researcher to effectively understand how the subject operates or functions (Berg, 2004). While Stake (1994) suggest that a case study is useful when "opportunity to learn is of primary importance". He states that the "distinctive need" for case study research "a rises out of the desire to understand complex social phenomena" (Yin, 1989). Give hat standard development is a complex process comprising activities, entities, processes, and force and their interrelationships.

Yin (1989) argues that a single case design is warranted or appropriate on the basic that case in revelatory. A revelatory case is one for which there is a belief or assumption that the problem discovered in a particular case are common to other case was well. A necessarily considering if it is prudent to conduct a single case study (Baxter, 2008). The aim of this research is to explore the process use of production in their project as a player by concentrating on 2D and 3D animation within the context of the management system.

This study served both exploratory and descriptive purposes. One research goal was to explore the situations in which the intervention being evaluated has no clear of the production process. The study explored and described whole processes. Given the comprehensive illuminate phenomenon of production process and real life context in which it occur its own sake, thus the study served a descriptive purpose.

The study was descriptive to the extent that it shed light on problems and issues that may be common to other information producing efforts. The study produced revised model focused on describing and representing a process development. The model may have utility in investigations of other information standard processes. Thus, as a single case, the study of animation production was aligned with Yin (1989) suggested that a case study can serve exploratory purpose. The depth of the personalized and contextual detail gathered from the case studies allowed analysis of the complexities of relationships, context, skills, experiences and beliefs of each of the case study participants (Starkey, 2010).

While an appropriate research approach to studying the process of production, was not without limitations and problems. A major limitation of a single case study is the lack of statistical generalizability. This study did not have a goal generalizability but one of understanding a complex phenomenon. The researcher believes, however, their insofar as the process may be a revelatory case of information production development, it was possible to abstracts or distill important conclusions for the study of one instance of standards development, conclusions that may be tested in order standard

production contexts. The study, however, makes no claims for generalizability about other standards development activities based on thos investigation of a single case.

3.5 Research questions

One main research question arose following a survey of the literature and three related questions gave further form and scope of the research. Within each of the questions there were variables of interest identified from the literature and modified during initial data collection.

1. How to identify the ideal animation production process suited for Malaysia context?
2. How to compare the method of Malaysia animation industry.
3. What is recommended to improve the animation production process?

3.6 Sampling

Purposive sampling was used to select the case studies. Cohen et al. (2000) defined purposive sampling as sampling for a specific purpose and picking a group who fit a profile. Two animation techniques both 2D and 3D in this case were applied by six experts running animation project were chosen from company and institution separately. Case were monitored from February

2014 to May 2015 and was a production whose either international or local contributed the animated tv, film, advertisement, game and etc. All the experts in the cohort running an animated business in February 2014 were interviewed in 2014 and 2015 to indicate their interest in participating in this study through an information sheet and consent form.

3.7 Interviews

As part of the process in designing study, the researcher conducted six interviews with experts in the field of animation. Open-ended semi-structured interviews were used for gathering data from the case study experts about their experiences. Interview questions were developed to align with the research questions, previous findings/interviews and variables of interest. The guiding interview questions are included in the appendices.

The interviews were semi-structured, Patton (1990) argued the characterize such interviews as a general interview guide approach in contrast with the informal conversational interview and the standard open-ended interview. The researcher developed a series of interview guides that outlined a set of issues and questions to cover in the interview.

These interviews informed the researcher‟s understanding of some of the concerns and issues related to common process and the assertions that animation production is problematic process. The interviews confirmed the researcher‟s perception that a systematic research study in production process was warranted.

The first interview was carried out with expert from academic and continues by experts from industry field. The purpose of this interview was to explore their skills, experiences and knowledge for the conduct of animation project in their processing and managing. The experts represented key participants from a variety of production process and context. The interview questions and format that was used is included in appendix. The questions were designed as a starting point for the case studies, to explore the previous experiences of the participants. This was mainly a qualitative approach, while the general topic of the production process was common in all the interviews, the researcher crafted specific questions appropriate for interviewees, the guide allowed the researcher to be flexible and responsive to unexpected paths and discoveries during the interview.

3.8 Data collection

This section discusses the source of data, the techniques to collect the data, and the data collected. Within case study research, investigators can collect and integrate quantitative survey data, which facilitates reaching a holistic understanding of the phenomenon being studied (Baxter, 2008). This study used 3 techniques to collect data: Documentary evidence consisting of primary source material related to animation production, Guided interview with experts related to production process, and Participant Observation of production process standard process.

The study was qualitative approach, thus research anticipated the multiple methods and multiple source of data would result in a wealth of data. To give a indication of the data produced in the source of the study. In document evidence, about 24 primary source documents selected from electronics and textbooks of records related to process of animation. Most of these were summarized and analyzed. Some of the documentary evidence was available in electronic format. As a guided interviews two categories of interview involving nearly 6 individuals. Typical interviews lasted approximately 60 to 90 minutes and results in transcripts. Participant Observation by recorded of field notes from six production studio implementers.

Primary source material and documentary evidence and guided interview all focused on addressing the question. The resulting data also served as the basic for answering the questions. The relationship between the data sources, research questions and variables of interest are considering of literature, interview and observation.

Case study production players were interviewed during their running the production to gain understanding about their experiences and knowledge (appendix 5). During the following three terms, five of face-to-face meetings with each from industry of the case study production process held, a apart of case study production process who from academic field. During semi-structure interviews, the production of animation was discussed. The notes and transcripts from these meetings were kept as part of the research documentation. Any negative results were closely analyzed, as Bereiter (2002) recommended. In case

study was invited to have an observation of production in which pipeline process were being adopted. This occurred in five production house where the researcher visited and observed the process and had a recorded discussion with experts about their encountering.

3.9 Data analysis

The researcher collected data from various sources and used the data management tools and procedures in preparation for analysis. As appropriate for an exploraty and descriptive study in which the study"s design evolved over the course of the research, there was not a clearly defined line between data collection, data analysis, and preliminary write-up of finding. For example, simply in choosing primary source documentary evidence involved analysis and determination of relevance.

In the first phase of analysis, the researcher concentrated on documenting the process of production. Primary source materials and documentary evidence were the basic for the process of animation production reported in chapter 4. This was a logically prior step developing a holistic understanding of animation production. In effect, the researcher analyzed the data to address study objective and research question through the producing process.

Analysis of the primary source material for processing a production of animation development focused first on outline the pipeline of that process. While reviewing the pipeline, the researcher examined the document in detail

and summarized selected documents in topical areas of the production process. The researcher recorded additional details about each meeting including participants, discussions, etc. Finding contains selections from the production studio database illustrating the pipeline and the more detailed summary resulting from analysis. Based upon that solid foundation, the researcher proceeded to analyze the data top address the study goals and, in particular, study objective and research question.

Since this research was exploratory as well as descriptive, data analysis also promoted discovery. The discovery aspect became paramount when the researcher determined that the preliminary concept model did not adequately accomodate certain aspets of animation production. Specifically, as reported in chapter 5, changes in system goals, and changes in players and participant, were represented conceptually in preliminary model. The researcher addressed additional categories, mediating mechanisms and relevant environment, that emerged in the data analysis and that addressed his emerging understanding of needed refinements in the concept framework.

3.10 Summary

This chapter outlines the research methodology which describes the design of research. The chapter exploring the valuation on comparison among animation production processes by categories clarified and recommends the model of production process. The assessment analysis of literature reviews by conducted examines analytical, critical and reflective thinking and writing in assessment. Although these summaries capture the major message of each assessment, the researcher examines the appropriate report chapter to find the context, background discussion, precise recommendation conducted, and further details about implementation. This chapter also discusses how research procedures, instrument applying and data analyzed.

CHAPTER 4

EMPIRICAL DATA COLLECTION AND ANALYSIS

4.1 Introduction

This exploratory and descriptive study presents an animation process approach to produce an animation project. The study addressed specifically, in what ways the production practiced a processing approach to producing. Strategies and approaches they used to assist production to complete, employed through tasking and management were observed. Following research question informed this study: 1. How to identify the ideal animation production process suited for Malaysia context?2. What is assesment to improve animation production processes for Malaysia practitioners in industry?

