THE DEVELOPMENT MALAYSIAN BATIK HERITAGE BY USING AUGMENTED REALITY

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
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2020

DECLARATION

I hereby declare that this project report entitled

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(TS DR SARNI SUHAILA BINTI RAHIM)

DEDICATION

This final project is wholeheartedly dedicated to my beloved parents, who have been my source of inspiration, gave me strength when I thought of giving up, support and help whenever and wherever I need.

In addition, to my supervisor, Ts Dr Sarni Suhaila Binti Rahim who always committed, endless support and guide me while the progress of this final project.

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Lastly, to all my beloved friends who always there to help me through anything and shared their words of advice and encouragement to finish my final year project.

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Thank you.

ABSTRACT

Malaysia has many different tribes, culture, religion, and art. Batik is one of the most popular cultural heritages. Batik is a fabric which has a unique pattern and that is processed in some way. One method of doing it is by teaching and educate young generation about Batik to the cutting edge utilizing innovation namely Augmented Reality(AR). This project involves the production of two products. First product is a flyers of Malaysian Batik. Then, the user need to download the Augmented Reality application and scan the flyers so the popup of Augmented Reality will display. This study aims to investigate the relevance and importance of Augmented Reality in elevating and preserving Batik as cultural heritage to become more well-known and established in its core design motifs. Nowadays, the current obstacles and problem faced by government is the way of introducing Batik using image, video, and internet. The application is expected to successfully develop the application that use an augmented reality feature as a platform for promote our batik so that tourists become more aware of our national heritage and identity and help the people keep better understanding about Batik.

ABSTRAK

Malaysia mempunyai pelbagai suku, budaya, agama, dan seni. Salah satu warisan budaya yang paling popular adalah batik. Batik adalah kain yang mempunyai corak yang unik dan diolah dengan cara tertentu. Generasi muda di Malaysia perlu mengekalkan budaya mereka, salah satunya adalah batik. Salah satu cara untuk melakukannya adalah dengan memahami dan mengajar mengenai batik kepada generasi akan datang menggunakan teknologi iaitu augmented reality (AR). Oleh itu, aplikasinya adalah untuk memvisualisasikan maklumat corak batik berdasarkan Augmented Reality. Projek ini melibatkan pengeluaran dua produk. Produk pertama adalah risalah Batik Malaysia di Malaysia. Produk kedua adalah aplikasi Augmented Reality di telefon bimbit yang dapat mengesan gambar di selebaran untuk memaparkan maklumat tambahan mengenai batik. Kajian ini bertujuan untuk mengkaji kesesuaian dan kepentingan Augmented Reality dalam mengangkat dan melestarikan Batik sebagai warisan budaya untuk menjadi lebih terkenal dan mantap dalam motif reka bentuk utamanya. Halangan dan masalah semasa yang dihadapi oleh kerajaan adalah cara memperkenalkan Batik hingga ke hari ini masih menggunakan media, gambar, video, internet dan batik yang jelas. Aplikasi ini diharapkan dapat berjaya mengembangkan aplikasi yang menggunakan fitur augmented reality sebagai platform untuk mempromosikan batik kita agar pelancong menjadi lebih peka akan warisan dan identiti negara kita dan membantu masyarakat memahami dengan lebih baik mengenai Batik.

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LIST OF ABBREVIATIONS

FYP	-	**Final Year Project**
AR	-	**Augmented Reality**

LIST OF ATTACHMENTS

CHAPTER 1: INTRODUCTION

1.1 Project Background

In Malaysia, there are many different tribes, culture, religion, and art. Malaysian Batik is one of the creative industries that have potential as part of a city branding. Batik industry can also be categorized as highly creative one because it is processed and developed by artistic ideas through a variety of distinctive and original motif. So, Batik is able to contribute significantly to the income of the nation, known also as a creative economy.

Batik is a fabric which has a unique pattern and processed in a certain way. The young generation is a valuable asset that will be preserving Batik in the future. One method of doing it is by teaching and educate young generation about Batik to the cutting edge utilizing innovation namely Augmented Reality(AR). Therefore, an AR application which will give overview and display of Batik using AR.

In this study, AR is a technology that combine real-world objects and virtual ones, so that it brings out and enhances information that may be hidden or not immediately be understood. Moreover, interaction between computer and human can be more powerful when the object in the screen can be integrated and displayed in real-world environment. The technology will enable people to get a real ‘feel’ for making Batik. This AR application also can allow people to interact with 3D photo-real version of the Batik. This is because AR is attempts to supplements the real environment with virtual information.

1.2 Problem Statement

Nowadays, the art of Malaysian Batik is not much introduced to the public people. This will cause most people lack the exposure or knowledge about the Batik. In the case of Malaysian Batik Heritage and develop Augmented Reality, it is used for people to understanding the process of making batik, type of Batik and many more about Malaysian Batik. The problem is now people and tourists will be difficult to get a choice of materials or technology that can provide information and knowledge about this traditional art and culture.

Nowadays, if we go to hotel or tourism counter, they are provided brochure and no interactive content. So, people are lazy to learn and Malaysian Batik seems to be forgotten among local or foreign tourists. Consequently, promoting the Batik in Malaysia should be focused so as not to waste the valuable culture. In general, those applications are mostly offer the information about Malaysian Batik and consumers can experience for themselves how to make Batik.

1.3 Objective

The objectives of developing this project are :

(a) To study the variation of Batik motif.

(b) To develop an augmented reality Malaysian Batik Heritage application for helping in visualizing the process of making Batik.

(c) To evaluate the effectiveness in delivering Batik information using Augmented Reality approach.

1.4 Project Scope

The scopes in developing this project are :

1.4.1 Target Audience

This Augmented Reality application is targeting for public.

1.4.2 Content

There are several module will be used in this application. The features on part of the Batik will be displayed such as

a) History of Batik

b) Process of Making Batik

c) Types of Batik

d) Design Motif.

1.5 Project Significant

In this project, the purpose of this project is to contribute to the promotion of Malaysian culture and make National heritage and identity more effective and attractive. In addition, this project will give a brand new experience to audience in the way of understanding Malaysian Batik. This will evoke their curiosity and attentiveness to Malaysian Batik rather than just experience it virtually. Thus, the new technology of Augmented Reality can improved or enhanced.

1.6 Conclusion

From this project, the expectation is to develop a standalone application which can visualize the process of making Batik to public for more understanding about Batik. The application is developed and designed by using Augmented Reality technology. The problem statements identify the situation from its current scenario, and why it is necessary to develop this project. The objectives are clearly stated from the problem statement. The objectives should be realistic and attainable. Research interests clarify the specific target user, framework and usability.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

A writing survey is an extensive synopsis of past exploration on a point. The writing audit overviews academic articles, books, and different sources applicable to a specific region of examination. The audit ought to count, portray, sum up, equitably assess and explain this past examination**.** According to Harvey. A Andruss Library (2019) it should give a hypothetical base for the exploration and help to decide the idea of the examination. The writing audit recognizes crafted by past specialists and, in doing as such, guarantees the reader that the investigation has been all around arranged.

Methodology is an organized arrangements of strategies, practices, cycles and systems used to accomplish. The procedure is the overall exploration system that plots the manner by which examination is to be embraced and in addition to other things, recognizes the strategies to be utilized in it. These strategies depicted in the philosophy, characterize the methods or methods of information assortment or how a particular outcome is to be determined. Philosophy doesn't characterize explicit techniques, despite the fact that much consideration is given to the nature and sorts of cycles to be followed in a specific methodology or to accomplish a goal.

2.2 Facts and findings

Chapter 2 will be discussed about the essential idea of Augmented Reality in term of definition and furthermore some issue related with Augmented Reality(AR). Plus, this part will likewise examine on the idea of the travel industry and furthermore the system of advancing the travel industry division. Some current existing AR SDK that gives

collaboration highlight will be examines and include in the correlation cycle in this section.

2.3 Domain

The domain of this project is based on the Augmented Reality in Malaysian Batik. Through this application, user can gain the experience on how the process of making Batik. Besides, users can also learn the art of Motif Batik. With this application, the users will be able to get knowledge about the traditional culture.

2.3.1 Augmented Reality (AR) definition

Augmented Reality is the workmanship innovation that limit between what is genuine and what is PC created. Term Augmented Reality is accustomed to compositing an immediate and roundabout perspective on the physical world with PC produced tangible information 3D model or sound. At the point when the increase is completed continuously, the utilization of Augmented Reality can genuinely improve the view of reality through intuitive and carefully data, and result in the formation of new novel stunning encounters. Augmented Reality overcomes any issues between the genuine and virtual universes progressively. In contrast to augmented reality (VR), AR makes an absolutely fake condition that actualize the current condition. (Straits Times, 16 February 2016).

2.3.2 Types of Augmented Reality

There are several platforms that can be used in AR to view the output which is Marker Based Augmented Reality, Marker-less Based Augmented Reality, Projection Based Augmented Reality and Superimposition Based Augmented Reality.

2.3.2.1 Marker Based Augmented Reality

The other name for Marker-Based AR is also called Image Recognition or Recognition based AR. this type of AR provides us more information

about the object after it focuses on the recognition of objects. It detects the object in front of the camera and provides information about the object on the screen. The recognition of the object is based on the marker such as QR Code or flyers where it replaces the marker on the screen with a 3D version of the corresponding object. Therefore, the user can view the object in more detail and from various angles. Apart from that while rotating the marker user can also rotate the 3D imagery as well.

Figure 2.1: Marker Based Augmented Reality (Researchgate.net, July 2016)

2.3.2.2 Marker-less Based Augmented Reality

Marker-less augmented reality is one of the most generally actualized applications in the business. It is otherwise called Location-based AR for the explanation behind the simple accessibility of the highlights in the cell phones that give area identification. Aside from that, it encourages clients to find intriguing spots inside their present area. This technique works by perusing information from the portable's GPS, advanced compass and accelerometer while foreseeing where the client is centering. This AR is tied in with including area data screen about the items that can be seen from the user’s camera.

Figure 2.2: Marker-less Based Augmented (Researchgate.net, July 2016)

2.3.2.3 Projection Based Augmented Reality

Projection-based AR is engaging and intuitive where light is blown onto a surface and the collaboration is finished by contacting the extended surface with hand. The far reaching employments of projection-based AR methods can be utilized to make misdirection about the position, direction, and profundity of an article. Another case of Projection Based Augmented Reality laser plasma innovation that venture multi-dimensional image in reality.

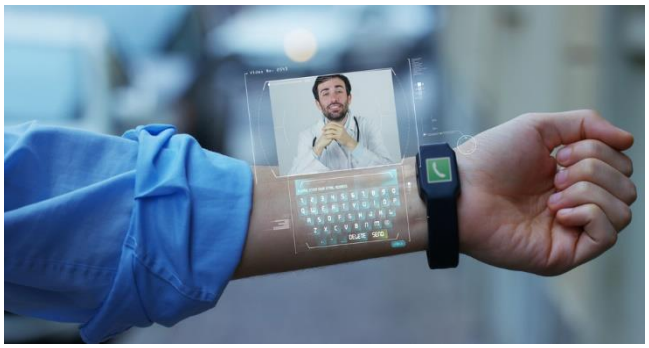


Figure 2.3: Projection Based Augmented Reality (Researchgate.net, July 2016)

2.3.2.4 Superimposition Based Augmented Reality

Superimposition Based Augmented Reality are the ability to recognize the object as the object replacement cannot be done if it cannot determine what the original object is. This AR provides a replacement view of the object in focus. This is done by replacing the entire or partial view with an augmented view of the object. For example, it is commonly used in the medical field to superimpose an X-ray onto a patient's body. In addition, Ikea augmented reality furniture catalogue where user just need to download the apps and place virtual furniture to get the one that match with their house.

Figure 2.4: Superimposition Based Augmented Reality (Researchgate.net, July 2016)

2.3.3 Augmented Reality Application

Augmented Reality Apps are software applications which consolidate the advanced visual (sound and different sorts additionally) content into the user's real world environment. There are different employments of AR programming like preparing, work and buyer applications in different ventures including open security, medical services, the travel industry, gas and oil, and promoting.

There are many of Augmented Reality innovation actualize in every day uses to upgrade the user encounter and improve user comprehension of something. Augmented reality additionally executed in program where it utilized client's camera to show logical data. For instance, user can open the camera application and point their cell phone at marker material and a spring up data will be show about the structure. Bit of leeway of this application are they gives video backing and offer precise developments other than giving custom essential exercises like SMS, call, email and interfacing in web-based media.

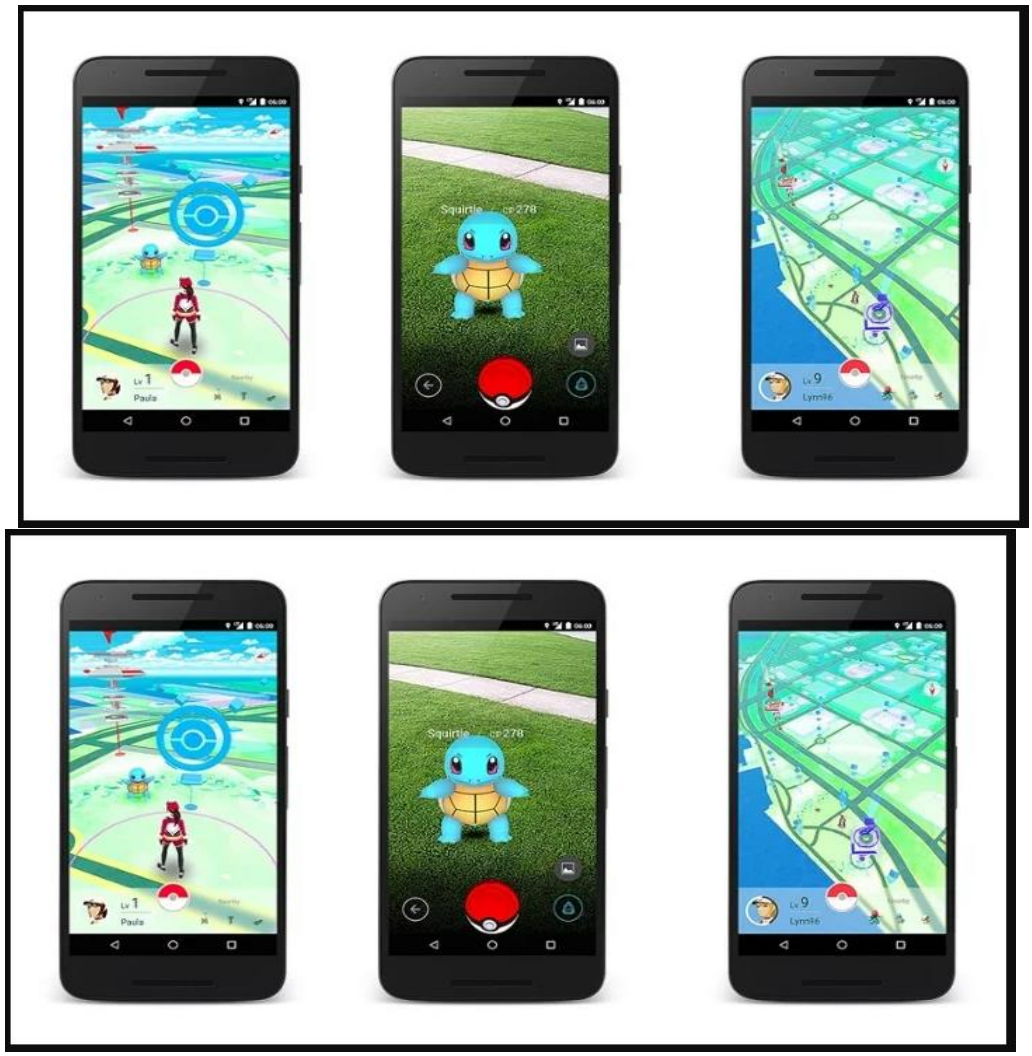


Figure 2.5: Example of Augmented Reality Application (Researchgate.net, July 2016)

2.3.4 Usage of Augmented Reality in Tourism

Augmented Reality has been viewed as of high potential for the travel industry (Fritz et al., 2005). A tourist is a person who typically has “little or no knowledge of the environment” (McKercher and du Cros, 2003) Accordingly, such an area based gadget, which can be utilized to get to data in the prompt encompassing, would significantly profit this industry. Current executions of AR in the travel industry need compelling commitment of the user and give an upgraded understanding to the tourist. Moreover, it has not yet been made faultless, and incorporates numerous bugs, which should be defeated before offering it to the general population. Another test is the acknowledgment and selection to such gadgets, the same number of sightseers despite everything incline toward traditional sources, for example, travel guides and different wellsprings of media (Pang et al., 2006In any case, Augmented Reality shows high potential in turning into a standard mechanical apparatus in the travel industry soon because of its useful convenience, which can be utilized inside just as in outside conditions (Fritz et al., 2005).

Figure 2.6: Example of Augmented Reality in Tourism (Fritz et al., 2005)

Figure 2.7: Example of Augmented Reality in Tourism (McKercher and du Cros, 2003)

2.4 Existing System

The existing system that is used for the project references are from the subject matter expert(SME) that contain several ideas that will contribute ideas to this project.

2.4.1 2D Animation of What is Batik?

This project 2D Animation What is Batik are produced for the people to learn and know about Batik. This animation can be found on Youtube. People may not knowing about animation as they only study through flyers/ in or just search anything about Batik in Internet. As for this, there are a few example regarding 2D animation.

Figure 2.8: Example of animation about What is Batik? (Youtube, 2016)

Figure 2.9: Example of animation about What is Batik? (Youtube, 2016)

Figure 2.10: Example of animation about What is Batik? (Youtube, 2016)

2.4.2 Application of Desktop-Based Batik Information System

Usage of computerized documentation of Batik in the learning cycle can be created as work area based data framework application. This project is designed the desktop-based application of Batik learning in education. This application is a data framework application that brought the understudy up in school as a source of ideas on making an

Batik designs. The result of planning this application is a work area application that can encourage students in school in learning Batik Pattern. The accessible data in this application is the source of idea of making Batik designs, the philosophical importance of Batik designs and innovative industry data of Batik design.

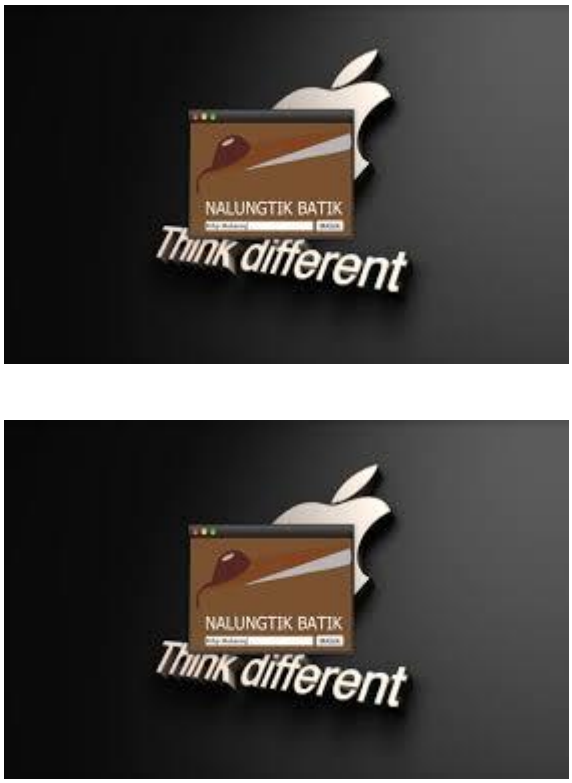


Figure 2.11: Display of login form of Batik Pattern Information System Application (Widiaty et al, 2018)

Figure 2.12: Display of information about Batik Patterns Information System Application (Widiaty et al, 2018)

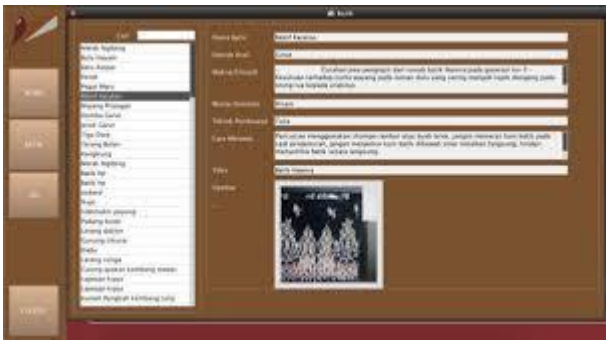


Figure 2.13: Display of batik patterns data on Batik Patterns Information System Application (Widiaty et al, 2018)

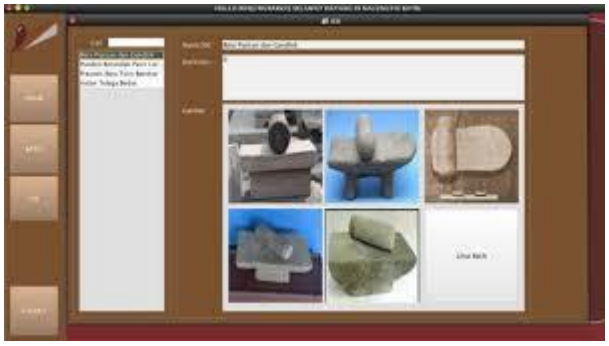


Figure 2.14: Display of source ideas data on Batik Patterns Information System Application (Widiaty et al, 2018)

2.4.3 Game-Based Learning to support Children learning the process of producing Traditional Batik

BatiKids encourages kids to learn and do the way toward creating batik in additionally interesting way and inside a brief timeframe when utilizing PCs as opposed to doing it in traditional ways. The game even offers the chance to handily alter kids' work if necessary. The game is safe for youngsters as they don't have to converge with hot wax, high temp water and fire that are utilized for genuine cycle. The methodology that is utilized in building up the game is participatory plan. The subsequent of the principal model incorporates the physical, computerized and social association into a groundbreaking encounter. It is fundamental to see how the advanced condition may influence kids'

intellectual turn of events. In this study, there are two key issues in designing for children:

1) deciding how to translate physical environments to digital space

2) translating each step of the process of making batik into what children might consider a meaningful visualization.

Figure 2.15: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

Figure 2.16: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

Figure 2.17: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

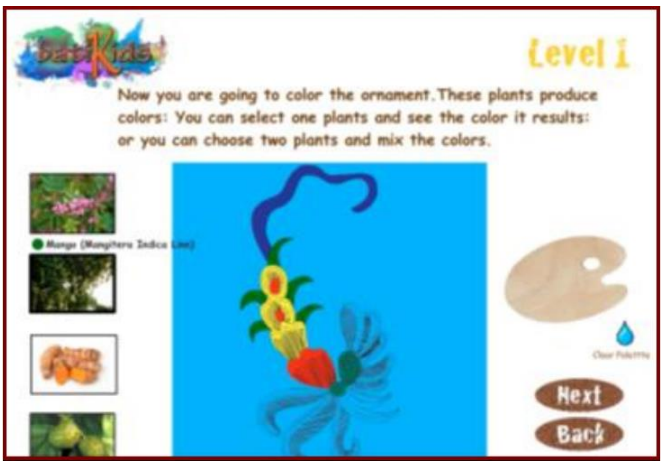


Figure 2.18: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

Figure 2.18: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

Figure 2.19: Display of interface Game-Based design of BatiKids (Hestiasari Rant, July 2016)

2.4.4 Comparison between existing system

Table 2.1 shows the three existing system which have been taken as the reference in this project. Comparison between the current system and proposed system have been made in this table.

Table 2.1 Summary and Comparison of Reviewed System and Proposed Project

Existing System	**2D Animation of What is Batik?**	**Desktop-Based Batik Information System**	**Game-Based Learning process of Traditional Batik**	**Malaysian Batik Heritage by using Augmented Reality**
Target User	All range	Student	Children aged 4-11 years	Public/Tourist

Platform	Animation	Web browser	Game	Augmented Reality
Software	Adobe after effect CC	NetBeans IDE 8.2 Version, MySQL	Adobe Animate CC	Unity, Vuforia SDK, Blender and Adobe Fuse
Language	English	English/Indonesia	English	English/Malay
Price	Free	Paid	Paid	Free
User interface	No	Yes	Yes	Yes
Ease of use	No	No	Yes	Yes
Audio	None	None	None	Background music
Feature	-Basic information about process patterns color	-Provide knowledge about the source of the idea of making Batik Patterns. -Digital documentation of local values of Batik	-Choosing the background color for the batik - Drawing the pattern by following dots on the ornament object	-Visualize process of batik with multimedia elements for interactive interface. -Display of history Batik. -Holographic content of design pattern.

