

**Edu4UX: Mobile Application for Year 6 Students to learn science  
based on UX Model**

by

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Dissertation submitted in partial fulfilment of the requirements for the  
Bachelor of Information Systems (Hons)

September 2021

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## CERTIFICATION OF APPROVAL

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(Hons)

Approved by,



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SERI ISKANDAR, PERAK

September 2021

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.

A handwritten signature in black ink, reading "Fadhlán", is centered on the page. The signature is written in a cursive style with a horizontal line above the letters.

MUHAMMAD FADHLAN BIN JUNAIDI

## **ABSTRACT**

User Experience is one of the important elements when designing a mobile application or web application aside from User Interface. Taking consideration in the UX elements will improve the customer satisfaction when using the application. Loyalty is the most important attributes from a customer when designing a product. Even though the User Experience (UX) are widely use in Mobile Application but nowadays most application developers nowadays failed to realize the use of User Experience (UX) when developing a Mobile Application for Education purposes. Thus, this research paper focus on developing a mobile application for education based on the UX model to attract the school students to use the application. Within the model there are four types of important elements that must be implemented when designing the application which are Cognitive, Aesthetic, Functional and Emotional. To make sure all the elements mentioned above are implemented correctly, a thorough analyzation of the student's interest within the mobile application will be conducted. This project is expected to increase student learning experience and enhance their cognitive ability.

## **ACKNOWLEDGEMENT**

Final year project is one of the crucial requirements for students before graduating from university. Being a final year student at Universiti Teknologi PETRONAS is one of the greatest blessings that Allah has given me to face any challenges and pursue His sustenance and acquire useful knowledge along the way. I would also like thank everyone that constantly supported me throughout my journey here in Universiti Teknologi PETRONAS.

First and foremost, I would like to express my thanks and gratitude to my Final Year Project Supervisor, which is Dr Khairul Safee Bin Khalid for his effort and guidance including throughout completing my journey in both Final Year Project 1 and Final Year Project 2 semesters. I am truly grateful by the kindness and positive insight given to me. Without his help, it will be impossible for me to complete this project.

Secondly, I would like to show my appreciation to my family members for their continuous support in giving me a will to go on. Without their supports, I could not have made it this far.

Lastly, not to forget my beloved friends in Universit Teknologi PETRONAS for their consistent support and love towards me to achieve my goals during this pandemic era. I hope that Allah S.W.T. blessed everyone who have helped me throughout this challenging journey.

Thank you.

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## LIST OF ABBREVIATIONS

COVID-19	Coronavirus Diseases 2019
FYP	Final Year Project
UX	User Experience
UI	User Interface



# CHAPTER 1

## INTRODUCTION

### 1. Introduction

#### 1.1 Background of Study

In this era of evolving technology, websites and mobile applications have unexpectedly more complex. What was once a one-way static medium has transformed into a rich and engaging experience. However, regardless of how much everything has changing within the creation process, the success of a website and mobile application is always determined by only one factor which is “How people perceive it?”, “Does this mobile apps provide me with any important value?”, “Is it simple to operate?”, “Is it enjoyable to use?”. Some of these questions are often asked by any user who are engaging with the application and from this they decide whether to continue using the application. To solve this question, User Experience is one of the success keys factors.

User Experience (UX) is described as how user feels when interacting with a system, in which the system could be referred to as websites and mobile application. It is usually can be identified by human-computer interaction (HCI) in modern situations nowadays. User Experience is all about giving out the best in either mobile application and websites and to make them say “Yes” to all those questions mentioned. Nowadays, there are many mobile applications are being developed which includes educational mobile application but not that many applications could maintain user’s loyalty and will be forgotten later. This happens because the necessity of creating and improving user experience seems almost redundant. According to Gube (2010), he stated that in creating application we need to take in user’s perspective as well and not just design based on our perspective because we do not how the people feel

when they use that mobile application. This especially as there are many applications that failed due to less adaptation of UX such as MySpace.

### **1.1.2 Decrease in number of Student taking Science Stream**

With the immense growing of digital industries nowadays, the number of students studying Science, Technology, Engineering, and Mathematics (STEM) subjects continues to decline. Despite STEM-related employment being among the top emerging jobs, the skill pool continues to diminish, which is one of the concerning factors in Malaysia. According to Prof Datuk Dr Noraini Idris (Head of National STEM Movement), she estimated that only 19% out of 447,000 students chose science stream in Malaysia. This statistic shows that most of Malaysian student did not like science due to their bad perception about science. Science, technology, engineering, and mathematics (STEM) learning methods need to be handled in an interesting way especially science as this subject involves a lot of facts memorization to ensure that more students pay attention to it and choose the field as a stream to university. According to Sgard (2004) OCDE Global Science Forum, in his research he stated that *Science themes usually pique the curiosity of primary school pupils, but courses generally place a larger focus on knowledge and facts rather than comprehension. Some teachers may also not comfortable enough with science topics and hands-on activities.*

As a result, from these statistics, she also mentioned that *due to the situation, she said, many study quotas involving STEM at the university could not be met due to the lack of candidates from the stream, thus not being able to produce more field experts.* Without the science students, how Malaysia is going to strive towards the Industrial Revolution 4.0 and achieve goals soon. That is why it is important for our younger generation to take science stream as they are our only hope to make our future better.

### 1.1.3 Science as a source of sustainable development

Science is essential for addressing difficult human concerns like climate change, biodiversity loss, pollution, and poverty reduction because it creates the groundwork for new approaches and answers. What is the most effective way for science to fulfil its societal obligations? What can we do to make knowledge and action more dynamic? As a result of these issues, a new method has emerged: sustainability science. UNESCO is bringing together key stakeholders from academia, policymaking, specialized institutions, and the United Nations to better define and broaden the sustainability science approach in support of the 2030 Agenda for Sustainable Development, thanks to the generous support of the Japanese government. This two-year project was announced in April at a conference held at UNESCO Headquarters in Paris. According to Nada Al-Nashif, UNESCO's Assistant Director General for Social and Human Sciences, she mentioned that *Science plays a critical role for sustainability as it encourages multidisciplinary methods to better understand human-environment interactions and systems, as well as how these connections affect the sustainability challenge.*

Humanity faces significant challenges because of global change. By 2025, the world's population is predicted to increase from around 6 billion to 8.5 billion people. The world's energy demands will continue to rise. The newly industrialized countries of Asia and Latin America are experiencing extremely rapid economic expansion, which is spreading contemporary society's environmental issues, such as air and water pollution, and waste concerns, to more parts of the world. Environmental issues resulting from human economic activities are intensifying and taking on global proportions. Examples include climate change, ozone depletion, and the loss of forest cover. At the same time, social circumstances in many developing countries continue to deteriorate. More than 1 billion people are believed to be living in poverty, with insufficient food, educational possibilities, and political involvement chances.