The first section with a description of players‟ experiences and knowledge and the context in which dealing their running a project. These are important when investigating the factors that may have enabled and limited their process during production. The study sought to address these areas, as well as to increase understanding about producing and its potential for use in industry and academic. Finally, recommendation a method process to practice judgment.

During in-depth interviews, study participants described their experience, knowledge and analysis to inform decisions. They also discussed their use of findings to improve project success in the market.

The research findings that this chapter reports are based on analysis of the following data sources: semi-structured interviews, literature, and the researcher‟s observations within the production.

4.1.1 Respondent profile

Out of the six respondents only one lecturer was interviewed (Table 4.1). Five of the respondents were chosen based on the success as indicated in the international and local industry. Three respondents had worked in 3D animation more than two years with the company, and the rest respondents worked with 2D animation company. Each respondent represented a different department of the company and institution, their tasks involved from marketing and sales, modeling, layout, and script writing, to animating, music, rendering, compositing, and lecture.

Table 4.1: Respondents profile.

Respondent	Post and Department	Company/Institution	Years of operation
Andrew Ooi	Director	Inspidea	2002
Mohd Irfan Faiz	Animator	KromosonLab	2011
Muhammad Zubir	Director	Tulus Fikir	2006
Sandra Khoo	Director	Giggle Garage	2011
Abdul Hakiim	Senior animator	Tudidut Studio	2012
Ezwan Mohd Mokhtar	Lecturer	UiTM (FiTA)	2000

4.2 Animation production plan

Jumping into production without proper planning can lead to misadventure project. Failure time spent planning the project goals, objectives and clarifying how the project will function will lead to much less of a painless development process. In fact, realistic plans should be reviewed and approved by a client or team‟s production prior to working project to ensure the design and concept is on target.

4.2.1 Clear purpose

Before beginning planning site‟s animation, it‟s essential to have a very clear idea of why doing it. Video project starts off as a concept in search of a purpose. Most of video production concept drives by both practical and creative imperatives. However, the 'concept' or 'idea' depends on imagination and budget allow. Define business objective about what to do with video. It has a variety of purposes that such as sell more of a particular product or service, attract attention on brand through social media, provide additional value to existing customer base. Each business objective should have a matching outcome that can measure. This is because failure to clear articulate business objective cause wasting time and money. By Determining a Business objectives allow to focus on outcomes, avoiding lack of clear focus is the principle reason why business fails.

To get a creative hat on once identified the „why‟ and the „who‟. The animation style was chosen will need to complement brand and massage and must appeal effectively and directly to the audience. Four main types of animation to consider are Flipbook animation, Stop motion animation, 2D animation and 3D animation. in terms of trying to exude a sense of realism, bringing the viewer to experience education or generate a few laughs, an animation style selection is necessary to meet the scope of the purpose, audience, brand and message criteria.

The many considerations to contemplate the client and project consist of a project type**,** is this advertisement, flash interface, or animation. Message - the primary message behind the project like an advertisement, promotional or informational. Message means the idea, theme or topic that need to communicate. As usually there is only one principle message, but if has a broader purpose may require two or three key messages. Goals, the goals for the company and project and the project should be purposeful and the objectives should be clear. Competition, to make the idea stand out in a crowd always do a research and scope client competition to ensure the ideas as innovative and creative as competition.

4.2.2 Building and Budgeting

There is little point In discussing a project‟s budget should be focused on communicating a budget for operational forecasting that will be implemented. For players, might have to do some research if no prior experience with video production budget.

Video length has their respective advantages either short or long. Shorter seems riskier because it necessarily has to leave things out and narrow down a message to a very few key ideas. While the length of the video then it really depends on the motivation of the audience. Audiences typically don‟t have too much time on their hands and don‟t want to sit down and watch a feature film. A video need to be succinct, it needs to include targeted, relevant information and it is better to be attractive.

Pre-production meeting will discuss the size and scope of job, at the same time also the its will determine how many meetings and how many people are involved in the production process. On particularly smaller projects a simple video production enough to meeting make estimates and start the planning process. Pre-production planning will reduce the risk associated with the project.

Some elements should be owned by every member of the team, the choose for teams to create animations need to have a very clear sense of what trying to achieve, understand who the audiences are, understanding what a brand is, what company does and what key message is, be a great communicator, be

highly skilled in this type of animation wish, be able to deliver on time and on budget and be able to add a little extra sparkle to project.

4.2.3 Marketing

A Planned distribution designed to be able broadcast audience distinguish from an audience on a professional business portal and different again from someone who viewing video on a mobile device. This is an essential value in creating the animation video by planning for getting people to view it.

Marketing is the process of communicating the value of the products or services to a particular audience. Define audience needs to know who is customer and prospects are and need to have differentiated messages for that specific audience. With a narrow focus greater chance for success, as the audience is concerned relay the message. The target audience will not only be factored into design but also it some usability factors. This encompasses viewers those less computers shrewd might not be able to figure out an intuitive hidden navigation system. Consider demographics, psychographics and geographic. The best animation in the world won‟t have the desired impact if it‟s aimed at the wrong peoples.

4.3 Production development process

The Production starts with generation of idea and development. Sponsorship idea from studio or outsources for a movie or product, and will take it through a selection procedure. An appropriate selection ideas will start to be fleshed put giving a storyline and some scenes. These are further developed by producing storyboard that starts to capture the "look" and feel the movie and any of characters and scenes. This process is done by making “reel", video mocks the cartoon video, to see if it stands by itself.

A producer requires steps all of animation to Developing an animation product regardless what kind of business conducted. . Whether it's for the trade show, for investors, the courtroom, or even entertaining the kiddos, animation team need as much information from clients to ensure that they create the idea and vision that in client‟s mind. Here, it is important for animation team to gather as much information as possible about what client wants that animation looks like as the final product. This is where the animation team gets a lot of referrals material from client.

Development of 2D animation and 3D animation is quite different in the process. 2D is limited in the amount of detail it can be shown and the amount angle or can view work from perspective. 3D animation looks very realistic like a photograph and allows more easily incorporate live-action video footage to give the project a more film or television commercial look. 3D can also

accurately shows scale, volume, shadow, and light which is much more difficult than with 2D animation. Since 2d animation cannot always be converted to 3D with easily, what to do must plan from the beginning, so that project easily develops from phase to phase until final delivery is achieved.

In the initial development phases, clients refine their messages or ideas in this phase until what they want to communicate to their audience becomes very clear and to the point. During this phase both production and client work at coming up with a “blueprint” of what the animation should look like before any major animation work begins. Pre-production is where start to see the first visuals created based on the development phase. Once our clients get to the Shot Production Phase, the resulting animation delivered to clients is often around 80% of what the final product will look like.

Post-Production is the last phase where any loose ends are tied up or anything that didn‟t happen correctly in earlier phases can often be cleaned up here. Small details can be corrected in this phase, cutting scenes out that aren‟t needed to happen here as well as adding text overlays and finishing touches on music and sound effects. All of these phases and steps are necessary in order to produce a high quality final product that is delivered on-time and is a final product that speaks to your audience.

4.3.1 2D Animation Process

For productions who produce an animated project by client, they collect as much information as possible from the customer. Production house will ask for reference examples such as images, sketches, or videos that will help them to understand what you want to create. **A**fter gathering the information and references provided, they will create drawings and illustrations based on client‟s ideas about the setting or environment of the animation. The production will also create any characters and variations of those characters might want so that clients can choose the options they think are best for project. This is the step where to determine the style, the flow, the length (more on this step below) and the structure of animation video.