			-Coloring patterns with mixed color	
Related Technology			Gaming	AR based simulation technology
Strength	Simple and easy to control	-Speedy and high storage capacity -Presentation of local content as a source of ideas of flora, fauna Batik	Helps children to learn and do the process of producing batik in a more fascinating way. -Very safe for children.	-Good graphical design -AR technology provide rapid rescue, evacuation simulation and guidance. -Very high performance
Weakness	Require internet connection	-Only compatible with desktop -Lacking decision making	Easy to lack when loading the game	

Based on Table 1, all of these application has its own strengths and weakness which can be improved by doing more research and development. However, these application has the same topic which is Batik. The platform that been used in What is Batik? is animation. It is for all range and has no interactive at all because the concept of storyline in this animation is linear. Next, Desktop-Based Batik Information System is

designed for student for learning purpose. The interact elements uses by this system is web-based where the system allows us to interact. User interact is where there will be a user-generated content that may be unfiltered by the developers. The system is available to other universities or colleges supporting distance and e-learning environment.

While BatiKids is Game-Based Learning process of Traditional Batik. It is the main purpose of this study for children aged 4-11 because children love cartoon. This game needs to be downloaded from the play store and not free. This game-based education designed by a participatory design method will help the museum provide knowledge and skills to make batiks. an application model installed in a museum setting.

2.5 Project Methodology

This project will be develop using Multimedia Production Process. The three main phases of the process of multimedia production are pre-production, production and post-production, and each phase has its own sub-phase. The analysis phase and the design phase occur during the pre-production phase, while the development and test phases consist of production phases. The three phases of postproduction consist of the trial, evaluation and publication or delivery phase. In design phase of Pre-Production stage, project requirement is identified and understand. Project requirement. The technology to be used, analysis of the existing system and lack of the current system are part of the requirements. Every multimedia element used in this project will be determined and project flow charts and storyboards created.

The next step is to build and implement the storyboard into a multimedia project. In this phase, all required hardware was set up, assets were exported to unit, coding and so on. The next phase is the pre-production phase in which the testing and assessment takes place. The main aim in the trial phase is to ensure that the product works the way it should work. During the evaluation, few users are selected by chance to test the product and to provide feedback on the presentation and efficiency of the product. The project is ready for further user release when the product passes the evaluation phase.

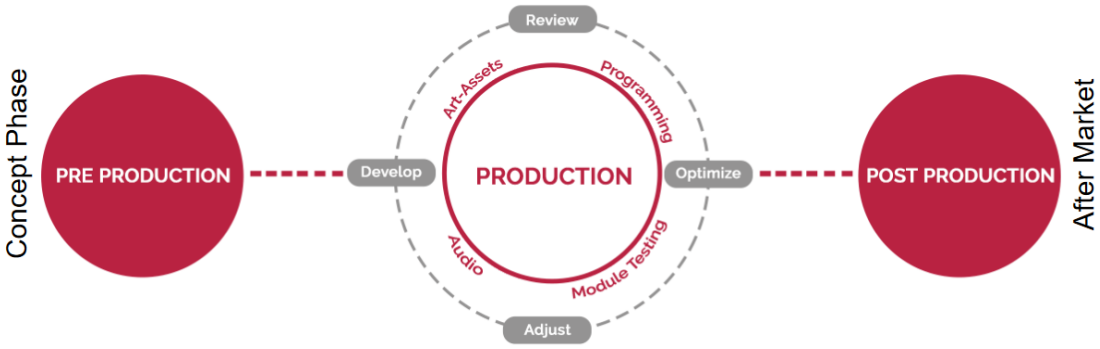


Figure 2.20: Multimedia Project Development Process (Research Gate, July 2017)

2.6 Project Requirements

The project requirements are the software and hardware needs that must be used to ensure the project's success. It provides a greats AR that need to be finish on the time by using the tools that needed.

2.6.1 Hardware Requirement

The device used in this project were LAPTOP which is DESKTOP-R8TLO26b and contains AMD A4-9120 RADEON R3, 4 COMPUTE CORE 2C+2G of processor, 64-BIT Windows 10 Operating System and 8.00 GB RAM.

2.6.2 Software Requirement

Unity, Adobe Fuse CC, Mixamo and Vuforia are the main platform of building application for this project.

2.6.2.1 Vuforia 7 Engine

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and

track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time.

2.6.2.2 Unity 2019.2.5.f1

Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop both three-dimensional and two-dimensional video games and simulations for computers, consoles, and mobile devices.

2.6.2.3 Adobe Fuse CC

Adobe Fuse CC is a 3D computer graphics software developed by Mixamo that enables users to create 3D characters. Fuse is part of Mixamo's product suite and it is aimed at video game developers, video game modders and 3D enthusiasts.

2.6.2.4 Mixamo

Mixamo is an animation 3D computer graphics technology. The technology of Mixamo uses machine learning methods to automate character animation steps, including 3D modelling and 3D animation.

2.7 Conclusion

In the conclusion, Augmented Reality has a market opportunity where it can contend in this time of modern innovation globalization. AR builds commitment and collaboration and gives a more extravagant client experience. Examination has indicated that AR expands the apparent estimation of items and brands. This part clarifies pretty much all the survey of existing frameworks and portrays the sorts of Augmented Reality in area segment. The undertaking being depict in 3 different ways of arranging stage which is pre-production, production, and post-production.

Project requirements additionally happen so as to ensure the undertaking being conduct effectively. Next segment, which is chapter 3, will address more detail on necessity examination comprising of venture prerequisite, programming necessity, and equipment prerequisite. An alternate sort of prerequisite being utilized to ensure this

application will be grown easily with no issue happen during the advancement. In Chapter 3 additionally will express the task achievement as a rule to build up this venture. How the strategy of this application will be assemble.

CHAPTER 3: ANALYSIS

3.1 Introduction

Analysis stage is the essential stage in the vast majority of existing strategy. Essentially, investigation requires an issue examination in the investigation procedures utilized, prerequisite investigation, assets and conveyance stage. This part will survey the issue and the prerequisite investigation of the task. The way toward recognizing issue is the way toward characterizing contrasts, so the cycle of critical thinking is the way toward figuring out how to lessen the distinctions.

Requirement analysis is also including functional, non-functional and other requirements. All the involve requirement which will be used in developing process will be list down with their detail usages. Hardware and software requirement play an important role in developing the system. Without identify the requirement clearly, the system will have a problem and not function properly in real environment.

3.2 Current Scenario Analysis

The current scenario of the Batik in the previous chapter is different. Batik and Songket also have the different from the domain and approach. The analysis of the current system is an important activity where to get an idea of how the current system is operating. Many of existing system for Batik using Flyers and brochure that provided

in tourism counter or hotel. They using almost all the elements to develop the flyers in 2D design.

3.2.1 Comparing Existing Augmented Reality

There are a few applications that have comparative capacity with Malaysian Batik Heritage by utilizing Augmented Reality. Nonetheless, every one of them has contrast includes that separate them. The following is the flowchart for existing framework.

3.2.1.1 2D Animation of What is Batik?

The scenario is 2D Animation What is Batik are produced for the people to learn and know about Batik. This animation can be found on Youtube. People may not knowing about animation as they only study through flyers/ in or just search anything about Batik in Internet

3.2.1.2 Desktop-Based Batik Information System

The scenario is designing this a work area application that can encourage students in school in learning Batik. The accessible data in this application is the wellspring of making Batik Patterns, the philosophical significance of Batik designs, Batik designs that has been showcased and innovative industry data of Batik.

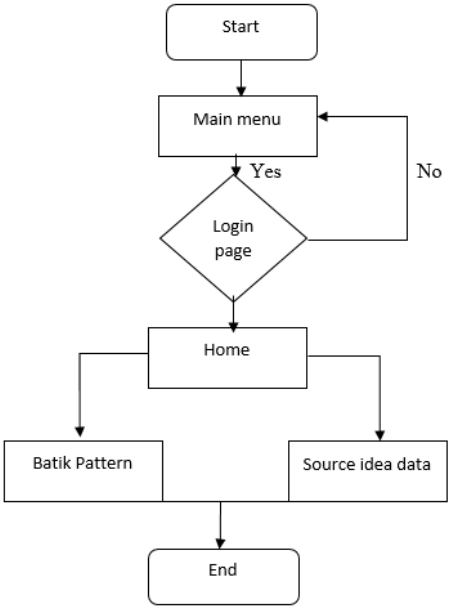


Figure 3.1: Flow Chart about the Application Web-Based Batik

3.2.1.3 Game-Based Learning process of Traditional Batik

The scenario is an intuitive game for youngsters, particularly for learning reason needs portrayal to make it more justifiable. Portrayal for BatiKids will be given as voice over that tells the history behind the examples. Then, the user will be able to choose the pattern from the template or customize their own pattern by choosing the different basic shapes and create a pattern. Besides, the user will be able to color the pattern created using the colors provided. After user is satisfied with the design, they can submit the design to preview it. If else, they can always continue to edit their design until it achieved the desired requirement.

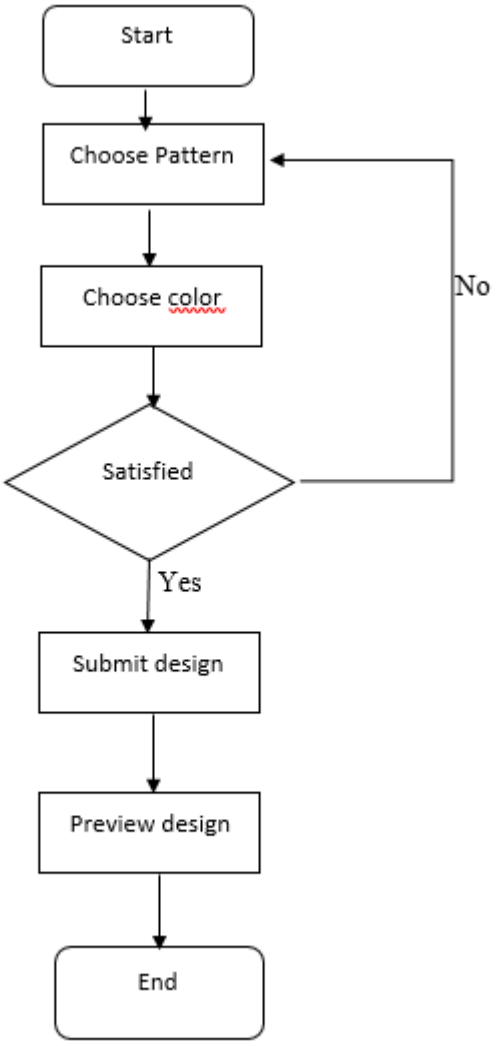


Figure 3.2: Process flow diagram of the Designing System

3.3 Requirement Analysis

Requirement analysis is the way toward characterizing the desires that led dependent on the necessities of the undertaking to be created.

3.3.1 Project Requirement

In the project requirements, the system to be developed is analyzed. It will describe the action, processes or other conditions the project needs to meet. It will analyze based on the requirement gathering and specific technique that used in this project. This project requirements will provide a clear clarification of the works that need to be done.

3.3.1.1 Requirement Gathering

Requirements gathering is presumably the most significant movement to be acted in conveying and data arrangement. There are two categories of requirement gathering which are qualitative and quantitative. Subjective evaluations utilize words or relative qualities to communicate danger, cost, and effect. A quality assessment is appropriate when there is not enough time, money and data to perform a quantitative assessment. Usually, the qualitative assessment is used in an interview. The interview will be conducted with the Manager of the company Batik. All of the project functionality, proposed interaction and the analysis of raw data and sources will be discussed in requirement gathering. The specific technique used when developed this project also be analyzed. The analysis result will be contributed to the augmented reality development.

3.3.1.1.1 Interview

This research uses ethnography method through observation, documentation and in-depth interview with the immersion process workers at batik workshop TMF Batek. This batik workshop is in Perbadanan Kemajuan Kraftangan Malaysia located at Alor Gajah, Melak.

From the interview that has been made with the Manager of the company Batik, Interviews with immersion workers, Tuan Mohd Fuad Bin Tuan Yacob and her assistant who has worked with her for about thirty years since the second generation of TMF Batek, about the process and the constraints. Tuan Mohd Fuad directly took a role in the process of coloring because in this process includes mixing batik chemical preparation which is genetic heritage, where only the offspring of TMF Batek can inherit it. The data retrieval process takes several months. In the early stages of data collection in the coloring process, the worker uses two units of modern tools and a traditional tool. However, due to ongoing research, several considerations have an impact on the changing use of the tools used to bring changes to the layout in the coloring process.

Table 3.1 Content Verification Form

Component	**Details**
Name:	Tuan Mohd Fuad Bin Tuan Yacob
Company Name:	TMF Batek
Position:	Manager of the Company
Venue:	Lot 89-102 Kawasan Perindustrian Kelemak, 78000 Alor Gajah, Melaka
Email:	tmfbatek@yahoo.com
No Tel:	012-2879315
Date	3/3/2020

3.3.2 Software Requirement

Unity, Adobe Fuse CC, Mixamo and Vuforia Engine are the principle foundation of building application for this undertaking.

3.3.2.1 Vuforia 7 Engine

Vuforia is an Augmented Reality Software Development Kit (SDK) for mobile devices that enables the creation of Augmented Reality applications. It uses Computer Vision technology to recognize and track planar images (Image Targets) and simple 3D objects, such as boxes, in real-time

3.3.2.2 Unity 2019.2.5f1

Unity is a cross-platform game engine developed by Unity Technologies, which is primarily used to develop both three-dimensional and two-dimensional video games and simulations for computers, consoles, and mobile devices.

3.3.2.3 Adobe Fuse CC

Adobe Fuse CC is a 3D computer graphics software developed by Mixamo that enables users to create 3D characters. Fuse is part of Mixamo's product suite and it is aimed at video game developers, video game modders and 3D enthusiasts.

3.3.2.4 Mixamo

Mixamo is a 3D computer graphics technology for 3D character animation. Mixamo's technologies use machine learning methods to automate the steps of the character animation process, including 3D modeling to rigging and 3D animation.

3.3.2.5 Microsoft Word 2016

Microsoft word is used to make the documentation and proposal. All the documentation part will be done in Microsoft Word. It has been used to type, edit, and makeup all the format that needs in the project documentation.

3.3.2.6 Blender

Blender is a free and open-source 3D PC illustrations programming toolset utilized for making vivified films, special visualizations, craftsmanship, 3D printed models, movement designs, intuitive 3D applications, and PC games.

3.3.3 Hardware Requirement

Hardware also is an important part in develops the application. It will be the supporting tool for the software. Hardware is chosen based on the software being used. If the hardware has the ability to support the requirement of software, it will be chosen. Hardware is important as it will be the platform and the functionality will determine the fastest to deliver the project. Below is the list of the hardware, its specification and the function.

3.3.3.1 Laptop

The device used in this project were LAPTOP MODEL ACER DESKTOP-R8TLO26b, that contains AMD A4-9120 RADEON R3 and 4 COMPUTE CORE 2C+2G of processor, 64-BIT Windows 10 Operating System and 8.00 GB RAM. It is chosen to support the software used and develop the project.

3.3.3.2 Mobile Device

The operating system for mobile device is it must be android phone that need Android 7.0 and higher and OpenGL ES 3.2 to support the augmented reality application. Besides, The mobile device that has camera function to scan and access the AR virtual object. The mobile device is used to run the application.

3.4 Project Schedule and Milestone

This section will clarify about venture timetable and achievement. Task is actualized in one semester comprising of fourteen (14) weeks. Undertaking timetable and achievement is significant and vital and must be well intend to guarantee the task accomplished its goal. Table below shows the project schedule and milestone of this project.

Table 3.2: Description of Project Schedule and Milestone

Activity Description	Duration (Working days only)	Start Date	End Date
1. Brainstorming	**7 days**	**8/1/20**	**14/1/20**
1.1 Select project title	4 days	8/1/20	11/1/20
1.2 Find the information related the title	3 days	12/1/20	14/1/20
2. Proposal	**13 days**	**15/1/20**	**27/1/20**
3. Project Preparation	**13 days**	**28/1/20**	**9/2/20**
3.1 Install the needed software	4 days	28/1/20	31/1/20
3.2 Learn how to use the software	9 days	1/2/20	9/2/20
3.1. Analysis	**14 days**	**10/2/20**	**23/2/20**
3.1.1 Describe project background	2 days	10/2/20	11/2/20
3.1.2 Identify target user	1 days	12/2/20	12/2/20
3.1.3 Identify project significance	1 days	13/2/20	13/2/20
3.1.4 Define literature review	5 days	14/2/20	18/2/20
3.1.5 Identify project methodology	2 days	21/2/20	20/2/20
3.1.6 Analysis project requirement	2 days	21/2/20	22/2/20
3.1.7 Review project plan	1 days	23/2/20	23/2/20
4. Development	**77 days**	**24/2/20**	**10/5/20**

4.1 Design 3D object	15 days	24/2/20	9/3/20
4.2 Modelling 3D object	15 days	10/3/20	24/3/20
4.3 Develop scene	15 days	10/3/20	24/3/20
4.4 Integrate object into Unity	16 days	9/4/20	23/4/20
4.5 Develop user interaction	16 days	24/4/20	10/5/20
5. Testing	**7 days**	**11/5/20**	**17/5/20**
6. Development	**7 days**	**18/5/20**	**24/5/20**
6.1 Edit scenes	4 days	18/5/20	21/5/20
6.2 Improve the interface	3 days	22/5/20	24/5/20
PSM 2			
7. Development	**28 days**	**25/2/20**	**21/6/20**
8. Implementation	**21 days**	**22/6/20**	**12/7/20**
9. Testing	**21 days**	**13/7/20**	**2/8/20**
9.1 Testing	11 days	13/7/20	23/7/20
9.2 Evaluate	5 days	24/7/20	28/7/20
9.3 Publish	5 days	29/7/20	2/8/20
10. Documentation	**14 days**	**3/8/20**	**16/8/20**
11. Final Preparation	**21 days**	**17/8/20**	**6/9/20**
11.1 Make correction of project report	16 days	17/8/20	1/9/20
11.2 Submit project report	1 days	2/9/20	2/9/20
11.3 Present final project	1 days	3/9/20	3/9/20
11.4 Finalize project report	1 days	4/9/20	4/9/20
11.5 Submit final project report	1 days	5/9/20	5/9/20

11.6 Project Complete	1 days	6/9/20	6/9/20

3.5 Conclusion

This section totals all the examination that has been done before beginning the new stage, structure the investigation and plan necessity for current and the framework that will be created is being clarified. This stage in general is performed to examine client need and necessity to address, improve and perform changes of user need. Through the requirement analysis, developer can understand what user want and what function should develop in the application. Instances, hardware and software is the requirement needed to be carried out, to improve the development experience. With the milestones and project schedule, the project can be run on time. In next chapter, the project design will be discussed with the project progression.

CHAPTER 4:

4.1 Introduction

This chapter outlines elaboration on the outcome of the review carried out in the shown. The design phase comprises of different advances with respect to the learning goals, assessment apparatuses, preparing and works out. Design phase is where the developer will design and structure the application. It is based on the concept and idea of the project. The idea, layout and design will be sketch in order for developer to get the basic layout on what to add on the project interface. The process of this design application will be elaborated more in chapter.

4.2 System Architecture

The system architecture are giving the briefly explanation for the overall application. In this Augmented Reality, there are several parts to form the system architecture. The "Malaysian Heritage Batik Augmented Reality" application is a marker-based AR application. The marker for this application is the flyer of the Malaysian Batik. User required to use the phone camera to scan the flyers, then the detection marker will render an AR Batik from the Vuforia Engine database according to the marker ID. After user are allowing the permission to access the camera, the application will process the visual rendering and load the 3D models. Then, the user are able to rotate and zoom the 3D models loaded. The act of 3D models are to perform the application content. Besides, to improve the user experience some buttons will be have in the

application. User can view and interact with the AR Malaysian Batik through the phone screen.

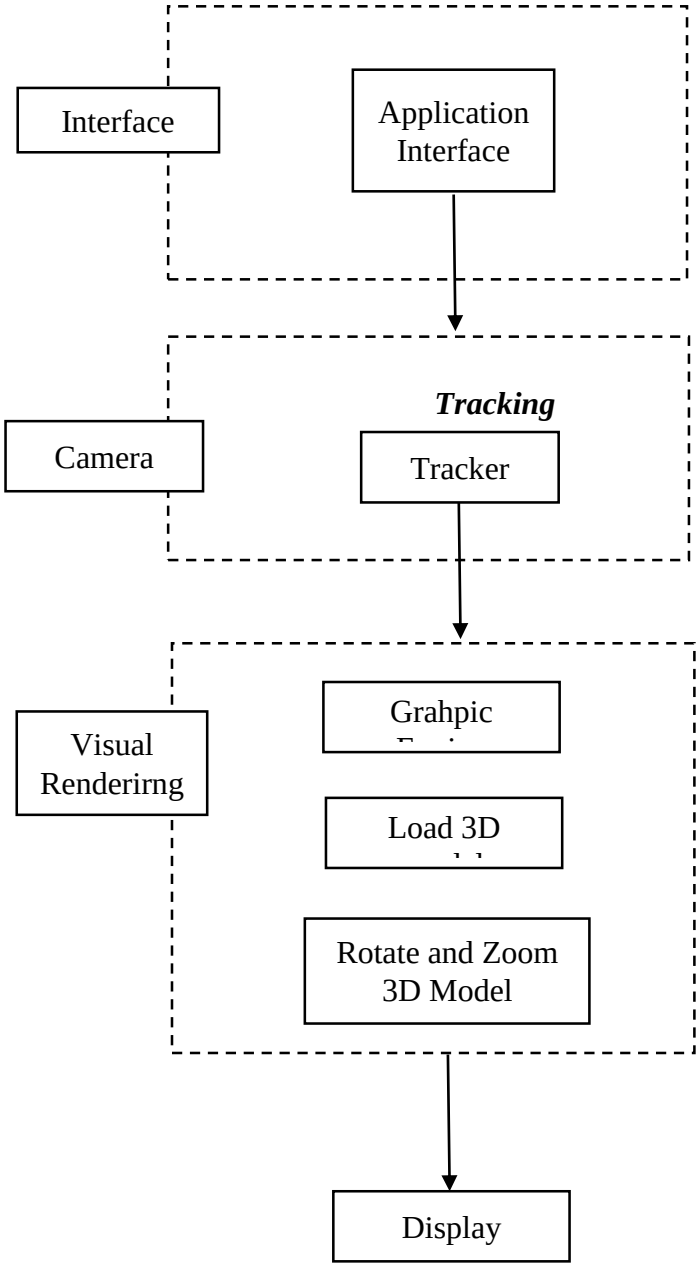


Figure 4.1: The System Architecture of Augmented Reality

4.2.1 Marker For Flyers Malaysian Batik

Figure below are the logo designed as marker for this project. The usage of the marker for this project is for able user or audience to scan the poster and experience the augmented reality technology.

Figure 4.2: Marker 1 for Flyers Malaysian Batik

Figure 4.3: Marker 1 for Flyers Malaysian Batik

4.3 Preliminary Design

The preliminary design is a high level design architectural design of the application. User interface design is one of the most important parts for developer to implement the interface design and there will explain about interactive storyboard, User interface design, navigation design, logo design and flyers design.