The primary goal for the twenty-first century is "sustainable development," which was endorsed by the world community at the United Nations Conference on Environment and Development in 1992. Sustainable development aims to strike a balance between environmental preservation and economic growth; it simply means consuming resources no quicker than they can replenish themselves and discharging pollutants no more than natural resources can absorb. Therefore, in order to support those goals, the younger generation needs to be educated with diverse critical thinking and problem-solving skills that can be derived from science subjects during primary school. It is the younger generation that could give a significant impact to our future without them the goals that the United Nation brings up would be pointless.

#### **1.1.4 Mobile Application an effective learning platform**

In today's world, adults including children are increasingly compelled to use their phones for all purposes. The entire world is at a student's fingertips, and he or she may obtain any knowledge from any location. This eliminates the need to go to a library and look up the information. As a result, a mobile phone may be used to a variety of uses. Mobile apps are what makes information easily accessible. Each mobile app has a distinct feature that provides a distinct set of services. Learning is an ongoing activity, and the emphasis has now shifted entirely to E-Learning. Students may study at their own pace and can take their time learning things thanks to mobile phones and different feature-oriented applications, since everything is just one click away. Based on the statistics, it is found that the number of educational applications that are being downloaded in both Google Play and Apple App Store are significantly increasing from year 2017 to year 2020. During this pandemic, school are closed due to lockdown for the people's safety. Therefore, parents or school children at their own initiative downloaded the educational application in order to increase knowledge about certain topic.

## **1.2 Problem Statement**

### **1.2.1 Lack of UX that were implemented in the making of mobile application for education**

Children and adults are becoming increasingly tech-savvy, particularly children who have been exposed to a variety of gadgets from an early age. Given this, plus the fact that there are currently so many educational solutions on the market, it is understandable that the process of developing an e-learning app is becoming more difficult. Though most designers follow the same standards when designing applications for different sectors, it is crucial to pay attention to where those principles change, since they are influenced by the complexities of apps for learning. Designers tends to overlook the UX elements when creating an educational mobile application. This will result in user does not stay loyal to the product. There are many great mobile applications that failed due to the designer does not understand the what the user wants. To implement a better UX there needs to be proper research so that we can understand the user better. The term “you are not you user” describes it well that we do not create the mobile application based on our perspective but rather we create based on the user’s wants.

### **1.2.2 Science applications that were developed not based on UX consists of abundance of information that might be hard and confusing.**

Science is packed with many facts and information, but it can be hard for the students to memorize every word in detail. Science is a related to problem-solving skills and they frequently regard problem-solving as complex and difficult to grasp. Students are frequently expected to memorize formulae and solve difficult word problems. To understand the terms within their science subject, the school children tend to download Science mobile application that can help them understanding science. But it is quite disappointing that some of these applications are not developed based on what the user’s wants and are lack of UX elements but rather more focus on User Interface (UI). Not just that the application developed

have abundance of information making the school children frustrated with the application. From this student tends to look for another application that could help to solve their goals. This is not learning for them, but rather a waste of time. Aside from memorization, will student understand the topic discussion? That is the question. To create a science application that are interesting and fun for the users, the knowledge provided within the application must be complete and simple for them to understand. It is important to understand the user first to create an application.

### **1.2.3 Student have lack of learning experience in science**

Student have lack of learning experience in science this is due to the fact because of the teacher's way of teaching. This has tremendous effect on the student's performance especially during this pandemic season where the class is carried out online. Online class there is both good and bad side of it, students can just go to sleep when the class is not that interesting to them. Thus, this will make them lose interest in obtaining knowledge, especially science. Students despise it for a variety of reasons, one of which may be the most important. Online class are not the only factors that contribute to this matter. According to Gyamfi (2013) in his research *he shown that the factors contribute to students lack interest in science includes less practical nature of science learning and science learning is merely a transmission of science knowledge from science teachers to the students.* Making the students frustrated as there is a broad knowledge of science and this leads to them thinking that science is the hardest subject in school as there is no simplicity and creativity in teaching science by the teachers. Teachers have a critical role in influencing their pupils' attitudes about science. Everyone may probably relate to this one because bored students tend to zone out. When students think that teacher are overly abstract or irrelevant to them, they commonly complain that they are boring. In fact, when they were in school, no one seemed to understand why they needed to know these things.

### **1.3 Objectives**

The aim of this project is to create a mobile application for science education based on the UX elements. In creating mobile application for education, we need to exactly know that the user wants and how the app looks like. This will in return create a mobile application that will be useful for the student in a long term.

The objectives applied for the projects are:

- a) To make research on existing UX models that were used in developing mobile application and implementing the UX elements that needs to be adapted within the mobile application.
- b) To design an educational mobile application based on a UX Model
- c) To investigate the experience of students in using educational mobile application by developing video about any educational mobile application and send the video to the school children.

### **1.4 Scope of Study**

To reach for the objectives of this research, the studies will be divided into smaller subset which includes:

#### **a) FOCUS**

The focus of this research is to implement the element of UX model by Fadel (2014) within the mobile application to give positive experience to the user.

The elements of this UX are:

- |                |               |
|----------------|---------------|
| i- Cognitive   | iv- Aesthetic |
| ii- Functional |               |
| iii- Emotional |               |

#### **b) Target users**

The target users are standard 6 school children who are studying science subjects and having a hard time understanding certain topics within their syllabus.

#### **c) Time Limitation**

The time limitation for this project will be 8 months which is equivalent to 24 weeks.

#### **d) Science Educational Application**

To create the mobile application, I will be using Flutter which is a Google open-source UI software development kit that lets you create apps for a variety of platforms. You can create apps for iOS, Android, Windows, Mac, Linux, the web, and Google Fuchsia with a single codebase. The UI toolkit is developed in C, C++, and Dart, and it aids in the creation of attractive, natively built apps. With enough UX research and a more stable platform for development, the mobile application can be developed successfully.

### **1.5 Significance of Study**

The important of this project to make an application for science educational purposes for standard 6 school children as to enhance their learning experience has been discussed as below:

- i- Science as a source to achieve Sustainable Development Goal by the United Nation
- ii- UX as a key to enhance user's satisfaction and helps better to understand what the users wants.



## CHAPTER 2

### LITERATURE REVIEW

## 2. Literature Review

### 2.1 User Experience (UX)

User Experience (UX) and User Interface (UI) are two distinct functions with distinct goals. Any interaction a user has with a product or service is referred to as the user experience. According to Norman (1990), he mentioned that “*User experience encompasses all aspects of the end-user’s interaction with the company, its services and its products*”. For instance, how the product looks visually, how its elements impact the user, how it makes them feel, and how they engage with it are all factors to consider. User Interface (UI) is more on digital terms, it can be described as complement of user experience, User Interface (UI) it is considers all the visual, interactive elements of a product interface that includes buttons, icons, colour, spacing, typography, colour schemes and responsive design. The main objective of user interface design is to visually lead the user through the interface of the product. It is about giving the user an intuitive experience that does not force them to think too much. UI design ensures that a product's interface is consistent, cohesive, and visually attractive for the user to use.