The first step usually begins life as a storyboard, which is a script of sorts written with images as well as words. The images allow the animation team to design the flow of the plot and the composition of the imagery. Before true animation begins, a preliminary soundtrack or “scratch track” is recorded, so that the animation may be more precisely synchronized to the soundtrack. In process of voice recording a completed cartoon soundtrack will feature music, sound effects, and dialogue performed by voice actors. Often, an animatic or story reel is made after the soundtrack is created before full animation begins. An animatic typically consists of pictures of the storyboard synchronized with the soundtrack. Storyboard and songs amended if necessary, and a new animatic will be created and reviewed with the director until the storyboard is perfected. Once the

animatic has been approved, and storyboard is sent to the design departments for design and timing process. Character designer provides a model sheet for all important characters and props in the film. Meanwhiles, the background stylists will do similar work for the settings and locations in the project, and art directors and color stylists will determine the art style and color schemes that will be used.

After the designs are completed and approved, the layout process begins. Here the background layout artists determine the camera angles, camera paths, lighting, and shading of the scene. Character layout artists will determine the major poses for the characters in the scene, and will make a drawing to show each pose. Animators will begin by drawing sequences of animation through key animator or lead animator draw the key drawings in a scene using the character layouts as a guide. In animating process timing is important for the animator drawing the frame; each frame must match exactly what is going on in the soundtrack at the moment the frame will appear. Once the key animation is approved, the lead animator forwards the scene on the cleanup department, which consists of the cleanup animators and the inbetweeners. The inbetweeners will draw in whatever frames are still missing in between the other animators drawing. While the animation is being done, the background artists will paint the sets in which the action of each animated sequence will take place. The background artists follow very closely the work of the background layout artists and color stylists, so that the resulting backgrounds are harmonious in tone with the character design. After the cleanup and in-between drawings for a sequence are completed, they are prepared for photography as ink and paint process. In

many cases, characters will have more than one color palette assigned to them, the usage of each one depending upon mood and lighting of each scene.

4.3.2 3D Animation Process

At this stage in the process, animators "sculpt" digital putty, by pushing and pulling it into the proper shape, whether a robot arm, a train, or a person's head. 3D modeling is a time-consuming process in which the process of creating the characters, sets, and props. To get a model that looks like a photograph might require texture in which the process of adding color to digital putty or 3D model. Texturing process will start with a rough draft of review, then it will add details into model as simulated texture, scratches, or shadows. Each Process of rigging can be considered unique to each object in production. The animator will digital manipulate the skeleton depending on the desired motion. The more complicated the motions are affected on complicated the rigging will be and the longer it will take to animate. After building a model and textured and rigged them, process to make them live, breathe, move, and sometimes even speak. This animation process involves one or more models that moving independently or simultaneously. More animations required, causal planning and management of these measures will take time. Lighting technician draws upon their vast experience to use the latest in lighting techniques to provide a product that looks great every time. This is how important it is to light images, virtual or otherwise. Lights especially for illuminating objects and characters, it also adds depth and

dimension to a scene and as well as set mood or tone for the intensity, color and direction. Usage of the software has done the same thing on camera setting. The teams will move the virtual camera through three-dimensional animated scenes and make the desired adjustments to give exactly the view and effect. Video camera provides the ability to adjust the focus, add the depth of field, blur, tracking, panning, and others. The last step in the animation process is where the add of things like reflections, shading, and shadows. In order to obtain the final image that has shadows, reflections, and lots of other details, we must go through a process called 'Rendering'. Rendering is the process of taking a computer graphic image from draft quality to a final production-ready look.

In final step is post-production, or compositing. In this step, teams edit rendering, do touch-ups, add effects such as explosions or morphing, and also combines real footage with digital production. Compositing can add a tremendous amount of depth to the production when it is called for. Just as in rendering, compositing take many forms and it can take a lot of different techniques to achieve the desired results. The soundtrack is keys one of animated binder, with the addition of music and sound effects known as "Foley" to tie it all together with mood and emotions for evoked. Expert teams will select and create a sound that will add another important dimension to 3D animation. The final step of the phases is editing into a finished animation video. Together, clients and the great team will review the complete animation and add or delete scenes and effects to create the finished product - if any were needed. Then

production will review with the stakeholders, and deliver it in the format (s) required.

4.4 The concept animation created

Animation has been around for a long time from the main technical basis, then has been cel animation. This technique has been perfected by the legendary animation practitioners. The introduction of computer-based animation tools has brought new techniques. Mostly these are built around process known as tweening (in-between). A various critical tools and techniques by using computer program in visual effect, animation or games. Topics include camera animation, expressions, deformers, match moving and camera tracking.

4.4.1 Techniques

Animation has many forms, as it includes any changes of appearance or any visual effect that is time-based. It includes motion vary changes in shape, color (palette), transparency as well as changes of the rendering techniques.

Two common animation techniques are frame animation and sprite animation. Frame animation is "internal" method of animation, it is usually a pre-complied and non-interactive. Frame animation with transparent information also referred to traditional animation known as "cel" animation.

Cut-out animation, in its simplest form, is a two-dimensional graphic object that moves across the display. Cutout animation is a unique technique has been applied in computer for produce animation using flat characters, props and backgrounds dissociate of parts in computer program or materials such as paper, card, stiff fabric or photographs. By using a mask or transparent color, cut-out is not limited to rectangular shape. Animated cut-out is interactive: the position of each part controlled by the user or by an application program and it is called "external" animation. The way it works almost all cut-out animation libraries and toolkit to allow some form of internal animation. In addition to moving part around, the library allows the animator to change the look of an angel, usually by attaching a new image of the frame.

4.4.2 Tools

Presently there are many different animation packages founded on the computer, ranging from which traditional animation programs to complex 3D animation packages. Existing programs in presence of technology that will provide some interesting possibilities for animators by it approach carefully. With the assistance of tools based on this technology will make a great animation. Some took the technology and create the images, fascinated by what tools can do. Others take their dreams and see what they can do with the tools.

These tools can help all animators and other creative people to improve their productivity. Their help in manage and execute the projects in an organized

and systematic way so that the project can be completed as scheduled. Animators can also able to deliver quality and timely results to their clients.

Computer animation systems are classified into different levels to define the depth of the assistance that provided. At the lowest level animators can use the software only to design drawings. And the highest levels the whole work drawings, modeling and motion control are generated by the system. The important advantages of modern animation system apart of the fact that make everything easier is interactivity. This has a large amount of applications that give to animation system very important in life.

Animation software package available in the market has a different approach to animation but tend to work on the same principles. There is an interactive graphical interface where drawings, paint and modeling take place. An Animation language takes care of the motion control and of any necessary advanced animation. The more advanced a language is, the more enhanced motions will be produced. Thus, software needs a different approach for each user depending on the results that are required to satisfy production.

Harmony programs in the cut-out animation using a traditional and paperless approach, where all effects were hand drawn in computer. This software program provides all the tools are needed to do paperless frame by frame animation and with the right equipment for drawing. Various different types of approaches ways can be used this in this program.

In the camera or drawing view in advantage by facilitating onion sknning to see previous drawings work as ways to end the cycle. In addition, throughout

the process of creating an animation frame-by-frame using a scrub through the timeline or use the flipping toolbar to keep the effect looks good.

With easily flipping toolbar or by scrubbing will be able to see whether the effect works. When creating hand drawn effects that require multiple drawing with sharing the same timing, it can streamline the drawing layer. Once satisfied with the effect, it is ready to composite into the scene.

Run through some of the best software for producing animation. Whether to try something for fun or thinking animation is the way to give company the strong image and message looking for. Blender is beginner tools, It is free and open source tools for 3D animation with more features. All of the usual instruments that would expect from an all in one tool such as model, rigging, animation, simulation, rendering, compositing and motion tracking are present. It also has even boasts video editing and video game creation studio. This makes this software a great choice for 3D animation because it supports the entire process from start to end. Synfig studio is a free tool firmly focus on 2D animation. Synfig specialty is that it uses vector-based animation, automate the tweening process. To create the illusion of motion without no worries of running lengthy and repetitive task of generating frames between two images to give the appearance that the first image flow smoothly into the second image. To create a simple stop-motion using JellyCam need to get going with something as basic as a webcam. This it works by capturing a series of frames through a webcam that can arrange and export then upload to Youtube.