4.3.1 Interactive Storyboard

The interactive storyboard for this Batik application will be divided into several parts. Firstly, user are able to see the cover of the application and user are able to navigate to the main menu of this application by clicking the AR as shown in Image 1. Then, user are able to choose the module that want to view in the main menu list as seen in Image 2. This application include 4 modules which are Introduction, Process of Batik, Types of Batik and Design Motif. When the user select the module

in the main menu list, the application will navigate user to the module function menu as shown in Image 1. The user will launch the mobile application and scan the Batik Flyers. Once the marker has been tracked, the 3D model will appear in the screen. The user can select the functions such as AR by clicking the AR icon in top left of the screen to view the model in AR Marker-Based. Then, the model are able to rotate and zoom for viewing the information more clearly, user can click the back button to exit the AR scene. Labelling also available in this application for user. User can click the label icon to view the labelling of information on the model as shown in Image 3. In module which is Process Batik, there are animation and explanation of each process. This will give the user more understandable about Batik. The steps of process in the making Batik can simply divide into 7 steps which are Canting, Dyeing, Color Fixing, Soaking, Boiling, Rising and Drying. Besides, in type of Batik's module, there are 2 types of Batik which are Hand Drawn and Block painted. Lastly , this AR also have several design motif such as Flora, Fauna, Geometry and Abstract.

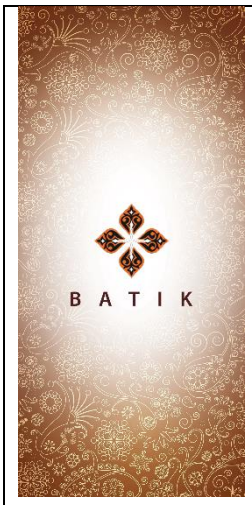
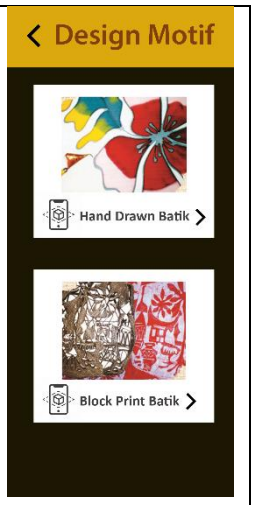
				

Image 1	Image 2	Image 3	Image 4	Image 5

Figure 4.4 Storyboard of AR Malaysian Batik

4.4 User Interface Design

User interface acts as as medium that permit the client to cooperate with the enlarged reality. It is significant on the grounds that the greater part of the great expanded the truth is depending what number of clients can see how to utilize the enlarged reality application. In this way, the way toward planning user interface must be legitimate so as to make the communication between the client and the increased reality compelling. There are three basic parts of user interface which are navigation design, logo design, flyers design and 3d model design.

4.4.1 Navigation Design

Navigation design is to create a system that users can interact easily with the system and use the system. The navigation design can help the users easier to use the system. Below are the flowchart for navigation design.

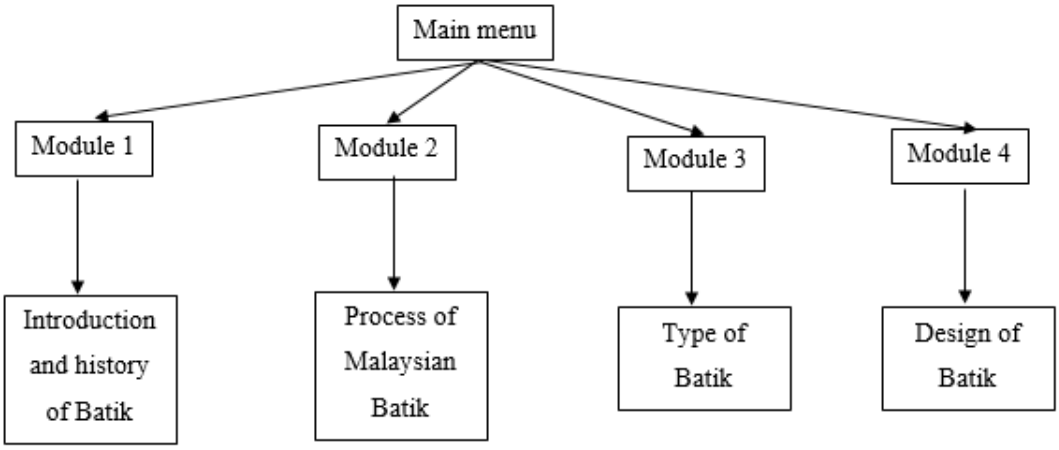


Figure 4.4 Flowchart for navigation design

4.4.2 Logo Design

The logo of this mobile application has been designed by including the pattern of Batik in Augmented Reality.

Figure 4.5 The logo for the BATIK mobile application

4.4.3 Flyers Design

In this project, the tri-fold flyers acts as the marker to the Augmented Reality BATIK mobile application. The flyers for this application has a themes which are heritage. There are some example of design Malaysian Batik shown included in each poster that related to theme.

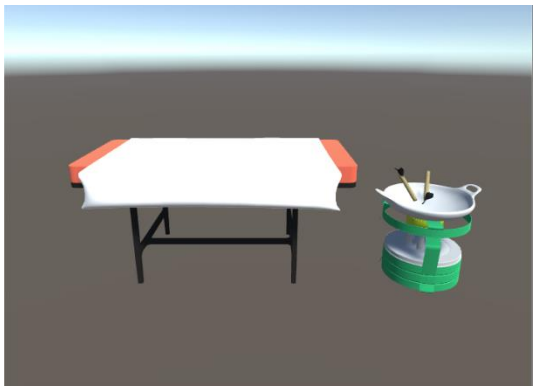
Figure 4.6 Flyers Design Page 1

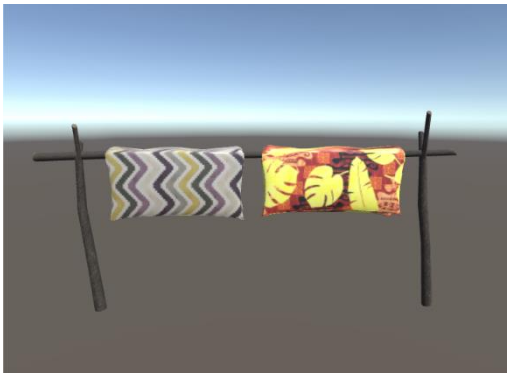
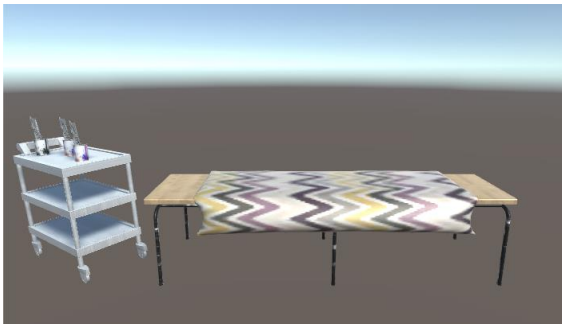
Figure 4.7 Flyers Design Page 2

4.4.4 Three-Dimensional Model Design

The 3D model is specifically designed for each process in making Batik. The purpose is to let user understand and visualize the tools that are used in each of process. For example, people only watch the process of Batik on YouTube but they cannot visualize and tools.

Table 4.1 3D Modelling Design

Object	3D Model
Character	
Canting Process	
Stir & Pot (Boiling process)	

Cloth Hanger (Drying Process)	
Table and Cart (Dying Process)	

4.4.5 Metaphor

The design for this application is based on the illustrate image. The design of this application has only one theme. The theme chosen was a heritage of Malaysian batik history.

4.4.6 Template Design

There is no specific template for this application interface. The design was created by following them that have been decided. In addition, the templates for this poster were created by developer alone.

4.5 Conclusion

Design phase is important for developer because in this phase the developer will get the idea to design the application. After that, the next phase will follow the sketch on the storyboard to develop the application. As for user interface design, the navigation

design help user to keep track the flow of the system. Lastly, the design of the system will come out from this phase. Next chapter will cover phase of implementation that involves the process and activities of implementation and the progress of the project.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

In this execution stage, the way toward actualizing and making the sight and sound components into this Augmented Reality will be intricate. All the cycle related with media creation will be talked about in this section. The media creation includes the creation of realistic, video, liveliness and cooperation. In this stage likewise discloses about the cycle to make all the media creation recorded previously. The reconciliation of all media components at that point will be applied to the Augmented Reality. In this section, the rendition control technique and the earth arrangement additionally will be examined. The point is with respect to the insight concerning module, the adaptation of the item well as the way toward actualizing this undertaking. There is some control to be taken while doing the item setup the board

5.2 Media Creation

Media creation refers to the formation of substance in any field of correspondence, diversion or data. (Amir Manzoor) Media creation will experience in insight concerning the age of substance, text, animation and realistic, games, sound and video segments. The entirety of the cycle will be accounted for whatever procedure and technique that the parts expected to experience could be recorded even more conclusively and clearly. The entirety of the part will be collect to create the last utilitarian item.

5.2.1 Production of Text

Text is one of the significant interactive media component in creating this undertaking. Text is being use to convey data to the crowd with the goal that crowd recognize what is this undertaking about. Text is the significant medium to convey the substance for depiction, guidance and subtleties. The word and sentences use in this venture is clear and direct with the goal that the crowd will see better.

The entirety of the content utilized in this venture is utilizing san serif text style. San serif is utilized in light of the letters is all the more simple to peruse and reasonable for everybody and it is significant for crowd to see each word in this task. San serif text style likewise have most keen differentiation better than serif text style family and it will deliver the best outcome in PC or cell phone screens. There are 3 distinctive kind of san serif text style that being utilized in this undertaking, is Century Gothic, Gotham Rounded and Futura Heavy.

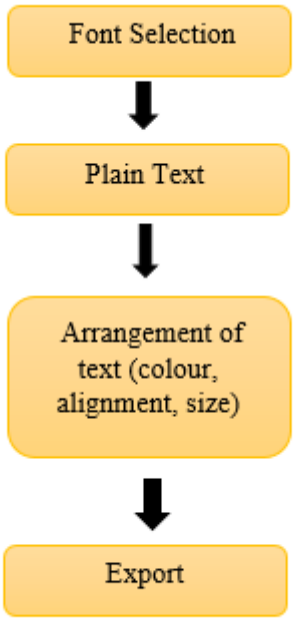


Figure 5.1 The process of the Elements

5.2.2 Production of Graphic

Graphic are the visual picture or configuration produces for this venture. It is imperative to make this undertaking additionally engaging and fascinating. The graphic component is delivered for the guidance application, picture target flyers and the vector resource for movement of the substance. The shading, textual style and realistic utilized will be modify and alter in Adobe Illustrator and Adobe Photoshop. This task is actualized 2D realistic in the entire venture which is made utilizing Adobe Illustrator. The primary cycle is the advancement of thought of the idea and structure for all the reasons include, that is instructional board, target banner and increased reality content. Innovative work sketch has been done to guarantee the structure of this venture is engaging and reasonable. After conclude the advancement sketch, the sketch will be follow again in Adobe Illustrator in vector base arrangement for digitalize the structure and not many modification and altering is being done in Adobe Illustrator to finish the plan. Subsequent to altering measure is done, the structure will be trade as indicated by their motivations either for printing reason or activity vector resource. Figure 5.2 and 5.3 below shows the process of graphic production.

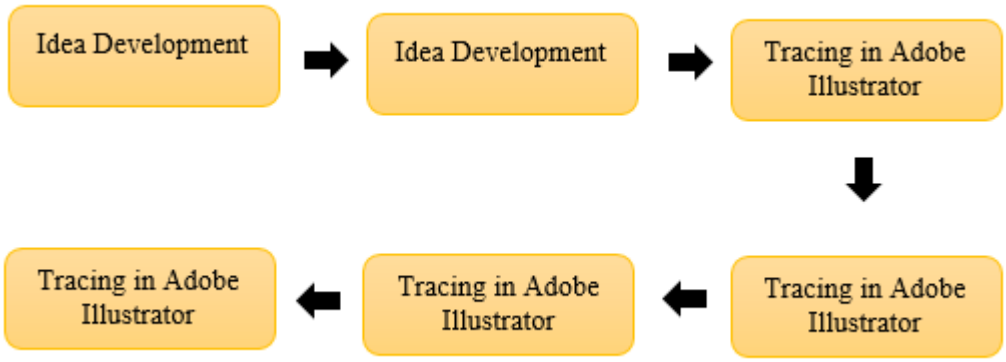


Figure 5.2 Production of Graphic for Flyers

Figure 5.3 Production of Graphic for Vector Asset

5.2.3 Production of Animation

The use of animation is purpose to attract audience and make the information deliverables to the audience. The utilization of animation movement is reason to pull in people and make the information output to the audience. A good use of animation is that it can effectively integrate the audience and make complicated responses simpler information. Besides that, it can make messages deliverables more memorable. The production of animation of this project is using Unity and Blender. The idea development and storyboard is the first thing to do. After sketching the storyboard, the asset will be design in Blender in vector base format. Then, all the vector asset is ready to be export into Unity for animation process.

All of the animation is creates in Unity and Blender. After all vector base asset has been imported into Unity library, the vector asset can be animate using timeline and key frame to create the illusion of moving and rotating. Figure 5.4 below shows the process of creating animation.

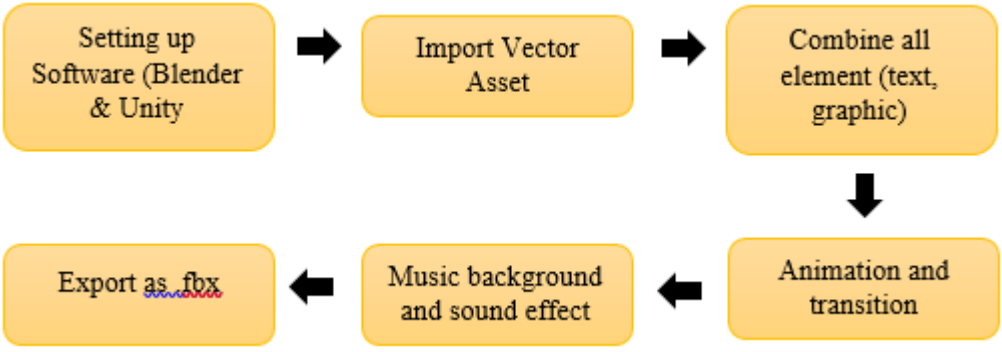


Figure 5.4 Production of Animation

5.3 Media Integration

All of the Augmented Reality content element is integrated is Unity and Vuforia Engine. 3D modelling is being imported and setup in Unity before it's ready to be publish. The image of target flyers being imported into Vuforia for setup purpose. All target flyers uses the same setup in Unity. After all the process finish, this application will be export into .apk file to be install into smart phone. Therefore, user can run and use it.

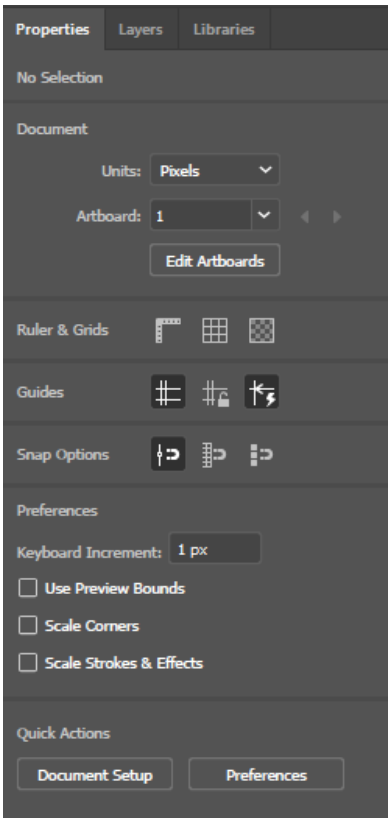
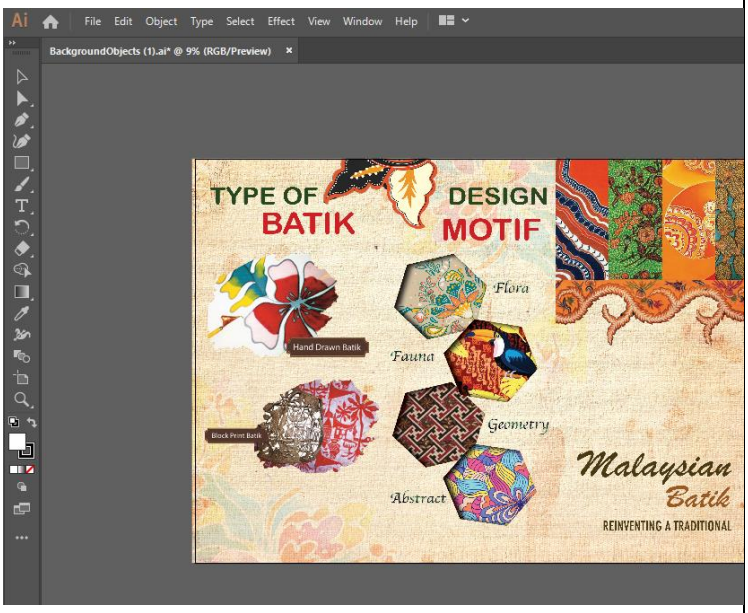
5.4 Product configuration management

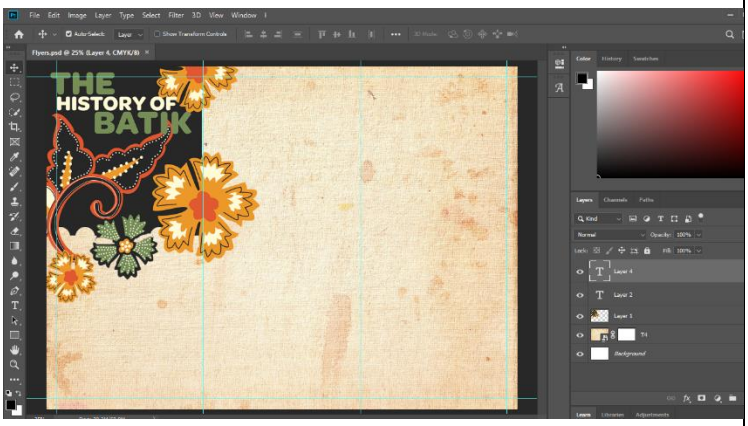
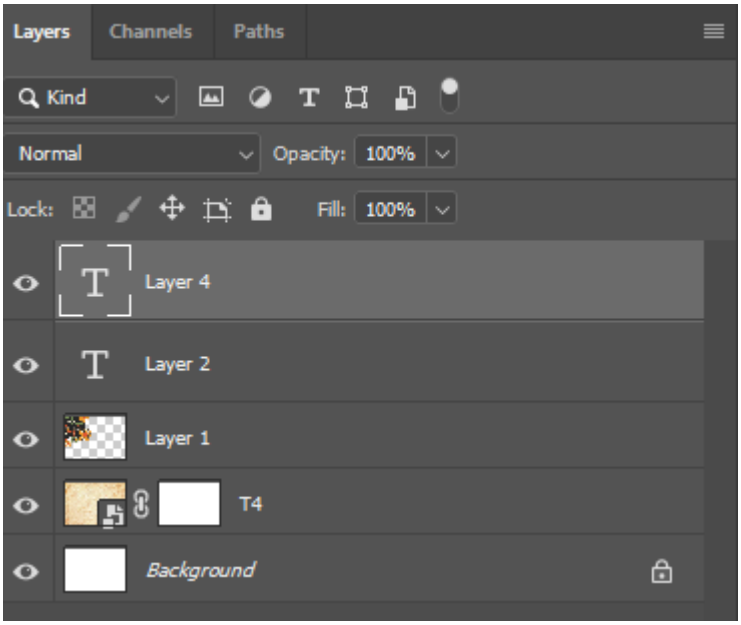
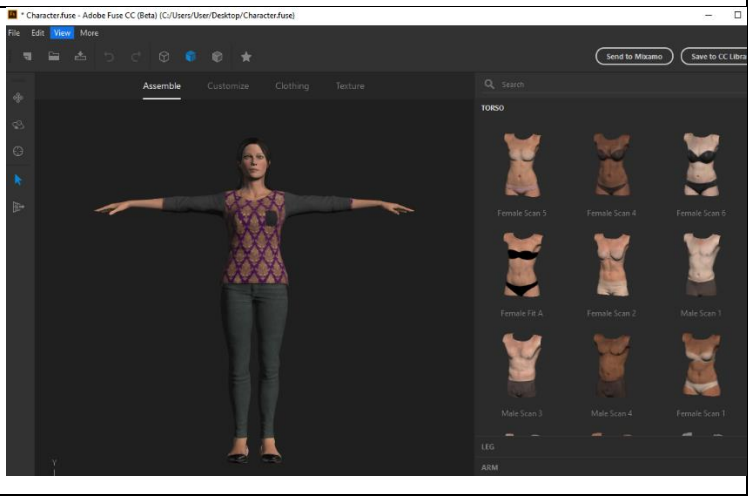
Product configuration management is where the whole setup should have been done to the item to accomplish wanted result. It likewise included adaptation control and clarification about design condition arrangement.

5.4.1 Configuration environment Setup

Configuration environment setup clarifies about the setting required in software used to make and create the substance. So, as to build up an Augmented Reality content, several software for example, Adobe Illustrator, Adobe Photoshop, Adobe Fuse, Unity and Vuforia Engine to build up all the substance includes in this undertaking. A few design should be get ready before start any develop and undertaking. This arrangement is imperative to guarantee the result true to form and work appropriately. Tables 5.1 shows the setup configuration of this project.