UX design encompasses a wide range of other topics. A UX designer is responsible for all parts of the product acquisition and integration process, including branding, design, usability, and function. It is a tale that starts even before the user gets their hands on the gadget. Products that give a fantastic user experience for example the iPhone are built with the whole process of obtaining, owning, and even troubleshooting in mind. UX designers, meanwhile, do not simply focus on making useful products but also consider other aspects of the user experience, such as enjoyment, efficiency, and fun. As a result, there is no universally accepted definition of a good user experience. A good user

experience, on the other hand, is one that satisfies a specific user's needs in the environment in which he or she utilizes the product.

When it comes to UX the designer should take consideration on What, Why and How of the product. The What is concerned with what the users can accomplish with the product's functionality. The Why refers to a user's reasons for adapting a product, whether they are related to a task they want to accomplish with it or to values and perspectives that consumers connect with product ownership and use. Finally, how is concerned with the creation of practical design that is both easily accessible and pleasing in the eyes of the users. To develop a product that provides a meaningful experience. This is especially important when developing the mobile application for education. We want the school children to think the application is fun and full of simple facts with beautifully design framework as an impact these school children will stay loyal to the application. But although user experience is important in the making of application, but User Interface must also work together so that the application can become better. As mentioned by Varshney (2021), *“A UI without UX is like a painter slapping paint onto a canvas without thought, while UX without UI is like the frame of a sculpture with no papier mache on it. A great product experience starts with UX followed by UI. Both are essential for the product's success”*.

## **2.2 Application that failed due to less adaptation of UX**

Over the year there are many applications that failed whether due to marketing and other issues. But there is also other application that failed due to less UX adaptation to their application. In building application, we must understand the user by doing research such as doing survey to collect information. User satisfaction is the top priority in building mobile application. Example of an application that failed due to UX is Myspace. According to Cadenas(2020), he mentioned that *“Myspace was once a hive of social activity and was regarded as the world's most popular online social network during the*

*late 2000s*". When Facebook took over in 2008, the network quickly fell out of favour. What caused Myspace's user base to migrate so fast to Facebook? The solution is straightforward. The Facebook user experience takes seconds to grasp and adjusts to a user's network of friends and interests on a continual basis, meanwhile Myspace user was forced to hunt and peck for information across several windows, resulting in an unpleasant user experience. Based on research made by White (2018), in his research he mentioned that "*Simplicity is the fundamental principles in UX design and that it meets what exactly the user's requirement or demand*". But unfortunately for Myspace, the developer disobeyed the golden guideline of user experience design which is to keep things simple. Simple actions like sending a message to a friend were difficult to perform on Myspace due to the inconsistent nature of each user's profile. While customization is typically seen as a desirable feature on social networking platforms, Myspace went too far. As a result, the site became difficult to navigate. Performance difficulties were exacerbated by hyper-personalization and a lack of consistency. Furthermore, owing to incompatible modifications between browsers and operating systems, the sites often resulting in crashed.

Besides that, Google Wave was one of the most talked-about yet misunderstood Google services ever. Wave allowed participants to create topics and make discussions, which Google dubbed as "waves." Inside waves, several individuals may edit and communicate at the same time. Waves might also include photos, links, movies, and polls. Wave was defined by Google as "what e-mail would look like if it were developed today," a mashup of elements found in e-mail, instant messaging, wikis, and online forums, but it was not intended to be a straight substitute for any of those tools. The UI choked under the weight of its own features. The tool was over-designed, yet it did not function as well as it should have. Wave included a lot of features that Google thought users would like, however the features were only half-baked and did not replace current collaboration platforms. It was a complicated product that demanded a user's attention merely to figure out how it functioned. Finally, Google Wave was a service that could only be accessed via invitation. For others who wanted

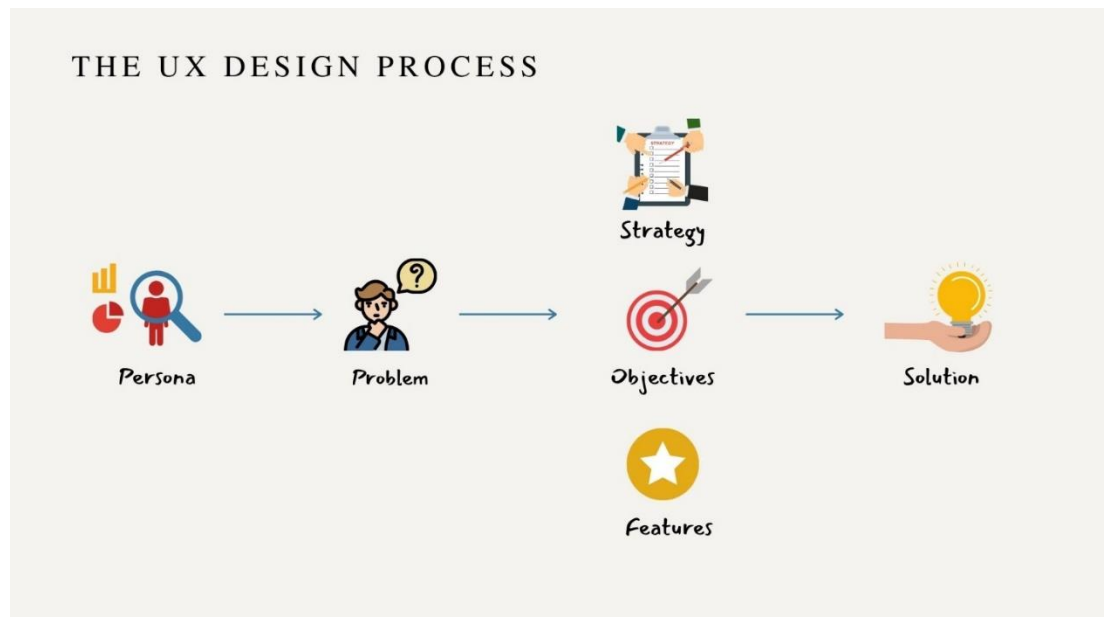
to try it, this caused unneeded friction. Google Wave was only around for 15 months.

### **2.3 The importance of UX in Mobile Application Development**

Satisfaction is one the element that must be fulfilled by any developers of products or application. Without satisfaction we could not gain the customer's trust. That is why almost educational application in Malaysia is not popular and never lasted long as the result the developer never fully understands the importance and the true concept of UX implementation in mobile application. According to Gangadharan (2019), he stated that "*The goals behind UX is to provide positive user experience that encourage users to stay loyal to the product*". Products sustainability in the market are depends on the customer, so in order to make sure our product can survive in the market. There needs to be a good element of UX implemented within the mobile application.

In designing mobile application, it is important to take note that there are different types of users with unique user experience. When designing the mobile application is the designer are not the only prospective consumer who will utilize the application. As a result, we cannot presume that the user wants and how they achieve their goals with the application. In order to define a great user experience, the main key is to get close to their target users, have a conversation with them, observe the way they use the application, and this will give us an insight about their experience in using the application.

