# THE DEVELOPMENT OF COVID-19 AWARENESS CAMPAIGN THROUGH 3D ANIMATED DIGITAL COMICS

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This report is submitted in partial fulfilment of the requirements for the Bachelor of [Computer Science (Interactive Media)] with Honours.

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2021

# DECLARATION

I hereby declare that this project report entitled

**THE DEVELOPMENT OF COVID-19 AWARENESS CAMPAIGN THROUGH 3D ANIMATED DIGITAL COMICS**

is written by me and is my own effort and that no part has been plagiarized without citations.

STUDENT : _____ Date : 22 June 2021
(YONG KIAN PING)

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I hereby declare that I have read this project report and found this project report is sufficient in term of the scope and quality for the award of Bachelor of [Computer Science (Interactive Media)] with Honours.

SUPERVISOR : _____ Date : 12 September 2021
(TS. NORAZLIN BINTI MOHAMMED)

# DEDICATION

This report is devoted foremost to my beloved family, supervisor, and friends which supervised and inspired me along the project.

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I would also like to thank my beloved parents who have been giving me support and motivation throughout my project especially during the pandemic.

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# ABSTRACT

The title of this project designated as "The Development of Covid-19 Awareness Campaign Through 3d Animated Digital Comics". The objective of this project is to study 3D animation in digital comics for the COVID-19 awareness campaign, to develop a 3D animated digital comic book on COVID-19 awareness, and to evaluate the usability of 3D animated comics in delivering awareness campaign compared to conventional comics. According to the research, the public still lacks awareness of the COVID-19 threat. The public needs to be more aware of how dangerous the viruses are. This project hybrid both the traditional digital comic with the 3D animation to form a new reading experience. It is intended to raise the COVID-19 awareness to the public through reading the motion comics. The research on the usability of the motion comics of the awareness campaign is then carried out.

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# ABSTRAK

Tajuk projek ini ialah "The Development of Covid-19 Awareness Campaign Through 3D Animated Digital Comics". Projek ini bertujuan untuk mempelajari animasi 3D dalam komik digital bagi kempen kesedaran COVID-19, untuk mengembangkan buku komik digital beranimasi 3D mengenai kempen kesedaran COVID-19, dan untuk menilai / membandingkan keberkesanan komik animasi 3D dalam menyampaikan kempen kesedaran berbanding dengan komik konvensional. Menurut kajian, masyarakat masih kurang mengetahui tentang ancaman COVID-19. Orang ramai perlu lebih menyedari betapa bahayanya virus tersebut. Projek ini merangkumi tradisional digital komik dengan animasi 3D untuk menyampaikan pengalaman pembacaan komik yang baharu. Projeck ini bertujuan untuk meningkatkan kesedaran ancaman COVID-19 kepada masyarakat melalui membaca komik bergerak. Penyelidikan mengenai keberkesanan komik bergerak tentang kempen kesedaran akan dijalankan kemudian.

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# LIST OF ABBREVIATIONS

| | | |
|---|---|---|
| **MCO** | **-** | **Movement Control Order** |
| **CGI** | **-** | **Computer-Generated Imagery** |
| **3D** | **-** | **2 Dimensions** |
| **2D** | **-** | **3 Dimensions** |
| **SMS** | **-** | **Short Message Service** |
| **PDF** | **-** | **Portable Document Format** |
| **AR** | **-** | **Augmented Reality** |
| **VR** | **-** | **Virtual Reality** |

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# LIST OF ATTACHMENTS



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# CHAPTER 1: INTRODUCTION

## 1.1 Introduction

Comics is known as the visual medium of image-text combination that is used to deliver ideas or information. It is commonly created by hand-drawing or in printed form with either sequenced of single or multiple panels of images. As soon as computer technology advancing, comics in digital form becoming the latest trends among the public. With the aid of drawing devices and software, digital comics creation is much faster than traditional hand-drawn comics. Without the need for paper, the lifetime of a digital comic is said to last forever compared to physical comics. On the other hand, animation is a moving object, image, or any kind of visually created by a photograph, drawing, or created by computer. Unlike the traditional hand-drawing and painting animation by frames, animations in this era are mostly created with CGI. It is faster and easier to produce high-quality animation. There are two main types of animation, 2D animation which consists of flat images, and 3D animation which integrates depth of third-dimension-space into the 2D world. People are more attracted to the motion visual compared to the static images or texts (Dindar, Yurdakul&Dönmez, 2013). As humans perceive better when things are in motion, 3D animation gives a better understanding and perception compared to 2D animation (Au, 2014). As computer technology becoming mature, a new form of comics is revealing in the public eyes. Animated comics, also known as motion comics, is the invention of hybridisation of both comics and animation through CGI, visual effects, and complex digital compositing that bring a new impression among the readers (Smith, 2015). Since the beginning of the pandemic, the world was putting massive affords into preventing the outbreaking of COVID-19 viruses (Kokudo&Sugiyama, 2020). The actions taken include educating the public on COVID-19 through awareness

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campaigns. The common approach in delivering COVID-19 awareness is through television, online media, radio, poster, SMS or any other publication such as newspapers, and magazines. Comics, however, is an alternative medium to educate the public through the awareness campaign as it encourages people to read and learn effectively (Muniran&Yusof, 2008).

## 1.2 Problem Statement

According to (Camoens, 2020), compounds that worth more than half a million ringgit were issued to MCO violators on 28th October 2020. This incidence shows the public still lack of awareness on the COVID-19 threat. Public needs to be more aware on how dangerous the viruses are (Hu, Lou,...&Wang, 2020). Besides, conventional comics for awareness campaign nowadays are mostly in static image form. Some people might face difficulty just by reading the texts or to visualise the static images compared to animation (LESTARİ&MUSTADİ, 2020). This could lead to obstruct on delivering the COVID-19 awareness campaign among the public.

## 1.3 Objective

This project embarks on the following objectives:

1. To study on 3D animation in digital comics for COVID-19 awareness campaign.
2. To develop a 3D animated digital comic book on COVID-19 awareness.
3. To evaluate the usability of 3D animated comics in delivering awareness campaigns compared to conventional comics.

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## 1.4 Scope

This project integrates 3D animation into the traditional comic book. The target users of this project are focusing to the young adult which aged between 18 to 24 and those are interested in reading comics or watching the animation film. The approach in delivering this project is through Windows application due to the animation media formatting.

## 1.5 Project Significant

This project hybrid both the traditional digital comic with the 3D animation to form a new comic experience. This animated comic book expects to benefit those having difficulty in reading or visualising the comics. It intended to raise the COVID19 awareness to the public through attractive comics with animation. Besides, this project also investigates the usability of 3D animated comics in delivering the awareness campaign compared to the conventional comics.

## 1.6 Conclusion

To conclude, this chapter briefly introducing the project that carried on as well as describes the project objectives.

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# CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

## 2.1 Introduction

This chapter will discuss about the domain and the other sub-categories of this project. Besides, the existing system that relates to the domain is described, and the methodology of this project is also explained in this chapter.

## 2.2 Domain

### 2.2.1 Comics

#### 2.2.1.1 Physical Comics

According to (Eisner, 1985; McCloud, 1993), comics is defined in combination term of communication, language, and is relies on visual experience of both creator and reader. Comics nowadays is not just a medium of enlightened, learned, or entertainment tools, but also involved in legal side (Chute, 2017). Traditionally, comics is created in printed medium such as newspaper, magazine, or combined as a book. Comics initially is to entertain the reader, or just act as a simple drawing art. At the late 1930s, the comic book covers act as the advertisement medium and as enterprising packaging for a product (Goulart, 2000). Figural 2.1 shows the comic strip back in 1912s where the story events and respective scenes are organised and arranged in panel strip. The viewport usually in a third or first-person angle, while the text captions use for story narrations (Eisner, 1985). The dialogues are showing in a white bubble or balloon and a tail to indicate the speaker.

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**Figure 2.1 shows Little Nemo comic strip by Winsor McCay**

**(source: Wikimedia Commons)**

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### 2.2.1.2 Digital Comics

As the computer technology advancing, new forms of comics are created and bring the visual art to the next level. Digital comics can preserve the quality and conditions of comics due to the changes in time. Digitalised comics can access, share, and download easily through free or premium online platforms at a better and affordable price comparing with printed comics. According to Cohn (2013), the comic strip layouts are influenced by the visual narrative structure. Digital comics creators have an abundance of choices to publish their work through the internet, such as online publications, social media, websites, and blogs (Lamerichs, 2013). A study by Rina, Suminar, Damayani, & Hafiar (2020) shows that digital comic media can increase the

learning process effectively primarily for students. Moreover, unlike static digital comics, the evolution of computer technology makes digital comics interactable. Interactive comics is the combination of rich media elements such as audio, video, and animation (Steinke, 2004).


**Figure 2.2 shows an example of digital comics – Green Wake**

**(source: Adam Geen)**

### 2.2.2 Comics in Awareness Campaign

Apart from entertainment, comics is found to be a useful tool in another way. Some research studied the possibility of comics in creating awareness on social issues (Terry, 2014; Reyns&Henson, 2010). One of the highlights that comics acquire is the

attractive visual. The combination of words and visual graphics can bring essential information to the readers. However, active participation and commitment from those involved are crucial to raising notable awareness (Chattopadhyay, 2019). Besides, age and gender should be considered in awareness delivery as reading comics should be fun and entertained (Branscum&Sharma, 2009).

There are several conventional comics used in awareness campaign delivery such as "Kids, Vaayu & Corona: Who Wins The Fight?" prepared by Dr Ravindra Khaiwal from PGIMER, Chandigarh, India and Dr Suman Mor from Panjab University Chandigarh, India. The comic aims to create awareness of the coronavirus threat and the prevention among children. For the project research purpose, this comic will act as the conventional comics for comparison in the testing phase.


**Figure 2.3 shows the comics "Kids, Vaayu & Corona: Who Wins The Fight?" by Dr Ravindra Khaiwal and Dr Suman Mor**

**(source: Countercurrents.org)**

### 2.2.3 Definition and Concept of Animated Comics

The term '3D motion comics' or '3D animated comics' is not commonly found on the Internet. The most popular motion comics or related resource these days are usually in 2D animated form. For the sack of study, 2D motion comics are the focus of this section. Motion comics, also known as motion book, is made up of limited-animations and the comic book (Morton, 2015). According to Morton (2015), the motion comics genre is describing as a new genre due to its multiple dimensions of motion representations, levels of interactivity, sequential structures, audio modalities, as well as production overlaps with video and animation. However, Smith (2015) seeing motion comics as a hybrid medium that manipulates static comics with animation software.

According to Smith's conceptualisation of motion comics aesthetic, there are several motion comics aesthetics models such as panels, motion, audio elements, narrative fidelity, spatial depth, adaption, genres, and distribution and formats.

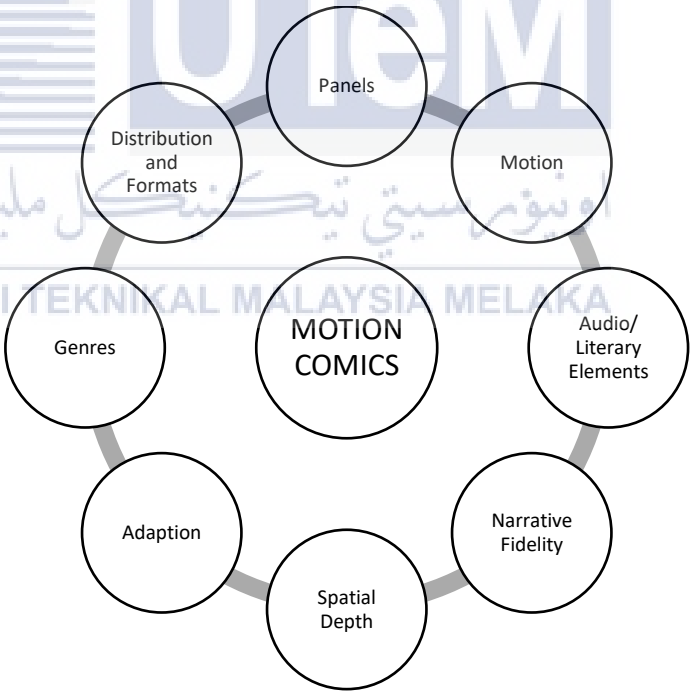


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**Figure 2.4 shows model of motion comics aesthetic by Smith, 2015**

**(Illustration by author)**

#### 2.2.3.1 Comic Panel

Motion comics adapting the regular flow of the comic book which, occurs within an overall order of panels, individual strips that represent scenes, and the artwork within those panels. Unlike the portrait aspect ratio, motion comics layout usually presented in landscape form.

#### 2.2.3.2 Motion

In process of animating the comics, there are three approaches:

a) separation of each layer of animated characters or the objects within the image,
b) applying the animation effects to the static character and the background, and
c) a camera that moves or focus around the scene.

#### 2.2.3.3 Audio/ Literary Elements

While comic book viewed as the connection of texts and images, motion comics can either use character voiceovers and soundtracks to replace the written words or applying the speech bubbles within the moving image. The speech bubbles, voiceovers, and soundtracks may or may not presenting altogether at once or separately in motion comics.

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#### 2.2.3.4 Narrative Fidelity

The narrative of motion comics is either reusing the original version of the comic story completely or neglect some parts of the storyline by using the abridged version. Some of the motion comics narratives are created solely from an original storyline to gain higher recognition on other products such as television series, videogames or movies.

#### 2.2.3.5 Spatial Depth

Unlike the original comic book, motion comics can strengthen the perception of spatial depth through graphical software. To deliver the sense of depth field, visuals are split into different layers and arranged according to the needs. Besides, the blurring effect and the distance from the moving camera can further empower the sense of the artificial world.

**Figure 2.5 shows the spatial depth effect of three flat images in separated visual layers**

**(source: The Doodle Boat from YouTube)**

### 2.2.3.6 Adaption

There are three adaption approaches in motion comics:

a) Cinematic approach: traditional comics features are dropped, for examples, panels and gutters (white space between each panel), to imitate the pattern of animation or movie.

b) Comic book approach: maintaining most of the comic book features, such as speech bubbles and panel layouts. This approach would give the impression of the original comic book visual.

c) Interactive approach: interactively presenting the comics narrative while keeping the comic book styles.

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### 2.2.3.7 Genres

The superhero genre, typically from the U.S., is dominating the field of comics. Motion comics as part of comics dividends, its heritage more or little from superhero trends.

### 2.2.3.8 Distribution and Formats

The emerge of motion comics forms new standards of universal digital distribution in the developed world. There are few major distribution and formats for motion comics. Readers can download, typically in pdf or application formats, or

stream the contents through the internet on a computer or a mobile device. On the other hand, DVDs and broadcast channels are used by television viewers.

## 2.3 Existing System

### 2.3.1 2D Motion Comics

Some might criticise that the motion comics is a poor cut-paper cartoon instead of comics nor an animation (McMillan 2008), the other thinks that motion comics is an indirect outcome of cooperation between reader's expectations and the multiple media industries (Jenkins, 2011). The presence of 2D motion comics in the market nowadays can be subdivided into two major types, in digital book form and video form. 2D motion comics in digital book form provides the reader with limited control over the scenes and pages changing, language preference, and brightness. It can be in form of PDF files and mobile application (Smith, 2012). The video format for 2D motion comics, however, has no control over the readers except for the video play and pause.


**Figure 2.6 shows a book form of 2D motion comics – Bottom of the ninth**

**(source: D'source)**


**Figure 2.7 shows a video form of 2D motion comics – Covidball Z by Ernest Ng**

**(source: Facebook)**

### 2.3.2 Interactive Motion Comics

The interactive comics narratives consist of several points of decision-making for the reader to interact. Reader's action or choices may or may not interfere with the ending of the comics narrative. Sometimes it can be a transition of other subplots of the story, as the example of interactive comics, The Boat (Figure 2.7).


**Figure 2.8 shows an example of digital interactive comics - The Boat, story by Nam Le**

**(source: sbs)**


**Figure 2.9 shows an interactive motion comics – Lost Girl published by Bedlam Games**

**(source: Behance)**

### 2.3.3 Augmented Reality and Virtual Reality Motion Comics

The advancement of AR and VR change how human interacting with technology in terms of the academic, way to interact, and thinking approach (Hashim, Idris & Said, 2020). Although computer technology is getting reliable, AR or VR motion comics yet to gain popularity among the public. As the workload is tremendously high, there are only a few showcases regarding the AR and VR motion comics on the internet.

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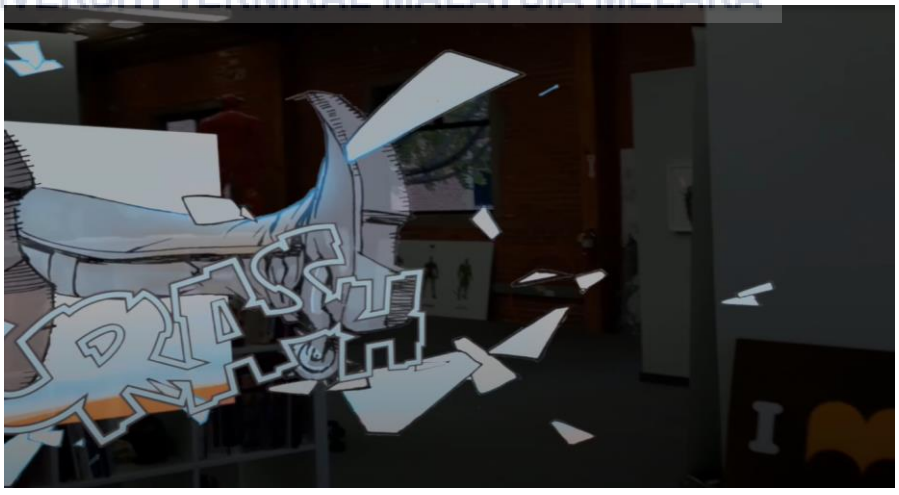

**Figure 2.10 shows an augmented reality of motion comics by Madefire**

**(source: YouTube)**

**Figure 2.11 shows an augmented reality of motion comics by TheDRIVER**

**(source: YouTube)**

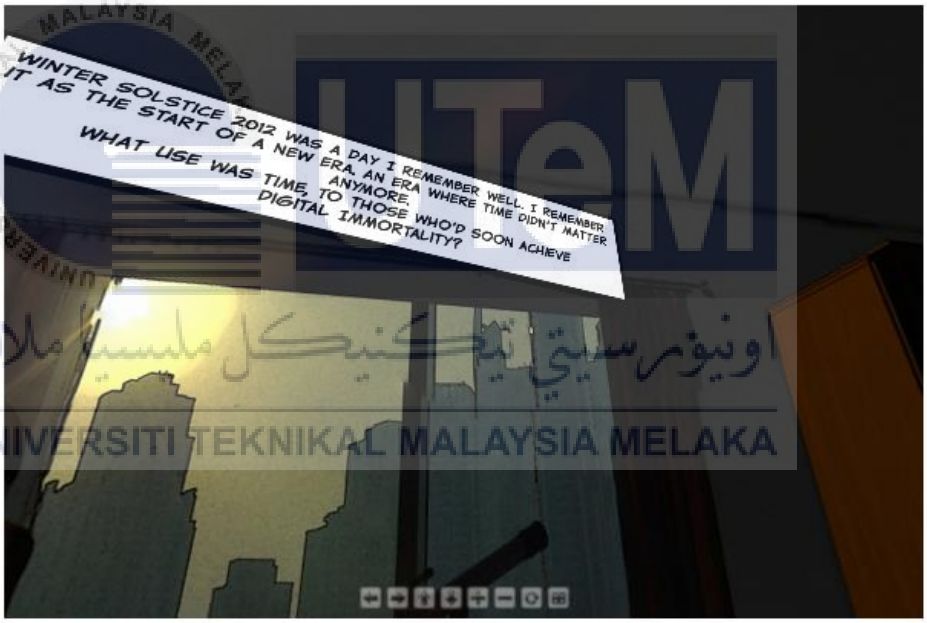


**Figure 2.12 shows an example of VR motion comics - MAYA**

**(source: realvision)**

### 2.3.4 Comparison of Existing System

There are five existing systems related to motion comics are found on the Internet. Each of the systems has a different aspect and platform. The comparison takes the consideration of the respective system approach and the advantage.