Table 5.1 Environment Setup

Application Software	Setting
Adobe Illustrator	 **Properties Setting**  **Designing Logo**

Adobe Photoshop	 **Designing Flyers**  **Layers Setting**
Adobe Fuse	

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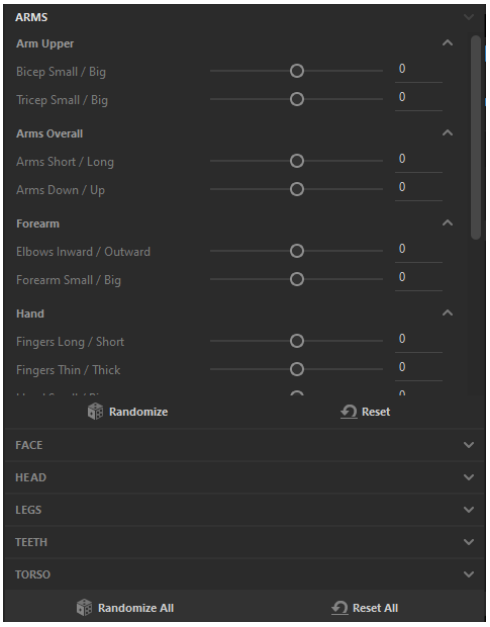
Modelling Character



Customize setting

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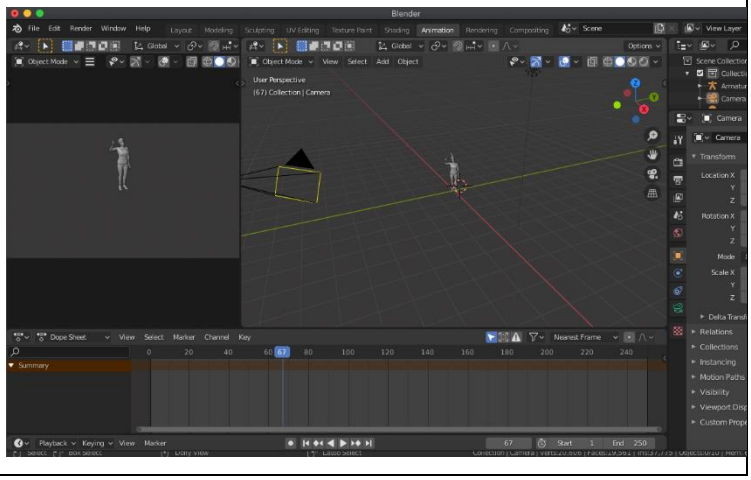
Character Modelling



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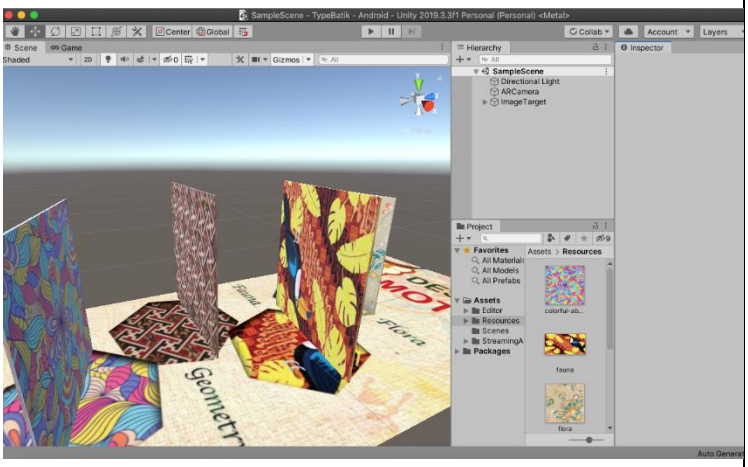
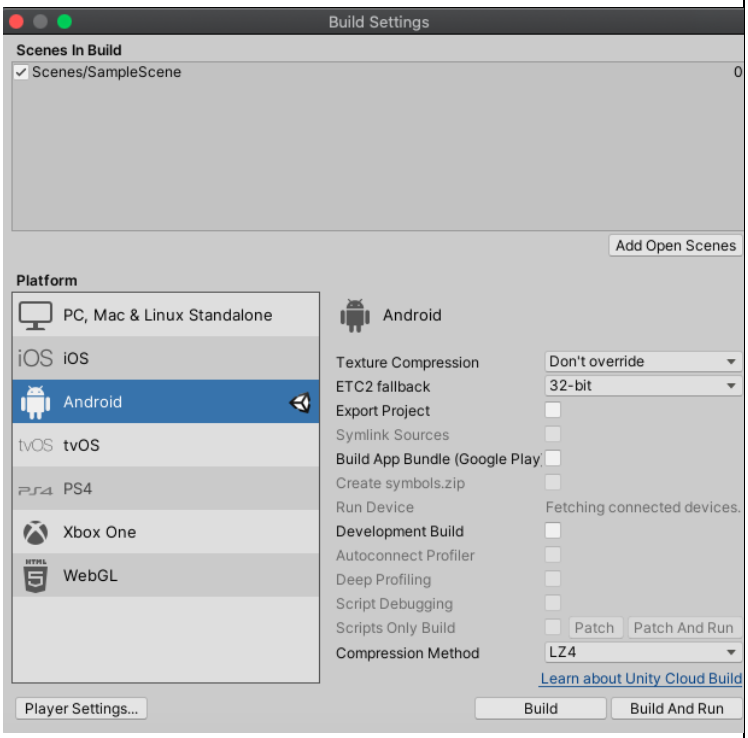
	Animation Setting
Unity	 **Sample Scene**  **Build Settings**

5.4.2 Version Control Procedure

During implementation phase, requirement needs is one of the factor that contribute to the changes that has been made in this project. The changes are made depends on the feedback from project supervisor. Table 5.2 and 5.3 shows version control procedure.

Table 5.2 Version Control Procedure

Version	Module	Modification
Ver1	Target Flyers	Add the number of the Flyers
Ver1.1	Target Flyers	Change the colour of the Flyers
Ver1.2	Target Flyers	Change the concept design of the Flyers (Heritage concept)
Ver1.3	Target Flyers	Change the concept design of the Flyers
Ver2	Motion Graphic	Improvement of animation and content of the motion graphic
Ver3	Target Flyers	Change the colour of the existing Flyers
Ver3.1	Final Touch Up	Improve augmented reality interaction

5.5 Implementation Process Status

Implementation process status is use to show the development progress from time to time. This progress need to be record to now the version and the details of progress that been made. Table 5.4 shows implementation status for this project.

Table 5.4 Status of component implementation

Component/Module	Description	Status
Module 1 (Research and Explore	Gathering information related with this project include the media elements to be applied	Completed
Module 2 (Create Development Plan)	Sketching the design concept and storyboard as a guideline	Completed
Module 3 (Design content)	Process of designing all media elements in the project.	Completed
Module 4 (Development of multimedia element)	Combination of all multimedia element such as text, graphic, interaction, sound and animations.	Completed
Module 5 (Implementation of Augmented Reality)	Process of combining essential elements to produce the end product.	Completed

5.6 Conclusion

In this section has been spread in insights regarding the media component that utilizations to create the finished result during the execution stage. It additionally secured the usage progress on the most proficient method to coordinate the last yield and status of every module dependent on Gantt Chart. It clarifies about the creation

of text, creation of animation, creation of video, creation of graphics, media integration, configuration management and implementation status. The following section is where all the testing will be made. There are a few necessities in the following section for cases framework testing, item quality, example target clients, maker, and partner and colleagues. In light of the outcome, it will decide the improvement required later on.

CHAPTER 6: TESTING

6.1 Introduction

Testing is another stage that must be done after implementation stage is finished. Testing stage will clarify about testing and assessing the output of this project finishing all the cycle and process being developed stage. It is critical to run this testing and assessment so the genuine information can be measure and contrast with guarantee it can meet the target expressed in chapter 1. Before the venture can be appropriated, all the functionalities of this undertaking must be test with the goal that it can run easily true to form. The purpose of the testing phase is to find out whether the project objective is achieved or not. In this chapter also cover the test user, test schedule, and test strategy to gather real data and analyzed the result. It is to determine the success of this project depend on the project's objectives.

There are three types of user that need to be done, there are multimedia expert, target user and subject matter expert. Three different kind of user will test both different testing. Multimedia expertise will test the functionality meanwhile user acceptance testing will be test by the target user of this project. In addition, for subject matter expert will focus on content and information of the product.

In this current period of technologies and innovation, an Augmented reality platform need to be align with the progress of technologies development. The use of advanced technologies handheld devices such as smartphone need to be fully utilize because new technologies can be an attraction to a Batik promotion strategy.

6.2 Test Plan

Test plan comprises of three section which are test user, test schedule and test strategy. The entirety of the test plan in this testing stage will be quickly clarifying in the entirety of this part. This is a plan to set up the beginning phase of testing stage. The test plan is basic since it will cover the significant issue in testing to guarantee its persuading to accomplish this current task's target. The proper test should be decided by the developer and designer with the goal that it can bring off for the objective user. All of item testing range, what project will be test, time testing, and all the individuals who will test the project will be recorded and archived in test plan. It is vital and critical to guarantee the undertaking stream is on target follow as needs be as plan without bugs.

To find a deficiency in a product, test plan need to be prepare as a plan to examine and test the product before it in full operation. The product need to be fully function to full capacity, smoothly, effectively and efficiently during the testing before it can be a fully operation product. Therefore, all detail about the testing module, testing aspect that need to be consider, who will perform the test and the duration of the testing will be clearly stated in test plan to ensure the effectiveness in the testing phase.

The entirety of the significant angle for the testing will be distinguish, for example, the test environment and platform for testing so the testing can run admirably. Test strategy will be the rules so as to complete the testing easily. A selection of user to test the project is significant on the grounds that their criticism will be entirely important data to improvise and update the project.

6.2.1 Test User

Test user will depict about the number of participant includes in the testing which is the tester of this undertaking. For this The Development Malaysian Batik Heritage By Using Augmented Reality, the testing stage include three distinct gatherings of user that will be run the test which is the multimedia expert, subject matter expert and the actual target user.

6.2.1.1 Multimedia Expert

Multimedia expert is the person who skilled and expert in the multimedia and IT field. For testing, 5 persons will test of the project. It is because the application need to run before it can be deliver to user. This test is conducted in the end of development process and before release the product. They will test the application focused on the usability such as the interface, interactivity, design, integration of multimedia elements and content arrangements in the project.

6.2.1.2 Public

This category will involve a person in both gender, male and female. This public people is the main target user for this project. They will be 30 respondent randomly choosing and will individually test the product. They have tested based on their acceptance and understanding of the project. It is performing to obtain a feedback from the real user to reduces product failure risk and increase the quality of the real product. It is the final test before the real product is release to the end user. The aim user acceptance testing is to test the understanding and effectiveness of this application from the target user of this project. The respondents need test the application and require to answer the questionnaire focused on the effectiveness of the project and its content.

6.2.1.3 Subject Matter Expert

An individual that has a profound comprehension of a Batik topic and can help improve product or address specialized difficulty. Batik owner was picked to go through the test. He will independently test the project and give an input about the application. For AR Batik, this testing is being held by Batik owner to see whether the information or content in the application is tally with the facts of the Batik.

Table 6.1 Test User for testing

Testing	**Multimedia Expert**	**Target user**	**Subject Matter Expert**
Profession	A) **Position** : Graphic Designer **Company** : Asia Mex Concepts SDN BHD **No of respondent**: 2 respondents B) **Position** : Graphic Designer **Company** : NexaSoft SDN BHD **No of respondent**: 1 respondents C) **Position** : Animator **Company** : mCube **No of respondent:** 1 respondent D) **Position** : Lecturer	Public	A) **Name**: Tuan Mohd Fuad **Position** : Founder **Company** : TMF Batik B) **Name**: Maharum **Position** : Assistant **Company** : TMF Batik

	University : Universiti Malaysia Perlis (UniMAP) **No of respondent:** 1 respondent		
General information	Working experience from below 1 year – 6 years and above	Age from 18 and below years old and 30 and above years old	Working experience from below 1 year – 6 years and above
No of respondent	5 respondent	30 respondent	2 respondent

6.2.2 Test Schedule

Running test among tester is difficult if there is no time management for the testing. User test on the functionality of the application will be done after a demonstration on the usage of AR Batik mobile application that has been proposed to the experts. The test environment will be conducted through online following the standard operating procedure stated by the government. The user will be given the .apk file of the AR Batik to perform testing and give evaluation through questionnaire using the Google form provided as a record of the test result. The software and hardware required throughout all testing is an Android smartphone with Android 4.4 KitKat or above and also with FHD 1080p display and a camera. The smartphone is for the installation of AR Batik application.

Table 6.2 Test schedule for testing

Tester	Number of Tester	Testing Date	Testing Venue	Platform (Online)
Multimedia Expert	5 people	21/08/2020-28/08/2020	Anywhere	Google form
Public	20 respondents	21/08/2020-28/08/2020	Anywhere	Google form
Subject Matter Expert	2 respondents	21/08/2020-28/08/2020	Anywhere	Google form

6.2.3 Test Strategy

So as to accomplish undertaking's goals, it is essential to set up the correct test strategy. Test strategy will cover on how the testing will be run and direct and what sort of testing will be lead contingent upon the item itself. There are three sorts of test that is multimedia expert, subject matter expert and target user that occur in different level of process. The testing have the particular aim and to guarantee it meet the objectives, the test strategy should be well arrangement. Every tester will be appointed to specific type of test. There are five scoring levels on their perspective on this question going from one to five which from strongly disagreeing to strongly agreeing. Table 6.3 showed the scoring details in the questionnaire.

Table 6.3 Scoring details for User Testing

1	2	3	4	5
STRONGLY DISAGREE/ *SANGAT TIDAK SETUJU*	**DISAGREE/** *SETUJU*	**MODERATE/** *SEDERHANA SETUJU*	**AGREE/** *SETUJU*	**STRONGLY AGREE/** *SANGAT SETUJU*

6.3 Test Implementation

Test implementation is the way toward creating and organizing test system, making test information and alternatively getting ready test hardness and composing automated test contents.

Test implementation will describe on how the testing will be implemented to specific target user during the testing phase. The related part between test description and test data is conduct based on test strategy. Throughout test implementation, the designer need to guarantee that all the essentials are handle before beginning the testing session relies upon the test reason so the developer ready to gather the normal outcome from the testing.

6.3.1 Test Description

For testing, survey have been disseminated to the specific target user during the testing meeting. There are 20 complete respondents which is haphazardly pick and energetically to partake in the testing phase. All respondent will do the testing independently after the developer give a concise clarification to them about the project. They have to try out all the objective flyers accessible. At that point, everything respondent require to answer a poll given by the developer to them. The questionnaire are provided in Appendix C.

6.3.2 Test Data

The evaluation will be recorded once the testing session is completed. All the test result is documented to be evaluate. Both functionality testing and user acceptance testing purposes is to determine whether this project meets its objective stated in the first chapter. All the test result is gathered and analyzed. Average ranking has been analyzed to spot the average ranking of each question. Each question has different level of satisfaction based on the question.

Table 6.7 Test data for user testing

No	Tester	Number of respondent
1	Multimedia Expert	5 people
2	Public	30 people
3	Subject Matter Expert	2 people

Table 6.8 Results of Functionality Testing for multimedia expert

No		Strongly disagree	Disagree	Moderate	Agree	Strongly Agree
	A. Learnability					
1.	The information provided in flyers are not too complex.					**5**
2.	The content of the Augmented Reality is easy to understand.				**2**	**3**
3.	The instructions stated in the application are clear to guide the user to use the application.				**1**	**4**
	B. Effectiveness					
1.	Integration of multimedia elements in the content helps user to receive the information effectively.					**5**
2.	The content arrangements make the delivery of information more effective.				**1**	**4**
3.	The information able to give an impact to the user.					**5**
	C. Ease of use					
1.	This application is easy to use.				**1**	**5**
2.	User can use this Augmented Reality anywhere they want.				**2**	**3**
3.	Readability of text is clear and easy to understand.				**1**	**4**
	D. Flexibility					
1.	The sensitivity of the flyers is good and accurate.					**5**
2.	This application don't have "hang" issue.					**5**
3.	The content of the Augmented Reality for the user to gain knowledge about Malaysian Batik Heritage is appropriate.				**1**	**4**
	E. Accessibility					
1.	The interface design in this application is appropriate and attractive.				**1**	**4**
2.	The colors used in this application is appropriate and attractive.					**5**
3.	The font and graphic used in this application is attractive, easy to read and understand.				**2**	**3**

Table 6.9 Result of User Acceptance Testing for target user

A) Usability of the project

No	Question	Strongly disagree	Disagree	Moderate	Agree	Strongly Agree
1	Does the instructions stated in the application are clear to guide the user to use the application? *Adakah arahan yang dinyatakan dalam aplikasi jelas untuk membimbing pengguna menggunakan aplikasi tersebut?*			2	4	24
2	Do the colour use in this application is suitable? *Adakah warna yang digunakan dalam aplikasi ini sesuai?*			1	9	20
3	Are the music and sound use in the augmented reality content is suitable? *Adakah muzik dan bunyi yang digunakan di dalam kandungan 'augmented reality' sesuai?*			1	6	23
4	Do the image and graphic use in this application helps you to understand better about this application? *Adakah gambar dan grafik yang digunakan membantu anda memahami aplikasi ini dengan lebih baik?*				11	19
5	Does the size and font of text use in this application is suitable? *Adakah saiz dan tulisan teks yang digunakan dalam aplikasi ini sesuai?*			2	12	16

B) Effectiveness of the content

No	Question	1	2	3	4	5
1	Do you understand what is this application about? *Adakah anda faham tentang aplikasi ini?*			2	13	15
2	Do you understand every content showed in this application? *Adakah anda faham tentang setiap kandungan di dalam aplikasi ini?*			2	4	16
3	Does this application give you any new knowledge about Batik or detail that you didn't know before? *Adakah projek ini memberikan and ilmu baru atau sesuatu yang and tidak tahu sebelum ini?*			2	13	15
4	In your opinion, do you think this method (augmented reality) is more effective to use in a campaign better that old method (eg: poster, risalah, billboard, etc)? *Pada pendapat anda, adakah anda rasa kaedah ini (augmented reality) lebih berkesan daripada kaedah lama (cth: poster, brochure, papan iklan, dll)?*				13	18
5	This augmented reality Malaysian Batik Heritage application can helping in visualizing the process of making Batik? *Aplikasi augmented reality Warisan Malaysian Batik Heritage ini dapat membantu dalam menggambarkan proses pembuatan Batik?*			1	14	15

C) Usability of product

No	Question	Strongly disagree	Disagree	Moderate	Agree	Strongly Agree
1	I would be more interested in Batik after using this application. *Saya akan lebih berminat dengan Batik setelah menggunakan aplikasi ini.*			**2**	**10**	**18**
2	I think that the incorporation of Batik design into Augmented Reality would encourage more interest in it. *Saya berpendapat bahawa penggabungan reka bentuk Batik ke dalam Augmented Reality akan mendorong minat yang lebih tinggi terhadapnya.*			**3**	**13**	**14**
3	I would be more interested in the handmade creation of aesthetic Batik products. *Saya akan lebih berminat dengan pembuatan produk Batik estetik buatan tangan.*			**5**	**8**	**17**
4	I would be more interested in exhibitions that showcase Batik. *Saya lebih berminat dengan pameran yang mempamerkan Batik.*			**4**	**11**	**15**
5	I would be more interested if more videos (eg. Commercial, music videos, etc) involving Batik are made and broadcast to most TV and online channels. *Saya akan lebih berminat sekiranya lebih banyak video (seperti iklan, video muzik, dll) yang melibatkan Batik dibuat dan disiarkan ke kebanyakan saluran TV dan dalam talian.*			**3**	**14**	**13**

Table 6.10 Results of Content Testing for Subject Matter Expert

A) The Content

No	Question	Yes	No	Others
1	Does the instructions stated in the application are clear to guide the user to use the application? *Adakah arahan yang dinyatakan dalam aplikasi jelas untuk membimbing pengguna menggunakan aplikasi tersebut?*	2		
2	This Augmented Reality tells about Malaysian Batik? *Augmented Reality ini menceritakan tentang Batik Malaysia?*	2		
3	Malaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and Pahang *Malaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and Pahang.*	2		
4	Does the arrangement of process batik are arrange correctly? *Adakah susunan batik proses disusun dengan betul?*	2		
5	Does the multimedia element(video) is helpful to understand the process of making Batik? *Adakah elemen multimedia (video) berguna untuk memahami proses pembuatan Batik?*	2		
6	Does the multimedia element(3D model) helpful to understand the function of each object in Batik Tools? *Adakah elemen multimedia (model 3D) dapat membantu memahami fungsi setiap objek dalam alatan Batik?*	2		
7	There are 2 types of Batik in Malaysia which are Hand Drawn and Block Painted *Terdapat 2 jenis batik di Malaysia iaitu "Hand Drawn" dan "Block Painted"*	2		
8	There are 4 types of design motif in Malaysia such as Flora, Fauna, Geometry and Abstract *Terdapat 4 jenis motif reka bentuk di Malaysia seperti Flora, Fauna, Geometri dan Abstrak*	2		

B) The Effectiveness

No	Question	Strongly disagree	Disagree	Moderate	Agree	Strongly Agree
1	This Batik Augmented Reality application is convenient to use. *Aplikasi Batik Augmented Reality ini senang digunakan.*					2
2	This Batik Augmented Reality application able to attract your attention. *Aplikasi Batik Augmented Reality ini dapat menarik perhatian anda.*					2
3	Using an Augmented Reality is more convenient compared to a personal computer for learning. *Menggunakan Augmented Reality lebih senang dibandingkan dengan komputer peribadi untuk belajar.*					2
4	The Augmented Reality is effective in learning basic Malaysian Batik on a mobile device anywhere and at any time. *Augmented Reality berkesan dalam mempelajari Batik Malaysia asas pada peranti mudah alih di mana sahaja dan pada bila-bila masa.*					2
5.	The integration of all learning content with augmented reality technology is more effective than the current teaching method. *Penyatuan semua kandungan pembelajaran dengan teknologi augmented reality lebih berkesan daripada kaedah pengajaran semasa.*					2

6.3.3 Test result and analysis

In this analysis, diagrams and chart will be shows dependent on the outcome acquired from the overview and testing measure. This is the examination diagram of the assessment testing that have been perform. From the information got from the testing result, a few chart have been develop to sum up the consequence of the assessment.

6.4.3.1 Multimedia Expert

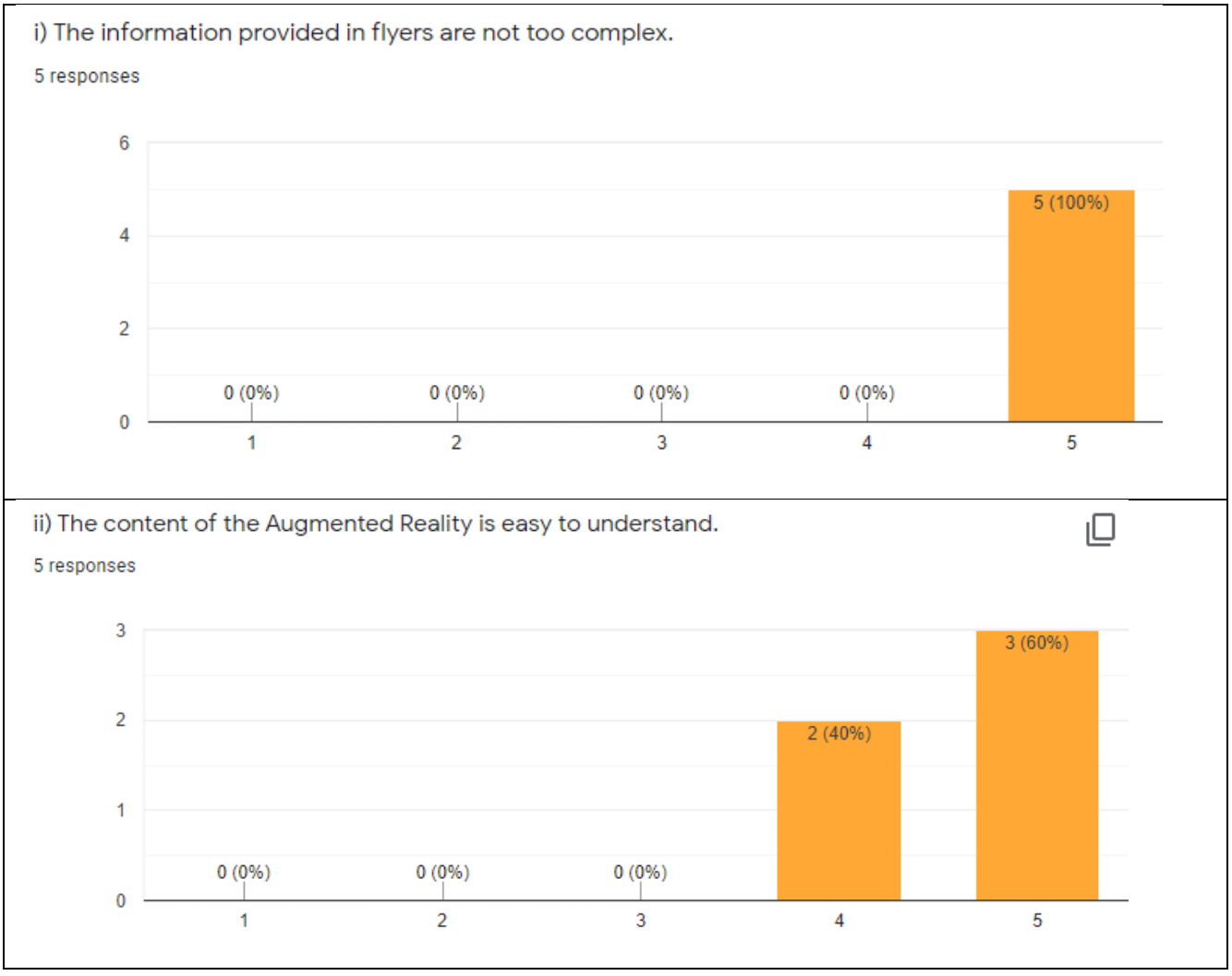
5 respondents consist of multimedia expert which is lecturer, animator and graphic designer have been involve in testing. Questionnaire has been appropriating after they test the product to see the usefulness and functionality of the application. The multimedia expert are asked to evaluate the effectiveness of the multimedia elements in the mobile app which is content,

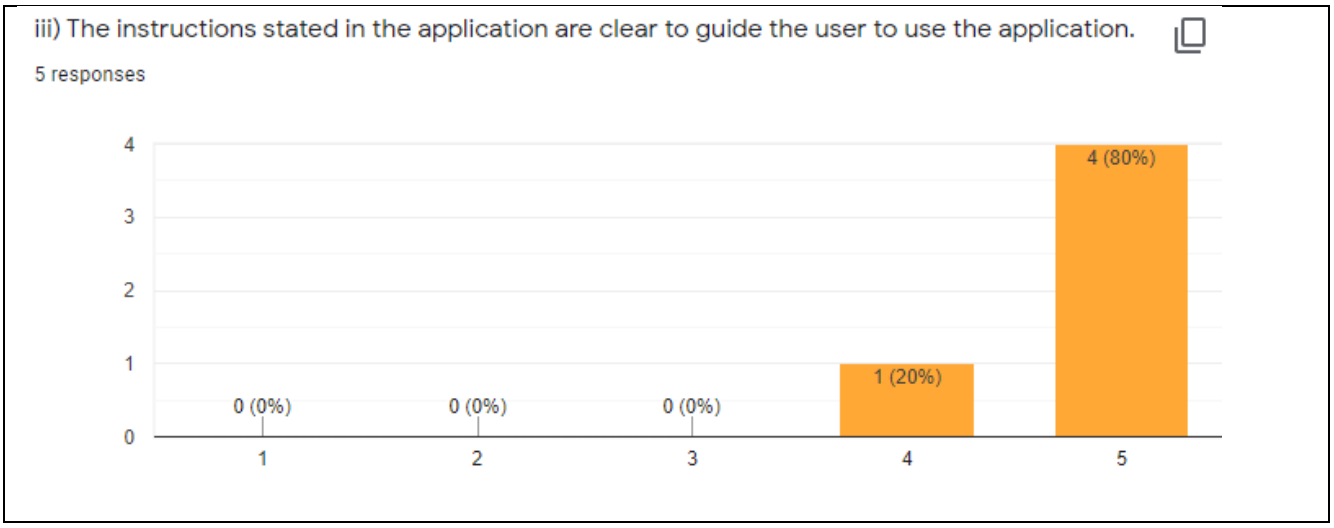
audio, video, and interface design as well as the product as overall. The data that has been collected will be analyze and compile into graph.