Advance tools such as Harmony‟s software with a budget. This 2D animation tool comes from Toon Boom software developer who‟s in producing storyboard and animation programs are used in famous production. Harmony has plenty of accessible features for those just looking for a tool capable of producing professional grade animation. Adobe animate CC updated it with many features integration with their other existing software. With this user get a tool that is expected from an advanced 2D animation suite all with Adobe level of polish would expect, intuitive vector brush, Wacom tablet functionality and live preview. The affordable alternative Software package is Anime Studio Pro. This package is intuitive with 2D animation option magnificent frame-by-frame technique paired well with some of the most powerful rigging support out there. In order to bring the characters to life through bone-rigging certainly adds complexity and subtlety of that movement which can really turn them into something convincing. Autodesk Maya satisfies the needs of some of features both standard and advanced which could rattle off happy. It is simulation capabilities, which is quite difficult for the sheer number of them as the quality. It can simulate high quality fluid, foam, fog, smoke, bullets, hair, fur, cloth, skin, muscle. Next up 3D tool is Cinema 4D from Maxon. There are basic features about its programs, streamlined approach with this program makes it more accessible and forgiving to the inexperienced users. Cinema 4D does not quite have the same schedule capability, especially when it comes to animation itself, for modeling, it's certainly no slouch though. DragonFrame stop motion software is having some serious high end functionality for the stop motion nuts

out there may take longer to learn, with production under its belt from studios such as big studio.

To master animation, it‟s quite a long and difficult process to learn everything especially programs that need. Most of the tools as the programs have a wiki associated with them or handbooks. A great resource that found invaluable is Pluralsight, a great provider of in-depth tutoring. There is a lot of course held by government or private institution to learn many different programs, techniques and best practice guides created by real industry professionals.

4.5 Industries Assessment Judged

The recommendation is aimed to obtain the judgment processes of production by recommended process for more competitive animation produce. To further gain a judgment two sectors were chosen to receive a recommendation from four industry companies and one academic instructor. These judgments are reviewed of mean consent from both sectors.

4.5.1 2D Production Assessment Judged

Schedule 4.3 is agreement judged with the following aspects of assessed by placing a cross (√).Two companies and one from academic A, B and C represent practitioners expert selected as respondents for 2D animation production processes. Eleven listed processes and each process was prescribed rate as follows: Extremely disagreed (1), Disagreed (2), Neutral (3), Agreed (4) and Extremely agreed (5).

Table 4.2: 2D assessment judged by industry and academic field.

	Companies	**Processes**	**Rates**				
			1	2	3	4	5
1.	**Respondent A**	1. Design				√	
		2. Recording					√
		3. Storyboard					√
		4. Animatic					√
		5. Pencil tests					√
		6. Rough layout					√
		7. Animation					√
		8. Effect					√
		9. Ink & Paint					√
		10.Composite exports					√
		11.Final editing					√
2.	**Respondent B**	1. Design				√	
		2. Recording				√	
		3. Storyboard					√
		4. Animatic					√
		5. Pencil tests			√		
		6. Rough layout				√	
		7. Animation					√
		8. Effect			√		
		9. Ink & Paint			√		
		10.Composite exports				√	
		11.Final editing					√

Table 4.2: 2D assessment judged by industry and academic field.

3.	**Respondent C**	1. Design				√	
		2. Recording				√	
		3. Storyboard					√
		4. Animatic					√
		5. Pencil tests			√		
		6. Rough layout				√	
		7. Animation				√	
		8. Effect				√	
		9. Ink & Paint				√	
		10.Composite exports				√	
		11.Final editing					√

4.5.2 3D Production Assessment Judged

Schedule 4.4 is agreement judged with the following aspects of assessed by placing a cross (√). Two companies and one from academic A, B and C represent practitioners expert selected as respondents for 3D animation production processes. Eleven listed processes and each process were prescribed rate as follows: Extremely disagreed (1), disagreed (2), Neutral (3), agreed (4) and Extremely agreed (5).

Table 4.3: 3D assessment judges by industry and academic field.

	Company	Processes	Rate				
			1	2	3	4	5
1.	**Respondent D**	1. Script					√
		2. Storyboard					√
		3. Recording					√
		4. Animatic					√
		5. Layout					√
		6. Modeling					√
		7. Animation					√
		8. Materials texture					√
		9. Lights & Cameras					√
		10. Visual effects					√
		11. Rendering compositing					√
		12. Sounds & musics					√
		13. Compositing					√
2.	**Respondent E**	1. Script			√		
		2. Storyboard			√		
		3. Recording			√		
		4. Animatic			√		
		5. Layout			√		
		6. Modeling			√		
		7. Animation			√		
		8. Materials texture			√		
		9. Lights & Cameras			√		
		10. Visual effects			√		
		11. Rendering compositing			√		
		12. Sounds & musics			√		
		13. Compositing			√		

Table 4.3: 3D assessment judges by industry and academic field.

3.	**Respondent F**	1. Script				√	
		2. Storyboard					√
		3. Recording				√	
		4. Animatic					√
		5. Layout			√		
		6. Modeling					√
		7. Animation					√
		8. Materials texture				√	
		9. Lights & Cameras			√		
		10. Visual effects			√		
		11. Rendering compositing					√
		12. Sounds & musics			√		
		13. Compositing					√

Based on following schedule 4.3 script process had different from all of respondent which respondent D extremely agreed, neutral by respondent E and agreed by respondent F. Storyboard process had extremely agreed from respondent D and F while respondent E just neutral. Recording process had extremely agreed from respondent D while agreeing from respondent F and neutral from respondent E. Animatic process had extremely agreed from respondent D and f, meanwhile neutral by respondent E. Layout process had extremely agreed from respondent D while neutral from both respondents E and F. Modeling and Animation process had extremely agreed from respondent D and F while just neutral by respondent E. Material texture process had different among respondent with extremely agreed from respondent D, agreed from respondent F

and neutral from respondent E. Light & camera process and visual process found that are same agreeing with extremely agreed from respondent D and neutral from E and F respondents. Rendering process had extremely agreed from respondent D and F, meanwhile neutral from respondent E. Sounds & musics process had extremely agreed from respondent D and neutral from both respondents E and F. The last process is compositing where is extremely agreed from respondent D and F while just neutral by respondent E.

4.6 Results

The study reliability results through document analysis and observation to determine the score against animation production. Document analysis is based on comparing among process usage and also methods used while observation of production through pipeline application in every single phase of production.

4.6.1 Document Analysis

Through observation the production studio divided three phases separately which pre-production, production and post-production. Pre-production phase is a same process in 2D and 3D animation. However the difference process occurs in production phase. Pre-production phase done with several processes will drive an animation work product. The process starts with ideas as initial step for mobilizing animation projects, in ideal or a vision of what

the animation should tell the audience. In regard to the story the production studio had prepared manuscript, character and scene descriptive that turn in to visual material. To help finalize the development of the storyline, storyboard process is an essential stage where it is used to both help visualize the animation and to communicate ideas clearly. This process also provides a visual reminder of the original plan that can be referred back to throughout the production. End of pre-production phase, the animatic is closing in on the result. This process is designed to get an overview of what has already been created, and to make sure that everything is working together as a whole.

Table 4.4: 2D and 3D animation pre-production pipeline.

Pipeline		**Processes**
Pre-Production	1.	Ideas
	2.	Manuscript
	3.	Storyboard
	4.	Animatic

During production phase in 2D animation, layout process uses to prepare an organized folder, this contains a field guide that shows the proper camera move and the right size of the scene. After all was completed animation process begun to sketch out the drawings by acting out the situations that the character in the scene requires. Once this is done, a pencil test of the scene is run then in-between frames will draw out. Once the key animation approved, cleanup process takes care all of the details present in the original sheet. After the color

models are ready, ink and paint started to clean the artwork and start applying the color on the character.

Table 4.5: 2D animation production pipeline.