**Table 2.1 shows the comparison between existing motion comics system**

| System/ Project | *Bottom of the ninth* | *Covidball Z* | *The Boat* | - | *MAYA* |
|---|---|---|---|---|---|
| Aspect | 2D Motion Comics (digital book format) | 2D Motion Comics (video format) | Interactive Motion Comics | Augmented Reality Motion Comics | Virtual Reality Motion Comics |
| Tool/ Platform | Web-based/ application | Video Player | Web-based | Mobile phone/ application | Oculus Rift/ VR device |
| Concept | Readers take minimal control on change page action either to next or to the previous page. | Voiceover applied to make the comics feel alive. However, readers cannot take control of the page or panel changing. | Background scene and panels are animating according to the story progress. Integrating the sound enhances the reading experience. | Readers using the AR application or device to scan the marker or comic panel to watch the animation playback. | Readers can read and interact with the motion comic while inside the comic itself. |
| Approach | Combining the animation clips, static images, and audio clips into the supporting platform or application, which is used | Animating the required scenes and objects as in comics layout with video editing software or animation | Using the online web browser features or tools to create the desire motion comics layout and set the | Develop the AR application through software and run it on mobile devices. | Develop the VR application through software and run it at the Oculus or VR devices. |

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| | | | | | |
|---|---|---|---|---|---|
| | for interface controller. | tools. Then export the output as video formatted files. | actions that user can interact with. | | |
| Advantage | Readers have the freedom to skip or back to the previous page as desire. | Readers do not need to take control of anything while 'watching' the motion comic. | Readers have better interaction with the storyline itself and can engage deeper into the story. | Can enhance reader's perception of comic narration through AR experience. | Give the readers a full and immersive reading experience while inside a virtual world. |

## 2.4 Project Methodology

The project methodology is similar to digital comics and 3D animation creation due to its similarity to motion comics. Initially, the comics narration is outlined and refined according to the subject matter. The layout of comic panels is then planed and sketched out as a storyboard. Then, determine the base colour of each comic panels to keep the consistency of colour usage and the contrast level.

The 3D modelling process is taking part after the storyboard outlined, follow by rigging, texturing and animating the scenes in Blender as required in the comic narratives. Finally, composite all the animation imageries into a series of video clips through video editing software such as Adobe Premier. Audio files and soundtracks then implemented into the video clips.

A digital comics interface requires as this project involving rich media. Unity is the tool that used for creating the motion comics interface. The primary actions containing in the comics interface are next page, previous page. Multimedia

Development Life Cycle (MDLC) is applied in this project. This methodology cycle is divided into five phases which shown in Table 2.2 below.

**Table 2.2 shows Multimedia Development Life Cycle**

| Phase | Activity |
|---|---|
| Define | The requirements needed for the project such as the objectives, target user, problem statement, and the resolution are determined. |
| Plan | The design for the output, development strategy, system architecture, target platform, milestones, and project specification are listed out. |
| Implement | The proposal is prepared and the relevant software is obtained and installed. |
| Construct | The product is built and integrated according to the design and requirement. The testing is carried out before dispatch for demonstration and presentation. |
| Evaluate | The target-user testing and product usability is carried out in this phase. The result is then used for product improvement. |

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## 2.5 Project Requirement

### 2.5.1 Software Requirement

The software required in this project are:

a) Unity
b) Blender
c) Adobe Photoshop
d) Adobe Premier
e) Microsoft Word
f) Microsoft Power Point

### 2.5.2 Hardware Requirement

The hardware required in this project is:

a) Laptop

## 2.6 Conclusion

To conclude, there are several domains reviewed in this project, which are the definition and concept of digital motion comics, physical comic, digital comics and interactive motion comics. Besides, the existence of the system related to the domain discussed in this chapter. Project methodology and requirement also stated in this project.

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# CHAPTER 3: ANALYSIS

## 3.1 Introduction

This chapter will discuss the analysis of the project and the requirements in this project. The requirements including project requirement, software requirement, hardware requirement, and others requirement. Besides, the project schedule and milestones are also discussed in this chapter.

## 3.2 Current Scenario Analysis

According to the previous chapter, some existing systems relate to 3D animated comics were existed in the market. For instant, 2D motion comics in the digital book are analysed in this chapter.

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Madefire (founded in 2011) is one of the well-known motion book publisher platforms that combining the animation and effects of motion comics with a more traditional reading experience. They concentrate on the mobile application where users can purchase, download and read motion comics through their smartphone. There are some buttons in the motion comics interface, which include the next/ previous page button, audio on/ off button, help button, and full-screen button. It is also supporting the keyboard input for the web browser on the desktop.

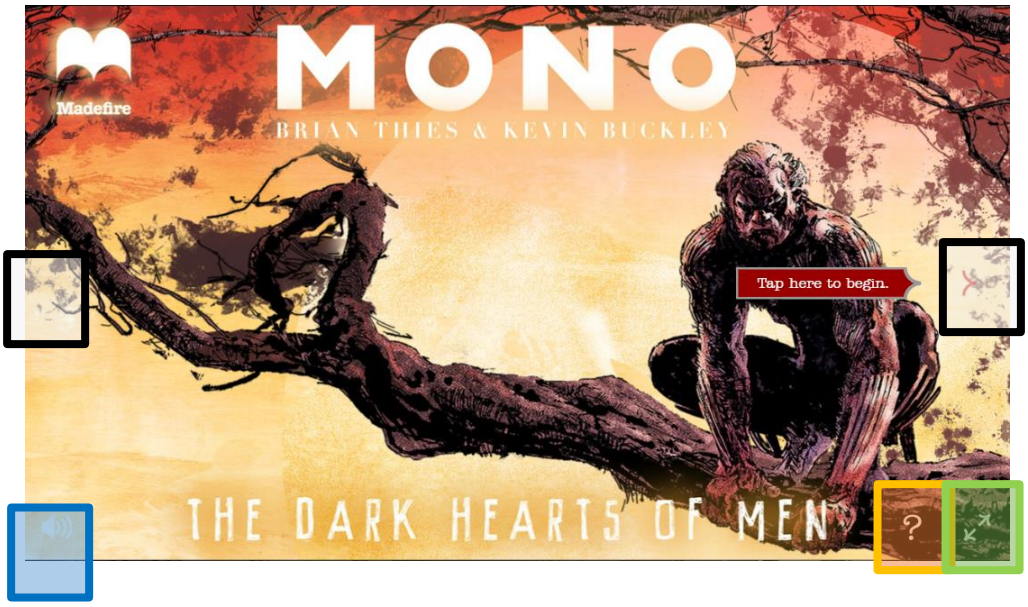


**Figure 3.1 shows interface of motion comics in Madefire**

**(source: The Dark Hearts of Men - Mono created by Ben Wolstenholme in Madefire)**

There are few general techniques in making the "motion" of motion comics. For example, transition of panels, movement of characters or objects, and the scene animation (eg raining).


**Figure 3.2 shows panel transition with animation in motion comics**

**(source: The Dark Hearts of Men - Mono created by Ben Wolstenholme in Madefire)**

The animation playback applies in the comic panels can be divided into three approaches, play-and-stop, loop, and hybrid of both. The play-and-stop animation in motion comics commonly used for the one-time movement of the object. The animation loop is usually applied for the object that is repetitive and has minimal motion such as smoke and rain. Finally, the hybrid animation for both approaches is used when there is both major and minor movement in one comic panel.


**Figure 3.3 shows the hybrid of play-and-stop (left hand movement) and loop animation (smoke)**

**(source: The Dark Hearts of Men - Mono created by Ben Wolstenholme in *Madefire*)**

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## 3.3 Requirement Analysis

### 3.3.1 Project Requirement

The project requirement ensures this project fulfils the requirement from different perspectives. The data collected is then analysed and become the guideline to produce the final output.

### 3.3.1.1 Requirement Gathering

Requirement gathering is carried out to identify the essential factors required in this project. For instants, the data collected used to distinguish the content creation according to the users' behaviour.

*(a) Questionnaire*

The requirement collection method used is by online questionnaire through Google Form. A questionnaire is a research instrument consisting of a series of questions to gather requirements from the respondents. Besides, the online questionnaire helps to collect data from a large number of target users which is nearly impossible to meet personally in real-world, particularly during the COVID-19 pandemic.

The survey consists of three sections, Section A (respondent's demographic), Section B (respondent's behaviour during COVID-19 pandemic), and Section C (respondent's behaviour on comics). There was a total of 34 responses collected at the end of this survey.

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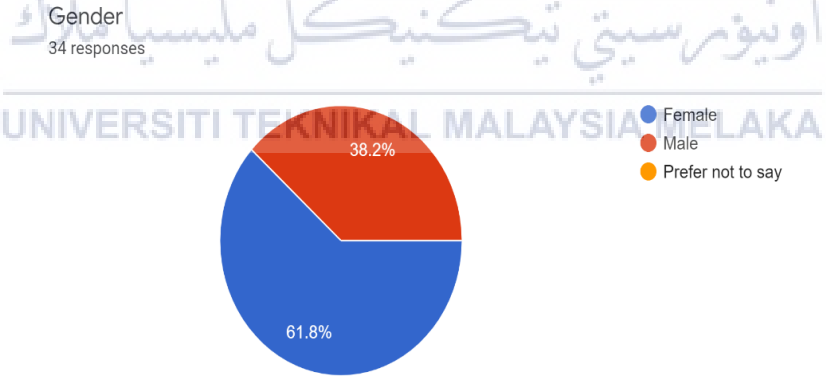


**Figure 3.4 shows the gender of respondents**

There are 21 female respondents which charted 61.8% and 13 male respondents for 38.2%.

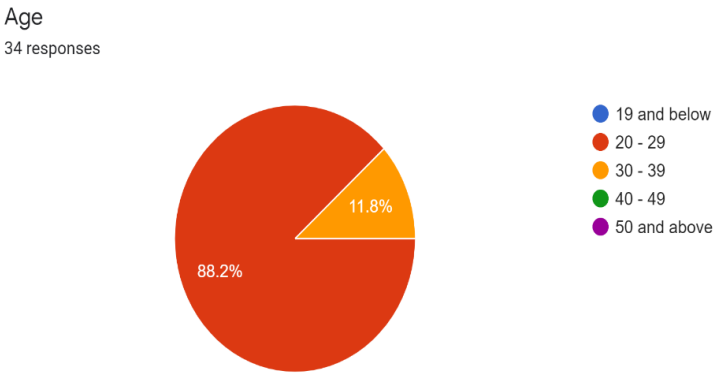


**Figure 3.5 shows the age of respondents**

The majority respondents are from the age group of 20-29 charted 30 responses (88.2%). Only 4 respondents are from age group of 30-39 charted 11.8%.

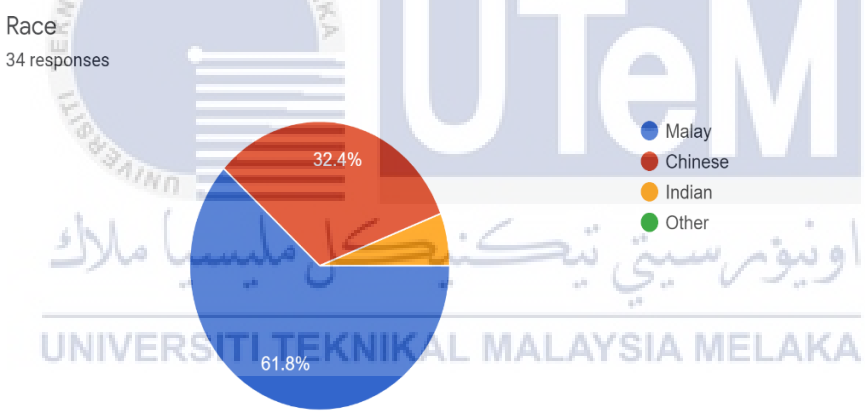


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**Figure 3.6 shows the race of respondents**

The majority of respondents are Malay which charted 21 responses (61.8%), followed by Chinese 11 responses (32.4%), and 2 Indian respondents which charted 5.9% of total responses.

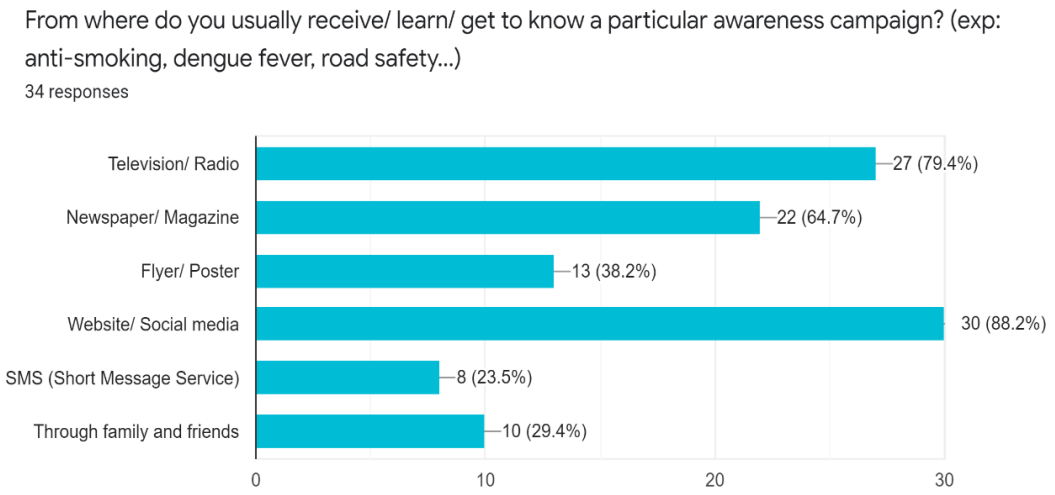


**Figure 3.7 shows the bar chart of responses**

Base on figure 3.7, the major mediums in delivering the awareness campaign to the public are Website/ Social media and Television/ Radio which charted 30 responses (88.2%) and 27 responses (79.4%) respectively. There are 22 respondents (64.7%) knowing a particular awareness campaign through Newspaper/ Magazine. Flyer/ Poster contributes 38.2% (13 responses) compare to the other medium in delivering the awareness campaign to the public. There are only 10 respondents (29.4%) and 8 respondents (23.5%) knowing a particular awareness campaign through the family and friends and SMS respectively.

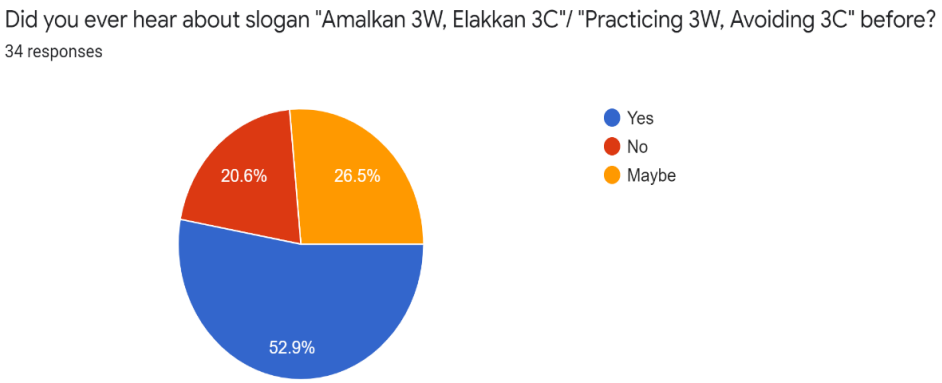


**Figure 3.8 shows the pie chart of the responses**

The majority of the respondents charted 18 responses (52.9%) heard about the slogan “Amalkan 3W, Elakkan 3C” before. However, there are 9 respondents (26.5%) not sure and 7 respondents (20.6%) never heard about the slogan “Amalkan 3W, Elakkan 3C” that government used to urge the public to stay safety during the pandemic.

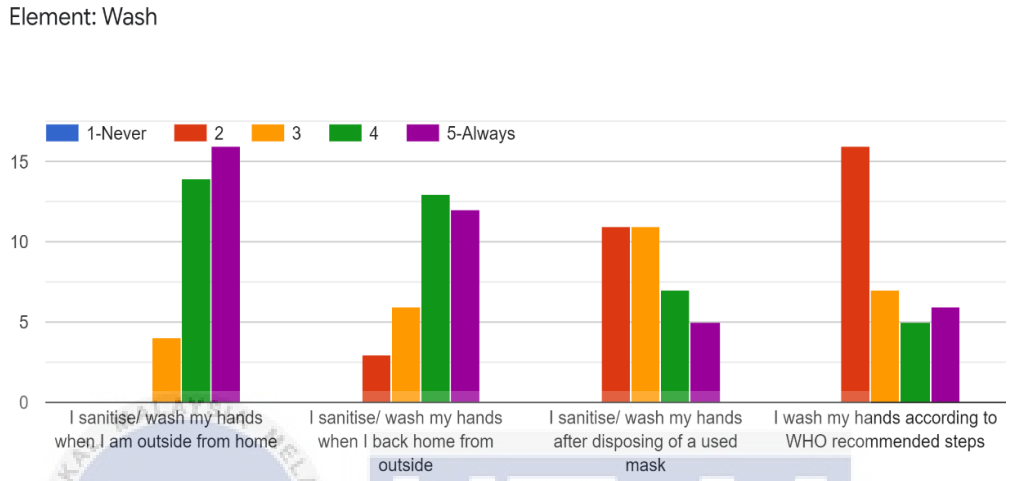


**Figure 3.9 shows the bar chart of the responses**

According to bar chart shown in Figure 3.9, the majority respondents charted total 30 responses (88.2%) and total 25 responses (73.5%) are frequently sanitise/ wash their hands when staying outside from home as well as when back home from outside. However, there are total 22 respondents (64.7 %) who did not frequently sanitise/ wash their hands after disposing a used mask. Besides, majority of respondent (16 responses) charted 47.1% rarely wash their hands according to the World Health Organization (WHO) recommended steps.

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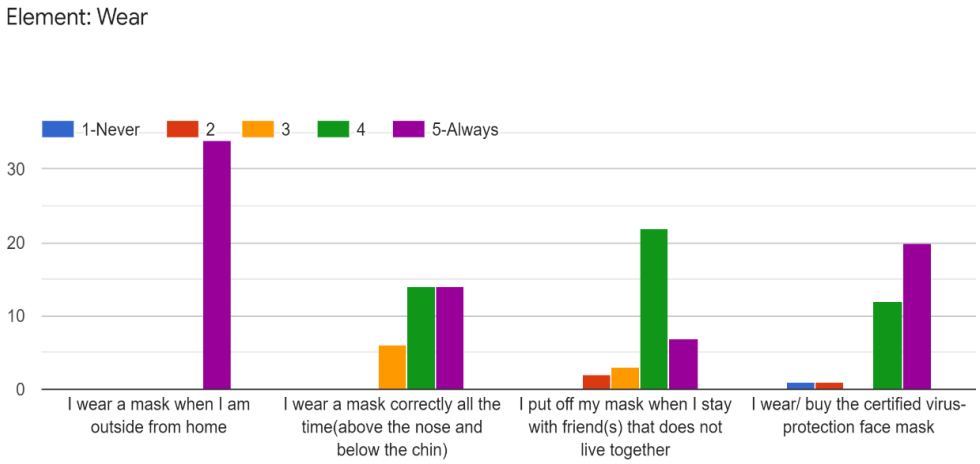


**Figure 3.10 shows the bar chart of the responses**

All of the respondents always wearing a mask when staying outside from home. Besides, there are total 28 respondents (82.4%) frequently wear the mask correctly, while the majority of the respondents charted total 32 responses (94.1%) wear/ buy the certified virus-protection face mask. However, only minority of respondents charted 5 responses (14.7%) keep the face mask on when staying with the friend(s) that does not live together.

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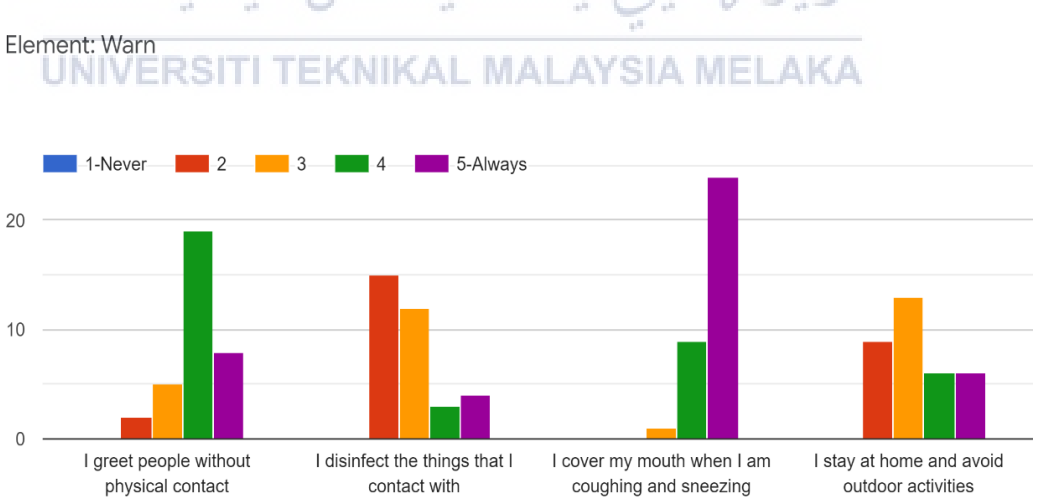


**Figure 3.11 shows the bar chart of the responses**

Based on Figured 3.11, the majority respondents that charted total 27 responses (79.4%) greet people without physical contact, while there is total 33 respondents (97.1%) frequently covering their mouth when coughing and sneezing. However, there are also total 27 respondents (79.4) that less frequently disinfect the things they contact. Besides, there is only a total 12 respondents (35.3%) who frequently stay at home and avoid outdoor activities, while the others do not.