6.4.3.1.1 Learnability

Chart beneath shows the outcomes for question 1, question 2 and question 3. The outcomes acquired shows that multimedia expert strongly agree that the level of learnability of this application is very good. The question is focused on the information in flyers, guideline and content in the AR application.

Table 6.11 Graph of learnability for multimedia expert

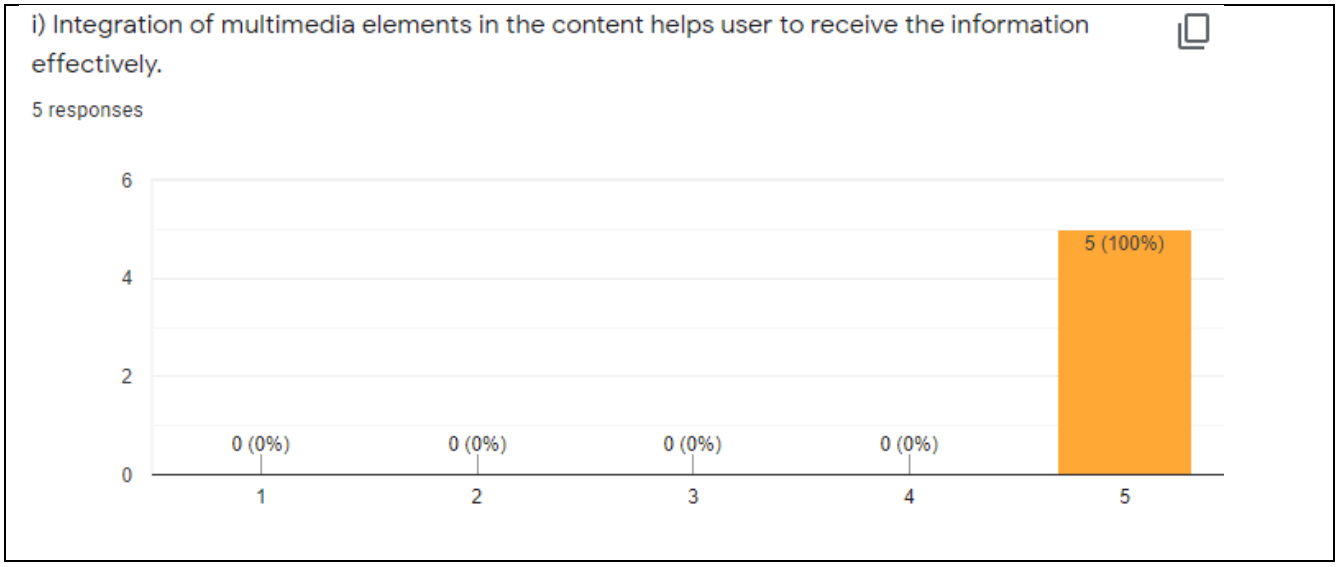


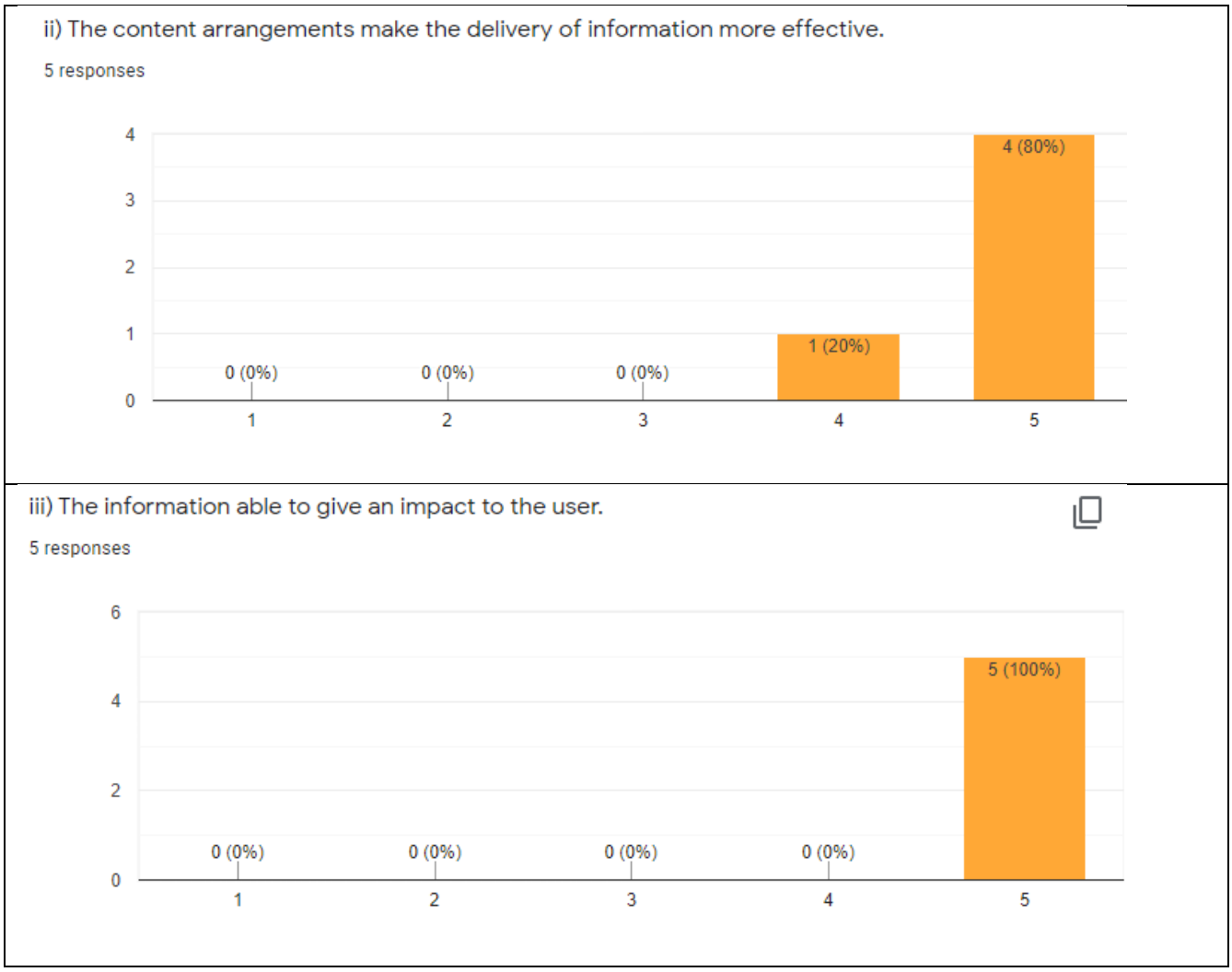


6.4.3.1.2 Effectiveness

Chart beneath shows the outcomes for question 4, question 5 and question 6. The outcomes acquired shows that multimedia expert agree that the level of effectiveness of this application is efficient. The question is concentrate of media components in conveying the substance and effect on the user.

Table 6.12 Graph of effectiveness for multimedia expert

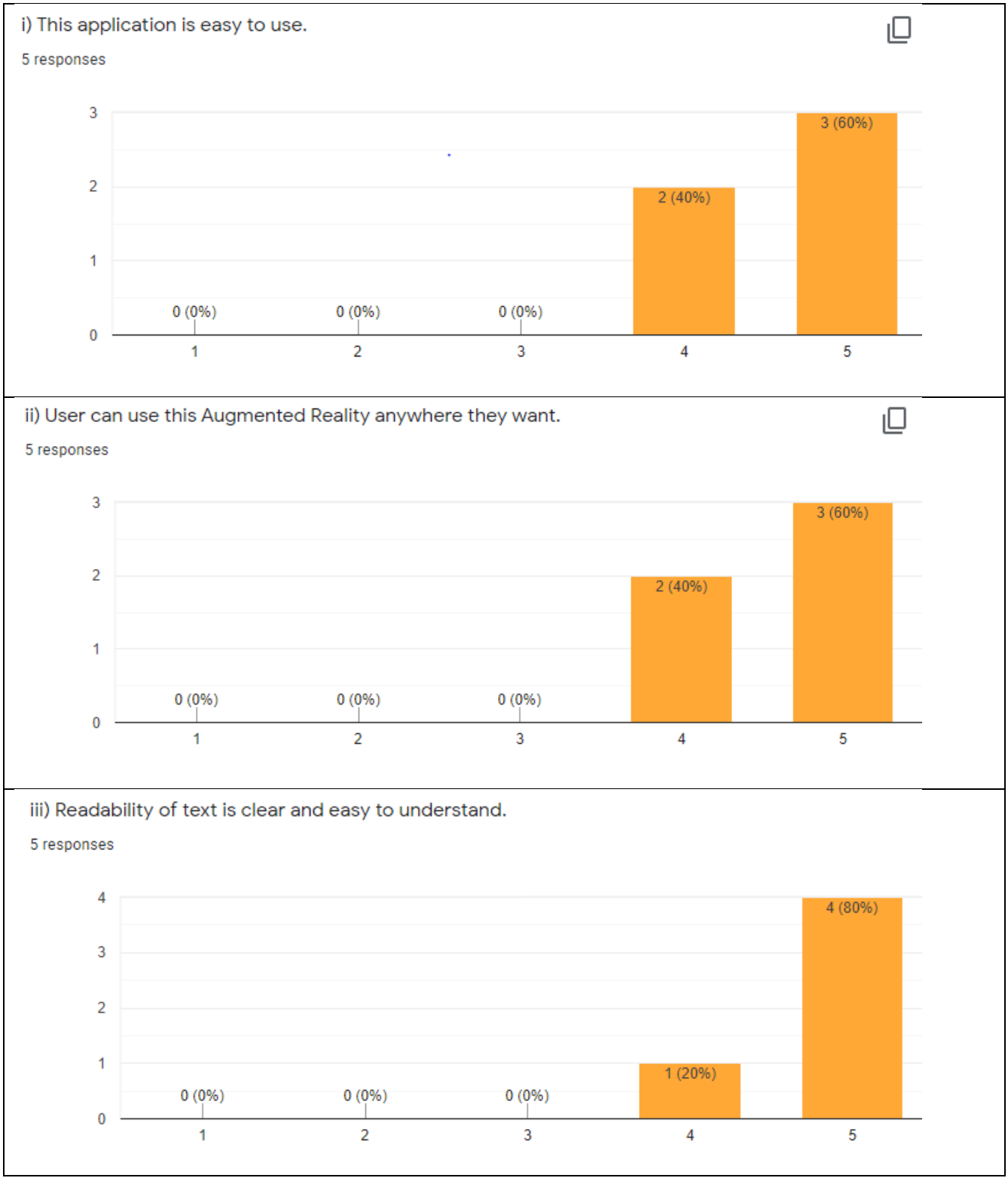




6.4.3.1.3 Ease of use

Chart beneath shows the outcomes for question 7, question 8 and question 9. The outcomes acquired shows that multimedia expert agree that the level of ease of use for this application is average. The question is concentrate of easiness of utilizing the AR and clarify of font.

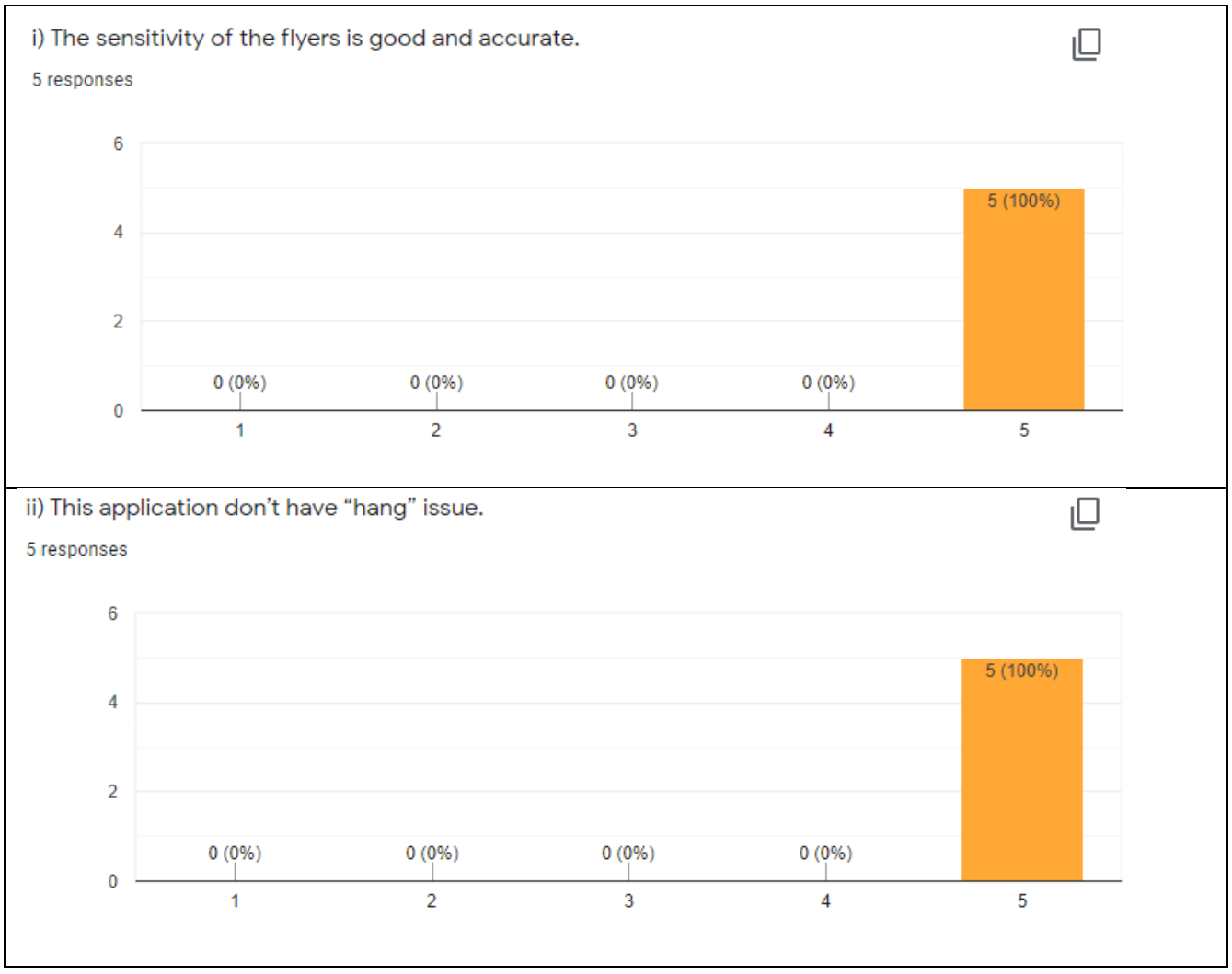
Table 6.13 Graph of ease of use for multimedia expert

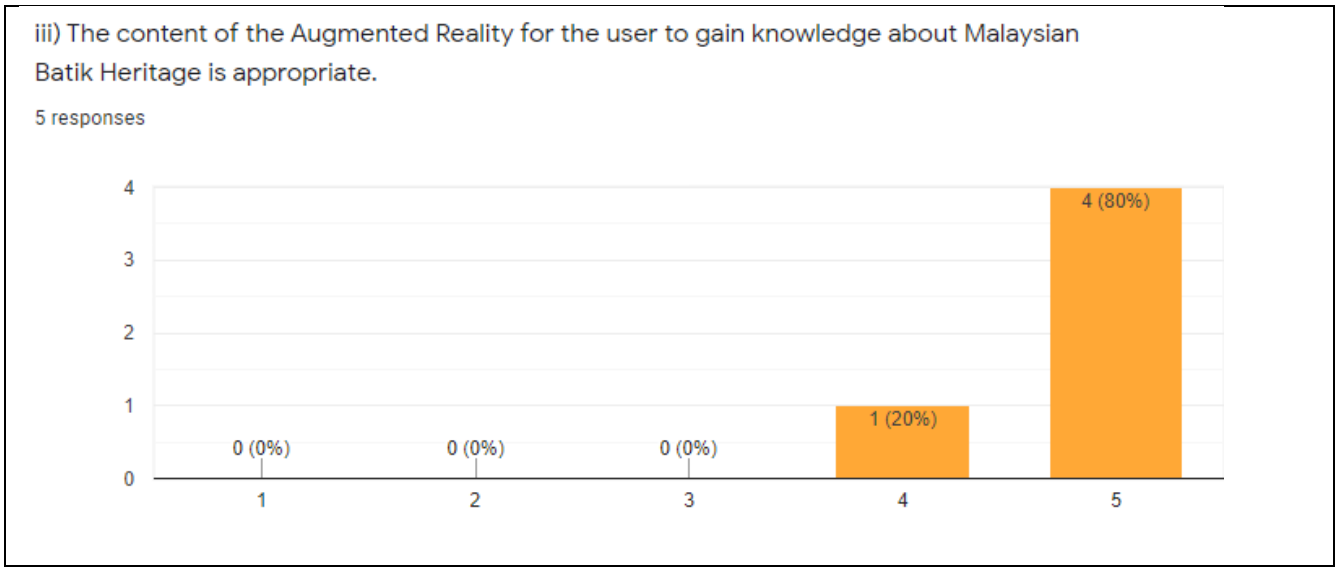


6.4.3.1.4 Flexibility

Chart beneath shows the outcomes for question 10, question 11 and question 12. The outcomes acquired shows that multimedia expert agree that the level of flexibility of this application is excellent. The question is concentrate on affectability of flyers, 'hang' issue and the information of Augmented Reality.

Table 6.14 Graph of flexibility for multimedia expert

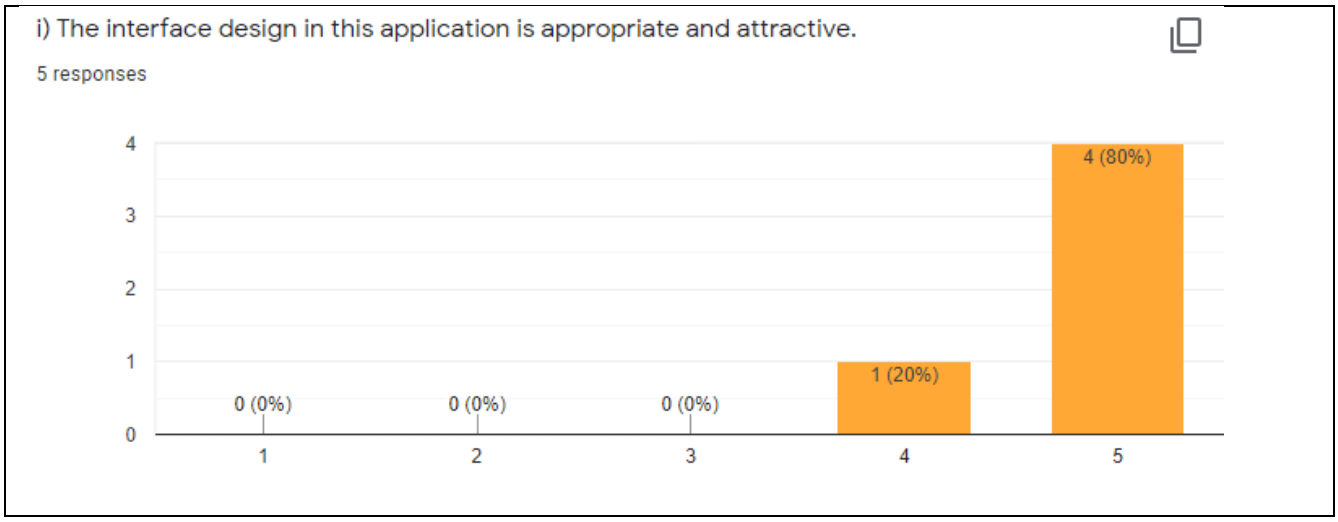




6.4.3.1.5 Accessibility

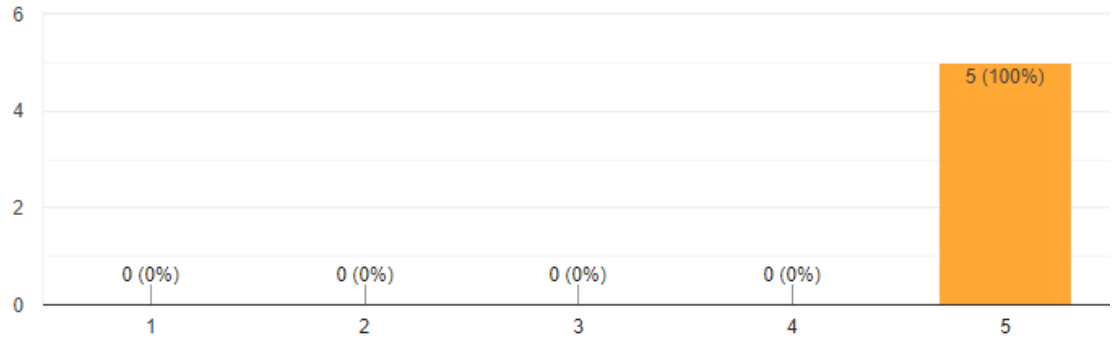
Chart beneath shows the outcomes for question 13, question 14 and question 15. The outcomes acquired shows that multimedia expert agree that the level of flexibility of this application is effective and attractive. The question is concentrate on interface structure of use which is text style, and design of application.