To initiate the UX implementation, it is crucial to take consideration of the UX design process. According to Gangadharan (2019), he stated that "Smart user experience starts with identifying the problem and guiding the data collected to solve that particular problem by asking question to them.". Below are flow or process within the design:



*Figure 1: UX Design Process*

## 2.4 Taking consideration of UX model when designing mobile application

In creating mobile application based on UX designs, UX designers has prepared their own UX model in assisting developer when they want to utilize the UX in the making of their own application. Each of this UX model has their own attributes that suites the designer expected results of the application.

## Experience-Centered Web Design Model – Fadel (2014)



Figure 2: Experience-Centred Web Design Model

Fadel created the Experience-Centered Web Design Model in 2014. In his UX approach, he considers the four key components of functional, cognitive, aesthetic, and emotional design. With all four parts in place, this module will be a good fit for the educational science mobile app which is Edu4U. The mission of the mobile application is to improve the learning experience for students in grades 6 through 8. The emotional dimension of the UX model will be the first to be designed, as this is where user experience will be built. The user experience, according to this document, will be conceived here. According to Fadel (2014), the emotional dimension consists of attractiveness, pleasure, satisfaction, enjoyment, and motivation. Does user feel the mobile application worth it? And does it give satisfaction? All this question is related to human emotions when using the application. Personally I think the emotional element within his model is one of the important asset to consider as studies *have found that 80% of an individual's life is consumed by emotions while the other 20% is intellect* (Lough, 2006) The user experience, according to this article, is the total perception of a web site's or mobile application interaction, and it may be developed by enhancing, altering, or re-creating the experience in the real world. To do so, the first step is to comprehend what this real-world experience entails.

Moreover, the functional element deals with the mobile application's functionality and usability. The dimension itself deals with two different perspectives which are the clients and the user. The client's point of view or expectation of the application makes use of needs in connection to the interface, which describes the application's overall context as well as the clients' expectations. Users' needs regarding the interface, on the other hand, are obtained through interviews. The demands of customers and users are resurrected as interface functionality, with the activities of the interface considered.

Besides that, the Aesthetic dimension takes in consideration of all the aspects of how the application visually such as the color, texture, images and graphic composition. The Aesthetic dimension represents the two other dimensions visually. Visualizing the concept and functioning may pique the user's curiosity in trying out the design. It is important to note that color, images, animation and audio can contribute better for interaction in mobile application. According to Fadel (2014) he stated that "*User nowadays respond better with more visual arrangements*" that is why with all this dimension link together, the mobile application for science education would be better for them.

Furthermore, the cognitive dimension there are also several elements which is defined in their own way. Learnability here refers to the speed and ease with which the user gets familiar with. Memorability is something which is likely to be remembered or worth remembering while using the application. Complexity has been referred as how the feature of the application makes it difficult to understand. Discoverability here means the quality of users to easily find information in the mobile application

## CUBI Model – Stem (2014)

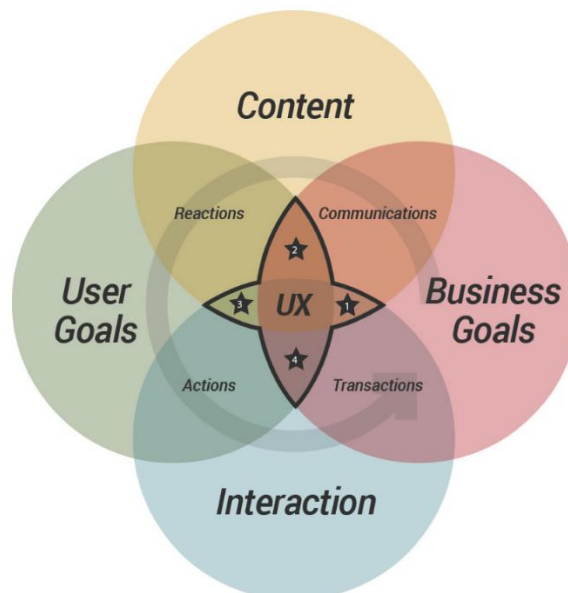


Figure 3: CUBI Model

Corey Stem (2014) established the Cubi UX paradigm to address business challenges and engage people in a more positive and enjoyable user experience. He looked at current user experience models or frameworks and concluded that most UX diagrams are confusing, unorganised, complex, or obsolete, making them useless to designers and clients. It was for this reason that the CUBI model was created. The CUBI UX model was created using reverse-engineering techniques to understand and explain the concepts, interactions, and features of hundreds of award-winning applications. CUBI stands for Content, User Goals, Business Goals, and Interaction and each of this dimension has five incorporating content.

### Content

The first element is content type. There is more to content than simply text. Photography, video, music, visualization, papers, and a variety of other formats are all examples of content. When many material types are combined, there is more possibility for new forms of communication and interaction. It is critical to create an inventory of the various types of information and the context in which they will be used. Besides that, content



models bring together many forms of content into a more recognizable model or structure. After the content model where aesthetics, and treatments have been applied, the content may be treated. Content must be brand-consistent and communicate the brand successfully. Simply said, content techniques refer to the many ways in which material can be displayed. It may be considerably more fascinating and engaging when used to build stories that incorporate analogies, metaphors, symbols, scenarios, challenges, or other creative ideas. Finally, content architecture refers to the way information is structured and organized on a website, software system, or even a retail store. It has an impact on all forms of content, as well as content types and models.

## **User Goals**

User Goals is made up of five parts, the first of which is user types. It is crucial to recognize the various types of users. Creating personas is a good approach for describing various professions, responsibilities, skill levels, demographics (gender, age range, languages, locations) and psychographics (personality, values, attitudes, interests, lifestyles). Personas may be used to establish different needs in terms of where, when, and how each user will use the product. After user categories have been identified, it is crucial to identify and articulate the necessary requirements and ambitions that will aid them in achieving their objectives. Some demands are more straightforward, such as locating documents, while others are more complicated, such as physiological or esteem requirements. Moreover, it is critical to understand the motives of users once their requirements have been recognized. Cues, design triggers, or other approaches might be used to create a wide range of intrinsic or extrinsic incentives or motivators. User research can identify possible modifications after the reasons have been established. There is a better chance of building new habits and devotion to a product and brand if you have enough incentive and modify your behavior. Lastly, will all the elements combine within the User Goals dimension it will lead to more successful outcome.

## **Business Goals**

People, resources, and other interconnected experiences all make up the operations that support the product in any project. Participants might include key corporate stakeholders, content creators, subject matter experts, collaborators, administrators, recruited users, and anyone involved in the project. Connected experiences may occur before to, during, and after the interaction. It is crucial to know how consumers will locate your goods. Internal marketing, such as advertising, or external marketing, such as internal communications, are obvious examples. App Stores, search engines, and social media are some of the other options. This aids in the creation of consistent, congruent, professional, and focused communications. Besides that, offering is where the company may provide a product and/or service ecosystem. It is also crucial to comprehend how these items and services interact with one another. The company will require a clear value proposition to communicate these products. Furthermore, the outcome of the solutions enables relevant measurements and Key Performance Indicators that aid in corporate success. Financial success, client acquisition goals, enhanced customer happiness, staff performance measures, call center metrics, and other indicators may all be included in KPIs. Lastly, every company has their own mission to achieve. The goal, competitive advantages, target audience, and why the organization exists are all explained in a mission statement. The mission statement should act as a roadmap for making decisions and clearly define goals.