Pipeline		**Processes**
Production	1.	Layout
	2.	Rough sketch
	3.	Pencil tests
	4.	Inbetween
	5.	Clean-up
	6.	Color

Character development process in 3D animation created base design guided by a script. In character process also was carry out rigging process to creating a skeleton for a model so it can move. Then texturing can be overlaid the entirely of a model‟s color, these textures are created in the form of maps which are then assigned to the model. After all the process provided character, they can finally bring the character to life by manipulating the rig controls to pose and move the character. A practice motion applied character planning a performance by creating a series of poses and playing it over frame by frame regarding on storyboard. In early stage line tests is made with low resolution rendered for setup for reviewing and production process will complete as generate final render.

Table 4.6: 3D animation production pipeline.

Pipeline		**Processes**
Production	1.	Modeling
	2.	Rigging
	3.	Texturing
	4.	Animation
	5.	Line tests

In the final phase of creating 2D and 3D animation the compositing process is to combine separate elements together into final sequences which are sound, music, effect and addition graphic visual have been created using other equipment and processes. Then the editing of footage is primarily carried out spruce and enhancement on visual and also sound for fault avoiding on animation. Sound editing is preparing to import sound track into video editing and involves adjustments to the occurrence of particular sounds due to changes made in the scenes.

Table 4.7: 2D and 3D animation production pipeline.

Pipeline		**Processes**
Post Production	1.	Composite
	2.	Sound Editing
	3.	Editing

4.6 Summary

In this chapter reports a finding from practitioner and also the comparative a production process methods by looking at percentages usage methods in producing an animation projects. In addition, this chapter as well reports an assessment judge from industry and academic. The end of this chapter reported the result of data collection by document analysis and observation.

The comparison among methods showed the average of process 2D and 3D animation production is equivalent and less different usage. However, the less similarity processes in term of usage are addition from sub-processes basic. Whereas both assessments of 2D and 3D animation production had satisfaction agreed from respondents. This recommendation was conceptualized by grounded theory and also methods result comparative. Only a few had similarity used processes from production pipeline structure among methods. This would smoothness the tasks following a little layout in production process.

CHAPTER 5

DISCUSSION AND CONCLUSION

5.1 Introduction

In the previous chapter a finding based on the methods process with the purpose of identify the processes of animation production, over designated stages process. In this chapter will conduct a within case analysis that compares the empirical data of between methods in order to discover the conceptualized and will be classified by comparison. This will shed some lights on whether there has been impact on animation processes. Because there are arguments in the literature to support each of the methods outcomes, by given the extent of debate within the literature it is likely there are both strengthen and weakness that come into play and theses may well counterbalance one another. Additionally, factors specific to the methods process being studied are likely to be influential to the results observed, which may mean that different outcomes are observed for each production processes.

5.2 Study Overview

A critical review of the literature showed that understanding the animation success of animation production is a process methods process. To generate more understands about production process among methods process, studies of production process in stages of production process for general animation (Tschang & Goldstein, 2004). If specific animation processes are significant of successful process performance.

The researcher sought to understanding how the different production processes related to and the animation production achievement of process. The research focused on three specifics questions.

Question One: How to identify the ideal animation production process suited for Malaysia context?

Question two: How to compare the Animation Production processes in Malaysia industry.

Question Three: What is recommendation to improve animation production processes for Malaysia practitioner in industry?

5.3 Analytical Approach

The overall objective of the analysis undertaken is to compare the methods process in produce an animation, to get an ideal of methods development. Prior to being able to comprise for methods process, the properties

of stages process being dealt with need to be established to gain likelihood result. In order to do this, the comparative methods are performed. The broadened understanding of types comparative studies, further justification for focus variable and debates on solutions to problem of many variables (Collier & Finifter, 1993). The analysis is undertaken for several methods process within 2D and 3D animation mediums, in order to compare the results for the different methods process and identify any differences and similarities in the results for the production processes.

As mentioned, the techniques selected for the analysis are among the most common technique for analyzing comparative studies (Flick, 2009). Goals of comparison were used in analyzing the process in the previous chapter. Therefore, analytical technique are required to understand process producing exist between the methods inherent.

5.4 The Ideal Animation Production Processes

Concerning the empirical data received from the first research question founded that five of companies are heavily involved by all methods process in the animation production processes but only three companies being referred against production processes. Since the production processes have a common with all involved parties and possess a large insight in methods reference, they become involved most of in the process.

5.4.1 Production Stages

The production pipeline of a typical animated film can be divided into three to four stages; conceptual, pre-production, production and post-production (Islam, Shamsuddin, & Choudhury, 2013; Siomacco, John L. Kundert-Gibbs, & Timothy A. Davis, 2006; Tschang & Goldstein, 2004). This research desirable an ideal production processes will be discussing these key stages in detail.

5.4.2 Production Process

The principal procedure in the liveliness pipeline furthermore a standout amongst the most essential is pre-creation. This stage to facilitate added to a thoughts and arranging before the procedure of creation (Gursac, 2001). It begins with the main concepts which are initially turned into full story and them, once the story has been finalized, other things such as script, shot sequence and camera angle are worked on (Mou, 2015; Purves, 2008). In spite of the fact that there is general succession of occasion s to pre-creation it's typical for the different stages to be returned to more than once. This is on the grounds that every stage mat either uncover an imperfection in the work to date or highlight how an as part of the undertaking could be further created (Ernest, 1998; Tschang & Goldstein, 2004).

In this research founded in pre-production the score started with Storyboard helps to finalize the development of the storyline, and is an essential

stage of the animation process (Ernest, 1998). It‟s useful when working in group environments, something that can be referred back to throughout the production. Once the storyboards have been approved, they are sent to the Layout department which then works closely with the director to design the locations and costumes. After done with various characters position Model sheets are created in order to both accurately maintain character detail and during this stage the character designs are finalized. In order to give a better idea and viewing of the motion and timing of complex animation sequence the mock-ups called animatic shortly after the storyboarding process. According to Tschang and Goldstein (2004) these helps the director plan how they will go about staging the above sequences, as well as how visual effects will be integrated into final shot.

After all pre-production has been approved the project enters the production phase. In production phase there were distinction processes between 2D and 3D. It‟s a process of animating scenes that the actual work started, based on the guidelines established during pre-production. In 2D part production are drawing guidance, dope sheet, line tests and ink and paint, some major parts in 3D production are layout, modeling, texturing lighting, rigging and animation (Gursac, 2001; Tschang & Goldstein, 2004; Wallace, 1981).

The ideal process in 2D production phase starting with layout links the storyboard and animator. In layout stages storyboard and prepare an organized folder for an animator (Fekete, Bizouarn, Cournarie, Galas, & Taillefer, 1995; Tschang & Goldstein, 2004). This folder contains a field guide that shows the proper camera move and the right size of the scene. Once the background

layouts are competed, they are ready to be painted. Then they will be sent to the compositing. Digital Video (2007); Tschang and Goldstein (2004) claim after all the production have the model pack, storyboard, format and foundations affirmed then now to continue to movement. The illustrator make scenes by showcasing the circumstances that the character in the scene requires, they based their timing and noted it down utilizing the presentation sheet (Fekete et al., 1995). The director takes the *animatic* and analyzes exactly what poses, drawing and lip movement will be needed on what frames. After all the drawings are clean-up, they are the photographed on an animation camera, pencil tests can be made using a video camera and computer software. Once the key animation is approved, the scene will be forward to clean up and in-between (Bezerra, Feijó, & Velho, 2005; Lasseter, 1987; Webster, 2005). This will taking care the greater part of the points of interest present on the first model sheet whilst the in the middle of will draw whatever casings are as yet lost. At the point when the shading models are prepared, the drawing legitimately uncovered, the colorist can begin cleaning the craftsmanship and begin applying the hues utilizing advanced paint. At the point when the drawings are cleaned, inked and painted, they are prepared for compositing. According to Fekete *et al*. (1995); Tschang and Goldstein (2004) the composting process is amasses all of components and make the camera moves and other vital movements. At last, this stage includes any advanced impacts required by the scene incorporate tones, highlights and shadows. Once the compositing is finished, the last step is to render the scene as

a motion picture or a picture arrangement in fare forms (Fekete *et al.*, 1995; Mou, 2015; Tschang & Goldstein, 2004).