Table 6.15 Graph of accessibility for multimedia expert



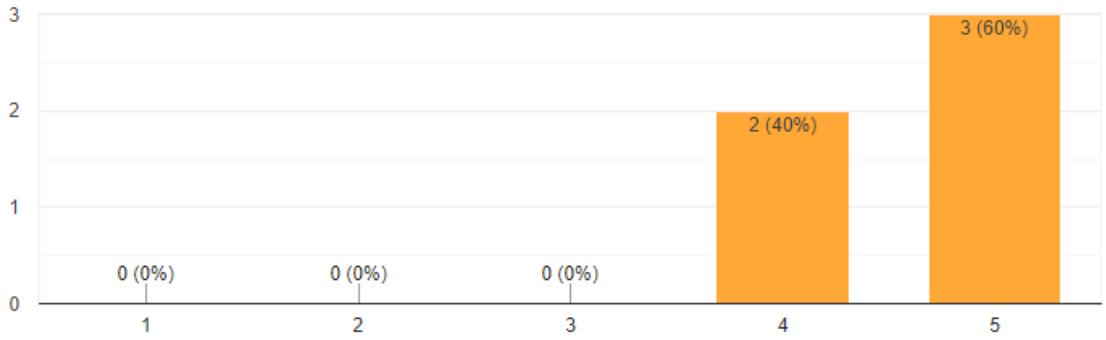
ii) The colors used in this application is appropriate and attractive.

5 responses



iii) The font and graphic used in this application is attractive, easy to read and understand.

5 responses



6.4.3.2 Target User

The survey is disseminated to the respondent after developer AR's demonstration is finished. The diagram below shows the gender of selected user for testing this AR application. From of 30 respondents, 16 respondents are Male and the rest 14 respondents are female.

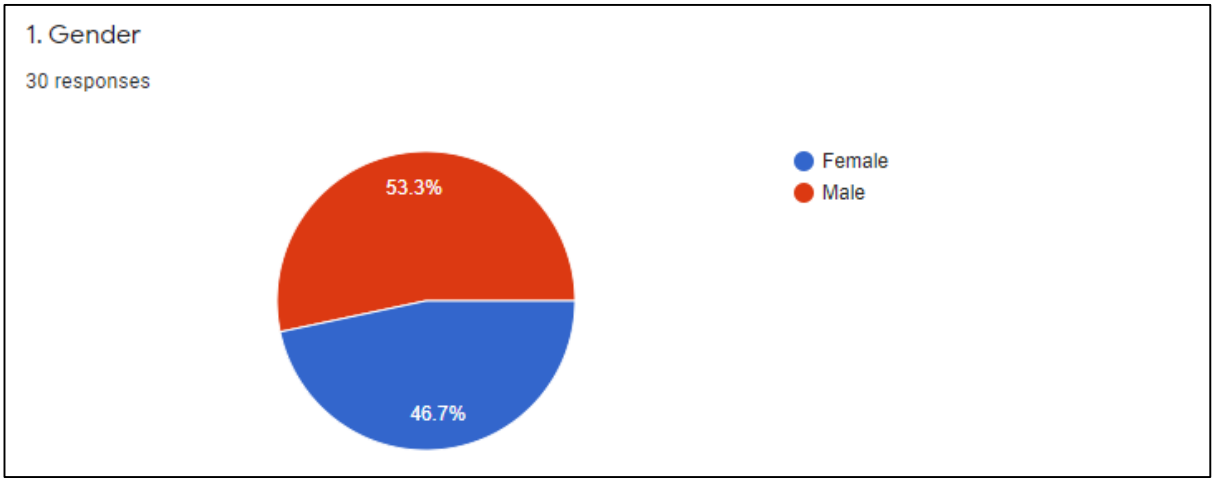


Figure 6.1 Result of gender for target user

Then, the other general information to be collected is about age, with 17 respondents mostly at around 19-30 years of age (56.7%), 9 respondents is from 18 and below years old (30%) and the rest 4 respondents with fewer percentage is around 30 and above years old (13.3%)

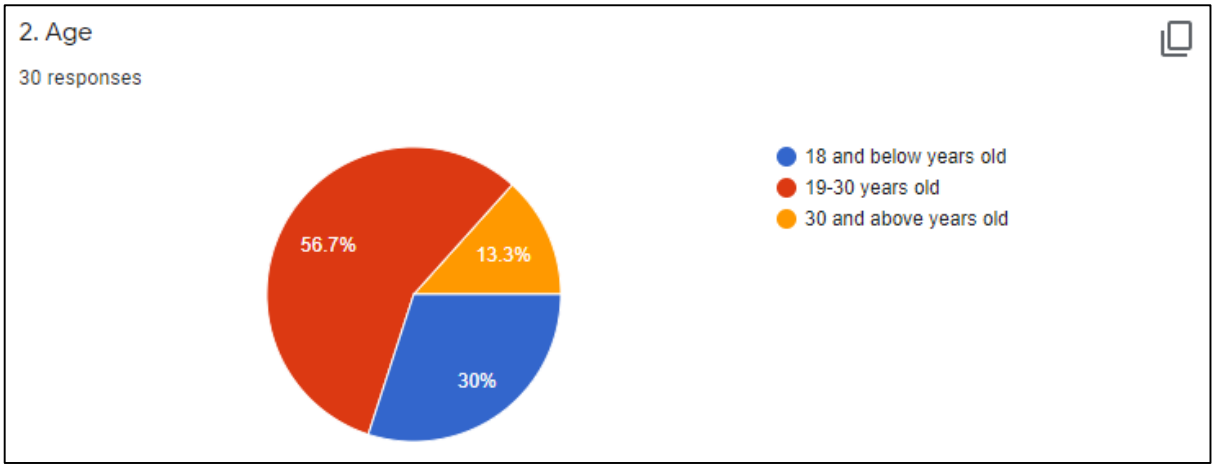
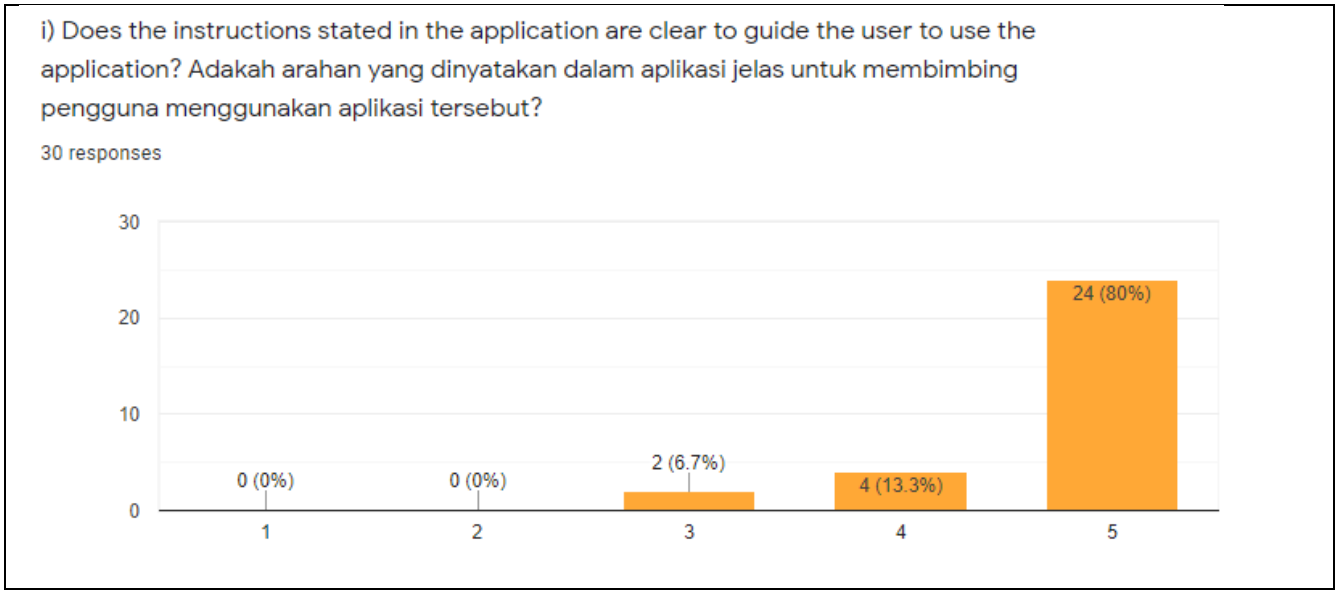


Figure 6.2 Result of age for target user

6.4.3.2.1 Usability of product

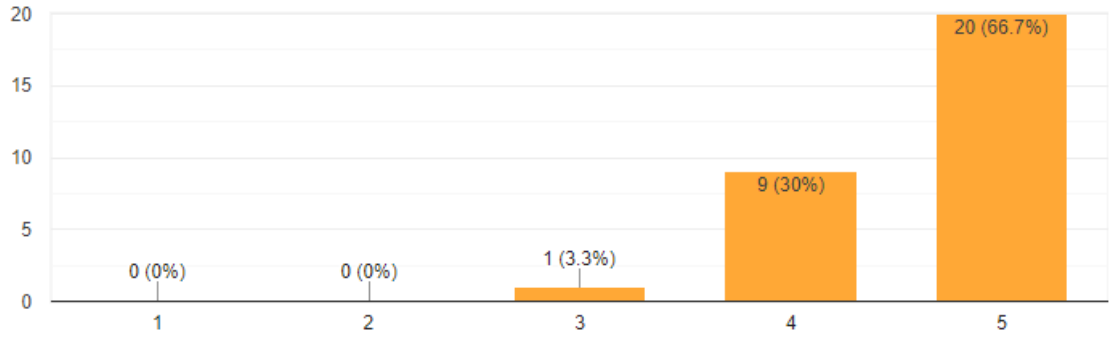
There are 5 questions consists in Section A which is focused on the usability of the product such as instruction layout, use of color, use of music and sound, use of graphic and image and use of text. Figure below show the results of Section B. In conclusion, most respondents are satisfied with the interface design. From the questionnaire, it can be seen that it is not an issue with the good and straightforward design to comprehend interactive design that most participants felt to use the application. They agreed that colors, fonts and graphics are simple to comprehend.

Table 6.16 Graph of usability of product for target user



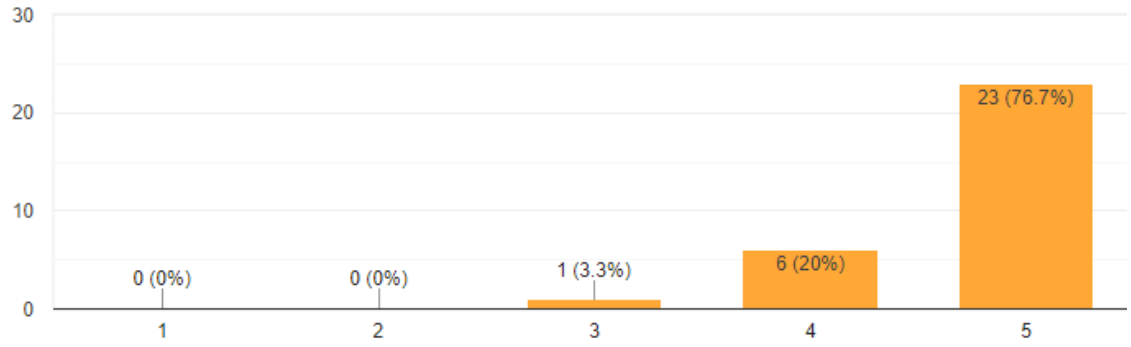
ii) Do the colour use in this application is suitable? Adakah warna yang digunakan dalam aplikasi ini sesuai?

30 responses



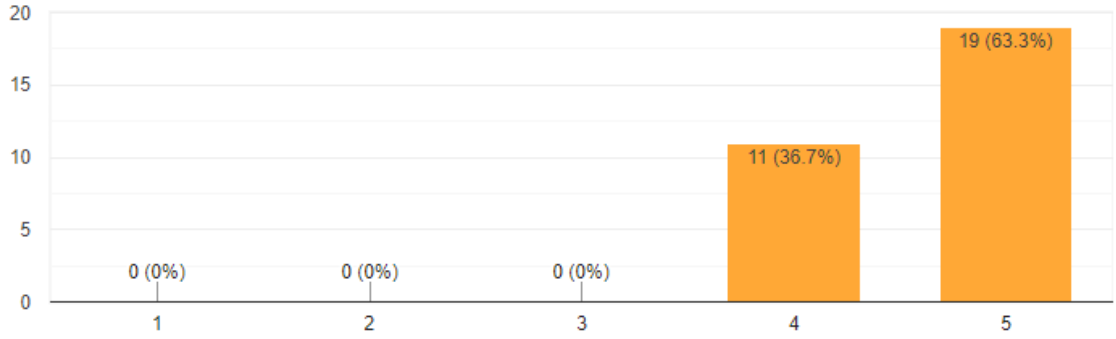
iii) Are the music and sound use in the augmented reality content is suitable? Adakah muzik dan bunyi yang digunakan di dalam kandungan 'augmented reality' sesuai?

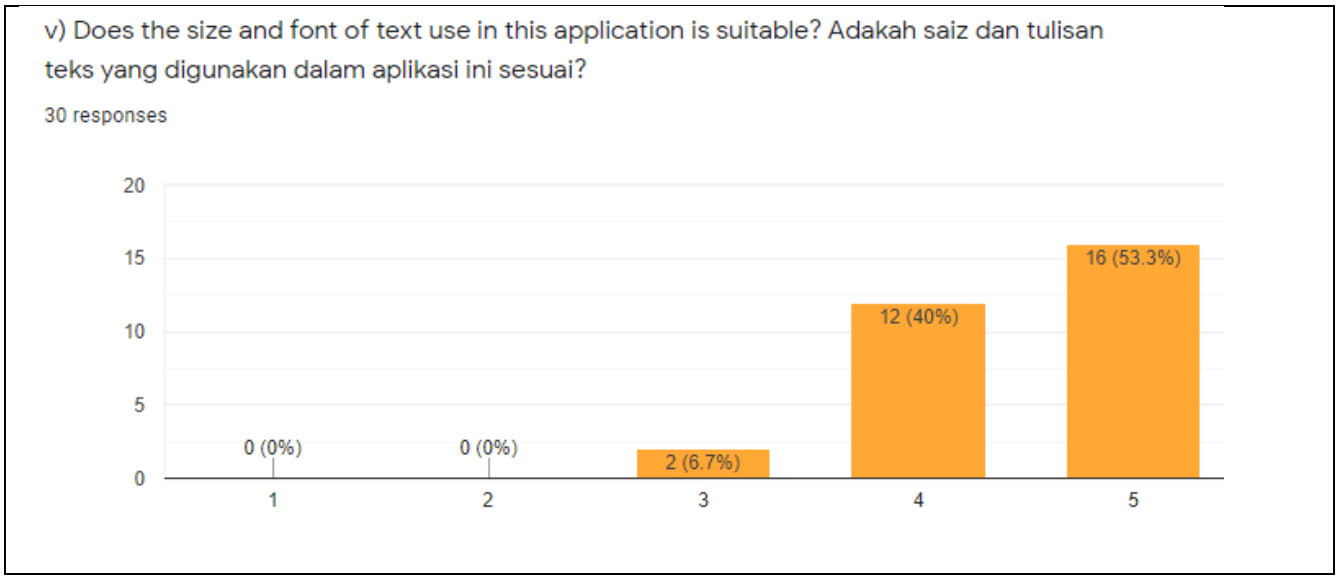
30 responses



iv) Do the image and graphic use in this application helps you to understand better about this application? Adakah gambar dan grafik yang digunakan membantu anda memahami aplikasi ini dengan lebih baik?

30 responses





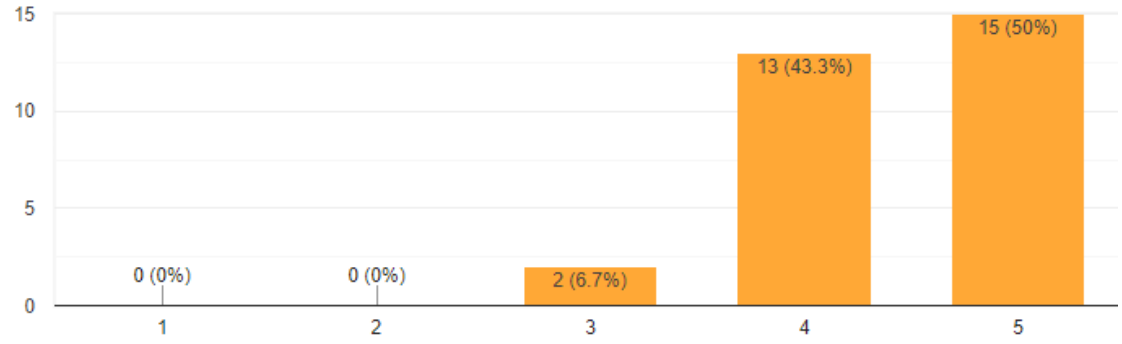
6.4.3.2.2 Effectiveness of product

There are total of 5 question that should be answer by the respondents in the questionnaire for Section B which is about the effectiveness of the project. It means this product is very effective and the integration of multimedia elements is very helpful to user in content and information delivery. Furthermore, since this product is a mobile application, the result of effective in understanding Batik on a mobile device anywhere and at any time highly agree by almost of the respondent. Also, since this AR application is focused on Batik, the data shows that respondents moderate agree with this application as an application that can gain their interest in learning Batik and can help and enhance their knowledge of Batik. In conclusion, this AR application is more effective to can helping in visualizing the process of making Batik and strongly agree by respondent.

Table 6.17 Graph of effectiveness of product for target user

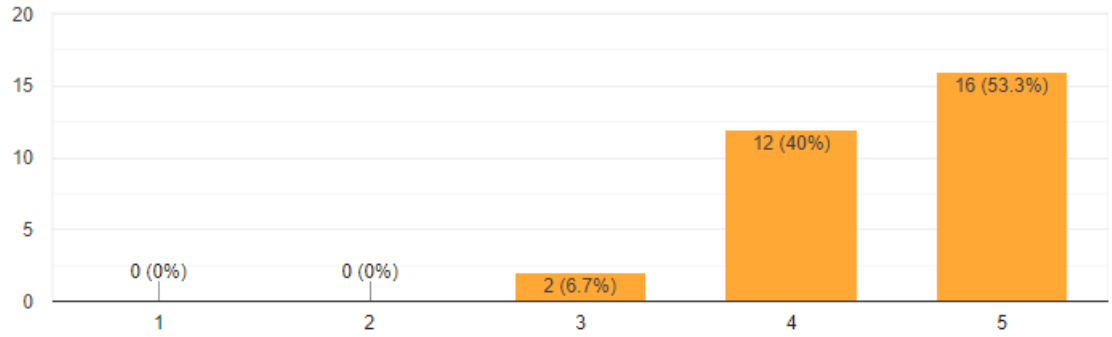
i) Do you understand what is this application about? Adakah anda faham tentang aplikasi ini?

30 responses



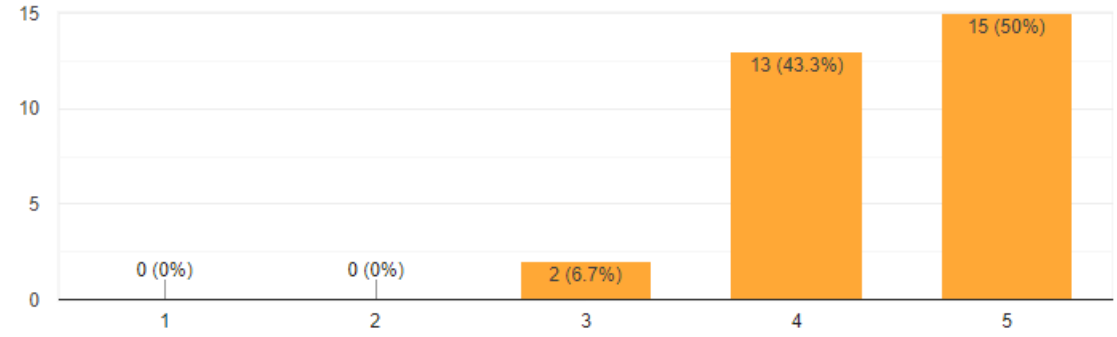
ii) Do you understand every content showed in this application? Adakah anda faham tentang setiap kandungan di dalam aplikasi ini?

30 responses



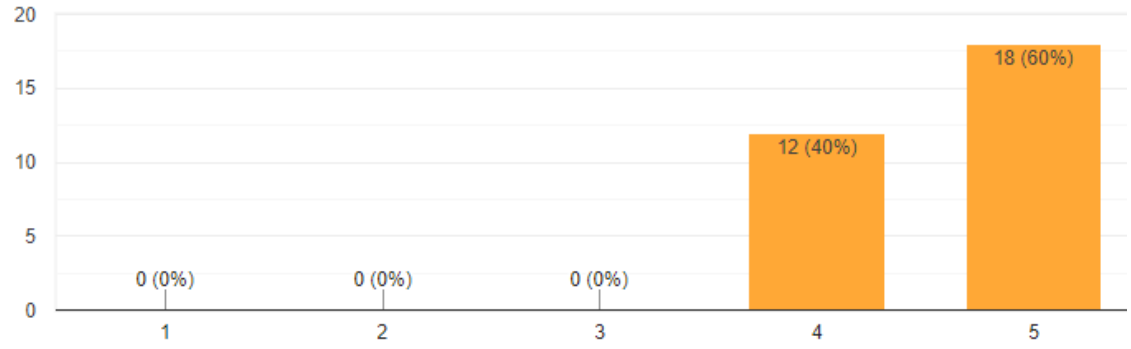
iii) Does this application give you any new knowledge about Batik or detail that you didn't know before? Adakah projek ini memberikan and ilmu baru atau sesuatu yang and tidak tahu sebelum ini?

30 responses



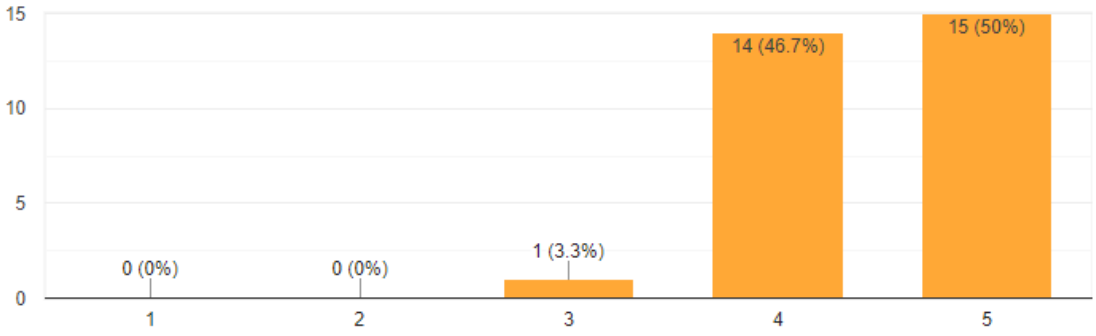
iv) In your opinion, do you think this method (augmented reality) is more effective to use in a campaign better that old method (eg: poster, risalah, billboard, etc)? Pada pendapat anda, adakah anda rasa kaedah ini (augmented reality) lebih berkesan daripada kaedah lama (cth: poster, brochure, papan iklan, dll)?

30 responses



v) This augmented reality Malaysian Batik Heritage application can helping in visualizing the process of making Batik? Aplikasi augmented reality Warisan Malaysian Batik Heritage ini dapat membantu dalam menggambarkan proses pembuatan Batik?

30 responses



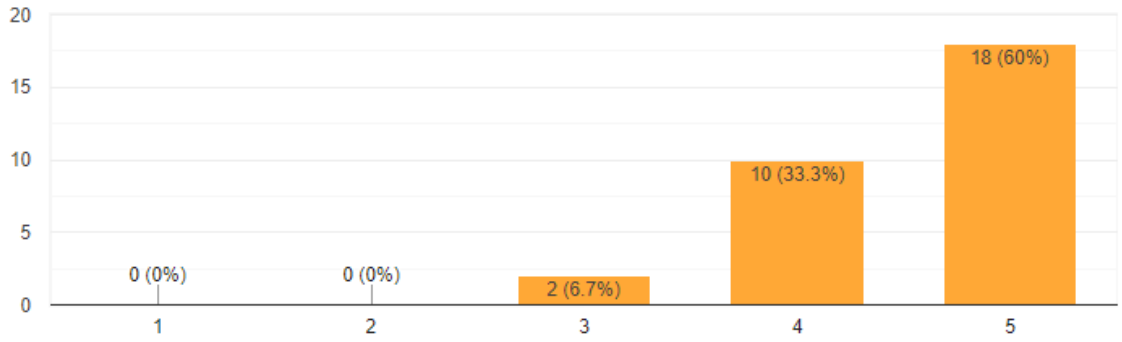
6.4.3.2.3 Flexibility

There are total of 5 questions that ought to be answer by the respondents in the survey for Section C which is about the flexibility of the application. The question is concentrate on the interest in Malaysian batik, the effect and knowledge gain from the application, and comparison between new media old media use for Batik.