## **Interaction**

Interaction dimensions consist of pattern interaction, system interaction, device interaction and human interaction. Pattern interaction is design patterns (also known as Micro Interactions) are components and interactions that may be reused. Headers, menus, calendars, and maps are all examples of patterns. Besides that, to assist the user in progressing and achieving their goals, the system might include navigation, flows, feedback, and notifications. The system's nature might be static, implying that it remains unchanging, or dynamic, implying that it is always changing or active. Various degrees of rights and activities are provided to different users based on their credentials in dynamic systems, which can be managed or self-regulated. Systems can also be defined using a content management system or other system software that has a set of capabilities and limits. When designing for an experience, it is important to understand the capabilities and limitations of the targeted devices, such as screen sizes, connectivity, user interface standards, and other elements. Phones, tablets, kiosks, terminals, watches, appliances, and other devices may all be used to deliver the experience. Gestures, geolocation, accelerometers, audio recording, camera capabilities, push notifications, and other features inherent to current phones, for example, may all be supported by modern phones. When utilizing some gadgets, user interface design considerations are also addressed to create ergonomic and enjoyable experiences. Lastly, the human interaction formal or informal human interactions, personal or interpersonal and social.

## UI/UX Model - Herasymenko (2019)

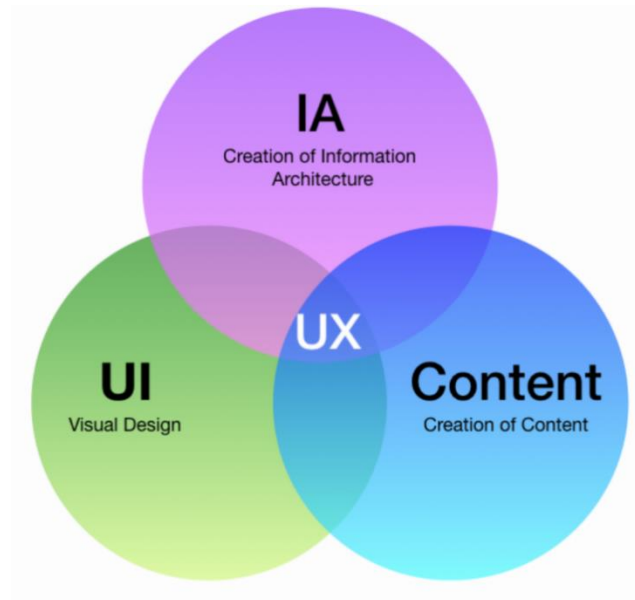


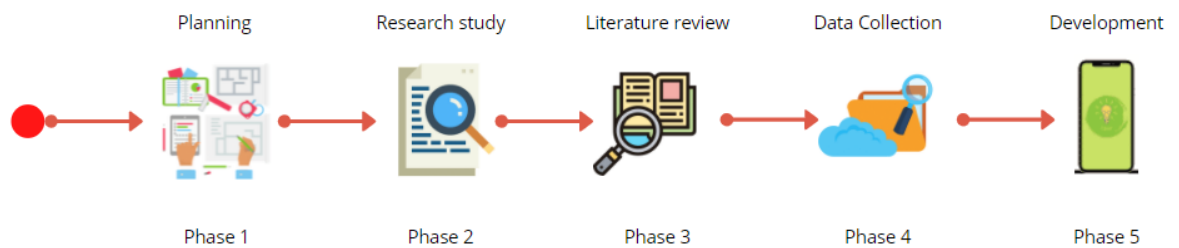
Figure 4: UI/UX Model

The UI/UX model was designed by Andrey Herasymenko (2019), the model was developed to avoid the misconception of UI and UX for beginners. According to Herasymenko (2019), he stated that *“User Interface is the appearance of the interface and the physical properties it receives and User Experience is the result of the user's interaction with your interface. Is he capable of achieving the objective, and if so, how simple or difficult will it be?”*. From the statement, it is crucial for both UI and UX to work together, so that the application could fulfill the user satisfaction. Within the model there are three important components which are UI for visual design, Content for creation and content and lastly IA creation of information architecture. The goal of information architecture (IA) is to organize material so that consumers can quickly adapt to the product's functioning and discover what they need with little effort. To sum up UX can be formed based on the three components mentioned. If these components are executed perfectly, the application could be better for both user and clients.

## CHAPTER 3

### METHODOLOGY

#### 3. Methodology



*Figure 5: Flow of Methodology*

To make sure the project is a success, a research diagram must be developed to keep track on the progress for the project. Each phase must be complete to reach to the next steps.

**Phase 1 (Planning):** The first phase is where the projects plan will be documented, the project deliverables and requirements are specified, and project timeline is created. Planning is important in a project to make sure that the project can be initiate smoothly.

**Phase 2 (Research Study):** After the initiation of the first phase, research study will be carried out to understand the real-world problems based on the documentation in the planning phase

**Phase 3 (Literature review):** To choose the right UX model for the development process a thorough research about any other UX models must be conducted, this is because there is a lot of UX model with different functionalities and to make sure the Science mobile application is a success, an accurate UX model must be adapted along their UX elements.

**Phase 4 (Data Collection):** Phase 4 is where the data collection begins to investigate the experience of students when using any other educational mobile application. The objectives are achieved through developing 3 videos with 3 different educational mobile applications and sending these videos to school children. Two applications are from the Android Store and one from the Apple App Store, asking for their perspective on both positive and negative experiences about these 3 applications. From these greater insights, it can be achieved making it easier for the development process later.

**Phase 5 (Development):** The development phase is where the analysis, design, and testing take place. For the development process, the Rapid Application Development will be used as the project must be completed in a limited amount of time. Hence, RAD is the recommended method to use for this project to complete the development of the science mobile application.

### 3.1 Rapid Application Development (RAD)

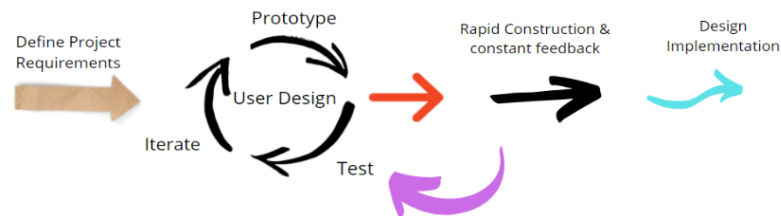


Figure 6: Rapid Application Development

The Software Development Life Cycle, or SDLC, is a process for creating high-quality, low-cost software in the shortest period possible. SDLC is a well-structured sequence of phases that allows a firm to quickly produce high-quality, extensively tested software that is ready for production. Software Development Lifecycle has a lot of models that could be used by developers such as waterfall model, spiral model, RAD model, and Agile model. For this project, Rapid Application Development (RAD) will be used. RAD model also known as Rapid Application Development model as this

method are suitable for those who must finish their project or application at limited time with a low-cost budget. Besides that, the method also suitable for single team with a small number of people. This enables for faster communication and information sharing through quick short meetings.