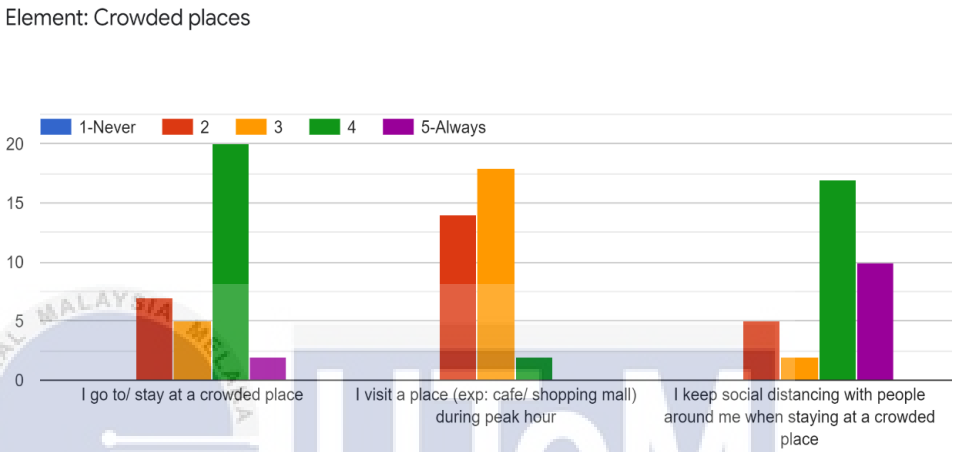


**Figure 3.12 shows the bar chart of the responses**

The majority respondents charted total 22 responses (64.7%) tend to go/ stay at a crowded place, and total 27 respondents (79.4%) frequently keep social distancing with people around when they are staying at a crowded place. Besides, the majority respondents infrequently visit a place during peak hour which charted total 32 responses (94.1%).

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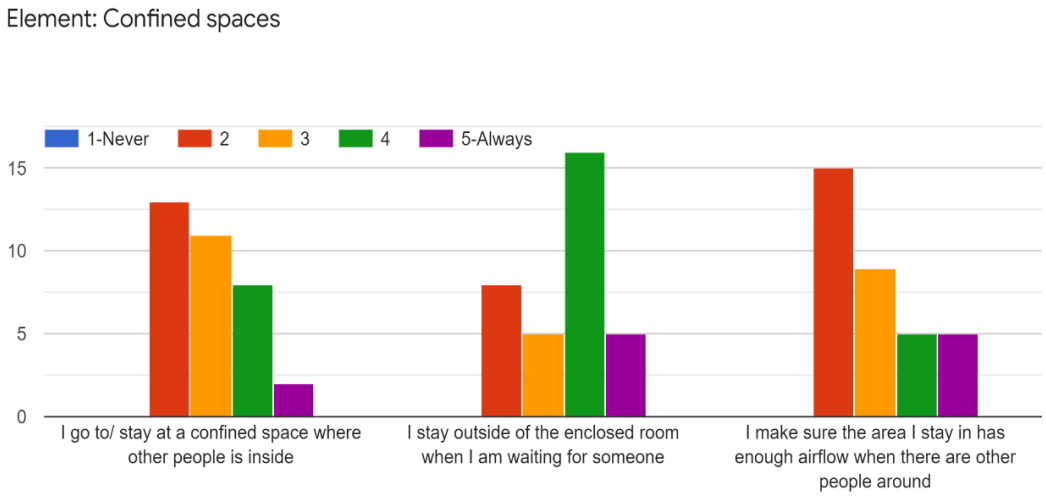


**Figure 3.13 shows the bar chart of the responses**

According to bar chart in Figure 3.13, there are total 24 respondents (70.6%) less frequently go to/ stay at a confined space where other people is inside. Besides, the majority respondents charted total 21 responses (61.8%) frequently staying outside of the enclosed room when they are waiting for someone. However, there are total 24 respondents (70.6%) infrequently ensure the area they are staying has enough airflow when there is people around.

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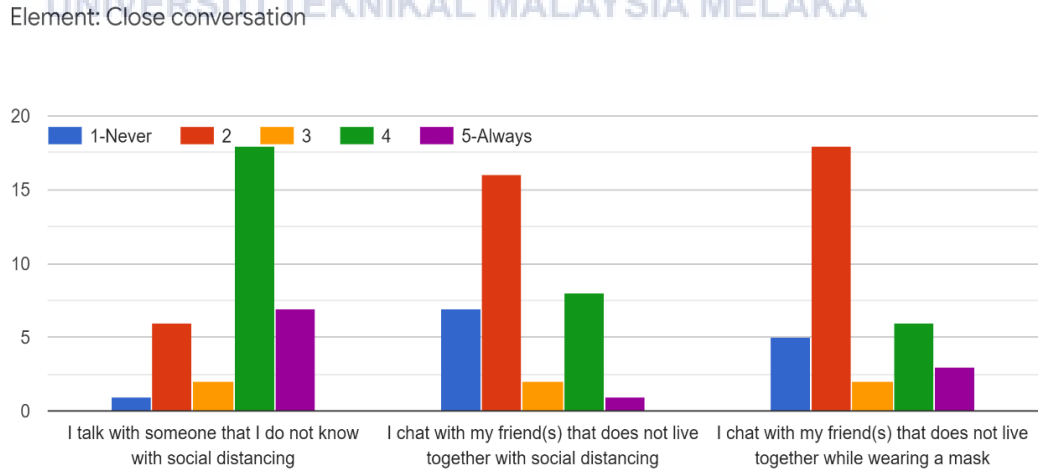


**Figure 3.14 shows the bar chart of the responses**

The majority respondents charted total 25 responses (73.5%) frequently talk with someone that do not know with social distancing. However, there are total 23 respondents (67.6%) infrequently chat with their friend(s) that does not live together with social distancing, while only total of 9 respondents (26.5%) frequently wearing a mask when chat with their friend(s) that does not live together.

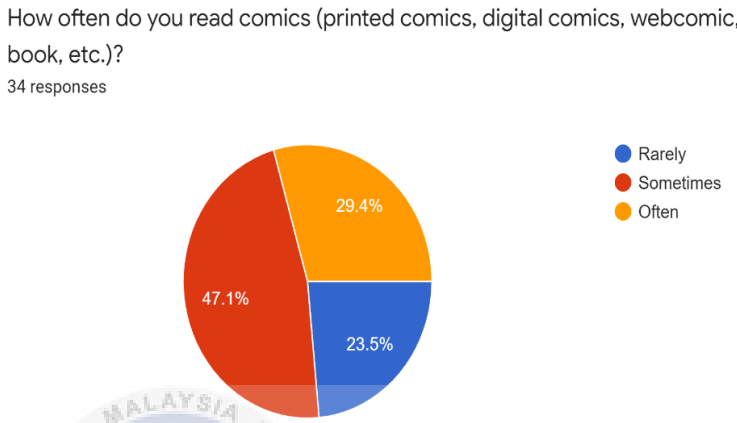


**Figure 3.15 shows the pie chart of the responses**

Based on the Figure 3.15, there are 10 respondents (29.4%) often read comics and 16 respondents (47.1%) sometimes read the comics. Meanwhile, there are 8 respondents (23.5%) rarely read comics.

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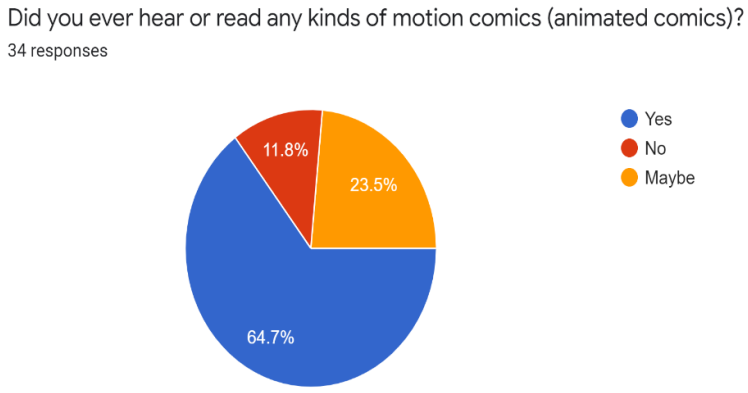


**Figure 3.16 shows the pie chart of the responses**

The majority respondents charted 22 responses (64.7%) were heard or read motion comics before. There are 8 respondents (23.5%) might hear or read motion comics, while only 4 respondents (11.8%) never heard or read any kinds of motion comics.

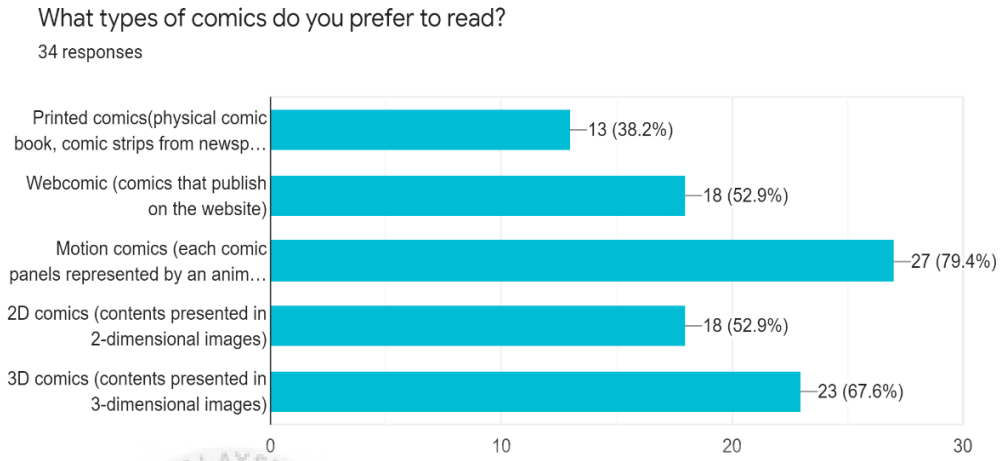


**Figure 3.17 shows the bar chart of the responses**

According to Figure 3.17, the majority respondents preferred motion comics and 3D comics which charted 27 respondents (79.4%) and 23 respondents (67.6%) respectively. There are 18 respondents (52.9%) prefer to read webcomic as well as 2D comics. Besides, there are only 38.2% respondents prefer to read printed comics which charted 13 responses.

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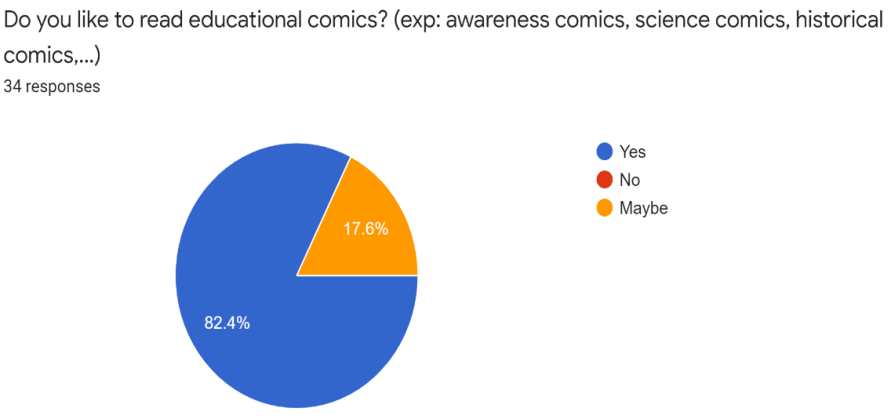


**Figure 3.18 shows the pie chart of the responses**

There is no respondent do not like to read education comics in this survey. The majority respondents like to read educational comics which charted 28 responses (82.4%), while 6 respondents (17.6%) not sure whether like or not to read educational comics.

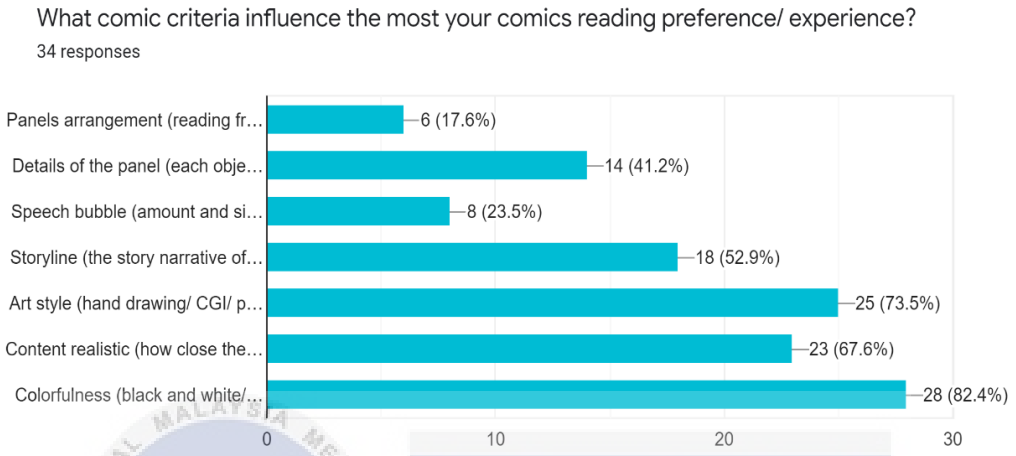


**Figure 3.19 shows the bar chart of the responses**

Based on bar chart in Figure 3.19, the majority of respondents which charted 28 responses (82.4%) think that colourfulness influences the most of their comics reading preference or experience. There are 25 respondents (73.5%) and 23 respondents (67.6%) think that art style and content realistic influence the most of their comics reading preference or experience. Besides, 18 respondents (52.9%) think that storyline as well as 14 respondents (41.2%) think that details of the panels would influence their comics reading preference or experience. There are only 8 respondents (23.5%) and 6 respondents (17.6%) think that speech bubble and panels arrangement would influence their comics reading preference or experience.

### 3.3.2 Software Requirement

The software that used to develop this project are Blender, Unity, Abode Premier and the operating system used is Windows 10. Besides, the software that used for documentation are Microsoft Word and Microsoft Power Point.

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**Table 3.1 shows the usage of software in the project**

| Software | Usage |
|---|---|
| Blender | Character modelling and animating |
| Unity | Comics UI design and development |
| Adobe Premier | Animation compilation and video output |
| Windows 10 | Computer operating system |
| Microsoft Word | Final report writing |
| Microsoft Power Point | Presentation slides |

### 3.3.3 Hardware Requirement

The hardware that used to develop this project is a laptop. It is then used with other computer accessories such as a mouse and an external keyboard to accelerate the development process.

**Table 3.2 shows specification of hardware in the project**

| Hardware | Specification |
|---|---|
| Laptop | Processor Intel(R) Core(TM) i5-7200U, RAM 8GB, NVIDIA GeForce 940MX |
| Mouse | General mouse |
| Keyboard | General keyboard |

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### 3.3.4 Other Requirement

The others requirement used in this project is printer, pen drive and Wireless Fidelity (Wi-Fi).

**Table 3.3 shows the usage of other requirement**

| Requirement | Usage |
|---|---|
| Printer | Print out the final report |

| | |
|---|---|
| Pen drive | Physical backup for the project files |
| Wi-Fi | Research and resource access on the Internet |

## 3.4 Project Schedule and Milestones

**Table 3.4 shows the list of milestones**

| Task | Day(s) | Start Date | End Date |
|---|---|---|---|
| **Phase 1: Project Assign** | | | |
| Determine problems statement | 2 | 3/1/21 | 3/2/21 |
| Brainstorming Ideas | 3 | 3/2/21 | 3/4/21 |
| Meeting with Supervisor | 1 | 3/5/21 | 3/5/21 |
| Determine the project title | 2 | 3/5/21 | 3/6/21 |
| **Phase 2: Project Planning** | | | |
| State the problem statement | 1 | 3/6/21 | 3/6/21 |
| Determine the objectives | 1 | 3/6/21 | 3/6/21 |
| Preparing the proposal | 3 | 3/6/21 | 3/8/21 |
| Discuss with supervisor | 2 | 3/7/21 | 3/8/21 |
| Proposal submission | 1 | 3/8/21 | 3/8/21 |
| **Phase 3: Project Design** | | | |
| Storyline and scripting | 7 | 3/9/21 | 3/15/21 |
| Storyboarding | 4 | 3/15/21 | 3/18/21 |
| Scenes and characters design | 4 | 3/19/21 | 3/22/21 |
| **Phase 4: Project Implementation and Development** | | | |
| Characters and objects modeling | 22 | 3/23/21 | 4/13/21 |

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| | | | |
|---|---|---|---|
| Discuss with supervisor | 7 | 3/29/21 | 4/4/21 |
| Models rigging | 5 | 4/2/21 | 4/6/21 |
| Models texturing | 5 | 4/7/21 | 4/11/21 |
| Animation phase 1 | 10 | 4/12/21 | 4/21/21 |
| Discuss with supervisor | 14 | 4/16/21 | 4/29/21 |
| Animation phase 2 | 10 | 4/22/21 | 5/1/21 |
| Lighting and visual effects | 12 | 4/27/21 | 5/8/21 |
| Animation phase 3 | 10 | 5/2/21 | 5/11/21 |
| Rendering | 3 | 5/12/21 | 5/14/21 |
| Create digital comic UI interface | 14 | 5/15/21 | 5/28/21 |
| Integrate animation into comic layout | 2 | 5/29/21 | 5/30/21 |
| Export final product | 1 | 5/31/21 | 5/31/21 |
| **Phase 5 Project Testing and Maintaining** | | | |
| Project Testing | 17 | 6/1/21 | 6/17/21 |
| Demonstration with supervisor | 5 | 6/7/21 | 6/11/21 |
| Project revise and improvement | 8 | 6/10/21 | 6/17/21 |
| Discuss with supervisor | 7 | 6/12/21 | 6/18/21 |
| Final Testing | 1 | 6/18/21 | 6/18/21 |
| Presentation | 7 | 6/19/21 | 6/25/21 |
| Prepare for final report | 7 | 6/19/21 | 6/25/21 |

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## 3.5 Conclusion

To conclude, this chapter discussed the analysis of the current system and the online questionnaire used to collect the data for further study. Besides, the project requirements such as software requirement, hardware requirement, and other requirements were explained in this chapter.

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# CHAPTER 4: DESIGN

## 4.1 Introduction

In this chapter, the analysis result from Chapter 3 will be used to determine the preliminary design and the user interface design. The system architecture and the storyboard design also discussed in this chapter.

## 4.2 System Architecture

This system intended to develop the COVID-19 awareness among the public. The comics is presented in 3D and animated way to make it attractive and interesting. The narrative contents are related to the user's practices during pandemic which should be emphasized. The common user interface such as start, exit, next page, and previous page button give the control of the system to the user.

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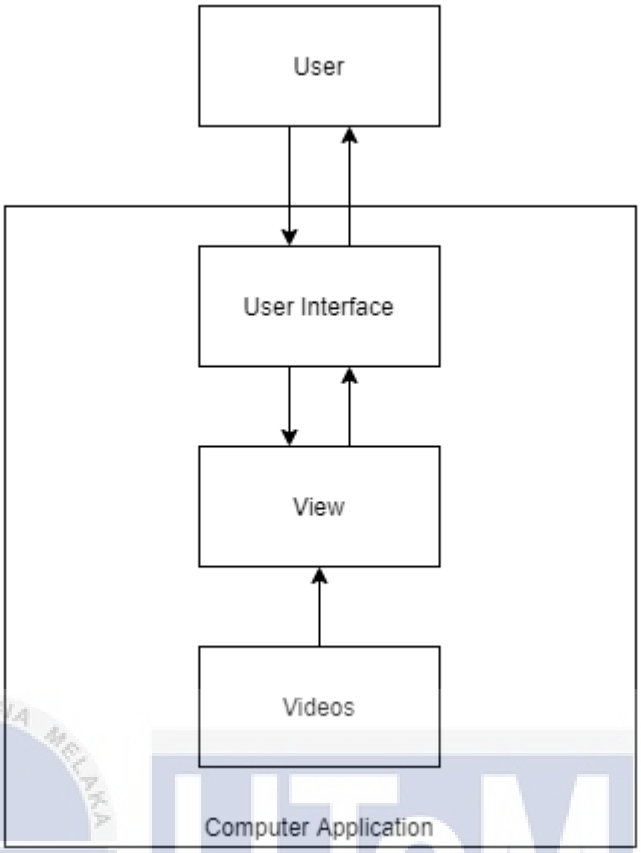


**Figure 4.1 shows system architecture of the project**

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## 4.3 Preliminary Design

### 4.3.1 Storyboard Design

The story background is similar to the zombie apocalypse where the COVID-19 virus represented as “zombie”. The main character helps the public by teaching them the way to prevent from getting infection.