Table 6.18 Graph of flexibility of product for target user

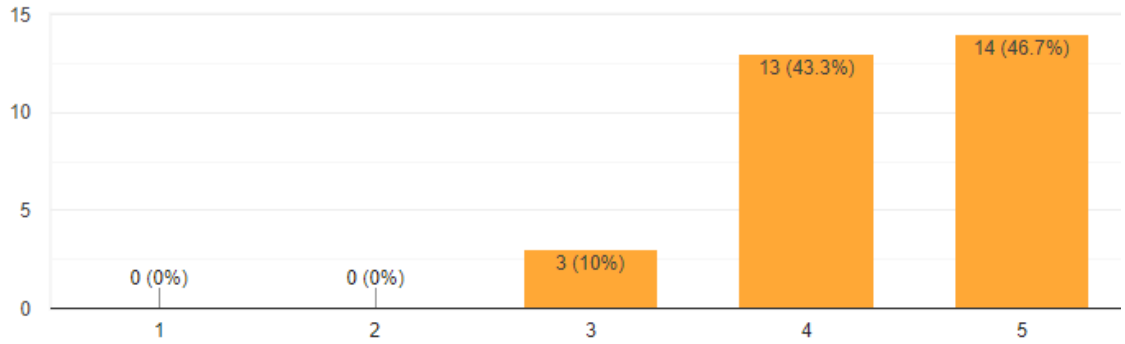
i) I would be more interested in Batik after using this application. Saya akan lebih berminat dengan Batik setelah menggunakan aplikasi ini.

30 responses



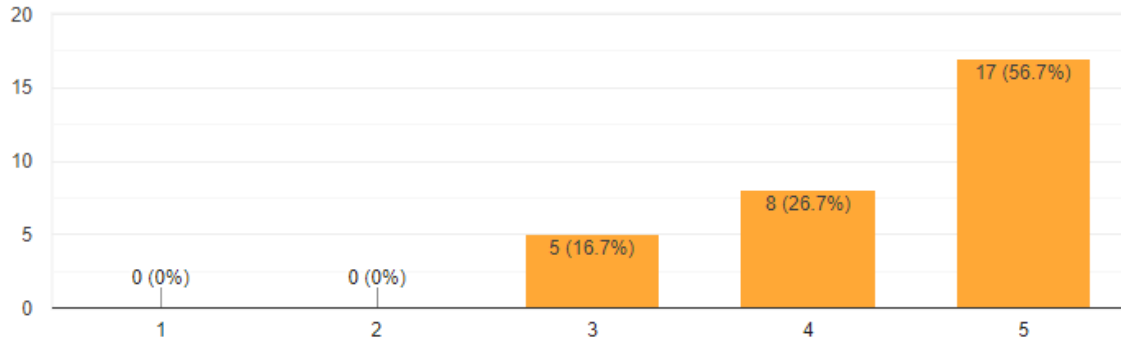
ii) I think that the incorporation of Batik design into Augmented Reality would encourage more interest in it. Saya berpendapat bahawa penggabungan reka bentuk Batik ke dalam Augmented Reality akan mendorong minat yang lebih tinggi terhadapnya.

30 responses



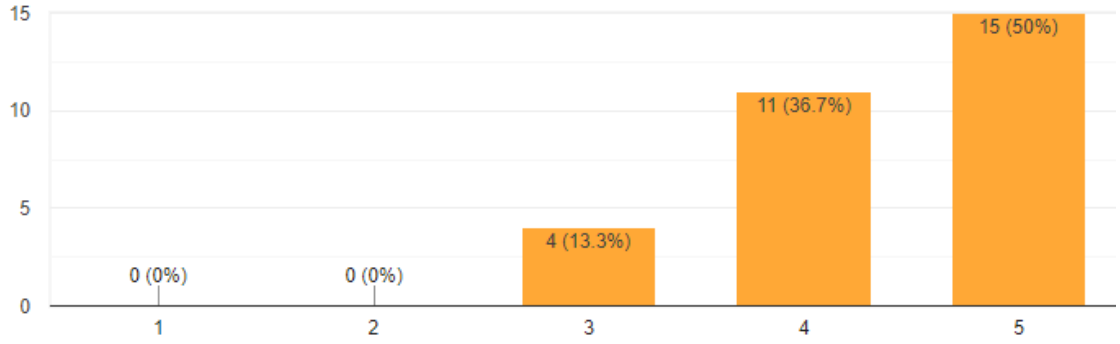
iii) I would be more interested in the handmade creation of aesthetic Batik products. Saya akan lebih berminat dengan pembuatan produk Batik estetik buatan tangan.

30 responses



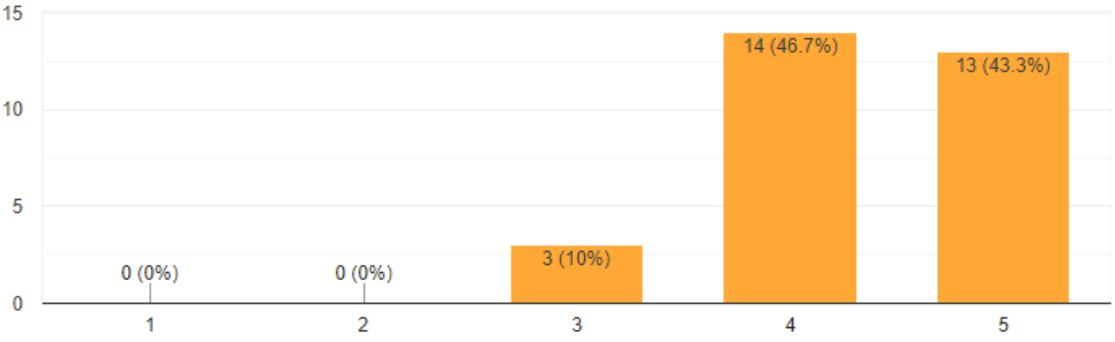
iv) I would be more interested in exhibitions that showcase Batik. Saya lebih berminat dengan pameran yang mempamerkan Batik.

30 responses



v) I would be more interested if more videos (eg. Commercial, music videos, etc) involving Batik are made and broadcast to most TV and online channels. Saya akan lebih berminat sekiranya lebih banyak video (seperti iklan, video muzik, dll) yang melibatkan Batik dibuat dan disiarkan ke kebanyakan saluran TV dan dalam talian.

30 responses



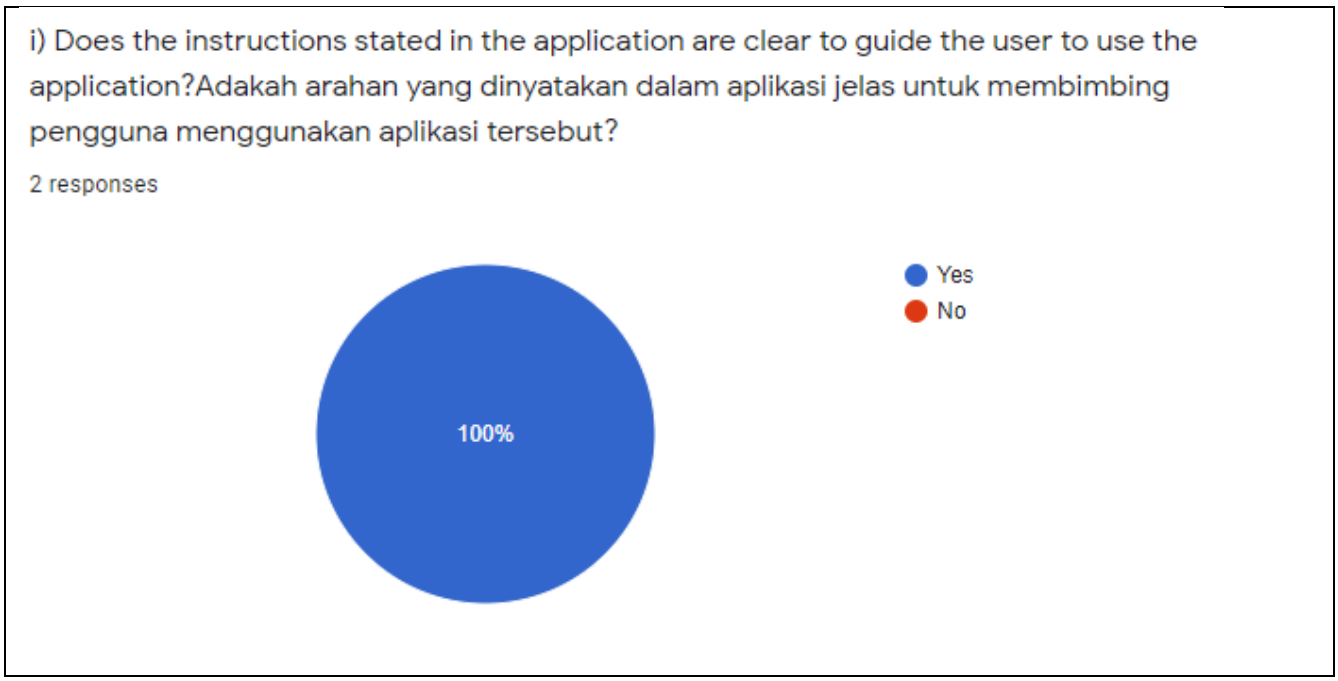
6.4.3.3 Subject Matter Expert

The subject expert for this mobile app is batik owner. They are asked to evaluate the effectiveness in delivering Batik information of using new method that is Augmented Reality.

6.4.3.3.1 Content of project

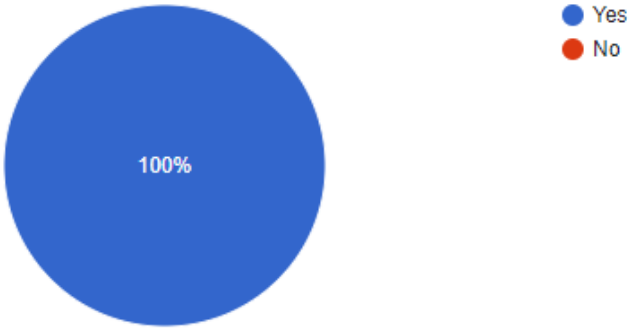
Graph below shows the result from questionnaire in Section A. Out of 2 respondents from Batik Owner, both of them or 100% have answer yes for this question which is focused on content and information about Malaysian Batik.

Table 6.19 Graph of content of project for subject matter expert



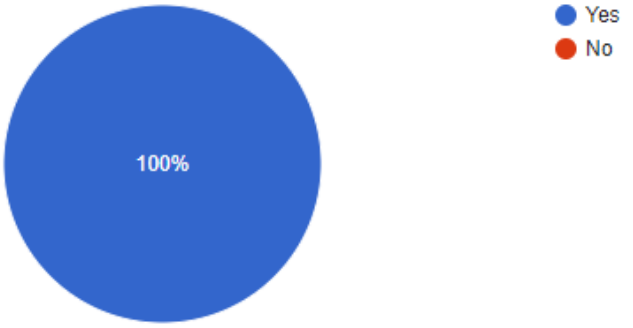
ii) This Augmented Reality tells about Malaysian Batik?Augmented Reality ini menceritakan tentang Batik Malaysia?

2 responses



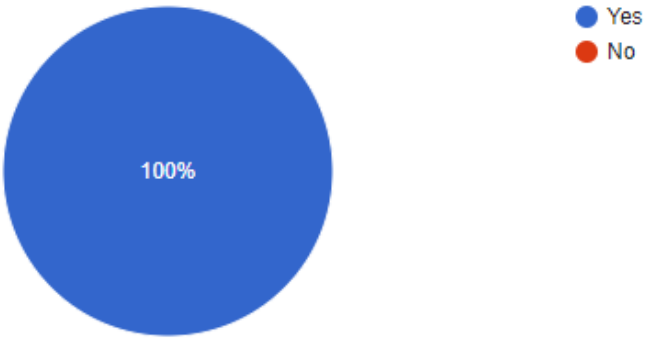
iii) Malaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and PahangMalaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and Pahang.

2 responses



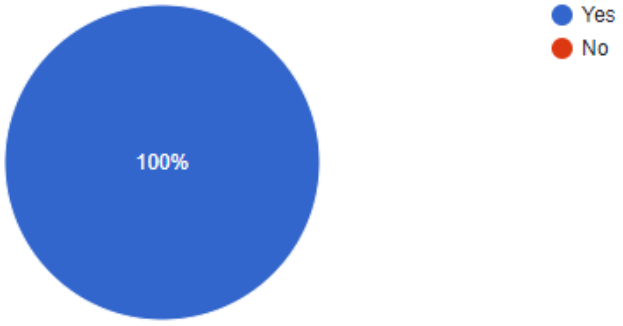
iv) Does the arrangement of process batik are arrange correctly?Adakah susunan batik proses disusun dengan betul?

2 responses



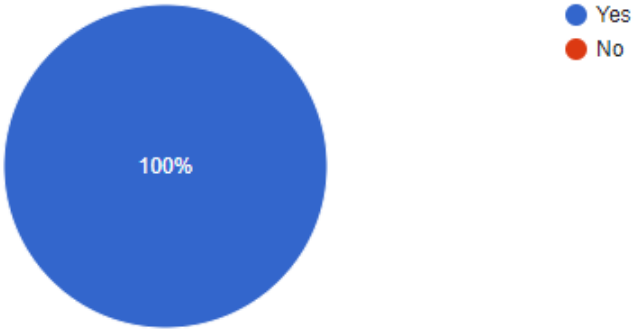
v) Does the multimedia element(video) is helpful to understand the process of making Batik? Adakah elemen multimedia (video) berguna untuk memahami proses pembuatan Batik?

2 responses



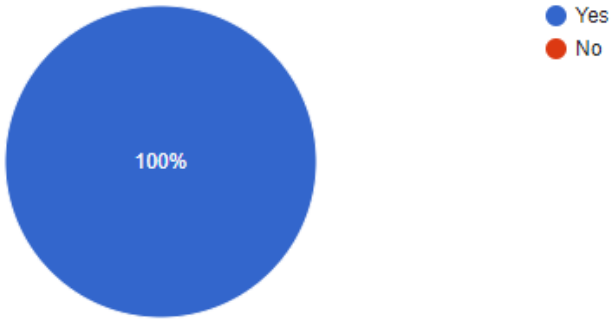
vi) Does the multimedia element(3D model) helpful to understand the function of each object in Batik Tools?Adakah elemen multimedia (model 3D) dapat membantu memahami fungsi setiap objek dalam alatan Batik?

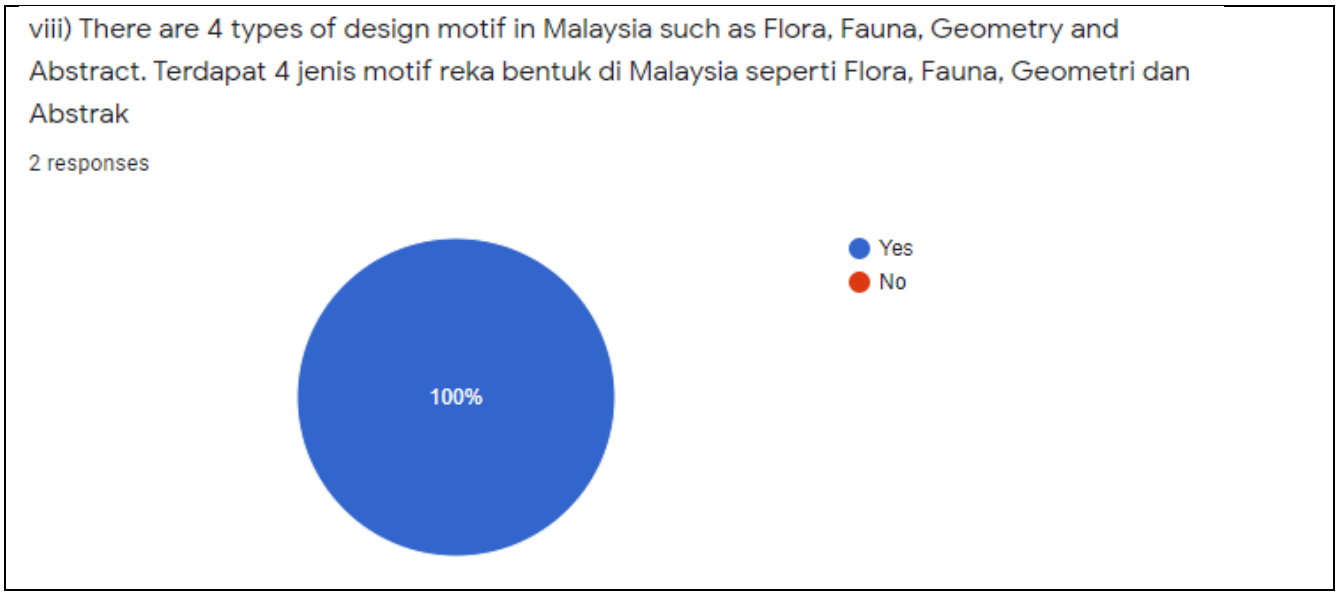
2 responses



vii) There are 2 types of Batik in Malaysia which are Hand Drawn and Block Painted. Terdapat 2 jenis batik di Malaysia iaitu “Hand Drawn” dan “Block Painted”

2 responses





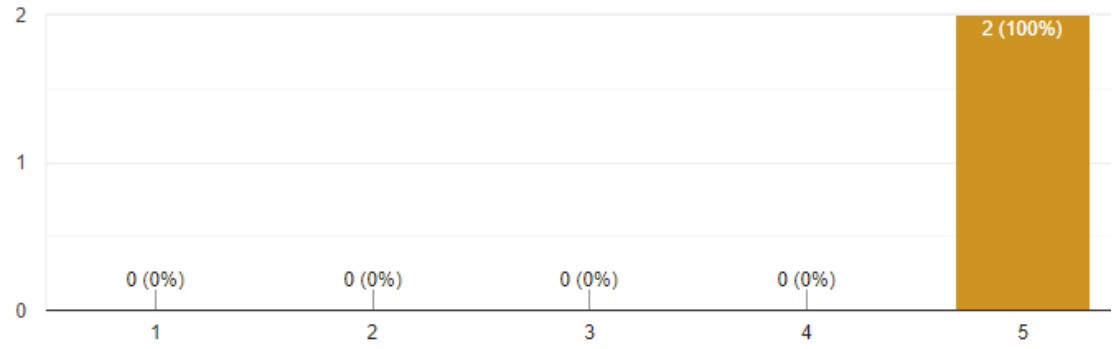
6.4.3.3.2 Usability of project

Based on the charts below, both of subject matter expert agree that this application ready to stand out for them and it's alluring to utilize. The experts likewise found that this application viably to in learning Malaysian Batik on portable application whenever and anyplace, where it very well may be depict as helpful and serviceable. But, in term of advantageous to utilize, both expert unequivocally concur for the helpful to utilize the application Malaysian Batik by utilizing Augmented Reality and it is solid concur by both of subject matter expert. Same goes to the aftereffect of is this application can magnify their insight about Malaysian Batik.

Table 6.20 Graph of usability of project for subject matter expert

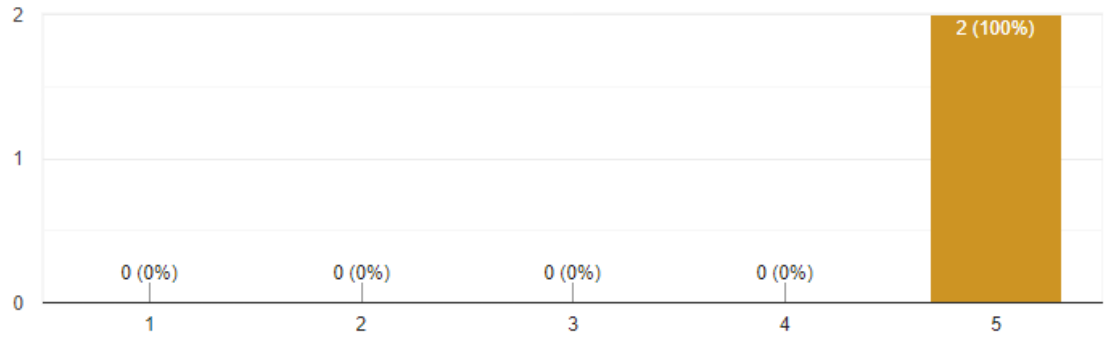
i) This Batik Augmented Reality application is convenient to use. Aplikasi Batik Augmented Reality ini senang digunakan.

2 responses



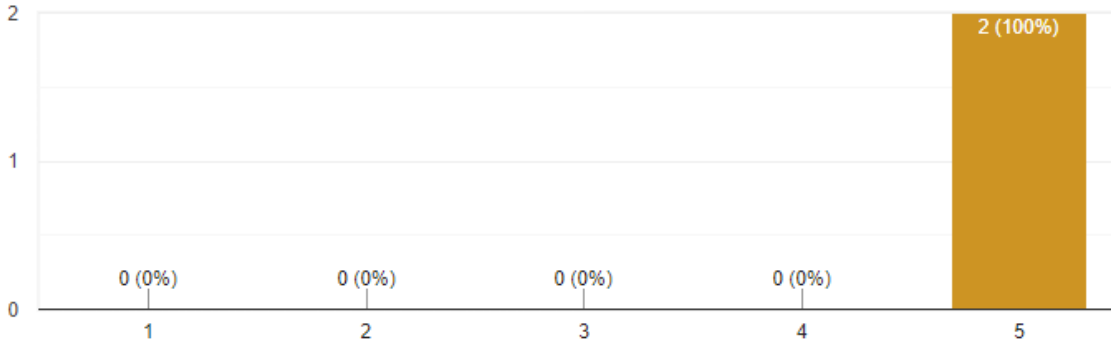
ii) This Batik Augmented Reality application able to attract your attention. Aplikasi Batik Augmented Reality ini dapat menarik perhatian anda.

2 responses



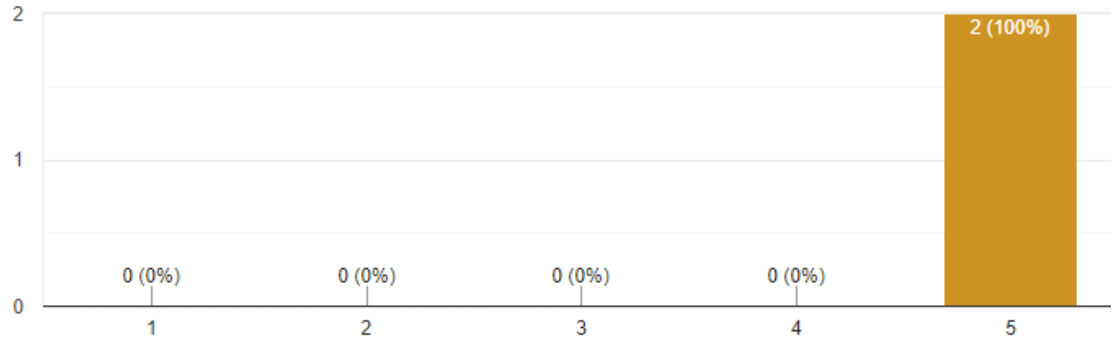
iii) Using an Augmented Reality is more convenient compared to a personal computer for learning. Menggunakan Augmented Reality lebih senang dibandingkan dengan komputer peribadi untuk belajar.