The Software Development Life Cycle (SDLC) approach focuses on the phases of software development such as requirement analysis, planning, software design, software development, testing and development. The stages will not stop but rather it will keep looping if there are any changes needs to be made.

- i. **Planning:** It is where define what types of problems that the customer is facing to develop the application as their intended. Any ambiguous information must be clarified solely during this step. After gathering the necessary requirements, an analysis is conducted to determine the viability of developing the product and compiled in a document.
- ii. **Design:** The requirements obtained and have been compiled in document are utilized as input in this phase, and the software architecture required to accomplish system development is generated.
- iii. **Implementation:** When the design has been decided, the implementation or coding begins. Development code is created from the software design. During this stage, all the software's components are implemented.
- iv. **Testing:** When the code is finished, the application is ready for testing. The produced application is carefully tested in this phase, and any faults discovered will be rectified immediately. Retesting, also known as regression testing, is carried out until the application meets the customer's expectations.

- v. **Deployment:** The application is released to the public for the user acceptance testing. If the application meets their needs, then the project is completed. If not, the process will go back to implementation to correct any errors.
  
- vi. **Maintenance:** After a product is deployed in a production environment, the developers are responsible for product maintenance, which includes fixing any issues that arise and any enhancements that need to be made.



## **3.2 Tools and Equipment**

Some of the software tools were necessary for the creation of the prototype mobile application for this research to guarantee that the development phase could be completed effectively and according to plan. A few of the software tools that will be utilized to create the prototype for this project are listed below:

### **Visual Studio Code**

Visual Studio Code is the best code editor, developers nowadays tend to use this software as it is free, open source and cross-platform. The software is available on Windows, Linux and macOS. The software supports almost all programming language such as HTML, CSS, Java, PHP, SQL, and Dart language for the development of mobile application.

### **Flutter**

Flutter, a UI software development kit from Google, is well-known for allowing developers to create visually stunning, natively built applications for the web, mobile, and desktop platforms from a single codebase. Flutter was initially developed as an open-source project to aid in the creation of mobile applications. Since its stable release, Flutter has risen to become one of the most talked-about cross-platform frameworks. Nowadays, flutter is a topic that most businesses are excited with. It is mostly since a single codebase can be used to build apps for Android, iOS, Windows, Mac, and Linux. Hence, the development of Edu4UX can be developed faster within the time range of FYP 2.

### 3.3 GANTT CHART AND MILESTONES

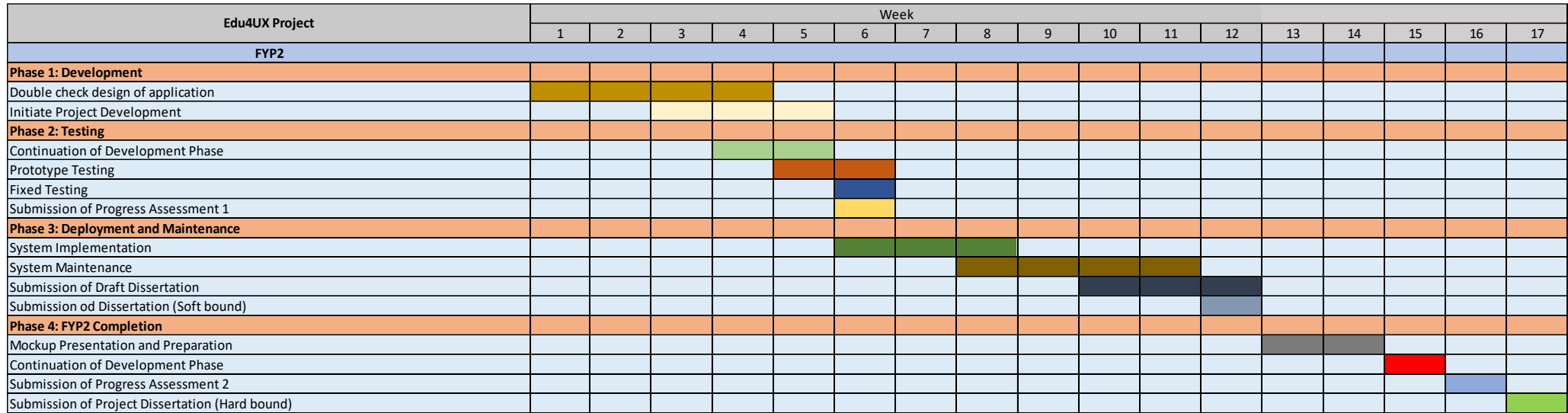


Figure 7: Gantt Chart and Milestones

## **CHAPTER 4**

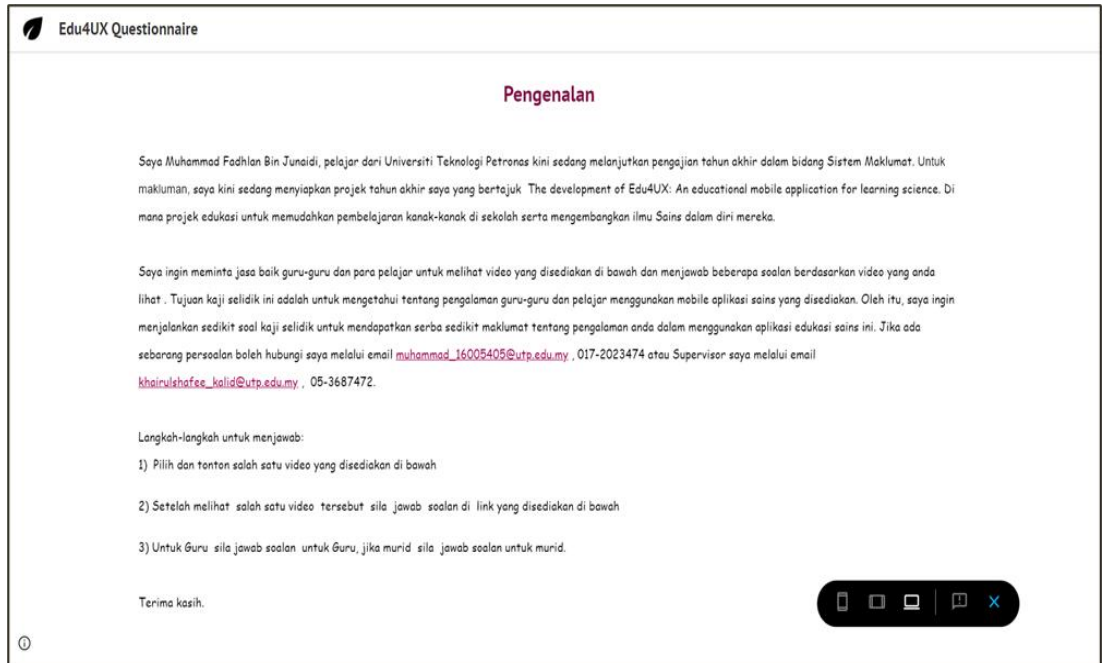
### **RESULTS AND DISCUSSION**

#### **4. Results and Discussion**

In this chapter it is divided into a several sub-topics which mainly focus: 1) Google Form Survey results gathered from students and teachers, (2) The system architecture for the Science mobile application that has been designed. (3) The result of developed mobile application.