Produce the 3D version in production phases begin with layout for composing the shot and delivering rough animation to the animators as a guide (Gursac, 2001; Tschang & Goldstein, 2004). During this stage the director approves camera moves, depth of field and the composition of the models making up the set and set dressing. Next stage is modeling where 2D concept art and traditionally sculpted *maquettes* into topologically 3D models (Gursac, 2001; Reichart, Arnberger, & Muhar, 2007; Tschang & Goldstein, 2004). Once the model is approved, it will be made available to the rigging and texture paint. Problems with models sometimes don‟t appear until the rendering stage (Gursac, 2001; Harrison, Landeck, & Clair, 1981; Reichart et al., 2007; Thalmann, 1992; Tschang & Goldstein, 2004; Tsingos & Gascuel, 1997). After models were done, creating a texture from scratch or through editing an existing image. Textures are painted to match the approved concept art and designs, these textures are created in the form of maps which are then assigned to the model (Kahn, 1977; Popkonstantinovic, Krasic, Dimitrijević, & Popović, 2012; Tschang & Goldstein, 2004; Wallace, 1981). Hereinafter, Popkonstantinovic et al. (2012); Thalmann (1992) claims lighting required setting up immediate and reflected lighting and shadows for each relegated shot, guaranteeing that every shot fits inside of the coherence of a grouping. Apparatus is the procedure of adding issues that remains to be worked out character of a mechanical article, and it's vital to the movement process (Gursac, 2001; Hsu & Lee, 1994). The test will be

made to show how the character shows up when disfigured into various stances, and in view of the outcomes remedial conformities are frequently made. Fixing likewise included in creating material reenactment (Ha & Fang, 2013). And final stage in production is animation, according to Gursac (2001); Lasseter (1987); Tschang and Goldstein (2004); Wallace (1981) the practice of meticulously planning a character‟s performance frame by frame is applied in 3D using the basic principles and aesthetic.

Post production is the third and final step in animation film creation, and it refers to the tasks that must be completed or executed after the filming of shooting end (Islam *et al*., 2013; Lauridsen, 2011; Purves, 2008; Simon, 2003; Tschang & Goldstein, 2004; Winder & Lowlatabadi, 2001). These incorporate the altering of crude footage to cut scenes together, embedding transitional impacts, working with voice and sound on-screen character and naming to give some examples of the numerous after generation errands. The after creation stage might likewise include further propelled procedures, for example, shading amendment. By and large, in any case, the three primary periods of after generation are compositing, sound altering and video altering (Tschang & Goldstein, 2004; Tsingos & Gascuel, 1997).

Compositing stage takes rendered images and start with compositing scripts in order to initially comp together their dailies (Catmull, 1978; Fekete et al., 1995; Irawan, 2012; Tschang & Goldstein, 2004). General composite tasks include rendering the different passes delivered to frame the last shot, paint settles and rotoscoping, and in addition the compositing of component and

general shading reviewing. For gathering the sound recording sound altering been utilized as a part of readiness for the last stable blend, guaranteeing lip adjust and including the greater part of the sound impacts required for the last film (Catmull, 1978; Tsingos & Gascuel, 1997). Tschang and Goldstein (2004); Tsingos and Gascuel (1997) agreed in final stage is the process of manipulating and rearranging shots to create a seamless final product, in video editing stage any unwanted footage and scenes are removed. Lauridsen (2011); Purves (2008) claim editing is a crucial step in making sure the video flows in a way which achieves the initial goal.

5.5 The Comparison Process in Animation Production

To find the difference processes for the animation production an adapted comparison method from Tanishima (2012) studies were analyzed. There are five methods from both medium were compared using percentage, frequency, similarity and difference in methods usage in animation production process.

Through this study, the methods of producing 2D animated shows a percentage of the comparative methods usage is irregular. This finding demonstrates the methods process applied by Mark being the highest usage. The used of process encompasses half overall process, this is because Mark insert the most process opposed other methods. Whereas the method of 3D animated production shows the comparative percentages methods usage quite substantial differences. The finding indicates a method process applied by Pixar is the

highest usage. This percentage is set with process adopted that applied for half exceed of animation production processes. It also shows the process percentage applied by both methods have certain comparative guide with other methods. This does not mean the others inefficient implemented, however both are more specific in their every process.

The similarity of animation production process shows there is slight similarity process as compared inherent processes in pre-production phase. Similarity processes used are directing dialogue, design, animatic and storyboard. In concrete terms, pre-production means getting the idea and script fleshed out in models. These similarities process broke out when the individual panels are edited together along with dialogue, music and sound effects to see how it flows as a movie. Production phase shows similarity was furcated with processes producing 2D and 3D animation. For 2D animation two similarity processes being used by methods are pencil tests, animation and effect. These processes are interconnected as rough animation lines are then cleaned up (inked), painted and combined with the background. The addition of effects animation, like shadows and highlights, can add considerable time to the process. For three similarities process being used by 2D methods are rough layout, background, animation, clean up, and composite and export. All these stages process have to checking stage is through everything, scene by scene, to ensure that there are no mistakes and that nothing has been left out. Three similarities for 3D are modeling, animation, material and texture, effect, and rendering. Besides, 3D animation is known for its dimensional look and realistic

quality. For 2D animation four similarities process being used by methods only ink and paint. This process is finalizing animation art using scanning, instead of inking, for each pencil drawing, and digitally coloring instead of hand painting. In 3D animation the highest is five similarities for being used by methods are light and camera. Lighting becomes the major focus after animation has been completed in each scene. Post production phase shows two similarities being used by methods are composite, music and sound, and editing. Where the various elements can be combined and processed *filmically,* it need to compile all of production elements, title cards, credits, footage, sound effects, music, dialogue, and more.

Animation production process shows considerable difference between methods. These differences sought on single process without having similarity between methods. Almost whole processes are single application at pre-production phase in producing 2D and 3D animation. Meanwhile, a single usage by methods process is equivalent with similarity process at production phase. In producing 2D animation at post production more than half are single processes in whole processes however in producing 3D animation there is no single process. All of each process carries a single process that more to addition steps base on basic process. This is giving auxiliary production with explicate, breadth and collective for convenient an understanding what is processed from entire production with clarity. Despite the process stage is characteristic differences granted by methods so that each process stages are able to make detail on by practitioner. Thus project direction on production is more focusing on goal.

5.6 Assessment an Animation Production Processes

The following are recommendations for animation production processes on factors to contribute to industry and also academic of practitioner and students. These recommendations are based on the findings and discussion of the present study. This recommendation measurement encompasses three parts in animation production consisted pre-production, production and post-production.

As much as recommendation is designed for producing interested in animation process but not necessarily in becoming pipeline, the section spend a brief time discussing the how to aspects of animation.

Script is required keeping in mind the end goal to change the undertaking into a story board. The same script is utilized as a dialog for the sound recording. Once the script is finished, the fashioner can begin work. Prior to any liveliness, foundation or tinge should be possible, the outline should be tended to. The sound recording is additionally called voice recording. The script is required for dialog and additional sound impacts. These voices will be utilized later on for the animatic, the liveliness and the last creation compositing.-- A story board is a visual representation of all the scenes and actions contained in the script. The dialogue, backgrounds, action notes and characters are included. The storyboard will be created at the same time as the characters, props, location design and audio recording. Animatic comes directly from the storyboard. The animatic is the first movie of a project and is used to help the animators and compositors. The storyboard is scanned in and mounted with sounds and dialogue.

In producing a 2D animation the pencil tests are quick samples of how the animation looks in motion as its being drawn. Pencil tests are also used for approvals before the animation goes through clean-up and painting. The layout and posing process links the storyboard artist and the animator, this rough layout folder contains a field guide that shows the proper camera move and the right size of the scene. The stage process proceeds to animation once the model pack, storyboard, layout and backgrounds approved. The animators create scenes by acting out the situations that the character in the scene requires. The effects department is responsible for prop animation, which might range from moving vehicles to exploding, buildings to wind-blown tree.-- There are numerous types of effects animation such as rigid body dynamics used in destruction shots, particle renders used to create sparks, fluid simulation to create oceans and rivers, or volumetric used in creating mist or smoke-and these may be created through a wide variety of software systems. When the color models are ready, the drawings are scanned and properly exposed, the colorist can start cleaning the artwork and start applying the colors using a digital paint software. When the drawings are cleaned, inked and painted, they are ready for compositing.