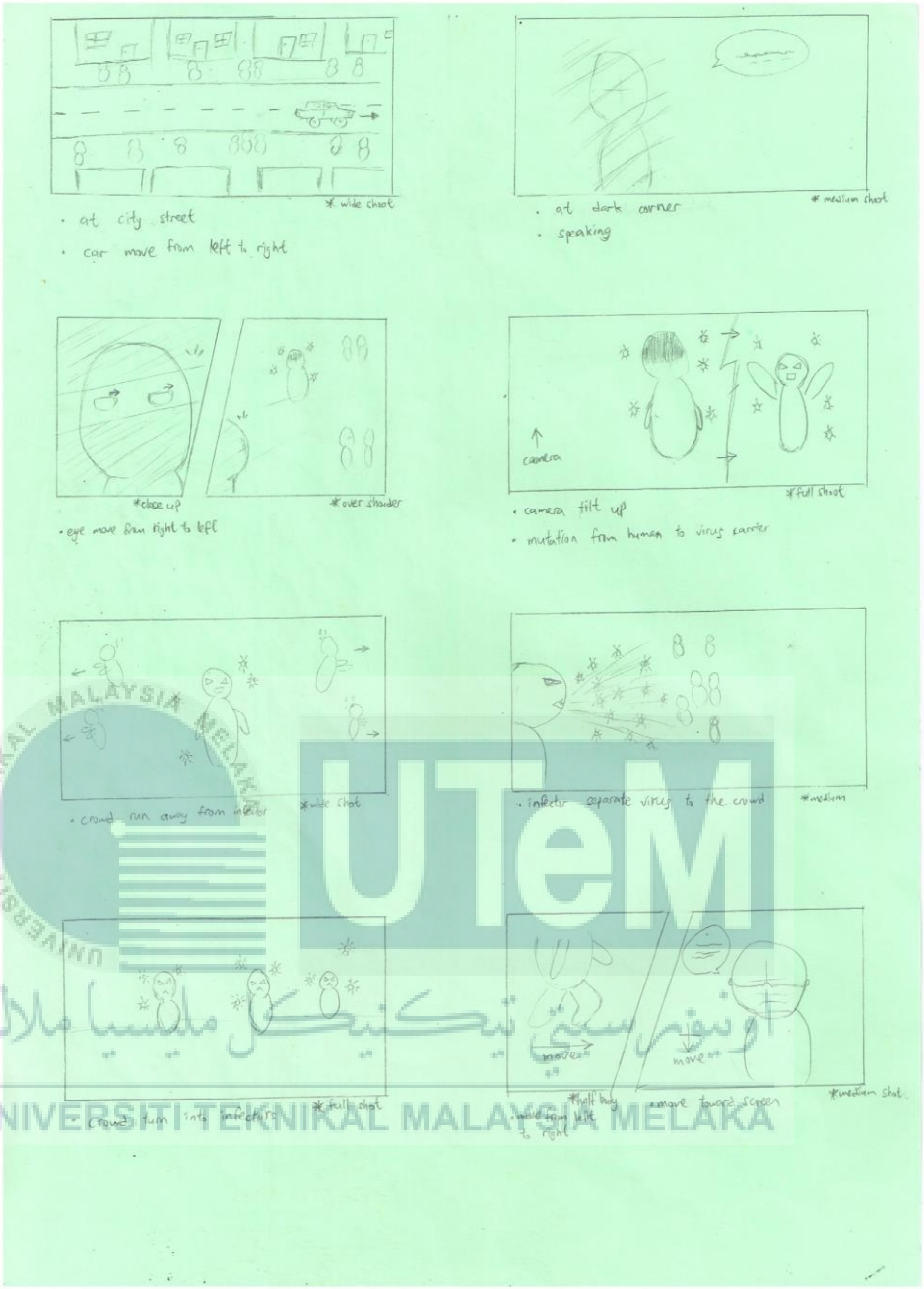


**Figure 4.2 shows storyboard of the project**

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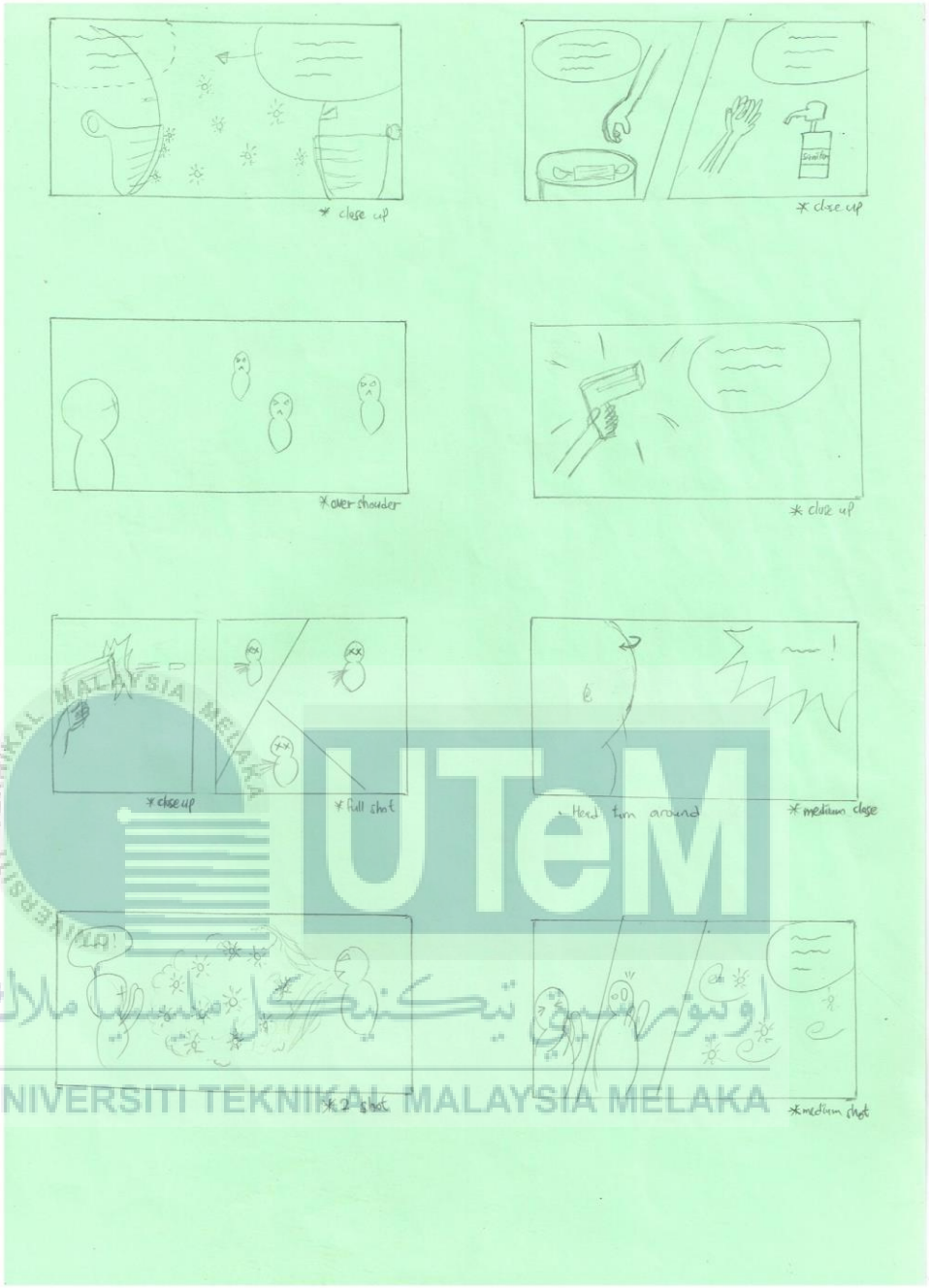


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**Figure 4.3 shows storyboard of the project**

## 4.4 User Interface Design

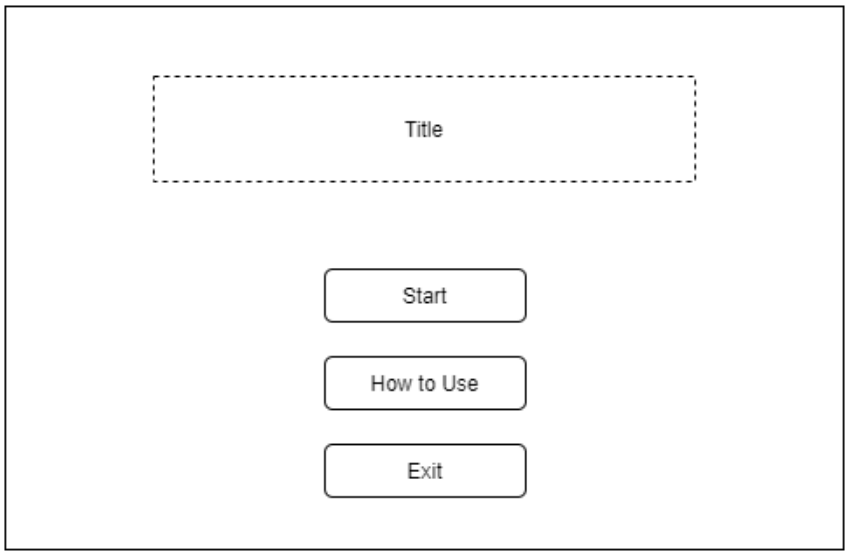


**Figure 4.4 shows Main Menu page of the system**

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**Figure 4.5 shows How to Use page of the system**

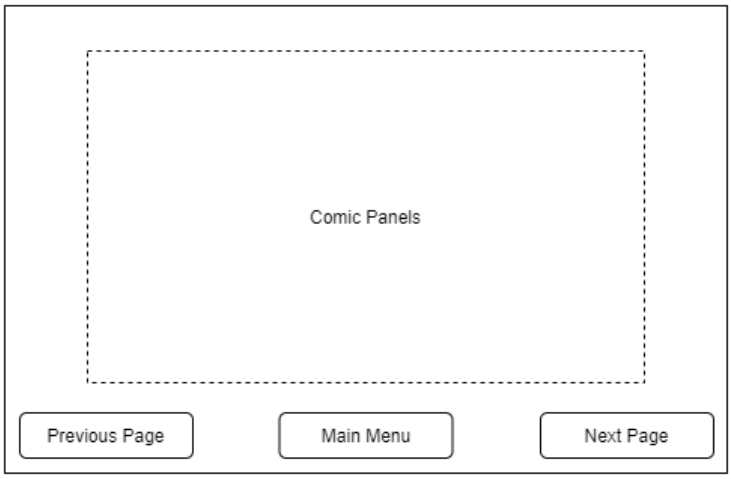


**Figure 4.6 shows content page of the system**

### 4.4.1 Navigation Design

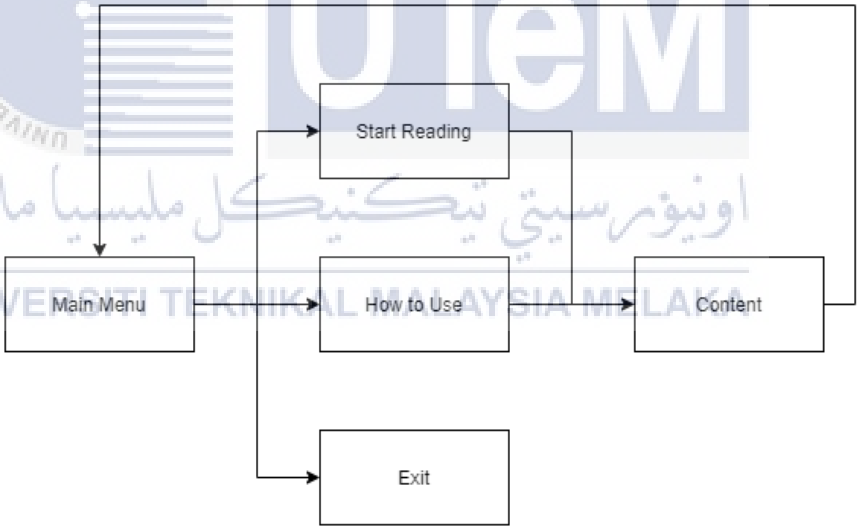


**Figure 4.7 shows navigation design of the system**

## 4.5 Conclusion

To conclude, the system architecture design, storyboard design, user interface design, and navigation design are discussed in this chapter. The uses of figures help to visualise and have better understanding for each respective design.

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# CHAPTER 5: IMPLEMENTATION

## 5.1 Introduction

The implementation phase of the project will be discussed briefly in this chapter. The method implemented in this project is also described. For instants, media creation, media integration, product configuration management, and implementation status are explained throughout this chapter.

## 5.2 Media Creation

### 5.2.1 Production of Texts

In comics, text used to deliver the message, chat as well as representing the voice. Texts play an important role in this project because it allows the reader to have a better understanding on a situation.

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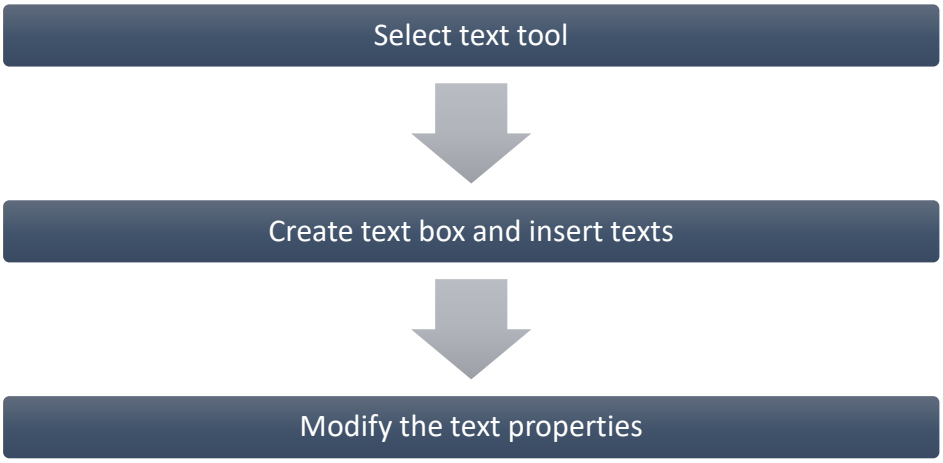


**Figure 5.1 shows the steps to create text in Adobe After Effect 2020**

**Table 5.1 shows the sample of text created using Adobe After Effect 2020**

| Font Family | Font Colour | Stroke Colour | Font Size | Uses | Example |
|---|---|---|---|---|---|
| Comic Sans MS | Black | None | 50px | Chat | That is...!? |
| Comic Sans MS | White | Red | 50px | Voice | Arhhhhhhh!!!!! |

### 5.2.2 Production of Graphics

Animated comics use the layout of the comic panel arrangement as the fundamental interface design. In this project, the user interface of the animated comics develops with Unity. For instants, comic panels design, system logic, and buttons for start, exit, change page, and next panel.

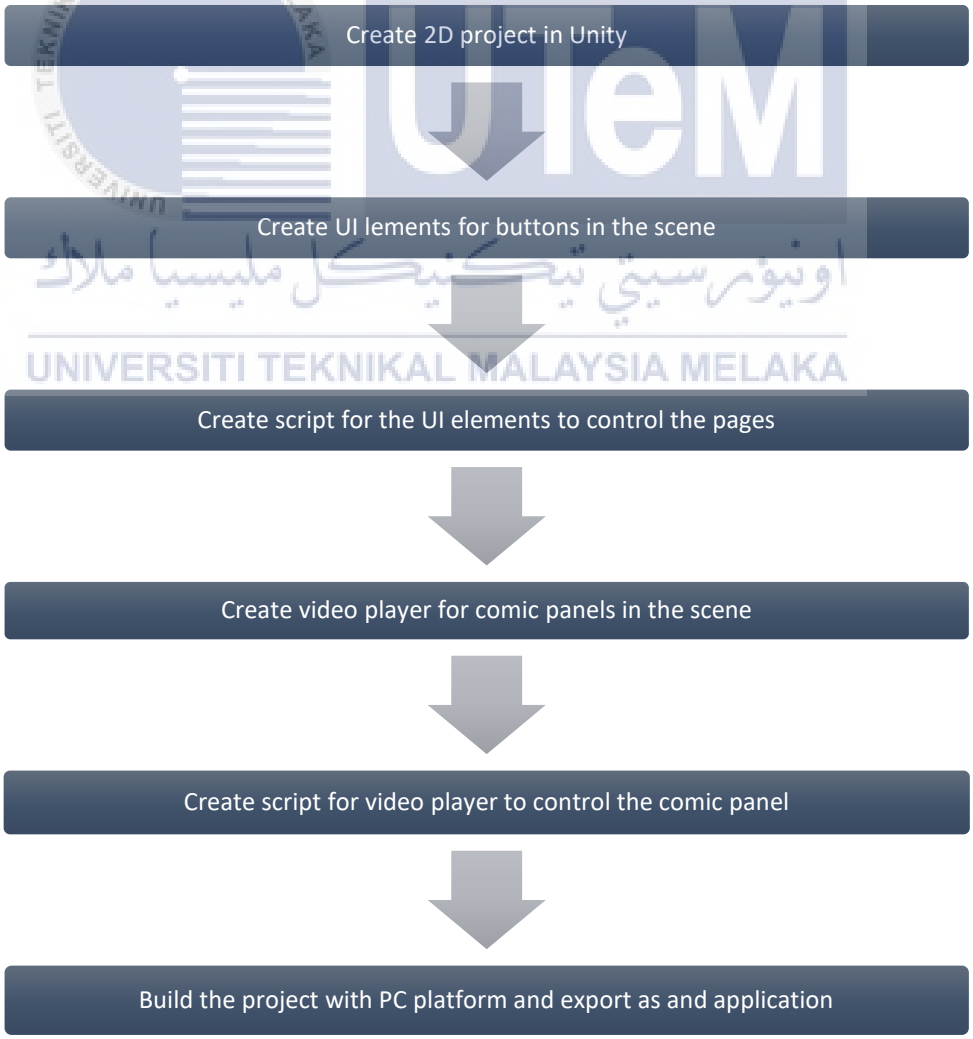


**Figure 5.2 shows the steps to create animated comics graphic in Unity**

**Table 5.2 shows the elements and application build for animated comics in Unity**

| | | |
|---|---|---|
| Elements Used in Unity | UI | Canvas<br>Raw Image<br>Text<br>Button |
| | Video | Video Player |
| | Script | C# script |
| Application Build Setting | Platform<br>Standalone<br>Target Platform<br>Architecture | : PC, Mac & Linux<br><br>: Windows<br>: x86 |

### 5.2.3 Production of Video

In this project, each of the comic panels is present in video form. The raw animation clip combined with other comic elements such as texts, audio, and border panel to form a video clip, then export as a video file with Adobe After Effect 2020.

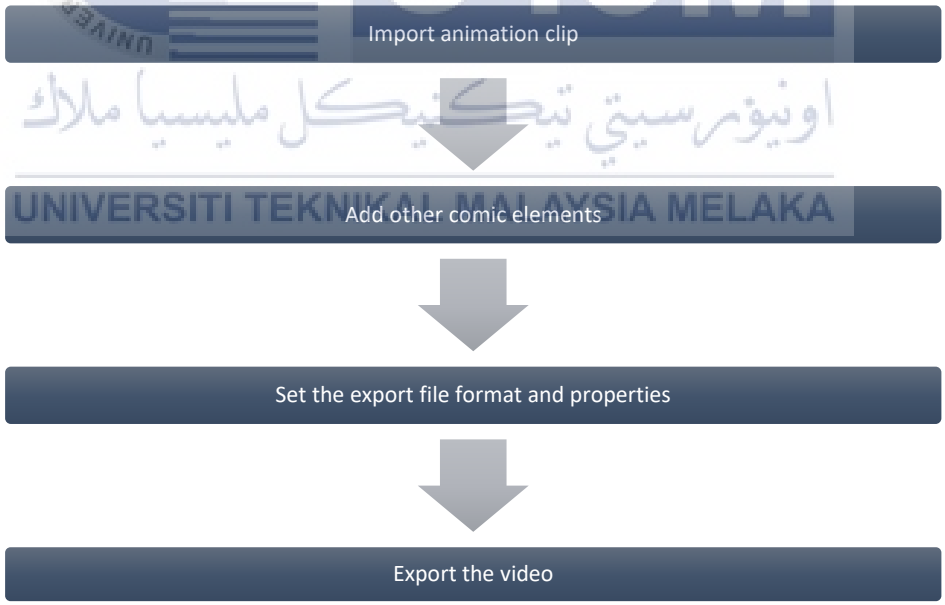


**Figure 5.3 shows steps to create video in Adobe After Effect 2020**

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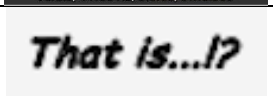
**Table 5.3 shows the video components and formatting in Adobe After Effect 2020**

| | Component | Example |
|---|---|---|
| Video Components | Raw animation clip |  |
| | Border panel |  |
| | Audio |   |
| | Text |   |
| | Chat bubble |  |
| Video Format | Codec : H.264<br>Frame Rate : 24 fps<br>Frame Size : 1920 x 1080 px<br>Render Engine : Mercury Playback Engine GPU Acceleration<br>Output format : MPEG-4 (mp4) | |

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### 5.2.4 Production of Animation

Animation is the core element in animated comics. In 3D animated comics, the production of animation includes modelling, texturing, rigging, lighting, animating, and rendering. All of the animation processes are produced and rendered with Blender.