2 responses



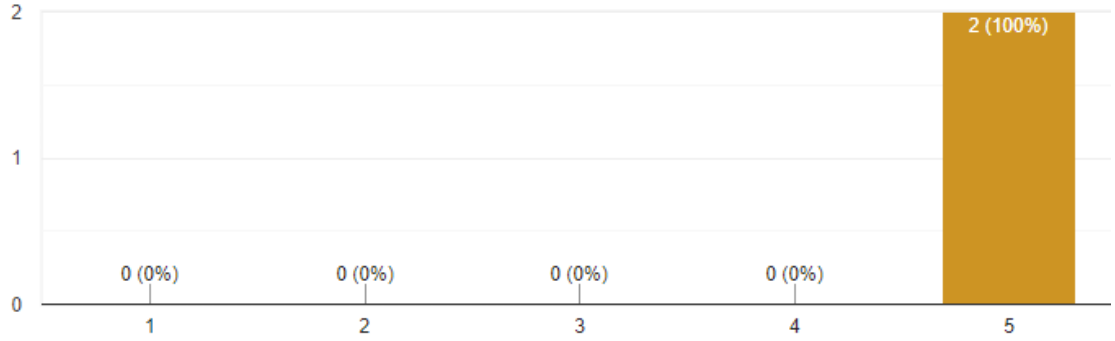
iv) The Augmented Reality is effective in learning basic Malaysian Batik on a mobile device anywhere and at any time. Augmented Reality berkesan dalam mempelajari Batik Malaysia asas pada peranti mudah alih di mana sahaja dan pada bila-bila masa.

2 responses



v) The integration of all learning content with augmented reality technology is more effective than the current teaching method. Penyatuan semua kandungan pembelajaran dengan teknologi augmented reality lebih berkesan daripada kaedah pengajaran semasa.

2 responses



On observation, it was found that the target user respondent who is public is very attracted by the AR Batik application. However, for expertise from a computer science background especially in the multimedia field, based on the respondent feedback, improvement of this application, the multimedia expert are very attracted by interface design because of combination all multimedia element. But there a little improvement can be made by replace the video of process making Batik with 3D animation. So, AR can helping visualizing and create immersive experiences for user to interact with their products.

6.4 Conclusion

To finish up, the application has been effectively executed. The components of the AR have been discussed in Chapter 3 and applied in the wake of contrasting it with existing AR. The consequences of the questions have been organized to diagrams and tables. This segment explains the testing technique. The utilization of survey is to explore whether the product's target have been satisfied. The outlines dependent on questionnaire have obviously indicated that the components which is applied into the AR has effectively been accomplished. As an end, it clarifies the suggestion and feedback from the survey during the testing. It is imperative to got a reaction and input from user to guarantee this undertaking meet its goal expressed in the first chapter. We can presume that AR can be considered as useful for learning purposes. From the outcome and input got from the testing, a few upgrades can be made to improvise for better application. The following part will have examined about the shortcoming, quality and finish of the entire project.

CHAPTER 7: CONCLUSION

7.1 Introduction

This final chapter discusses the strengths and weaknesses of this Augmented Reality project. The strength and weakness of the product are achieved in this project from the testing phase. There are a few weakness of this product that need to improvise and enhanced in the future for this AR application. In addition, from this project what contribution on Augmented Reality Batik to industry in today will explained.

7.2 Observation on weakness and strength

Every application that has been develop have its strength and weakness as a new approach utilizing a new technology namely Augmented Reality. Conversely, this product's strength and weakness may be an advantage for a better clarification to create a good product. Limitation of this application is the user can only experience Augmented Reality only using mobile and available for android user. Besides that, the video of process of making Batik is linear and there is no interactivity, so user need to pay attention in every sentence of video.

7.2.1 Weakness

7.2.1.1 Too many details need to read

In ever video content, there is too much details and information, for example process of batik and user could perhaps forget the vital information they ought to get.

7.2.1.2 Fewer Augmented Reality interaction

There are fewer interaction with user in Augmented Reality such as button and interactive animation.

7.2.1.3 Difficult to use the application

Since this is AR marker-based, user need to print and preview the flyers first before experience and used the application. Without flyers, the AR application cannot function well.

7.2.2 Strength

7.2.2.1 Combination of multimedia element

The Augmented Reality can intuitively transmitted the enjoyment about new media innovation. It can give the users a good experience with the combination of graphics, text , audio , video and some collaboration from users and the device. From the test results, it was mentioned that the directive on application is simple and easy-to-understand by the tester.

7.2.2.2 Utilizing the use of smartphone

With this application, user does not need additional devices such as joysticks to engage with innovation of technology, by using their mobile it is enough to user experience AR that they can perceived on their own.

7.2.2.3 Interactive design of application

This AR application uses an attractive design for people to improve a better knowledge of Malaysian Batik. Augmented Reality is a substitute tool which can turn into an interesting and rewarding method of teaching rather that read the information of Batik in internet.

7.3 Proposition for improvement

A reasonable recommendation to upgrade and better the application abilities and execution will clarify in this segment. To conquer the constraint and shortcoming of the application, a recommendation for development will be the primary subject. The recommendation and proposal for development of this undertaking got from the comment of the tester who utilize the application during testing stage. A few upgrades suggestion has been distinguishing so as to improve the item for a better performance later on.

7.2.3.1 Build in iOS user

Nowadays, many smart phone user change from android operating system to iOS operating system, therefore develop an application that can fulfil the market request is necessary.

7.2.3.2 Implement live-action with 3D animation

Apply more 3D animation in the Augmented Reality than video.

7.2.3.3 Upload an application to google play store

Develop the stand-alone application specifically for this AR to enable user to use the application and directly install from google play store. So, user can be used Augmented Reality application anywhere and at any moment.

7.4 Project Contribution

Augmented reality have been use by many industries for many reason and purposes. The technology of augmented reality has been use to engage people and transform various things and enables more intuitive way of interaction. This project contributes to the organization who run a event of Batik. It can enhance the way of promoting a Batik effectively. With AR innovation implanted, it can draw in individuals to take an interest in the Batik. This project has used the attractive graphical element on the interface design, flyers and video to attract people watching and participating in this

Batik. With the combination of graphical element and animation, it makes the content deliver effectively to the audience.

7.5 Conclusion

To wrap things up, Augmented Reality is successfully develop and run for user. In literature review chapter, the comparison of existing system and project requirement are aligned with AR application. In design stage, the storyboard and user interface design is sketch in details to ensure the project is run successfully. Augmented Reality have a splendid effect to the enlightening scene user to experience in real world. In spite of the deterrents that the things experience, the application despite everything gets ready to motivate everyone. An improvement can be made to make this application more compatible for users.

In conclusion, Malaysian Batik Augmented Reality have provided an effective way of promoting Batik and meets its requirements. Association ought to have the option to convey the substance successfully and the user ready to get the data gave in the mission a fascinating and intelligent way. This AR application necessary to help students improve and educate in learning Malaysian Batik.

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LIST OF APPENDIX

APPENDIX A: CONTENT VERIFICATION FORM

NOORIN NASRINA BT. RUSAN
B03170375

Content Verification

Project title : The development Malaysian Batik Heritage using Augmented Reality

Module/Topic	Content
Unit 1 : History of Batik	What is Batik ? • Batik is a technique for decorating textiles, by which parts of the textile that are not to be coloured are covered in molten wax. • The wax prevents the textile from absorbing the dye during the decorating process. Source : (My Batik) What is Batik? Link : https://mybatik.org.my/batik/ History of Batik • The origin of batik production in Malaysia is not easy to trace. However, it is known for certain that the Javanese influenced Malay batik-making technically as well as in the development of designs. • At an early stage the Malaysians used wooden blocks in order to produce batik-like textiles. • As late as the 1920s Javanese batik makers introduced the use of wax and copper blocks on the East Coast. • The production of hand drawn batik in Malaysia is of recent date and is related to the Javanese Batik Tulis. • Commercial production started in the 1960s. • This craft has developed its own particular aesthetic and design, peculiar to Malaysia. • The new Malaysian batik is clearly different from the Javanese tradition of hand-painted batik. • Malaysian batik can be found on the east coast of Malaysia such as Kelantan, Terengganu and Pahang, while batik in Johor clearly shows Javanese and Sumatran influences since there are a large number of Javanese and Sumatran immigrants in southern Malaysia. Source : (Love Milia) Batik History Link : https://www.lovemilia.com.my/batik-history/ Comments:

Unit 2 : Process of making Batik	• Material/Tool a. Cantings (or tjantings) b. Wooden Printing Blocks c. Copper stamps (tjaps) d. Waxes, soda ash and waxpot e. Procion Dyes f. Plain Fabrics g. Batik kits h. Batik Process sets and books. Source : (Dhrarmatrading) Batik Instructions Link : https://www.dharmatrading.com/techniques/batik-instructions.html • Process of making Batik -Batik is a process of using melted wax as a resist on fabric -The wax may be painted on a white or coloured fabric using a canting or brush or it may be stamped onto the fabric using a copper stamp dipped in melted wax. -The fabric is then dyed, and the areas that have been waxed will not be penetrable by the dye. -The process can be repeated many times to get a multi-coloured result. -The maximum length of fabric that the batik maker can work with is 8-10 meters. This is because certain steps in the process requires the stretching out of the fabric on a wooden frame like a painting. -The maximum working length of such a frame is 10 meters. White fabric has been dyed first time, this will be the colour of the stamp or motive of the batik. 1. Cloth Stretching 2. Canting 3. Dyeing 4. Colour Fixing 5. Soaking and Rising 6. Boiling 7. Final Rising

	8. Dying Source : (Angel Circle) The Batik Process Link : https://angelcircle.net/about-272/the-batik-process-274/ Comments:
Unit 3 : Types of Batik	• There are two main types of batik in Malaysia today; hand-painted and block printed. These types differ in production techniques, motif and aesthetic expression, and are often classified according to the tool that has been used. 1. Hand-drawn painted a. -Hand-drawn Batik is where the designs are drawn on the fabric with hot liquid wax by using a metal object called CANTING. b. -When the wax outlines are done, artists use the brushes to paint the dyes within the outlines. The use of brush allows for the creation of shaded and multi-hued designs. c. -Various fabrics are used including cotton, rayon, linen, voile and silk. These fabrics are patterned with floral and geometrical motifs, arranged in various layouts as dictated by current trends. d. -Hand drawn Batik is usually produced in 4 metre length or 2 metre length. 4 metre length hand-drawn batik is used for women's wear and 2 metre hand-drawn batik is used for men's wear. These garments are often used for formal events. e. -Besides shirt and dresses, hand-drawn batik is also made into scarves, pareos, craftans and even as framed art. 2. Block printed a. The canting will be replaced by a copper block or sometimes a wooden stamp with artistically patterned bottom. b. The block is dipped into the wax and printed onto the fabric, which is then dip-dyed. Then the wax will be removed and batik with single color is produced. To create multi-colors and complex batik, waxing with different blocks, dying and de-waxing have to be done many times.

	c. Block-printed Batik does not have the intricate delicacy of hand-drawn and similar shapes or patterns are repeated on a piece of fabric. d. Cotton is a popular fabric used in block-printed Batik and the output quantity is around 20 metres, depending on the original size of fabric. e. Block-printed batik is usually tailored into shirts and dresses for leisure wear. f. Block-printed batik is also made into handicrafts and soft furnishings like table clothes. In general, the process of hand-drawn batik is very slow and time consuming, while block-printed batik is faster and more suitable for mass production. As a result, hand-drawn batik is more expensive and exclusive than block-printed batik. Source : (Jadi Batek) Types of Batik Link : http://jadibatek.com/index.php/en/types-of-batik Comments:
Unit 4 : Design Motif	• In Malaysia, there are four types of motifs commonly used by artists in producing batik patterns. 1. Flora Motif  Flora motif, it is inspired by plants such as shoots, flower buds, shrubs and others. Flowers, shoots, shoots and twigs are treated and diversified in interesting patterns and shapes. Now floral motifs used are orchids, flowers and roses. All of these motifs change over time

2. Fauna Motif

Fauna motif is a source of sea, land and air animals. However, this fauna motif is rarely used by Malaysian artists to paint Batik. Some of the animals used are fish, poultry, and shellfish which are limited to curtains only.

3. Geometric Motif

Geometric motifs, modified in various variations such as repetition motifs. Among the motives of the motif are the manipulation of round shapes, triangles and so on. Some of the motive patterns are fish nets, worms, puppets and so on.

4. Abstract Motif

	It is based on the artist's own creativity and imagination, though sometimes it is very difficult to interpret. It belongs to a very unique art. Abstract patterns are now becoming one of our favourite patterns as their shape and motif vary from person to person Source : (Word Press) Batik Motif Link : https://kbait09.wordpress.com/batik-2/motif-batik/ Comments:
Comment	

Verified by:

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Date : 3/3/2020

APPENDIX B: INTERVIEW PHOTO


#MehMelaka
Visit Truly Asia Malaysia
2020

APPENDIX C: QUESTIONNAIRE

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

THE DEVELOPMENT OF MALAYSIAN BATIK HERITAGE BY USING AUGMENTED REALITY

Assalamualaikum and hello. I am Noorin Nasrina Binti Rusan, student of 3 BITM from Faculty of Information Technology and Communication. The objective of this project is to evaluate the effectiveness in delivering Batik information of using new method that is Augmented Reality. Thank you for your willingness to answer this survey.

Assalamualaikum dan Selamat Sejahtera. Saya Noorin Nasrina Binti Rusan, pelajar 3BITM dari Fakulti Teknologi Maklumat dan Komunikasi. Objektif projek ini adalah untuk menilai keberkesanan dalam menyampaikan maklumat Batik dengan menggunakan kaedah baru iaitu dengan menggunakan 'Augmented Reality". Kesudian saudara/saudari untuk menjawab soalan kaji selidik ini saya dahului dengan ucapan terima kasih.

Functionality Testing Questionnaire

(To be completed by Multimedia Expert)

Section A- General Information

Please tick(✓) in the box below.

1. Gender: ☐ Male ☐ Female
2. Experience in this field: ☐ Below 1 year ☐ 1-3years ☐ More than 3 years

Section B: User Testing

Direction: Please rate the following question according to the following scale:

Arahan: Sila nilai soalan berikut mengikut scala berikut:

1	2	3	4	5
STRONGLY DISAGREE/ *SANGAT TIDAK SETUJU*	**DISAGREE/** *SETUJU*	**MODERATE/** *SEDERHANA SETUJU*	**AGREE/** *SETUJU*	**STRONGLY AGREE/** *SANGAT SETUJU*

No		1	2	3	4	5
	A. Learnability					
1.	The information provided in flyers are not too complex.					
2.	The content of the Augmented Reality is easy to understand.					
3.	The instructions stated in the application are clear to guide the user to use the application.					
	B. Effectiveness					
1.	Integration of multimedia elements in the content helps user to receive the information effectively.					
2.	The content arrangements make the delivery of information more effective.					
3.	The information able to give an impact to the user.					
	C. Ease of use					
1.	This application is easy to use.					
2.	User can use this Augmented Reality anywhere they want.					
3.	Readability of text is clear and easy to understand.					
	D. Flexibility					
1.	The sensitivity of the flyers is good and accurate.					
2.	This application don't have "hang" issue.					
3.	The content of the Augmented Reality for the user to gain knowledge about Malaysian Batik Heritage is appropriate.					
	E. Accessibility					
1.	The interface design in this application is appropriate and attractive.					
2.	The colors used in this application is appropriate and attractive.					
3.	The font and graphic used in this application is attractive, easy to read and understand.					

Section C: Comment and suggestion:

Komen dan cadangan:

_____

_____

_____

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_____

I have testing the product and answer the questionnaires:

.....

Name: .....

Position: .....

Date: .....

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

THE DEVELOPMENT OF MALAYSIAN BATIK HERITAGE BY USING AUGMENTED REALITY

QUESTIONNAIRE

Assalamualaikum and hello. I am Noorin Nasrina Binti Rusan, student of 3 BITM from Faculty of Information Technology and Communication. I want to conduct a survey about **The development of Malaysian Batik Heritage By using Augmented Reality**. The objective of this project is to evaluate the effectiveness in delivering Batik information of using new method that is Augmented Reality. Thank you for your willingness to answer this survey.

*Assalamualaikum dan Selamat Sejahtera. Saya Noorin Nasrina Binti Rusan, pelajar 3BITM dari Fakulti Teknologi Maklumat dan Komunikasi, ingin menjalankan kaji selidik tentang satu projek iaitu "**The development of Malaysian Batik Heritage By using Augmented Reality**". Objektif kempen ini adalah untuk menilai keberkesanan dalam menyampaikan maklumat Batik dengan menggunakan kaedah baru iaitu dengan menggunakan 'Augmented Reality". Kesudian saudara/saudari untuk menjawab soalan kaji selidik ini saya dahului dengan ucapan terima kasih.*

SECTION A – GENERAL INFORMATION

Please tick (√) yes or no in the table below.

Sila tandakan (√) ya atau tidak di jadual di bawah.

Gender*Jantina*

- ☐ Male / Lelaki
- ☐ Female / Perempuan

Age/ *Umur*

- ☐ 19 – 20 years' old
- ☐ 21 – 22 years' old
- ☐ 23 – 24 years' old

SECTION B – USER TESTING

Direction: Please rate the following question according to the following scale:

Arahan: Sila nilai soalan berikut mengikut scala berikut:

1	2	3	4	5
STRONGLY DISAGREE/ *SANGAT TIDAK SETUJU*	**DISAGREE/** *SETUJU*	**MODERATE/** *SEDERHANA SETUJU*	**AGREE/** *SETUJU*	**STRONGLY AGREE/** *SANGAT SETUJU*

A) Usability of the project

No	Question	1	2	3	4	5
1	Does the instructions stated in the application are clear to guide the user to use the application? *Adakah arahan yang dinyatakan dalam aplikasi jelas untuk membimbing pengguna menggunakan aplikasi tersebut?*					
2	Do the colour use in this application is suitable? *Adakah warna yang digunakan dalam aplikasi ini sesuai?*					
3	Are the music and sound use in the augmented reality content is suitable? *Adakah muzik dan bunyi yang digunakan di dalam kandungan 'augmented reality' sesuai?*					
4	Do the image and graphic use in this application helps you to understand better about this application? *Adakah gambar dan grafik yang digunakan membantu anda memahami aplikasi ini dengan lebih baik?*					
5	Does the size and font of text use in this application is suitable? *Adakah saiz dan tulisan teks yang digunakan dalam aplikasi ini sesuai?*					

B) Effectiveness of the content

No	Question	1	2	3	4	5
1	Do you understand what is this application about? *Adakah anda faham tentang aplikasi ini?*					
2	Do you understand every content showed in this application?					

	Adakah anda faham tentang setiap kandungan di dalam aplikasi ini?					
3	Does this application give you any new knowledge about Batik or detail that you didn't know before? *Adakah projek ini memberikan and ilmu baru atau sesuatu yang and tidak tahu sebelum ini?*					
4	In your opinion, do you think this method (augmented reality) is more effective to use in a campaign better that old method (eg: poster, risalah, billboard, etc)? *Pada pendapat anda, adakah anda rasa kaedah ini (augmented reality) lebih berkesan daripada kaedah lama (cth: poster, brochure, papan iklan, dll)?*					
5	This augmented reality Malaysian Batik Heritage application can helping in visualizing the process of making Batik? *Aplikasi augmented reality Warisan Malaysian Batik Heritage ini dapat membantu dalam menggambarkan proses pembuatan Batik?*					

C)

No	**Question**	**Yes**	**No**			
1	I would be more interested in Batik after using this application. *Saya akan lebih berminat dengan Batik setelah menggunakan aplikasi ini.*					
2	I think that the incorporation of Batik design into Augmented Reality would encourage more interest in it. *Saya berpendapat bahawa penggabungan reka bentuk Batik ke dalam Augmented Reality akan mendorong minat yang lebih tinggi terhadapnya.*					
3	I would be more interested in the handmade creation of aesthetic Batik products. *Saya akan lebih berminat dengan pembuatan produk Batik estetik buatan tangan.*					
4	I would be more interested in exhibitions that showcase Batik. *Saya lebih berminat dengan pameran yang mempamerkan Batik.*					

5	I would be more interested if more videos (eg. Commercial, music videos, etc) involving Batik are made and broadcast to most TV and online channels. *Saya akan lebih berminat sekiranya lebih banyak video (seperti iklan, video muzik, dll) yang melibatkan Batik dibuat dan disiarkan ke kebanyakan saluran TV dan dalam talian.*					

Section C: Comment and suggestion:

Komen dan cadangan:

_____

_____

_____

_____

_____

I have testing the product and answer the questionnaires:

.....

Name: .....

Date: .....

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

THE DEVELOPMENT OF MALAYSIAN BATIK HERITAGE BY USING AUGMENTED REALITY

QUESTIONNAIRE

[TO BE COMPLETED BY BATIK OWNER]

Assalamualaikum and hello. I am Noorin Nasrina Binti Rusan, student of 3 BITM from Faculty of Information Technology and Communication. I want to conduct a survey about **The development of Malaysian Batik Heritage By using Augmented Reality**. The objective of this project is to evaluate the effectiveness in delivering Batik information of using new method that is Augmented Reality. Thank you for your willingness to answer this survey.

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SECTION A – GENERAL INFORMATION

Please tick (√) yes or no in the table below.

Sila tandakan (√) ya atau tidak di jadual di bawah.

Gender*Jantina*

☐ Male / Lelaki

☐ Female / Perempuan

Position/*Kedudukan* : _____

Section B: User Testing

Please tick (√) yes or no in the table below.

Sila tandakan (√) ya atau tidak di jadual di bawah.

A) The Content

No	Question	Yes	No
1	Does the instructions stated in the application are clear to guide the user to use the application? *Adakah arahan yang dinyatakan dalam aplikasi jelas untuk membimbing pengguna menggunakan aplikasi tersebut?*		
2	This Augmented Reality tells about Malaysian Batik? *Augmented Reality ini menceritakan tentang Batik Malaysia?*		
3	Malaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and Pahang *Malaysian Batik can be found on the east of Malaysia such as Kelantan, Terengganu and Pahang.*		
4	Does the arrangement of process batik are arrange correctly? *Adakah susunan batik proses disusun dengan betul?*		
5	Does the multimedia element(video) is helpful to understand the process of making Batik? *Adakah elemen multimedia (video) berguna untuk memahami proses pembuatan Batik?*		
6	Does the multimedia element(3D model) helpful to understand the function of each object in Batik Tools? *Adakah elemen multimedia (model 3D) dapat membantu memahami fungsi setiap objek dalam alatan Batik?*		
7	There are 2 types of Batik in Malaysia which are Hand Drawn and Block Painted *Terdapat 2 jenis batik di Malaysia iaitu "Hand Drawn" dan "Block Painted"*		
8	There are 4 types of design motif in Malaysia such as Flora, Fauna, Geometry and Abstract *Terdapat 4 jenis motif reka bentuk di Malaysia seperti Flora, Fauna, Geometri dan Abstrak*		

A) The Effectiveness

No	Question	Yes	No
1	This Batik Augmented Reality application is convenient to use. *Aplikasi Batik Augmented Reality ini senang digunakan.*		
2	This Batik Augmented Reality application able to attract your attention. *Aplikasi Batik Augmented Reality ini dapat menarik perhatian anda.*		
3	Using an Augmented Reality is more convenient compared to a personal computer for learning. *Menggunakan Augmented Reality lebih senang dibandingkan dengan komputer peribadi untuk belajar.*		
4	The Augmented Reality is effective in learning basic Malaysian Batik on a mobile device anywhere and at any time. *Augmented Reality berkesan dalam mempelajari Batik Malaysia asas pada peranti mudah alih di mana sahaja dan pada bila-bila masa.*		
5.	The integration of all learning content with augmented reality technology is more effective than the current teaching method. *Penyatuan semua kandungan pembelajaran dengan teknologi augmented reality lebih berkesan daripada kaedah pengajaran semasa.*		

Section C: Comment and suggestion:

Komen dan cadangan:

_____

_____

I have testing the product and answer the questionnaires:

.....

Name: .....

Date: .....