Meanwhile 3D production using lo-res models or blocks of geometry in the place of the final set and characters, the layout is for composing the shot and delivering rough animation to the animators as a guide. It is then the responsibility of the modeling department to deliver these approved set, prop and character models in the final layout stages. Whilst organic modelers tend to have a sculpture background and specialize in building the characters and other

freeform surfaces. Once the model is approved, it will be made available to the rigging and texture paint departments. Animation the practice of meticulously planning a character's performance frame by frame is applied in 3D graphics using the same basic principles and aesthetic judgments. Material texture, working hand-in-hand with the surfacing and shading departments, textures are painted to match the approved concept art and designs which were delivered by the art department. These textures are created in the form of maps which are then assigned to the model. They are required to establish direct and reflected lighting and shadows for each assigned shot, ensuring that each shot fits within the continuity of a sequence, all the while aiming to fulfill the vision of the Directors. The effects produce elements such as smoke, dust, water and explosions, although development on these aspects does not start until the final animation/lighting. General compositing tasks include rendering the different passes delivered by a lighting department to form the final shot, paint fixes and *rotoscoping* (although compositors sometimes rely on mattes created by a dedicated *rotoscoping* department).

Post production process consisting a video editing, it‟s a crucial step in making sure the video flows in a way which achieves the initial goal. After rendering an episode into an image sequence in compositing, we then edit it with the sound and music, so it will render much faster to the chosen media. Other tasks include titling and adding any effects to the final video and text. Editing is choosing segments of the animation production footage, sound effects and sound recordings in the post-production process that will be in the final output.

5.7 Study Limitations

Although there is much remains to be done, the study generates important finding in the field of production house and comparative by methods sample. In other works, having acknowledged the limitations of data processing, nevertheless there are some limitations of this study. The study was in the critical care setting producing process in the animation production where the structure of the phases, stages step, and the tasks department. Additionally, the managing of the production working there may different to the company in industries setting. Thus, a great deal of caution should be addresses as to the transferability of this study to other studies with different study settings. Two productions could only do obtained by data collection, therefore secondary data was examined. Also, only directors were interviewed hence, the opinions clients, audiences, and other stakeholders were not including this study.

Doing this study was obtaining a reliable data, particularly about the Malaysian animation production. Despite this, the study approach in this research obtained an affluent data set from the production involved. Data relating this topic is significant limited in the literature. The limited data from this study restricted this project‟s ability to generalize about wider trends or build new theories. The finding of this thesis are based on the experience of two production companies, and offer greater knowledge about the producing of a animation product for local and aboard markets. This study will add to the significant gap existing in regards to this topic in industry and academic. As one

of the first research studies examining the issues of the Malaysia industry, this research makes a significant contribution to an emerging field of academic enquiry.

5.8 Summary

This study being conducted for obtains an ideal animation production process in producing an animation through foresee three part phases. The comparative methods process carried out for seeking an advantage and disadvantage each process methods in similarity and difference. Base on findings, the processes stage being identified for recommendation from industry and academic sector as proposal to form a reference for production house and academic institute.

Thus, the recommendation more appropriated for local industry or developing country application. Based on achieved industry and academic side feedback, this recommendation being sensible reference in academic learning and industry guidance with appropriate a few additionally improvement for student and practitioner and also able to enhance production process efficiently.

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APPENDIX A

Research title: The efficiency issues on the animation production stages

Research objective: To determine a common animation production process

Semi-structure interview questions with a common animation production process

1. **The production plan**

   1.1 What are involved aspects in planning out an animation project?

   1.2 What are conventional animation marketplaces and how a potential filmmaker might approach them?

   1.3 How to know those costs up front and to find a ways of covering them to ensure that the production can be completed?

   1.4 How to embark on a project that turns out to be far too time-consuming or cost-guzzling to complete?

   1.5 What are the steps to be taken and how they will handle, including milestone and approval points?

   1.6 Using the preliminary master schedule, how the producer is to build a detailed crew plan?

   1.7 How much does it cost to hire an animator for animation project?

   1.8 Why animation can be an expensive business?

   1.9 Who is the most crucial core staff position in production?

   1.10 How do you put a production plan together for animation?

2. **Professional development for production process**

   2.1 How to abound the idea and way of coaxing them out?

   2.2 What intellectual property and copyright, and how essential related to the idea?

   2.3 How to progress the basic idea into a story that follows the accepted motif of that approach?

2.4 How to determine that suitable program against animation production?

2.5 What cn be a lot of variation between studios and individual production?

3. Techniques and tools

3.1 What is technically making animation more professional, life-like, and believable?

3.2 How might different technique used to create the animation?

3.3 What an appropriate tool for creating animated video in industry?

3.4 What are types of support tool are most likely to be effective in assisting animation made that engaged animator from diverse task?

3.5 What are the techniques in placing to ensure consistency in developing a project?

3.6 In terms of what technique and tool those assisted the production in completing project?

4. 2D and 3D animation overviews

4.1 How many stages involved in creating an animated movie from scratch as influences the time and cost?

4.2 How many steps for process of making a complex animate in stages?

4.3 What are major components of pre-production as initially works?

4.4 What are major parts in 3D animation process?

4.5 What are major parts in 2D animation process?

4.6 What is your method of animation that you are support?

4.7 What are main phase of post-production as last pipeline?

4.8 Why a most studios are likely to have a custom pipeline?

4.9 Why the production for classical animation starts much faster than other styles?

4.10 How the computer software makes it possible for artists to manipulate single drawing?

4.11 Why in any 2D animation is usually mush faster than 3D animation?

APPENDIX B

Title of the Project: The efficiency issues on the animation production stages

Course: Master in Multimedia.

Institution: Faculty Technology Creative and Heritage, University Malaysia Kelantan.

Date: September 2015

Project Outline

Recommendation for 2D animation production processes.

This is an empirical research focus on animation production methods that can be used to being guided for produce an animation product.

This study looks a comparison method among producing processes an animation, as recommendation for practitioner and references study.

Dear Datuk/Datin/Tan Sri/Puan Sri/Prof./Assoc. Prof./Dr./Sir/Mdm,

I'm currently conducting a study with the aim to comparison an animation production processes within among processes method. We assure that your responds through validation of recommendation method processes treated complete confidentially will be used for academic and industry purpose.

Your kind participation in this study is greatly appreciated.

Instruction

Please rate your satisfaction with the following aspects of our recommendation by placing a cross [√] at the point of the line that most corresponds to your response. Please record any remark or explanation in the columns below.

i. Extremely Dissatisfied [1]
ii. Dissatisfied [2]
iii. Neutral [3]
iv. Satisfied [4]
v. Extremely Satisfied [5]

No.	Process	1	2	3	4	5	Remark
	Pre-Production						
1.	**Design**: It is crucial to allocate adequate including a story, a concept, anything to draw.						
2.	**Recording dialogue**: Once the story is laid out, the dialogue is recorded. This is done before animation, so the animators know what the characters will say.						
3.	**Storyboard**: The process to reveal significant plot and filmic deficiencies in the script before the extensive production effort is initiated.						
4.	**Animatic**: Combining the final track with the storyboard drawings, the director will create an *animatic*. The *animatic* is a filmed version of the storyboard, timed and edited to the established soundtrack.						
	Production						
5.	**Pencil tests**: The process is quite simply the moving line drawings of the action, filmed, and timed as requested by the director.						
6.	**Rough layout**: Usually these drawings are quite messy, there is still no color, or background.						
10.	**Effect**: Water, props, shadows, flames, and objects other than characters are usually animated separately from						

	character animation. Effects are seldom the focus of a scene.						
11.	**Ink and Paint**: The drawings are first scanned, then colored and painted electronically or manual, using either bitmap or vector technology.						
12.	**Composite and Export**: Where the various elements can be combined and processed *filmically* within a single desktop computer is done in the digital environment.						
	Post Production						
13.	**Final Edit**: It used every frame of animation to draw in the final edit. During editing, it need to compile all of production elements, title cards, credits, footage, sound effects, music, dialogue, and more.						
14.	**Composite final**: Where all the animation is complete, the music is perfect, and all the sound effects are in.						