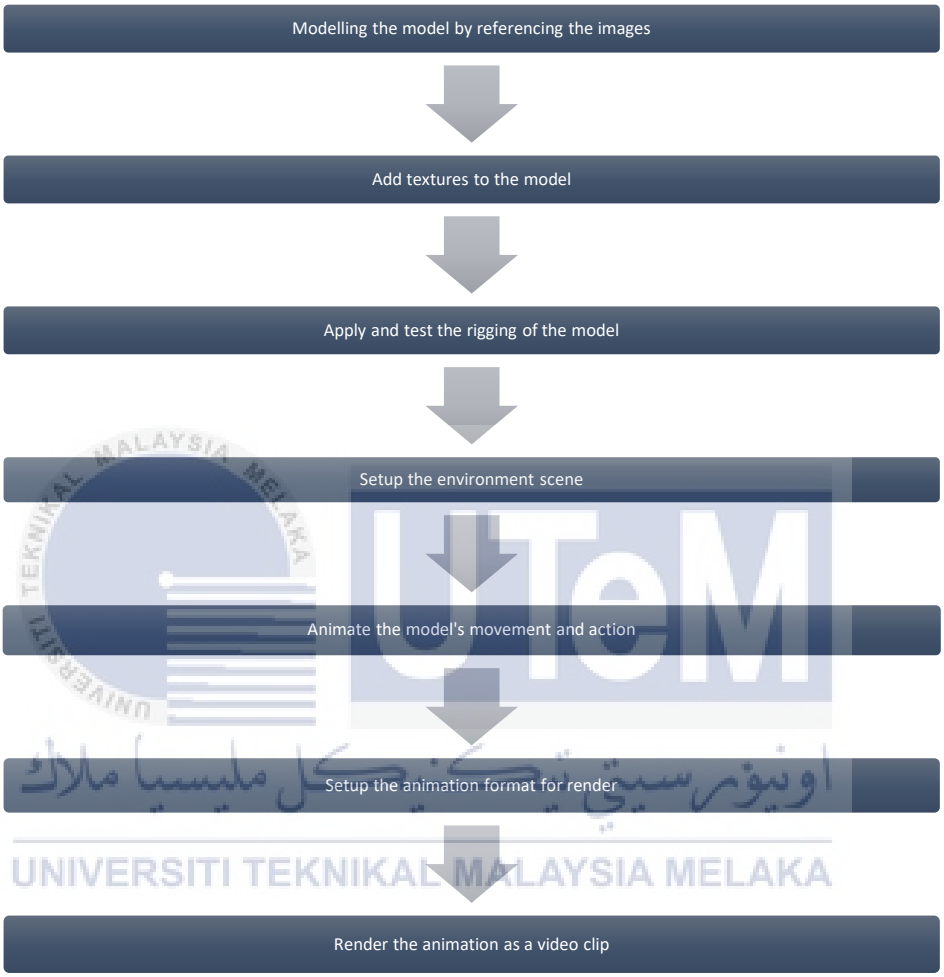


**Figure 5.4 shows the steps to create animation clips in Blender**

**Table 5.4 shows the animation clip formatting in Blender**

| | |
|---|---|
| Animation Clip Format | Codec : H.264<br>Frame Rate : 24 fps<br>Sample size : 30<br>Resolution : 1920 x 1080 px<br>Render Engine: Cycles<br>Output format : MPEG-4 (mp4) |

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## 5.3 Media Integration

The implementation of this project consists of several productions such as text, graphic, video, and animation. Firstly, the 3D animation clips with MPEG-4 format are rendered using Blender. Then, import the raw animation clips into After Effect 2020 for editing. By using the After Effect 2020 built-in tool, the texts, audio, and panel border are created and design according to the requirement. The edited video clips are then export as .mp4 files. The application structure of animated comics is developed using Unity. After finishing the layout setting and the framework design, the video clips then import and combine into the comic panels in Unity. Finally, the project is then export as a Windows application.

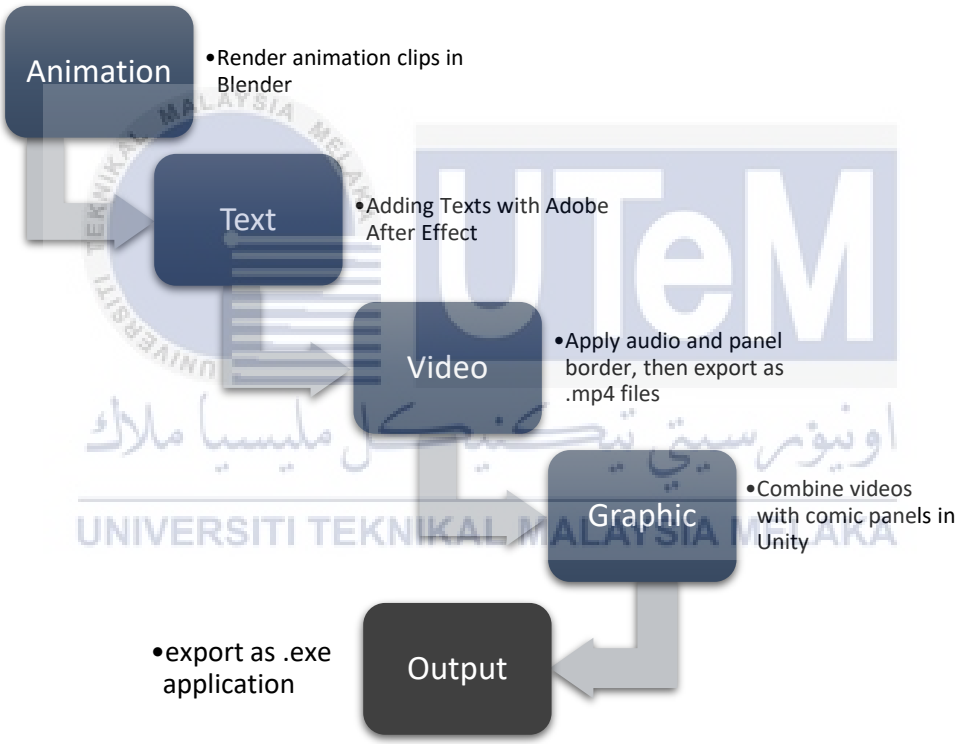


**Figure 5.5 shows the process of media integration of the project**

## 5.4 Product Configuration Management

### 5.4.1 Configuration Environment Setup

Several configurations need to be done along with the project development. For instants, this project is developed for the PC platform as a Windows application.

**Table 5.5 shows the configuration of each software used in the project**

| Software | Configuration |
|---|---|
| Blender | - Version : 32-bits<br>- Render Engine : Cycles<br>- Render Sampling : 30<br>- Resolution : 1920 x 1080 px<br>- Frame Rate : 24 fps<br>- Render File Format : FFmpeg video (MPEG-4)<br>- Video Codec : H.264<br>- Output Quality : Medium<br>- Add-ons : Rigging: Rigify<br>: Node: Node Wrangler<br>: Mesh: Loop Tools |
| Adobe After Effect | - Composition Pre-set : HDTV 1080 24<br>- Resolution : 1920 x 1080 px<br>- Frame Rate : 24 fps<br>- Output format : MPEG-4 (mp4)<br>- Video Codec : H.264<br>- Render Engine : Mercury Playback Engine GPU Acceleration |
| Unity | - Version : 32-bits<br>- Project Template : 2D project<br>- Platform Build : PC, Mac & Linux Standalone<br>- Target Platform : Windows<br>- Architecture : x86 |

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### 5.4.2 Version Control Procedure

There are few versions of application launched in this project. Each version comes with an improvement or new contents.

**Table 5.6 shows the version control of the application**

| Version | Description |
|---|---|
| 0.4 | Basic comics framework produced. |
| 0.5 | Added button and panel functionality. |
| 0.7 | Added raw animation clips for full visualisation. |
| 0.9 | Fix some known bugs. |
| 1.0 | Added comic elements to the animation clips. |
| 1.1 | Implement audio to the animation clips. |
| 1.2 | Optimise the application file size. |
| 1.3 | Added new comic contents. |

## 5.5 Implementation Status

The implementation status lists out the development progress of the project from the beginning of the project until the final output. The progress status is able to help the developer to keep track of the working progress according to the planning.

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**Table 5.7 shows the implementation status of the project**

| No | Task | Duration (Days) | Date Started | Expected Complete Date | Actual Complete Date | Status |
|---|---|---|---|---|---|---|
| 1 | **Project Assign** | | | | | |
| | Determine problems statement | 2 | 01 Mar 21 | 02 Mar 21 | 02 Mar 21 | On-time |
| | Brainstorming Ideas | 3 | 02 Mar 21 | 04 Mar 21 | 04 Mar 21 | On-time |
| | Determine the project title | 2 | 05 Mar 21 | 06 Mar 21 | 06 Mar 21 | On-time |
| 2 | **Project Planning** | | | | | |
| | State the problem statement | 1 | 06 Mar 21 | 06 Mar 21 | 06 Mar 21 | On-time |
| | Determine the objectives | 1 | 06 Mar 21 | 06 Mar 21 | 06 Mar 21 | On-time |
| | Preparing the proposal | 3 | 06 Mar 21 | 08 Mar 21 | 08 Mar 21 | On-time |
| | Proposal submission | 1 | 08 Mar 21 | 08 Mar 21 | 08 Mar 21 | On-time |
| 3 | **Project Design** | | | | | |
| | Storyline and scripting | 7 | 09 Mar 21 | 15 Mar 21 | 13 Mar 21 | In-time |
| | Storyboarding | 4 | 15 Mar 21 | 18 Mar 21 | 20 Mar 21 | Delayed |
| | Scenes and characters design | 4 | 19 Mar 21 | 33 Mar 21 | 29 Mar 21 | In-time |
| 4 | **Project Implementation and Development** | | | | | |
| | Characters and objects modelling | 11 | 23 Mar 21 | 13 Apr 21 | 10 Apr 21 | In-time |

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| | | | | | | |
|---|---|---|---|---|---|---|
| | Models rigging | 7 | 29 Mar 21 | 04 Apr 21 | 01 Apr 21 | In-time |
| | Models texturing | 5 | 07 Apr 21 | 11 Apr 21 | 09 Apr 21 | In-time |
| | Animation phase 1 | 10 | 12 Apr 21 | 21 Apr 21 | 24 Apr 21 | Delayed |
| | Animation phase 2 | 10 | 22 Apr 21 | 01 May 21 | 01 May 21 | On-time |
| | Lighting and visual effects | 12 | 27 Apr 21 | 08 May 21 | 03 May 21 | In-time |
| | Animation phase 3 | 10 | 02 May 21 | 11 May 21 | 18 May 21 | Delayed |
| | Rendering | 3 | 12 May 21 | 14 May 21 | 25 May 21 | Delayed |
| | Create digital comic UI Interface | 14 | 15 May 21 | 28 May 21 | 22 May 21 | In-time |
| | Integrate animation into comic layout | 2 | 29 May 21 | 30 May 21 | 30 May 21 | On-time |
| | Export final product | 1 | 31 May 21 | 31 May 21 | 31 May 21 | On-time |
| 5 | **Project Testing and Maintaining** | | | | | |
| | Project Testing | 17 | 01 Jun 21 | 17 Jun 21 | 17 Jun 21 | On-time |
| | Final Testing | 1 | 18 Jun 21 | 18 Jun 21 | 23 Jun 21 | Delayed |
| | Presentation | 1 | 24 Jun 21 | 24 Jun 21 | 24 Jun 21 | On-time |
| | Preparation for final report | 7 | 19 Jun 21 | 25 Jun 21 | 23 Jun 21 | On-time |

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## 5.6 Conclusion

To conclude, this chapter explained the implementation phase of the project. The media creation for each production also listed out. Besides, the media integration of production media is explained. The product configuration management of the project also described in this chapter. The implementation status of the project progression also listed in the table form.

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# CHAPTER 6: TESTING

## 6.1 Introduction

The testing procedure will be explained in this chapter. This chapter includes test plan, test strategy, test implementation, test results and analysis, and analysis testing. The pre-post testing and usability testing method is used to obtain the results for objective accomplishment.

## 6.2 Test Plan

### 6.2.1 Test User

The test user involved is young adults aged between 18 to 24 years old. There is a total of 32 users involved in the pre-post testing to identify whether the expected results took place in this project. Then, a usability test is conducted after the pre-post testing phase is finished.

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### 6.2.2 Test Script and Design

Test script is the instructions that contain the information to validate the test of the system or application. To ensure the test results are as expected, the test script should list the actions that need to be followed by the testers. There are 32 respondents aged between 18 to 25 years old involved in the testing. The test will be conducted through online Google Form. Firstly, the respondents will read through the conventional comics through the URL link for about 10 minutes. Then, the respondents will answer the pre-test questions sheet based on the conventional comics they read. After that, 3D animated comics will be given through Google Drive for respondents to read for about 10 minutes. Then, the respondents will answer the post-test questions

sheet based on the 3D animated comics they read. Lastly, the respondents are required to answer the usability test questions sheet and submit the form to complete the test.

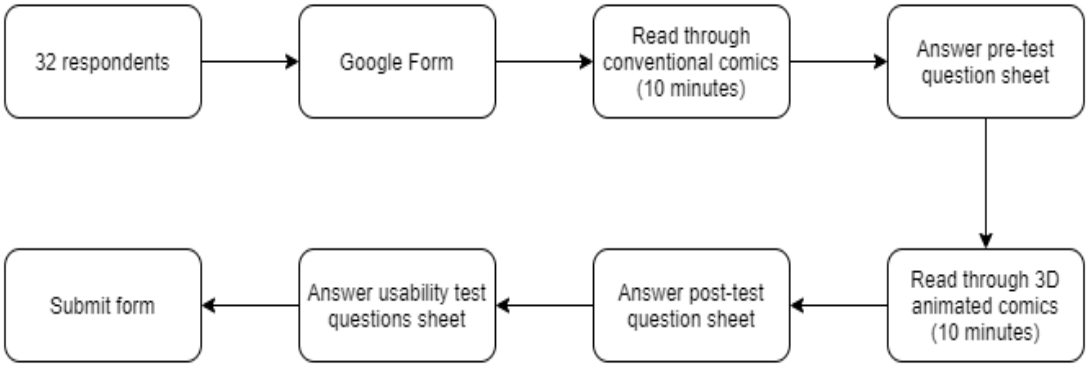


**Figure 6.1 shows the test design of the project**

### 6.2.3 Test Environment

The test environment requires a platform that supports the web browsing functionality as well as execution of Windows applications (.exe). The questionnaires are conducted using Google Form and distributed through online.

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**Table 6.1 shows test environment of the project**

| Device | Operating System |
|---|---|
| Laptop/ PC | Microsoft Windows 10 |

### 6.2.4 Test Schedule

The test schedule ensures the duration of the data gathering is completed within the given time. Both pre-post test and usability test durations are conducted within a week.

**Table 6.2 shows the test schedule of the project**

| Test | Date | Durations |
|---|---|---|
| Pre-test Testing | 21st August 2021 – 24th August 2021 | 4 days |

| | | |
|---|---|---|
| Post-test Testing | 21st August 2021 – 24th August 2021 | 4 days |
| Usability Testing | 21st August 2021 – 24th August 2021 | 4 days |

## 6.3 Test Strategy

This testing conducted to end-user is divided into two sections, pre-post testing and usability testing. There was a total of 32 users among the young adult aged between 18 to 24 years old involved in the testing.

### 6.3.1 Pre-Post Testing

The pre-post testing is divided into pre-test and post-test. Users will be given a conventional comic to read before answering the pre-test questions set. Then, users will be given a 3D animated comic to read before answering the post-test questions set. Both sets of the testing have five multiple choice questions. To ensure data accuracy, both question sets are intended to have a similar level of difficulty. The results comparison between the pre-test and the post-test are conducted to determine the performance of each comic in delivering the awareness. Table 6.3 and Table 6.4 below shows the question sheets used for pre-post testing.

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**Table 6.3 shows the Pre-Test question sheet**

| Answer the questions based on the conventional comic. | | |
|---|---|---|
| No | Question | Answer |
| 1 | How do the COVID-19 viruses separate among humans? | A. Through blood transfusion<br>B. Through movement from one to another<br>C. Through body contact or air movement |
| 2 | What is the symptom of COVID-19 infection? | A. Low blood pressure<br>B. Fever<br>C. Stomach ache |

| | | |
|---|---|---|
| 3 | How many washing-hands steps according to the comics? | A. 5<br>B. 6<br>C. 7 |
| 4 | Apart from hand sanitiser, what is the approach to keep hands hygiene? | A. Wash hand with running water and soap<br>B. Wash hand with running water only<br>C. Wash hand with running water and brushes |
| 5 | It is easy to kill germs and bacterial. | A. True<br>B. False |

**Table 6.4 shows the Post-Test question sheet**

| Answer the questions based on the 3D animated comic. | | |
|---|---|---|
| No | Question | Answer |
| 1 | How far is the social distancing approach? | A. Less than 1 meter<br>B. 1 meter<br>C. At least 1 meter |
| 2 | What is the purpose to wear a facemask? | A. To prevent the physical contact between hands and face.<br>B. To prevent contact/ separate airborne viruses<br>C. To prevent recognition by other people |
| 3 | Why should we ensure good ventilation in the public area? | A. Good ventilation helps to keep someone healthy<br>B. Good ventilation helps to reduce separate of viruses<br>C. Good ventilation helps to maintain ideal humidity |
| 4 | When should we dispose a mask? | A. after use or for every 2 hours usage<br>B. after use or for every 4 hours usage<br>C. after use or for every 8 hours usage |

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| | | |
|---|---|---|
| 5 | We need to wear a mask even we do not feel sick. | A. True<br>B. False |

### 6.3.2 Usability Testing

Users will be given a usability test after the pre-post testing to evaluate the usability of 3D animated comics in delivering awareness campaigns compared to conventional comics. There are five aspects that concentrating on the usability test, which includes learnability, efficiency, memorability, error, and satisfaction. Each of the aspects containing three questions. Users are required to answer the questions based on the 4-points Likert scale given. Table 6.5 shows the usability test questions sheet used in the testing.

**Table 6.5 shows the usability test question sheet**

| Tick (✓) the answer for each of the questions. | | | | | |
|---|---|---|---|---|---|
| No | Question | Conventional comic<br>3D animated comic | | | |
| | | Strongly Disagree (1) | Disagree (2) | Agree (3) | Strongly Agree (4) |
| **Learnability** | | | | | |
| I | I think that the comic is attractive for learning. | | | | |
| II | I think that the comic can delivers the awareness clearly. | | | | |
| III | I think that it is easy to learn an awareness campaign through the comic. | | | | |
| **Efficiency** | | | | | |
| I | I think that the time I spent reading the comic does not much. | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| II | I think that the quality of the comic is good. | | | | |
| | | | | | |
| III | I think that the comic does not need much effort to read. | | | | |
| | | | | | |
| **Memorability** | | | | | |
| I | I think that I still can remember the comic's content (storyline) after some time without reading it. | | | | |
| | | | | | |
| II | I think that I still can remember the comic's content (awareness) after some time without reading it. | | | | |
| | | | | | |
| III | I think that I still can navigate the process/ control/ UI to read the comic after some time without reading it. | | | | |
| | | | | | |
| **Error** | | | | | |
| I | I do not encounter any errors when I read the comic. | | | | |
| | | | | | |
| II | All of the display and user controls (mouse scroll, click, UI buttons, etc...) of the comic are functioning well. | | | | |
| | | | | | |
| III | I think that reading the comic is not likely to encounter any errors in the future. | | | | |
| | | | | | |
| **Satisfaction** | | | | | |
| I | I think that the comic reading experience meets my expectations. | | | | |
| | | | | | |
| II | | | | | |

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| | | | | | |
|---|---|---|---|---|---|
| | I think that the awareness delivery method of the comic is suitable to me. | | | | |
| III | Overall, I am satisfied with the comic I read. | | | | |
| | | | | | |

## 6.4 Test Implementation

### 6.4.1 Test Description

There are 32 respondents from the public aged between 18 to 24 years old. The respondents were required to read through both conventional comics and animated 3D comics before answering the questions. For conventional comics, respondents are required to click on a URL link to read the comics on a website. For animated 3D comics, respondents can either choose to watch a pre-recorded demo video on YouTube or download the application through Google Drive and test it on their own. The usability testing method is used to evaluate the usability of 3D animated comics in delivering awareness campaign compared to conventional comics. There are five aspects to test in the usability testing which are learnability, efficiency, memorability, error, and satisfaction. The responses are then recorded for future analysis and improvement.