##### **4.1 Survey Preparation**

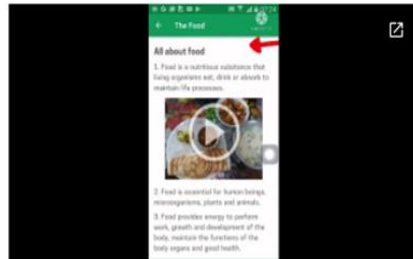
Result from the survey provided for the students to know their experience when using other Science mobile application have given me an insight on how to develop the application based on the student's preference. Also, not to forget the Science teacher plays a significant part in achieving the project's goals. To make sure they can use the application also to teach their Grade 4, Grade 5, and Grade 6 students on that particular subject. To collect the data, a website was created using Google Sites and all the 3 Videos mentioned in the methodology are inserted within the website. The purpose of creating a website is to make sure the user felt comfortable to answer the google form survey questions. The survey was written in Bahasa Malaysia to make sure the grade 4,5 and 6 students and Science teachers able to understand the project purposes. Below is the sample website created using Google Sites:



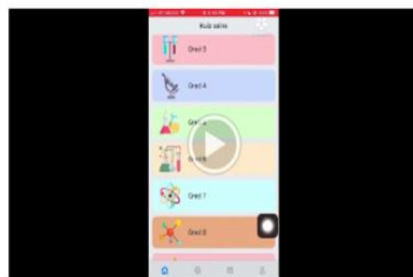
On the first page, the students and teachers are given a few introductions on the purpose of the projects and a few steps on how to begin answering the questionnaire.

## Videos

Sila pilih dan lihat salah satu dari 3 video yang disediakan ini



6th Grade Science - Android



SciQuiz - Apple



MyLatihan Sains Tahun 6 - Android

After a brief introduction, students and teachers are required to watch one of the three videos provided which are (1) 6<sup>th</sup> Grade Science (Android Platform), (2) SciQuiz (Apple Platform), (3) MyLatihan Sains Tahun 6 (Android Platform).

### **Soalan ( untuk Guru)**

*Sudah selesai melihat satu dari tiga video tersebut? Sila tekan link di bawah dan jawab soalan yang diberikan*

Soalan Guru

### **Soalan (untuk Murid)**

*Sudah selesai melihat satu dari tiga video tersebut? Sila tekan link di bawah dan jawab soalan yang diberikan*

Soalan Murid

Finally, when one of the videos has been watched, students and teachers must answer the question as given above based on the videos that they watched. Students must answer questionnaire for student's category, meanwhile teachers must answer questionnaire for teacher's category.

## **4.2 Survey Results**

An online poll has been done to better understand the issue statement that has been raised because of this project, as well as the goals that have been highlighted, since the present pandemic continues to limit physical activities. The survey was continued using the Google Forms platform and Google Sites, and it is now being distributed and shared via a variety of channels, the majority of which are social media platforms such as Instagram, WhatsApp, and Facebook. The study focused primarily on the school student and science teacher's perceptions of the present science educational mobile applications that are being developed in Malaysia. Consequently, there are currently 21 students from different school and 10 teachers that answer the survey respectively. Several of them are from different schools and teaching science.

### **Question 1: -**

**Question: In your opinion, do you think that learning science through mobile application will help school children to excel in their studies?**

According to the survey, all teachers agrees that educational mobile application will help students to learn more about science. Meanwhile, for the students almost all of them agreed that mobile applications are fun and will help them in learning process. Hence, it is important to develop a mobile application based on their preference as they are the one who will use the application. Below are the total percentage of teachers and students who thinks that educational mobile application is fun and will help them in learning process

## Survey Results (Teacher)



### Question 2: -

**Question: Do you think that one of science application in the video is fun and will use it again?**

Some videos also have been uploaded to the Google Sites to see whether the teacher likes the mobile application. And the data collected shows that about 90% teachers will use the application and 10% will not use the application. Meanwhile, for the students almost all of them agreed that mobile applications are fun and will help them in learning process. Hence, it is important to develop a mobile application based on their preference as they are the one who will use the application.