Recommendation:_____
_____
_____
_____
_____

Title of the Project: The efficiency issues on the animation production stages

Course: Master in Multimedia.

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Instruction

Please rate your satisfaction with the following aspects of our recommendation by placing a cross [√] at the point of the line that most corresponds to your response. Please record any remark or explanation in the columns below.

i. Extremely Dissatisfied [1]
ii. Dissatisfied [2]
iii. Neutral [3]
iv. Satisfied [4]
v. Extremely Satisfied [5]

No.	**Process**		1	2	3	4	5	**Remark**
	Pre-Production							
1.	**Script:** the writing processes with describing camera shots, this process includes establishing and setting up the characters, their world, their conflict(s), and the resolution.							
2.	**Storyboard**: The process to reveal significant plot and filmic deficiencies in the script before the extensive production effort is initiated.							
3.	**Recording dialogue**: Once the story is laid out, the dialogue is recorded. This is done before animation, so the animators know what the characters will say.							
4.	**Animatic**: Combining the final track with the storyboard drawings, the director will create an *animatic*. The *animatic* is a filmed version of the storyboard, timed and edited to the established soundtrack.							

	Production						
5.	**Layout or shot setup:** The stage for identifying possible refuses of sets and or combining of shots.						
6.	**Modeling:** The process of creating shape and form on screen included entirely model setup.						
10.	**Animation: C**horeographing the movements and facial expressions in each scene. Throughout motion in each scene by defining key frames or poses**.**						
11.	**Materials and textures:** Define the nature of the surface of a character's skin, clothes, other props, specifically the transparency*, reflectiveness*, and luminance.						
12.	**Lights and cameras:** The process to illuminate and frame objects.						
13.	**Visual effects:** Water, props, shadows, flames, and objects other than characters are usually animated separately from character animation. Effects are seldom the focus of a scene.						
14.	**Rendering and Compositing:** Rendering is the act of translating all of the information in the files that make up the shot, (sets, colours, character movement), into a single frame of film.						
	Post Production						
15.	**Sound and musical score:** The completion and addition of the musical score and the other sound effects.						

16.	**Compositing:** Where all the animation is complete, the music is perfect, and all the sound effects are in.						

Recommendation:_____
_____
_____
_____
_____

APPENDIX C

Table C.1: 2D methods comparison

No.	Processes	Catherine & Zahra	Mark Simon	Tony White	Rick Parent	Disney	Frank & Ollie	Eric Goldberg	Ed Hooks	Helen Piercy	Robert Ruseett	Francis Glebas	David B.Levy
1	In-house pitch		√							√			
2	Script			√			√	√			√		
3	Budget		√									√	√
4	Crewing up		√										
5	Dope sheet and production folders			√							√		
6	Model Sheet				√		√			√			
7	Exposure sheet				√				√	√			
8	The route sheet				√							√	
9	Design and art direction Character Designs	√	√	√			√	√			√		√
10	Directing Dialogue		√			√							
11	Audio Recording and Editing		√					√	√				
12	Soundtrack			√			√			√			
13	Track breakdown			√					√				√
14	The voice track	√					√				√		
15	Audio breakdowns		√					√			√		√
16	Assigning production work		√										
17	Detailed story				√					√			
18	Storyboard	√	√	√	√	√	√	√	√		√	√	
19	Storyboard present					√						√	

20	Revisions of storyboards		√										
21	Preparing a shipment	√											
22	Songs	√											
23	Title sequence and end credits	√									√		√
24	Animatic		√	√	√		√		√	√	√		√
25	Pencil tests		√	√									
26	Pose test			√									
27	Rough sketches					√			√				
28	Rough layout	√	√	√				√					
29	Enhanced animatics		√										√
30	Rotoscoping		√									√	
31	Key frames				√						√	√	
32	Scene planning	√							√				
33	Shot setup	√								√			
34	Layout turnover	√					√						√
35	Backgrounds		√	√		√		√					
36	Inbetweens		√				√	√					
37	Scanning		√								√		√
38	Animation breakdowns, slugging, or timing	√	√						√				
39	Cleanup layout	√											
40	Background painting	√										√	
41	Clean-up animation	√	√	√			√						
42	Effects animation	√	√					√		√			
43	Photographed					√							
44	Camera Moves and Special Effects		√										√

45	Animation check		√										
46	Color styling Digital ink and paint	√	√	√	√	√		√	√		√	√	
47	The final edit and Dub			√		√							
48	Compositing and Export of Individual Layers	√	√							√		√	
49	Final Image Composite Final shoot		√	√			√	√				√	
50	Final check	√											
51	Music	√								√			
52	Audio post-production	√							√				√
53	Picture post-production	√					√						
54	Final delivery	√										√	

Table C.2: 3D methods comparison

No.	Process	Catherine & Zahra	Daniella Lamothe	Tony White	Jean Ann Wright	Pixar	Preston Blair	Shamus Culhane	David Rodriguez	Sergi Camara	Eric & Kenny	Jason Osipa	Hans Bacher
1	Story Idea					√							
2	Text Treatment					√							
3	Script					√	√				√		
4	Storyboard					√		√					
5	Voice Talent					√							
6	Reels				.	√		√	√	√	√	√	
7	Look and Feel (Colour Scripts)					√	√					√	
8	Layout or shot setup	√				√	√	√		√			√
9	Character modeling			√	√	√			√			√	√
10	Character design			√				√		√	√		
11	Character finaling	√											
12	Sets					√			√				
13	Rigging				√		√	√			√		√
14	Animation	√	√			√		√					
15	Final layout	√										√	
16	Materials and Textures color		√	√	√		√		√		√		
17	Environmental models			√						√			
18	Shade					√							
19	Lights and cameras	√	√	√	√	√			√		√	√	
20	Cinematography elements				√			√		√			√
21	Visual effects	√	√		√				√	√			
22	Matte paintings	√					√			√	√		√

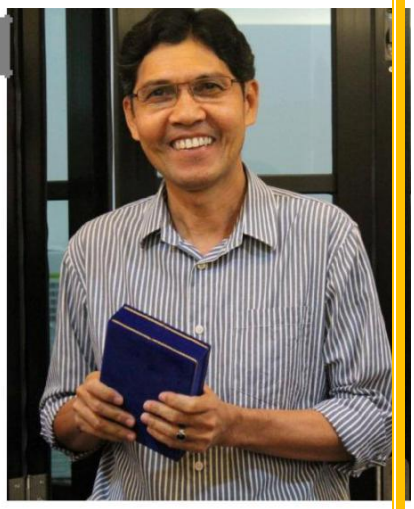
23	Rendering Compositing		√		√	√			√		√		
24	Composite	√			√				√				√
25	Editing and Final Touches				√	√	√		√				√
26	Sound effects Musical Score				√	√				√		√	

APPENDIX D

Picture of Respondents

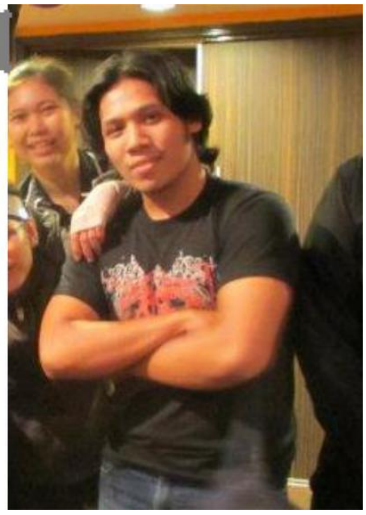
ANDREW OOI

MUHAMMAD ZUBIR



SANDRA KHOO

M. IRFAN FAIZ



EZWAN M. MOKHTAR

ABDUL HAKIIM