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### 6.4.2 Test Data

The data is recorded and collected after the testing session ended. All of the data was obtained through real-life testing. In pre-post testing, the average number of corrected answers is recorded for both pre-test and post-test. The 4-point Likert scale used for the usability testing is 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree). The test result and analysis are then carried out after the data is collected.

## 6.5 Test Result and Analysis

There is a total of 32 respondents who participate as the tester through online media invitations. The target tester is young adults aged between 18 to 24 years old. The comparative interpretation of pre-post testing for testers are recorded in the number of corrected answers. Besides, the usability testing results are recorded in the number of respondents for each scale of the agreement by each of the comics. All the collected data are tabulated for further analysis as shown below.

**Table 6.6 shows the respondents' demographic**

| Aspect | Number of Respondents | |
|---|---|---|
| Gender | Female | 15 |
| | Male | 17 |
| Age | 18 | 0 |
| | 19 | 0 |
| | 20 | 0 |
| | 21 | 0 |
| | 22 | 6 |
| | 23 | 23 |
| | 24 | 3 |
| Race | Malay | 21 |
| | Chinese | 8 |
| | Indian | 3 |
| | Other | 0 |

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**Table 6.7 shows the pre-post test data of the respondents**

| Respondent | Number of Corrected Answer / Total Questions | |
|---|---|---|
| | Pre-Test | Post-Test |
| 1 | 2 / 5 | 5 / 5 |
| 2 | 4 / 5 | 4 / 5 |
| 3 | 3 / 5 | 4 / 5 |

| | | |
|---|---|---|
| 4 | 4 / 5 | 5 / 5 |
| 5 | 5 / 5 | 5 / 5 |
| 6 | 4 / 5 | 4 / 5 |
| 7 | 3 / 5 | 4 / 5 |
| 8 | 4 / 5 | 4 / 5 |
| 9 | 5 / 5 | 5 / 5 |
| 10 | 4 / 5 | 3 / 5 |
| 11 | 5 / 5 | 4 / 5 |
| 12 | 4 / 5 | 4 / 5 |
| 13 | 4 / 5 | 4 / 5 |
| 14 | 2 / 5 | 5 / 5 |
| 15 | 3 / 5 | 5 / 5 |
| 16 | 4 / 5 | 4 / 5 |
| 17 | 5 / 5 | 5 / 5 |
| 18 | 4 / 5 | 4 / 5 |
| 19 | 5 / 5 | 3 / 5 |
| 20 | 3 / 5 | 4 / 5 |
| 21 | 5 / 5 | 5 / 5 |
| 22 | 4 / 5 | 4 / 5 |
| 23 | 4 / 5 | 5 / 5 |
| 24 | 5 / 5 | 5 / 5 |
| 25 | 4 / 5 | 5 / 5 |
| 26 | 5 / 5 | 4 / 5 |
| 27 | 4 / 5 | 5 / 5 |
| 28 | 4 / 5 | 5 / 5 |
| 29 | 3 / 5 | 5 / 5 |
| 30 | 5 / 5 | 5 / 5 |
| 31 | 5 / 5 | 5 / 5 |
| 32 | 4 / 5 | 5 / 5 |
| **TOTAL** | **129 / 160** | **143 / 160** |

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**Table 6.8 shows the usability test data of the respondents**

| Aspect | Question | Number of Respondents (Conventional comic \| 3D animated comic) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Strongly Disagree (1) | | Disagree (2) | | Agree (3) | | Strongly Agree (4) | |
| Learnability | I | 6 | 0 | 22 | 0 | 3 | 7 | 1 | 25 |
| | II | 0 | 0 | 10 | 0 | 16 | 17 | 6 | 15 |
| | III | 1 | 0 | 18 | 0 | 13 | 4 | 0 | 28 |
| Efficiency | I | 1 | 0 | 21 | 0 | 10 | 22 | 0 | 10 |
| | II | 13 | 0 | 17 | 0 | 2 | 9 | 0 | 23 |
| | III | 0 | 0 | 23 | 5 | 9 | 23 | 0 | 4 |
| Memorability | I | 12 | 0 | 17 | 2 | 3 | 24 | 0 | 6 |
| | II | 0 | 0 | 12 | 0 | 15 | 8 | 5 | 24 |
| | III | 2 | 0 | 3 | 0 | 3 | 15 | 24 | 17 |
| Error | I | 1 | 0 | 2 | 3 | 3 | 4 | 26 | 25 |
| | II | 1 | 0 | 2 | 2 | 2 | 3 | 27 | 27 |
| | III | 1 | 0 | 2 | 18 | 8 | 8 | 21 | 6 |
| Satisfaction | I | 10 | 0 | 20 | 0 | 2 | 9 | 0 | 23 |
| | II | 2 | 0 | 16 | 0 | 13 | 10 | 1 | 22 |
| | III | 3 | 0 | 20 | 0 | 9 | 10 | 0 | 22 |

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### 6.5.1 Pre-post Testing

The pre-post testing is used to compare the usability of conventional comics and 3D animated comics in awareness campaign delivery.

**Table 6.9 shows the average corrected answer for pre-post testing**

| Testing | Average Corrected Answer / Total Question | Percentage, % |
|---|---|---|
| Pre-Test | 4.031 / 5 | 80.62 |
| Post-Test | 4.469 / 5 | 89.38 |

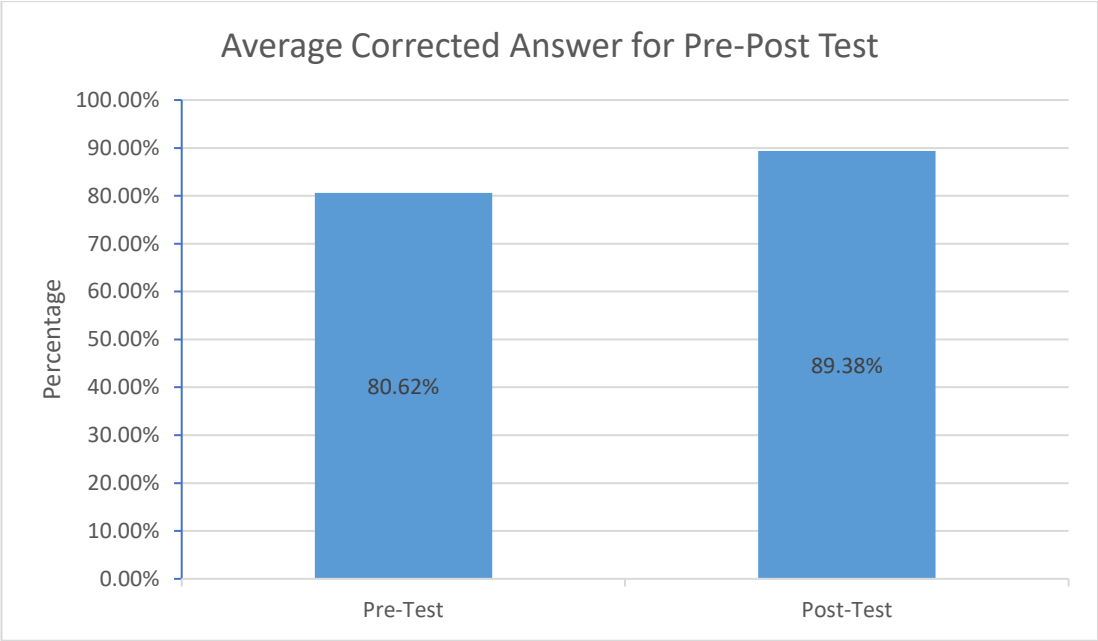


**Figure 6.2 shows the bar chart of percentage of average corrected answer for pre-post testing**

Based on Figure 6.1, the percentage of average corrected answers for pre-test is 80.62%, while the percentage of average corrected answers for post-test is 89.38%. The result explains that the respondents are able to perform better when using 3D animated comics compared using conventional comics. The result showed that awareness campaign delivering using 3D animated comics is has higher usability compare to the conventional comics.

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### 6.5.2 Usability Testing

#### 6.5.2.1 Learnability

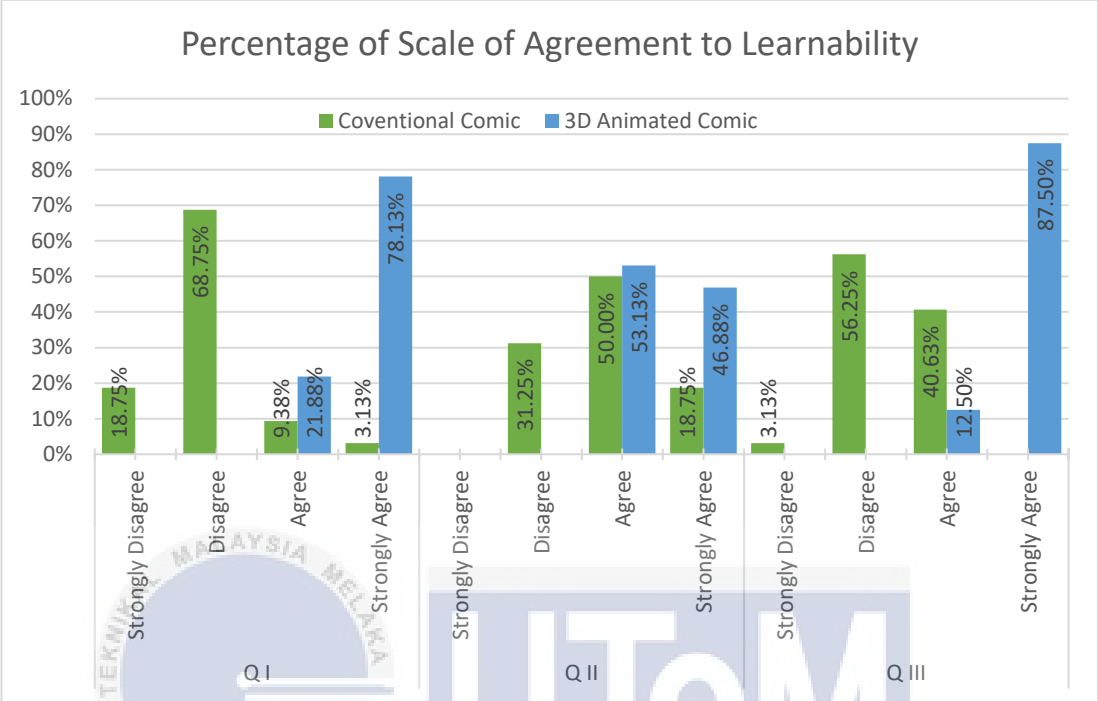


**Figure 6.3 shows the bar chart of percentage of scale of agreement to learnability**

According to Figure 6.2, there are 78.13% respondents strongly agree and 21.88% agree that 3D animated comic is attractive for learning, while only 3.13% respondents strongly agree and 9.38% respondents agree that conventional comic is attractive for learning. Majority respondents which charted 68.75% disagree and 18.75% respondents strongly disagree that conventional comic is attractive for learning.

All of the respondents which charted 46.88% strongly agree and 53.13% agree that 3D animated comics can deliver awareness clearly. Besides, the majority of respondents charted 18.75% strongly agree and 50.00% agree that conventional comics can deliver the awareness clearly, while there are only 31.25% respondents disagree with that statement.

There are 87.50% of respondents strongly agree and 12.50% of respondents agree that it is easy to learn an awareness campaign through 3D animated comics.

However, in terms of conventional comics, only 40.63% of respondents agree with that statement. The majority of respondents charted 56.52% disagree and 3.13% strongly disagree that it is easy to learn an awareness campaign through conventional comics.

### 6.5.2.2 Efficiency

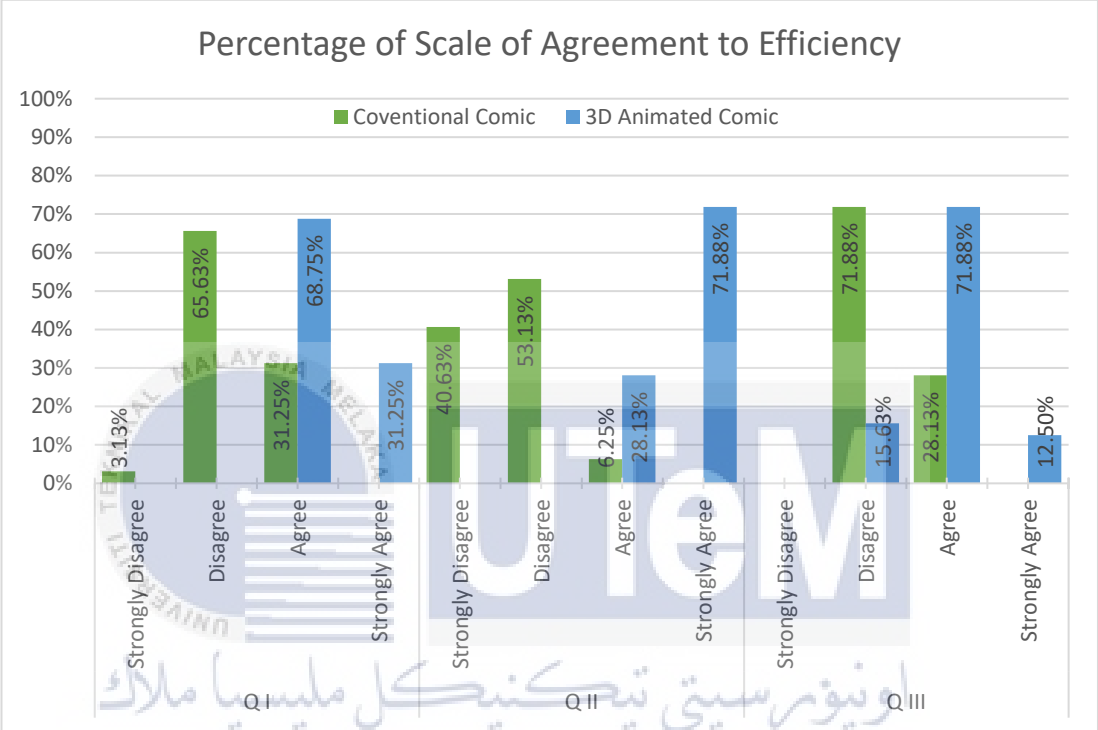


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**Figure 6.4 shows the bar chart of percentage of scale of agreement to efficiency**

Based on Figure 6.3, the majority of respondents charted 68.75% agree and 31.25% strongly agree that the time spent on reading the 3D animated comics does not much. For conventional comics, there are only 31.25% of respondents agree with that statement while 65.63% of respondents disagree and 3.13% of respondents strongly disagree with that statement.

There are 71.88% of respondents strongly agree and 28.13% of respondents agree that the quality of 3D animated comics is good while only 6.25% of respondents agree with that statement when in the case of conventional comics. Majority of respondents which charted 53.13% disagree and 40.63% strongly disagree that the quality of conventional comics is good.

There are 71.88 respondents agree and 12.50% of respondents strongly agree that 3D animated comics does not need much effort to read. However, there are 15.63% of respondents disagree with that statement. Only 28.13% of respondents agree that 2D animated comics does not need much effort to read, while the majority of respondents charted 71.88% disagree that that statement.

### 6.5.2.3 Memorability

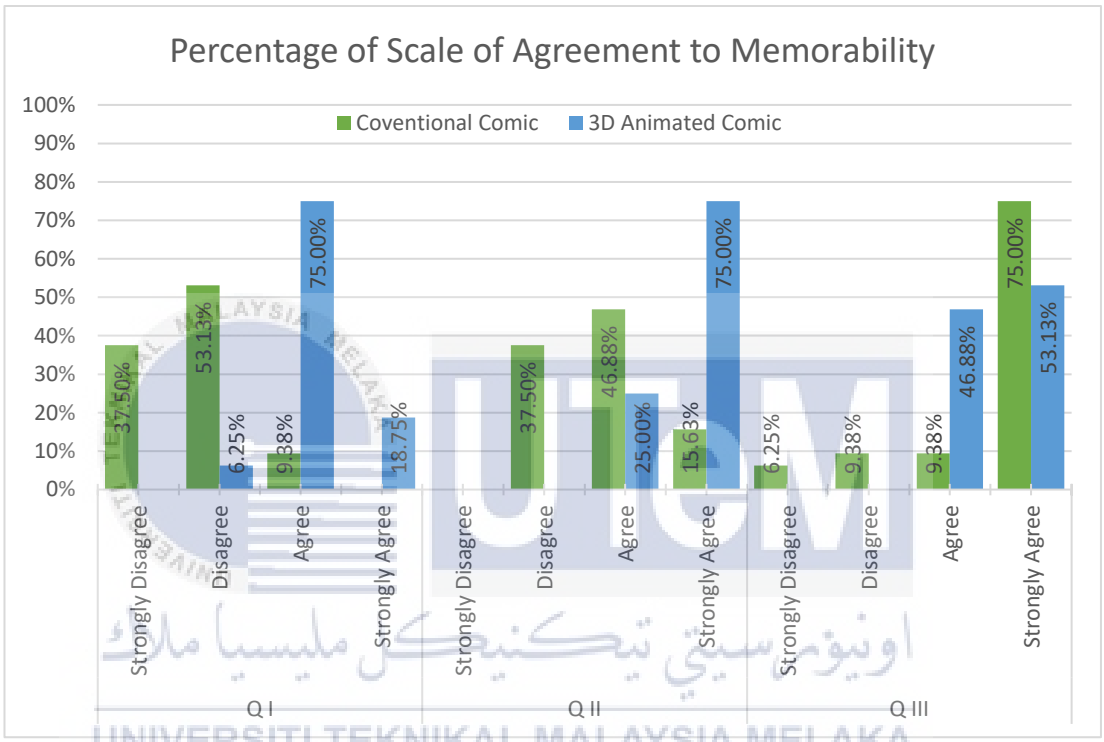


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**Figure 6.5 shows the bar chart of percentage of scale of agreement to memorability**

According to Figure 6.4, there are 75.00% of respondents agree and 18.75% of respondents strongly agree that they can still remember the storyline of 3D animate comics even after some time without reading it, while only 6.25% of respondents disagree with that statement. Besides, there are only 9.38% of respondents agree that they can still remember the storyline of conventional comics even after some time without reading it. Majority of the respondents which charted 53.13% disagree and 37.50% strongly disagree with that statement.

All of the respondents who charted 25.00% agree and 75.00% strongly agree that they can still remember the awareness in 3D animated comics even some

time without reading it. Although there are 37.50% of respondents disagree, the majority of the respondents charted 46.88% agree and 15.63% of respondents strongly agree that they can still remember the awareness in conventional comics even some time without reading it.

Respondents that charted 46.88% agree and 53.13% strongly agree that they still can navigate the process/ control/ UI to read the 3D animate comics even after some time without reading it. Besides, the majority of respondents which charted 9.38% agree and 75.00% strongly agree that they still can navigate the process/ control/ UI to read the conventional comics even after some time without reading it. However, there are 9.38% of respondents disagree and 6.25% of respondents strongly disagree with that statement.

### 6.5.2.4 Error

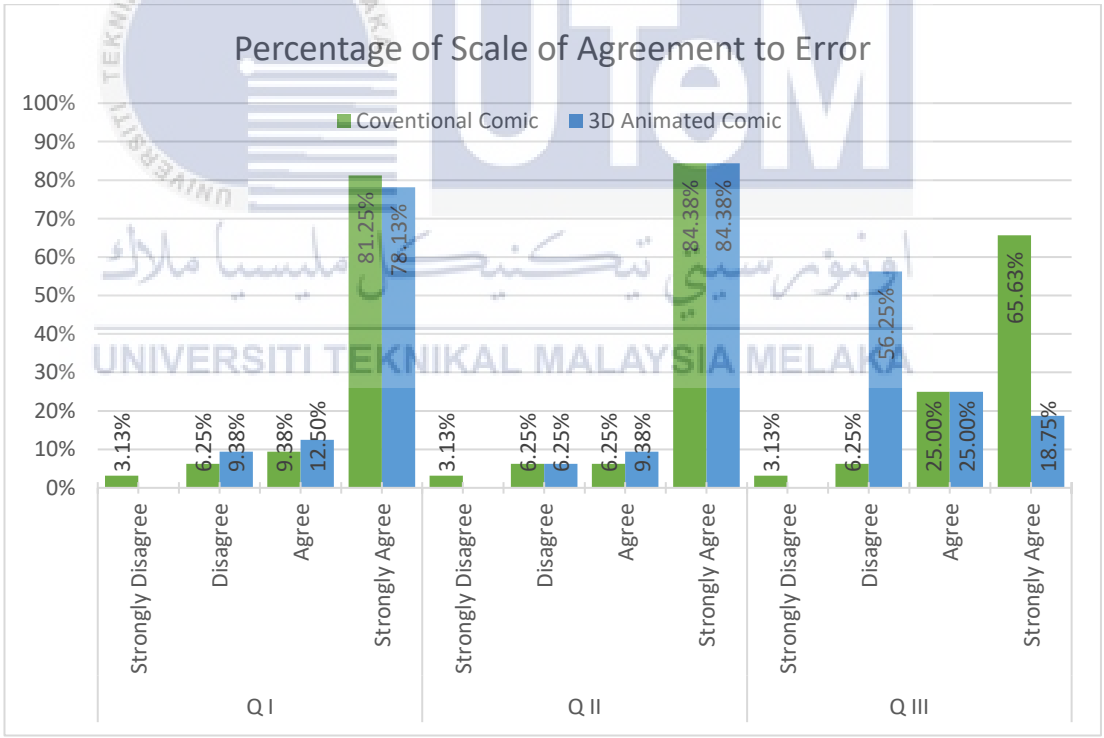


**Figure 6.6 shows the bar chart of percentage of scale of agreement to error**

Based on Figure 6.5, the majority of respondents which charted 78.13% for 3D animated comics and 81.25% for conventional comics, are strongly agree that they do not encounter any errors when reading the comics. Besides, there are 12.5% of

respondents agree but 9.38% of respondents disagree with that statement when using 3D animated comics. For conventional comics, 9.38% of respondents agree but 6.25% of respondents disagree and 3.13% of respondents strongly disagree that they do not encounter any errors when reading the comics.

There are 84.38% of respondents strongly agree that all of the display and user controls for both 3D animated comics and conventional comics are functioning well. The respondents who agree that all of the display and user controls for 3D animate comics are functioning well are charted 9.38%, while respondents who disagree charted 6.25%. For conventional comics, respondents who agree and disagree with that statement are both charted 6.25%, while there are 3.13% of respondents strongly disagree.

Although there are 25.00% of respondents agree and 18.75% of respondents strongly agree, the majority of respondents charted 56.25% disagree that reading 3D animate comics is not likely to encounter any errors in the future. Nevertheless, the majority of respondents charted 25.00% agree and 65.63% strongly agree that reading conventional comics is not likely to encounter any errors in the future, while there are only 6.25% of respondents disagree and 3.13% of respondents strongly disagree with that statement.

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### 6.5.2.5 Satisfaction

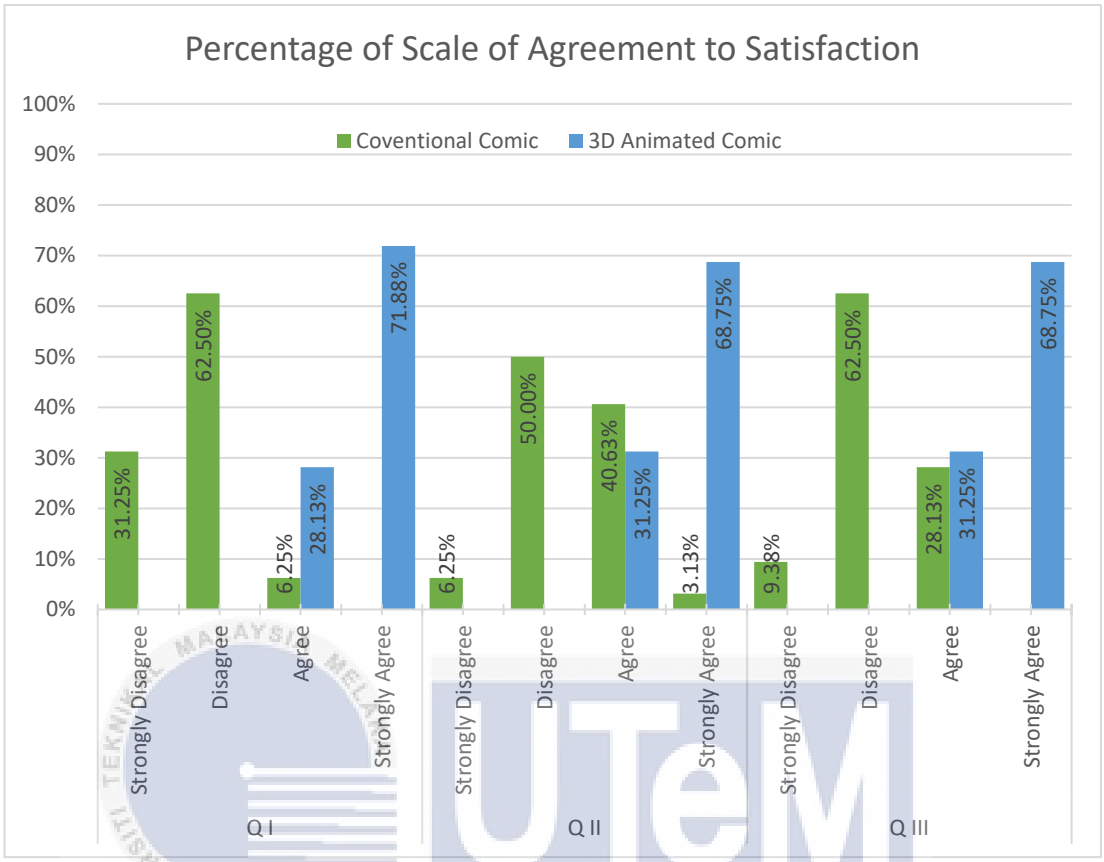


**Figure 6.7 shows the bar chart of percentage of scale of agreement to satisfaction**

According to Figure 6.6, all of the respondents charted 28.13% agree and 71.88% strongly agree that the 3D animated comics reading experience meets their expectations. However, only 6.25% of respondents agree that the conventional comics reading experience meets their expectations. The majority of respondents which charted 62.50% disagree and 31.25% strongly disagree with that statement.

There are 31.25% of respondents agree and 68.75% of respondents strongly agree that the awareness delivery method of 3D animated comics is suitable for them. Respondents who agree and strongly agree that the awareness delivery method of conventional comics is suitable to them are charted 40.63% and 31.3% respectively. However, 50.00% of respondents disagree and 6.25% of respondents strongly disagree with that statement.

Respondents who agree and strongly agree that they are satisfied with the 3D animated comics are charted 31.25% and 68.75% respectively. There are 28.13% of respondents who agree that they are satisfied with the conventional comics they read, however, the majority of respondents charted 62.50% disagree and 9.38% strongly disagree with that statement.

## 6.6 Analysis Testing

**Table 6.10 shows the average percentage of scale of agreement in usability testing**

| Usability | Average Percentage of Scale of Agreement | | | |
|---|---|---|---|---|
| | Conventional Comics | | 3D Animated Comics | |
| | Agree / Strongly Agree | Disagree / Strongly Disagree | Agree / Strongly Agree | Disagree / Strongly Disagree |
| Learnability | 59.375% | 40.625% | 100.000% | 0.000% |
| Efficiency | 21.875% | 78.125% | 94.792% | 5.208% |
| Memorability | 52.083% | 47.917% | 97.917% | 2.083% |
| Error | 90.625% | 9.375% | 23.958% | 76.042% |
| Satisfaction | 26.042% | 73.958% | 100.000% | 0.000% |

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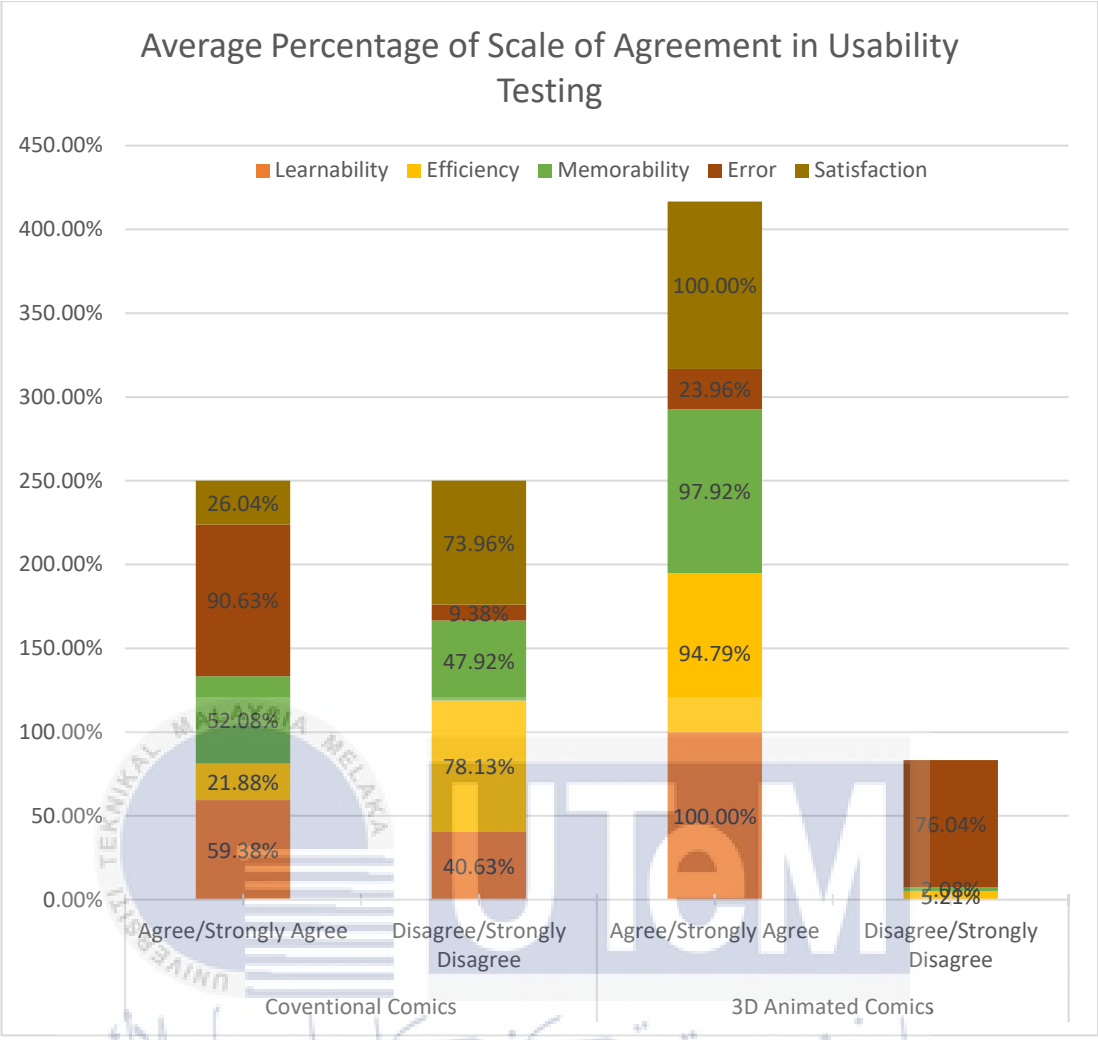


**Figure 6.8 shows the bar chart of average percentage of scale of agreement in usability testing**

According to Figure 6.7, the overall usability test for 3D animated comics has higher positive agreement compared to conventional comics. The analysis shows that 3D animated comics perform well in learnability, efficiency, memorability, and satisfaction. However, the error aspect of conventional comics has higher positive agreement compared to 3D animated comics. Apart from the error aspect, the efficiency of 3D animated comics has the lowest positive agreement. Besides, the analysis also reveals the significant lack of efficiency and satisfaction of conventional comics in delivering the awareness campaign compared to 3D animated comics. However, the learnability and memorability aspects still possess the majority of positive agreement (>50%). As conclusion, the researcher can conclude that 3D

animated comics has better usability in delivering the awareness campaign compared to conventional comics.

## 6.7 Conclusion

The testing aims to evaluate the usability of 3D animated comics in delivering awareness campaigns compared to conventional comics. The comparative tests are conducted successfully with 32 test users aged between 18 to 24 years old. The data collected are then analysed. The analysis has shown that 3D animated comics has better usability in delivering the awareness campaign compared to conventional comics.

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# CHAPTER 7: CONCLUSION

## 7.1 Observation on Weaknesses and Strengths

According to analysis testing, there is a noticeable weakness in this project. As the target platform aims for PC Windows 10, the error tolerance of 3D animated comics is low which includes the device operating system being incompatible, UI resolution scaling, and application bugs. Users are also required to download the full application first before reading the comics. Besides, the sound effects are implemented inconsistently which causes an unsatisfied reading experience. Some users also pointed out that the UI controls of the application are limited.

The strength of the 3D animated comics is the implementation of various multimedia components. The combination of graphics, texts, and audio can enhance the reading interest of the users. Besides, the use of animation helps in delivering the awareness campaign. The 3D models also give a realistic sense for users to reflect on themselves as they are in the situations.

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## 7.2 Proposition for Improvement

From the analysis and users' feedbacks, there are several improvements that can be done to the 3D animated comics. The application needs to support different operating systems such as Mac, and Linux. Besides, more audio should implement to further enhance the reading experience. The application should also include functionality such as the ability to control the audio level and the brightness. The 3D models should repolish for better visualisation as those are the main components of the comics.

For the project testing, the test should divide into the alpha test and beta test. The alpha test of the project will be carried out by the experts in motion comics, whereas the beta test will be carried out by the end-users. Their professions on the motion comics can provide technical overviews of the application. These will helps to improve the application such as in terms of functionality, accessibility, and ease to access.

## 7.3 Project Contribution

The development of 3D animated comics able to help in delivering the awareness campaign effectively. The public with difficulties in reading can learn the awareness with the aids of interesting animated comics. The 3D animated comics also assist in educating the public on the awareness of COVID-19 during the pandemic. Besides, this project reinforces the idea of the importance of multimedia elements in education. Furthermore, this project can enrich the educational resources for the 3D animated comics-related topic. This project also enhances the researcher's capability to develop a functional application individually.

## 7.4 Conclusion

To conclude, this project is developed successfully and fulfil the objectives of the project. The testing and analysing of 3D animated comics are conducted after the development of the project. As the result, the combination of 3D animation with comics are proved to have better usability in awareness campaign delivery. Although there are several weaknesses, the project still has the capability for improvement. Ultimately, the researcher claims that the project has been successfully accomplished.

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# REFERENCES

Camoens A. (2020). Over half a million ringgit worth of compounds issued to MCO violators. TheStar. Accessed March 3, 2021 <https://www.thestar.com.my/news/nation/2020/10/29/over- half-a-million-ringgit-worth-of-compounds-issued-to-mco-violators>

Hu, D., Lou, X., Xu, Z., Meng, N., Xie, Q., Zhang, M., ... & Wang, F. (2020). More effective strategies are required to strengthen public awareness of COVID-19: Evidence from Google Trends. *Journal of global health*, *10*(1). Accessed March 4, 2021 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7182392/>

Branscum, P., & Sharma, M. (2009). Comic books an untapped medium for health promotion. American Journal of Health Studies, 24(4), 430-439. < https://www.researchgate.net/profile/Manoj_Sharma29/publication/246545517_Comic_books_an_untapped_medium_for_health_promotion/links/566ef1c408ae0e4446b41e0d/Comic-books-an-untapped-medium-for-health-promotion>

Dindar, M., Yurdakul, I. K., & Dönmez, F. I. (2013). Multimedia in test items: Animated questions vs. static graphics questions. *Procedia-Social and Behavioral Sciences*, *106*, 1876-1882. Accessed March 3, 2021 <https://www.sciencedirect.com/science/article/pii/S1877042813048362>

Kokudo, N., & Sugiyama, H. (2020). Call for international cooperation and collaboration to effectively tackle the COVID-19 pandemic. *Global Health & Medicine*, *2*(2), 60-62. Accessed March 3, 2021

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

<https://www.jstage.jst.go.jp/article/ghm/2/2/2_2020.01019/_article/-char/ja/>

Rina, N., Suminar, J., Damayani, N. & Hafiar, H. (2020). Character Education Based On Digital Comic Media. International Association of Online Engineering. Accessed March 4, 2021 <https://www.learntechlib.org/p/216555/>

LESTARİ, B., & MUSTADİ, A. (2020). Animated Video Media vs Comic on Storytelling Skills: Which One is More Effective?. Journal for the Education of Gifted Young Scientists, 8(1), 167-182. Accessed March 4, 2021 <https://dergipark.org.tr/en/pub/jegys/article/664119>

Chattopadhyay, D. (2019). Can comic books influence consumer awareness and attitude towards rape victims and perpetrators in India? The case of Priya's Shakti. Journal of Graphic Novels and Comics, 10(1), 28-46. Accessed 4, 2021 < https://doi.org/10.1080/21504857.2017.1412992 >

Terry, D. T. (2014). Imagining a strange new world: Racial integration and social justice advocacy in Marvel Comics, 1966–1980. In Soul Thieves (pp. 151-199). Palgrave Macmillan, New York. Accessed March 4, 2021 < https://link.springer.com/chapter/10.1057/9781137071392_9>

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Molina Fernández, M. (2019). Image, movement and interactivity in digital comics. EME Experimental Illustration, Art & Design, 7 (7), 44 51. Accessed March 5, 2021 <https://doi.org/10.4995/eme.2019.11360>

Ashwal, G., & Thomas, A. (2018). Are comic books appropriate health education formats to offer adult patients?. AMA journal of ethics, 20(2), 134-140. Accessed March 5, 2021 <https://journalofethics.ama-assn.org/article/are-comic-books-appropriate-health-education-formats-offer-adult patients/2018-02>

Hanson, A., Drendel, A. L., Ashwal, G., & Thomas, A. (2017). The feasibility of utilizing a comic for education in the emergency department setting. Health

communication, 32(5), 529-532. Accessed March 5, 2021 <https://www.tandfonline.com/doi/abs/10.1080/10410236.2016.1211076>

Gao, A. W., Maizels, E. T., Brennan, K. M., Thaxton, C. S., McMahon, K., & Young, C. D. (2018). Comparing the Effectiveness and Engagement of Comics to 3D Animation in Teaching Advances in Nanomedicine. Journal of Biocommunication, 42(2). Accessed March 6, 2021 <https://journals.uic.edu/ojs/index.php/jbc/article/view/9545>

Muniran, F., & Yusof, M. R. M. (2008). Using comics and graphic novels in school and libraries to promote literacies. Library & Information Science Unit, Faculty of Computer Science & Information Technology, University of Malaya. <https://www.academia.edu/download/2392219/2a4ntrmxfk1i8y9x.pdf>

Supriyanto, E. (2020). THE MOTION COMIC JAKA BEREK. ARTISTIC: International Journal of Creation and Innovation, 1(2), 34-55. Accessed March 6, 2021 <https://jurnal.isi-ska.ac.id/index.php/artistic/article/view/3310>

Aggleton, J. (2018). Defining digital comics: a British Library perspective. Journal of Graphic Novels and Comics. Accessed March 6, 2021 <https://www.tandfonline.com/doi/shareview/10.1080/21504857.2018.1503189>

Murphey, P. (2016). The Life of a Still Image: Comics vs. Animation. Illustration History. Accessed March 6, 2021 <https://www.illustrationhistory.org/essays/the-life-of-a-still-image- comic-vs-animation>

Media (2021). Cartoon Animation: Evolution From Paper to Digital. Techsci Research. Accessed March 6, 2021 <https://www.techsciresearch.com/blog/cartoon-animation-evolution- from-paper-to-digital/141.html>

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

Morton, Drew. (2015). “The unfortunates: towards a history and defi-nition of the motion comic.” Journal of Graphic Novels and Comics 6 (4): 347-366. <https://www.tandfonline.com/doi/full/10.1080/21504857.2015.1039142?scroll=top&needAccess=true>

Chute, H. (2017). Comics. In The Oxford Handbook of Law and Humanities. <https://www.oxfordhandbooks.com/view/10.1093/oxfordhb/9780190695620.001.0001/oxfordhb-9780190695620-e-43>

Goulart, R. (2000). Comic book culture: an illustrated history. Collectors Press, Inc. <https://books.google.com/books?hl=en&lr=&id=gW36Qs3rLB0C&oi=fnd&pg=PA2&dq=history+of+the+comic&ots=3mbJ084_ng&sig=r7P7PRXVW2Vg-KICW9cZQWVo4Ig>

Azman, F. N., Zaibon, S. B., & Shiratuddin, N. (2014). Exploring digital comics as an edutainment tool: An overview. <http://repo.uum.edu.my/id/eprint/14695>

Eisner, W. (1985). Comics & sequential art (pp. 194-209). Tamarac, FL:Poorhouse Press McCloud, S. (1993). Understanding comics: The invisible art.Northampton, Mass.

Andersen, T. F., & Vistisen, P. (2020). What is so super about motion comics?. Akademisk kvarter| Academic Quarter, (20), 72-91. <https://somaesthetics.aau.dk/index.php/ak/article/view/5849>

Smith, Craig (2015) Motion comics: the emergence of a hybrid medium. Writing Visual Culture, 7. ISSN 2049-7180. <http://www.herts.ac.uk/__data/assets/pdf_file/0018/100791/wvc-dc7-smith.pdf>

Smith, Craig (2012) Motion comics: Modes of adaptation and the issue of authenticity. Animation Practice, Process & Production, 1 (2). pp. 357-378. ISSN 20427875.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

<https://repository.canterbury.ac.uk/download/c02477c21a64154a66ec9eac27a48772bc6cfdd1bc723331d22e81e383c07459/1052029/13408.pdf>

Au, K. C. (2014). Animation: 2D versus 3D and their combined effect (Doctoral dissertation, Massachusetts Institute of Technology). <https://dspace.mit.edu/handle/1721.1/92640>

Cohn, N. (2013). Navigating comics: an empirical and theoretical approach to strategies of reading comic page layouts. Frontiers in psychology, 4, 186. <https://www.frontiersin.org/articles/10.3389/fpsyg.2013.00186/full>

Steinke, J. (2004). Science in cyberspace: Science and engineering World Wide Web sites for girls. Public Understanding of Science, 13(1), 7-30. <https://www.femtech.at/sites/default/files/Science_in_Cyberspace.pdf>

Jenkins, H. (2011). Convergence Culture: Where Old and NewMedia Collide. Revista Austral de Ciencias Sociales, 20, 129-133. <http://revistas.uach.cl/pdf/racs/n20/art09.pdf>

Reyns, B. W., & Henson, B. (2010). Superhero justice: The depiction of crime and justice in modern-age comic books and graphic novels. In Popular Culture, Crime and Social Control. Emerald Group Publishing Limited. < https://www.emerald.com/insight/content/doi/10.1108/S1521-6136(2010)0000014006/full/html>

McMillan, Graeme. (2008). “Why Motion isn’t the Future of Comics.” Accessed April 2021. <http://io9.com/5032273/why-motion-isnt-the-future-of-comics/all>

Hashim, M. E. A. B., Idris, M. Z. B., & Said, C. S. B. (2020). The Potential of Integrating User Experience (UX) and Aesthetic Experience (AX) in Augmented Reality Comic (AR Comic). <http://www.ijeeee.org/vol11/551-IT030.pdf>

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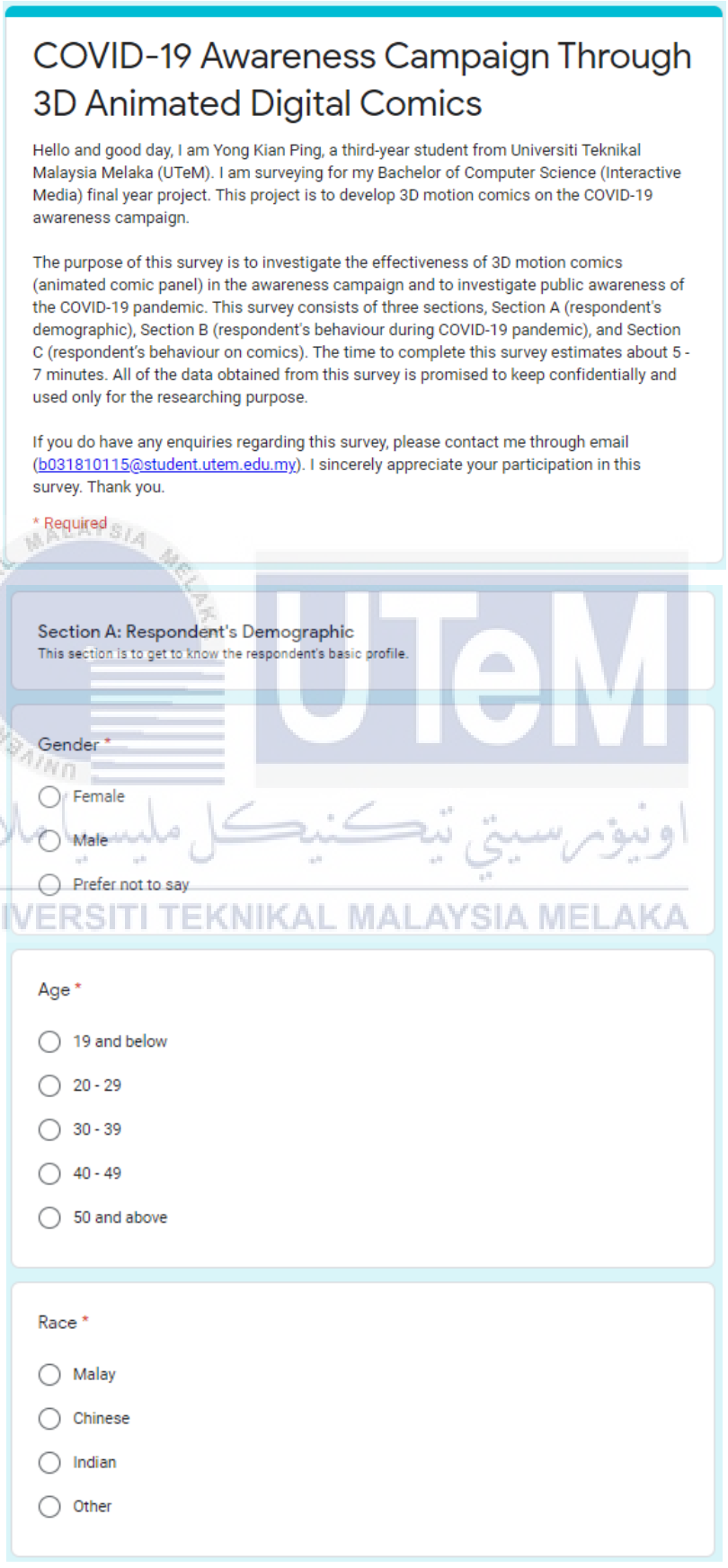
# APPENDICES

## APPENDIX A



COVID-19 Awareness Campaign Through 3D Animated Digital Comics

Hello and good day, I am Yong Kian Ping, a third-year student from Universiti Teknikal Malaysia Melaka (UTeM). I am surveying for my Bachelor of Computer Science (Interactive Media) final year project. This project is to develop 3D motion comics on the COVID-19 awareness campaign.

The purpose of this survey is to investigate the effectiveness of 3D motion comics (animated comic panel) in the awareness campaign and to investigate public awareness of the COVID-19 pandemic. This survey consists of three sections, Section A (respondent's demographic), Section B (respondent's behaviour during COVID-19 pandemic), and Section C (respondent's behaviour on comics). The time to complete this survey estimates about 5 - 7 minutes. All of the data obtained from this survey is promised to keep confidentially and used only for the researching purpose.

If you do have any enquiries regarding this survey, please contact me through email (b031810115@student.utem.edu.my). I sincerely appreciate your participation in this survey. Thank you.

* Required

Section A: Respondent's Demographic

This section is to get to know the respondent's basic profile.

Gender *

- Female
- Male
- Prefer not to say

Age *

- 19 and below
- 20 - 29
- 30 - 39
- 40 - 49
- 50 and above

Race *

- Malay
- Chinese
- Indian
- Other

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## Section B: Respondent's Behaviour During COVID-19 Pandemic

This section is to observe the respondent's awareness of the daily practices during the COVID-19 pandemic. The questions below are derived through the slogan "Practicing 3W(wash, wear, warn), Avoiding 3C(crowded places, confined spaces, close conversation)" by the government.
There are some abbreviations used in this section: WHO (World Health Organization), SOP (Standard Operating Procedure)

From where do you usually receive/ learn/ get to know a particular awareness campaign? (exp: anti-smoking, dengue fever, road safety...) *

- [ ] Television/ Radio
- [ ] Newspaper/ Magazine
- [ ] Flyer/ Poster
- [ ] Website/ Social media
- [ ] SMS (Short Message Service)
- [ ] Through family and friends
- [ ] Other: _____

Did you ever hear about slogan "Amalkan 3W, Elakkan 3C"/ "Practicing 3W, Avoiding 3C" before? *

- ◯ Yes
- ◯ No
- ◯ Maybe

"Practicing 3W, Avoiding 3C" is a slogan that the government used to raise COVID-19 awareness among the public. The elements include are Wash, Wear, Warn, Crowded places, Confined spaces, and Close conversation.

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From 1(never) to 5(always), state how frequently are you performing the following actions in the new norm of the COVID-19 pandemic.

1-Never 2-Rarely 3-Sometimes 4-Often 5-Always

Element: Wash *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I sanitise/ wash my hands when I am outside from home | ◯ | ◯ | ◯ | ◯ | ◯ |
| I sanitise/ wash my hands when I back home from outside | ◯ | ◯ | ◯ | ◯ | ◯ |
| I sanitise/ wash my hands after disposing of a used mask | ◯ | ◯ | ◯ | ◯ | ◯ |
| I wash my hands according to WHO recommended steps | ◯ | ◯ | ◯ | ◯ | ◯ |

Element: Wear *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I wear a mask when I am outside from home | ○ | ○ | ○ | ○ | ○ |
| I wear a mask correctly all the time(above the nose and below the chin) | ○ | ○ | ○ | ○ | ○ |
| I put off my mask when I stay with friend(s) that does not live together | ○ | ○ | ○ | ○ | ○ |
| I wear/ buy the certified virus-protection face mask | ○ | ○ | ○ | ○ | ○ |

Element: Warn *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I greet people without physical contact | ○ | ○ | ○ | ○ | ○ |
| I disinfect the things that I contact with | ○ | ○ | ○ | ○ | ○ |
| I cover my mouth when I am coughing and sneezing | ○ | ○ | ○ | ○ | ○ |
| I stay at home and avoid outdoor activities | ○ | ○ | ○ | ○ | ○ |

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Element: Crowded places *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I go to/ stay at a crowded place | ○ | ○ | ○ | ○ | ○ |
| I visit a place (exp: cafe/ shopping mall) during peak hour | ○ | ○ | ○ | ○ | ○ |
| I keep social distancing with people around me when staying at a crowded place | ○ | ○ | ○ | ○ | ○ |

Element: Confined spaces *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I go to/ stay at a confined space where other people is inside | ○ | ○ | ○ | ○ | ○ |
| I stay outside of the enclosed room when I am waiting for someone | ○ | ○ | ○ | ○ | ○ |
| I make sure the area I stay in has enough airflow when there are other people around | ○ | ○ | ○ | ○ | ○ |

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Element: Close conversation *

| | 1-Never | 2 | 3 | 4 | 5-Always |
|---|---|---|---|---|---|
| I talk with someone that I do not know with social distancing | ○ | ○ | ○ | ○ | ○ |
| I chat with my friend(s) that does not live together with social distancing | ○ | ○ | ○ | ○ | ○ |
| I chat with my friend(s) that does not live together while wearing a mask | ○ | ○ | ○ | ○ | ○ |

## Section C: Respondent's Behaviour on Comics

This section is to determine the respondent's reading preference for the comics.

How often do you read comics (printed comics, digital comics, webcomic, comic strips, comic book, etc.)? *

- ◯ Rarely
- ◯ Sometimes
- ◯ Often

Did you ever hear or read any kinds of motion comics (animated comics)? *

- ◯ Yes
- ◯ No
- ◯ Maybe

What types of comics do you prefer to read? *

- ☐ Printed comics(physical comic book, comic strips from newspaper or magazine,...)
- ☐ Webcomic (comics that publish on the website)
- ☐ Motion comics (each comic panels represented by an animation clip)
- ☐ 2D comics (contents presented in 2-dimensional images)
- ☐ 3D comics (contents presented in 3-dimensional images)
- ☐ Other: _____

Do you like to read educational comics? (exp: awareness comics, science comics, historical comics,...) *

- ◯ Yes
- ◯ No
- ◯ Maybe

What comic criteria influence the most your comics reading preference/ experience? *

- ☐ Panels arrangement (reading from left to right/ right to left/ big to small/...)
- ☐ Details of the panel (each objects/ scenes/ backgrounds are visualise in details)
- ☐ Speech bubble (amount and size of dialog box of the character)
- ☐ Storyline (the story narrative of the comics)
- ☐ Art style (hand drawing/ CGI/ painting/ abstract/...)
- ☐ Content realistic (how close the visual/ story/ character is, as to the real world)
- ☐ Colorfulness (black and white/ grey scale/ coloured)
- ☐ Other: _____

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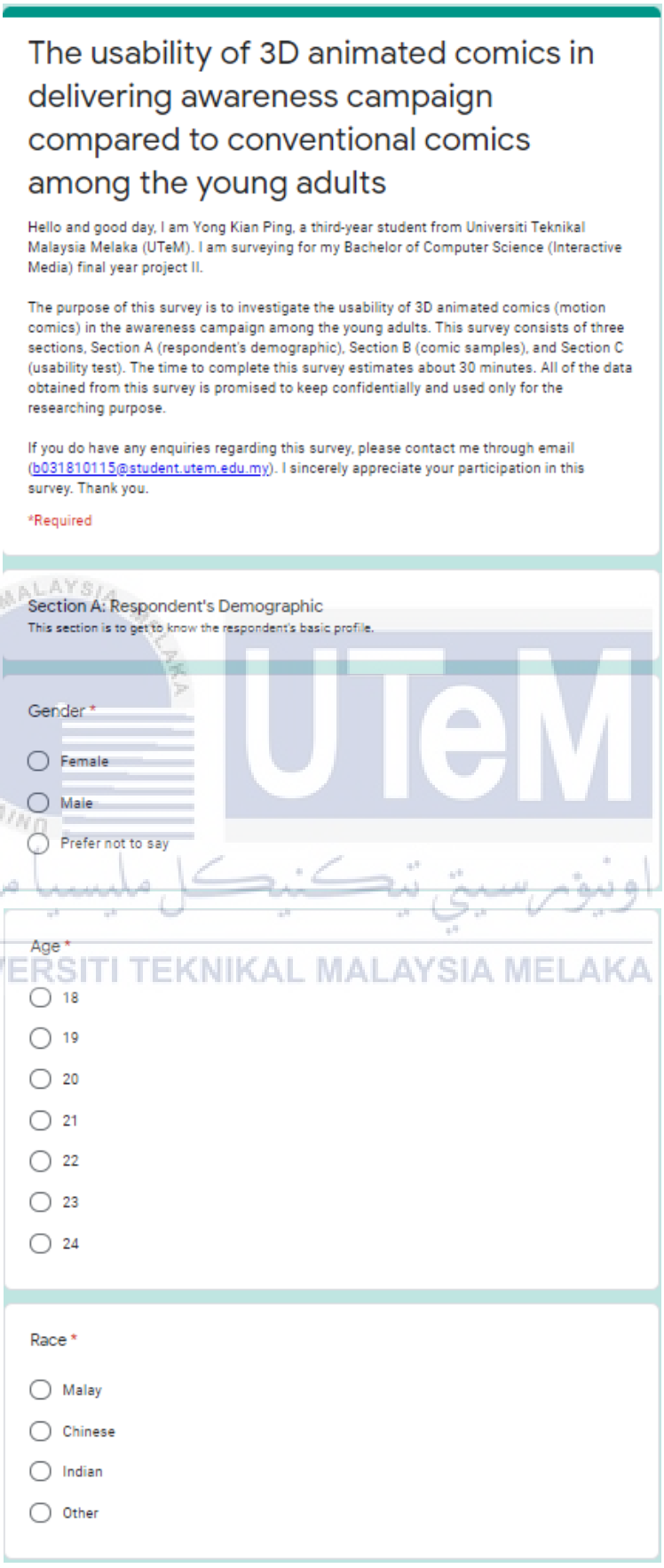
**APPENDIX B**



# The usability of 3D animated comics in delivering awareness campaign compared to conventional comics among the young adults

Hello and good day, I am Yong Kian Ping, a third-year student from Universiti Teknikal Malaysia Melaka (UTeM). I am surveying for my Bachelor of Computer Science (Interactive Media) final year project II.

The purpose of this survey is to investigate the usability of 3D animated comics (motion comics) in the awareness campaign among the young adults. This survey consists of three sections, Section A (respondent's demographic), Section B (comic samples), and Section C (usability test). The time to complete this survey estimates about 30 minutes. All of the data obtained from this survey is promised to keep confidentially and used only for the researching purpose.

If you do have any enquiries regarding this survey, please contact me through email (b031810115@student.utem.edu.my). I sincerely appreciate your participation in this survey. Thank you.

*Required

## Section A: Respondent's Demographic

This section is to get to know the respondent's basic profile.

Gender *

- Female
- Male
- Prefer not to say

Age *

- 18
- 19
- 20
- 21
- 22
- 23
- 24

Race *

- Malay
- Chinese
- Indian
- Other

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# The usability of 3D animated comics in delivering awareness campaign compared to conventional comics among the young adults

*Required

## Section B: Comic Samples

This section has given two different types of comics (conventional comics and 3D animated comics). Respondent is required to read through both comics before proceeding to Section C.

### Instructions

1. Open the URL link below and read through the comic (read once only).
2. Answer the questions below BASED ON that comic (without referring back).

URL link: https://countercurrents.org/2020/03/a-comic-strip-on-coronavirus-for-kids-kids-vaayu-corona-who-wins-the-fight/

How do the COVID-19 viruses separate among humans? *

- ◯ Through blood transfusion
- ◯ Through movement from one to another
- ◯ Through body contact or air movement

What is the symptom of COVID-19 infection? *

- ◯ Low blood pressure
- ◯ Fever
- ◯ Stomach ache

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How many washing-hands steps according to the comics? *

- ◯ 5
- ◯ 6
- ◯ 7

Apart from hand sanitiser, what is the approach to keep hands hygiene? *

- ◯ Wash hand with running water and soap
- ◯ Wash hand with running water only
- ◯ Wash hand with running water and brushes

It is easy to kill germs and bacterial. *

- ◯ True
- ◯ False

# The usability of 3D animated comics in delivering awareness campaign compared to conventional comics among the young adults

*Required

Instructions

1. Open the YouTube link below /or download the application, then read through the comic (read once only).
2. Answer the questions below BASED ON that comic (without referring back).

Watch on YouTube: https://youtu.be/WVCp31o1tvo
/OR/
Download for PC (66MB): https://drive.google.com/file/d/1pBY-05iPeAINN_UQsqlc35vYNsYKlYov/view?usp=sharing

How far is the social distancing approach? *

- ◯ Less than 1 meter
- ◯ 1 meter
- ◯ At least 1 meter

What is the purpose to wear a facemask? *

- ◯ To prevent the physical contact between hands and face.
- ◯ To prevent contact/ separate airborne viruses
- ◯ To prevent recognition by other people

Why should we ensure good ventilation in the public area? *

- ◯ Good ventilation helps to keep someone healthy
- ◯ Good ventilation helps to reduce separate of viruses
- ◯ Good ventilation helps to maintain ideal humidity

When should we dispose a mask? *

- ◯ after use or for every 2 hours usage
- ◯ after use or for every 4 hours usage
- ◯ after use or for every 8 hours usage

We need to wear a mask even we do not feel sick. *

- ◯ True
- ◯ False

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# The usability of 3D animated comics in delivering awareness campaign compared to conventional comics among the young adults

*Required

## Section C: Usability Test

This section is to determine the respondent's acceptance of two different types of comics. Respondent is required to read through both comics in Section B before answering the questions below.

Instructions

1. From 1 (Strongly Disagree) to 4 (Strongly Agree), select the scale of the agreement for each of the comics you read in Section B.

| Strongly Disagree | Disagree | Agree | Strongly Agree |
|---|---|---|---|
| 1 | 2 | 3 | 4 |

Learnability

I think that the comic is attractive for learning. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that the comic can delivers the awareness clearly. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that it is easy to learn an awareness campaign through the comic. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

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## Efficiency

I think that the time I spent reading the comic does not much. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that the quality of the comic is good. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that the comic does not need much effort to read. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

## Memorability

I think that I still can remember the comic's content (storyline) after some time without reading it. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that I still can remember the comic's content (awareness) after some time without reading it. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that I still can navigate the process/ control/ UI to read the comic after some time without reading it. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

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Error

I do not encounter any errors when I read the comic. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

All of the display and user controls (mouse scroll, click, UI buttons,...) of the comic are functioning well. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that reading the comic is not likely to encounter any errors in the future. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

Satisfaction

I think that the comic reading experience meets my expectations. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

I think that the awareness delivery method of the comic is suitable to me. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

Overall, I am satisfied with the comic I read. *

| | 1 (Strongly Disagree) | 2 | 3 | 4 (Strongly Agree) |
|---|---|---|---|---|
| Conventional comic | ○ | ○ | ○ | ○ |
| 3D animated comic | ○ | ○ | ○ | ○ |

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