### Survey Results (Teachers)



### Survey Results (Students)

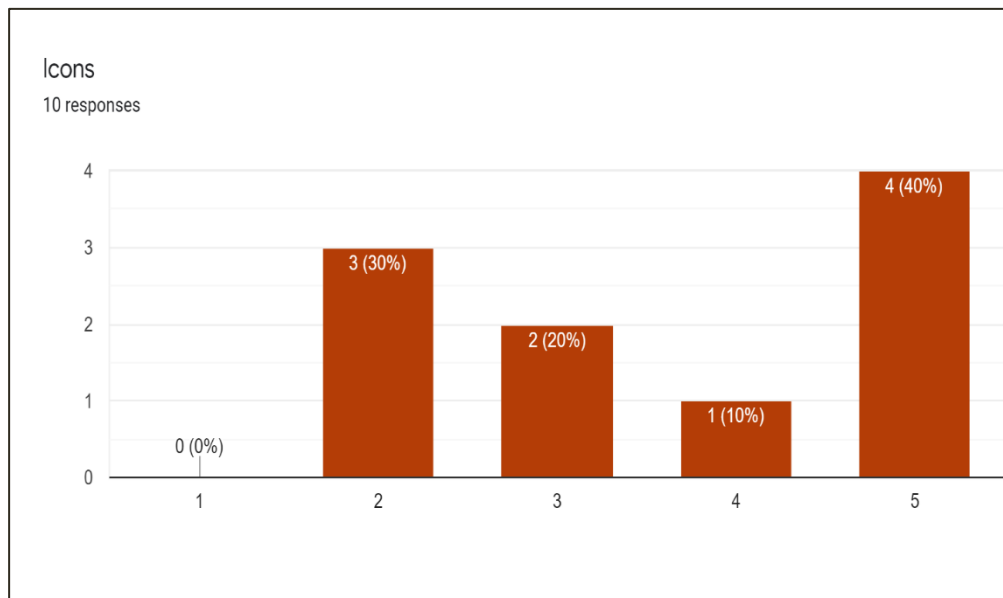


### Question 3: -

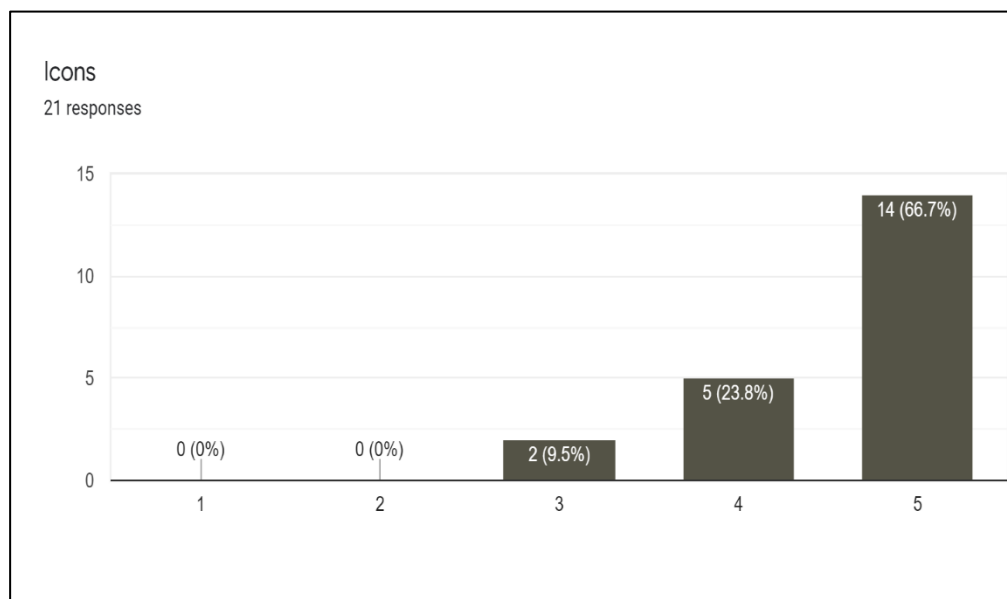
**Question: Rate 1 out of 5 the elements (Icons, Color, Image, Font, Video and Animation) that are presence within one of the applications in the video that you have watched**

The survey also includes a several question about the mobile application's usability in terms of Icons, Colors, Picture, Fonts, Videos and Animation on the teacher's perspectives and student's perspectives. All this feature will help in the data collection process to develop the application successfully.

#### Icons (Teachers)



#### Icons (Students)



It is usually not difficult to distinguish between a good-looking mobile application design and a bad-looking mobile application design in most situations. However, it might be difficult to distinguish between the two and determine which is superior. The main key element that contributes to the full usability of the application is in the detail. When we look at the content of certain mobile application, readability is the most important factor especially educational mobile application. User 's ability to understand the key themes, as well as their ability to read and absorb information, are measured. Icons can assist users in a variety of ways when it comes to supporting the applications content presentation:

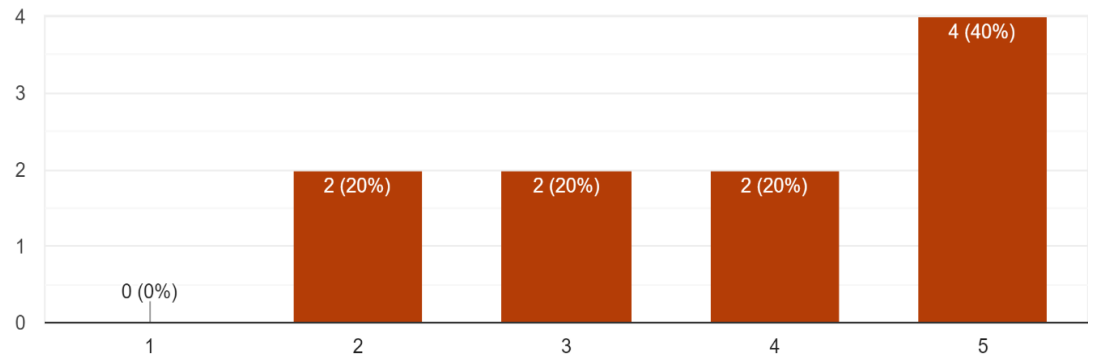
- 1) Icons can explain briefly about what the topic is about
- 2) Icons can attract attention
- 3) Icons can increase user's understanding or readability

According to the data collected 4 teachers gave the 5 rating for the application's icons while 3 teachers responded with 2 rating for the Icons. This shows that icons are an important element when developing a mobile application. Meanwhile, for the students about 66.7% responded with 5 rating, 23.8% responded with 3 rating and the remaining 9.5% responded with 2 rating.

## Colors (Teachers)

Warna

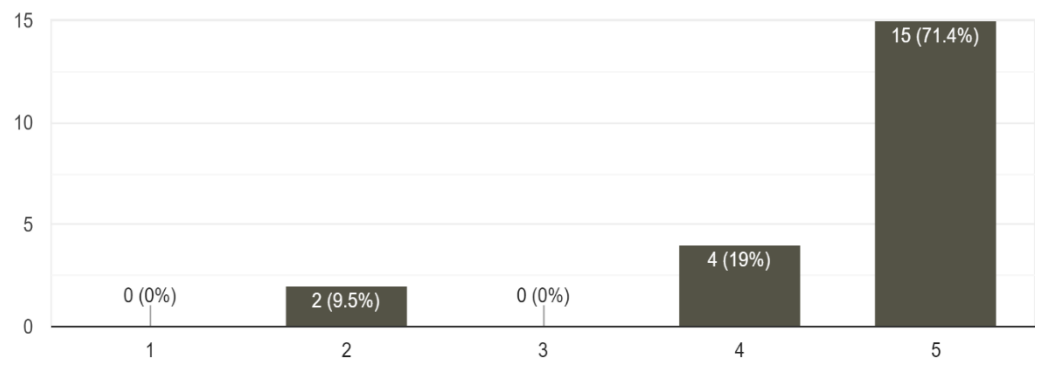
10 responses



## Colors (Students)

Warna

21 responses



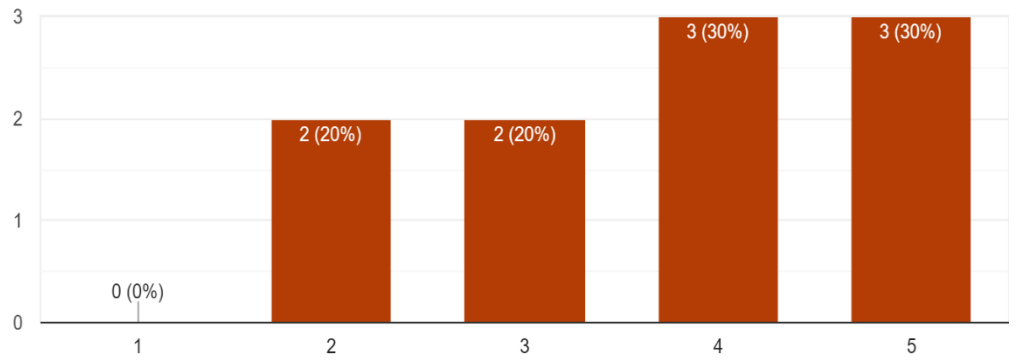
Based on the survey it can be said that about 40% of teachers rate 5 out of 5 for the mobile application's colors that they are watching. 20% teachers responded with 4 out of 5, another 20% responded 3 out of 5 and lastly the remaining 20% responded with 2 out of 5. Meanwhile, for students this shows that the mobile application for primary school Science students in Malaysia has not met the requirement of both students and teachers in primary school.

Colors brighten our day but in mobile application it draws the attention of consumers and help them recognize and remember the brand, as well as participate in it. They have an impact on our manner of thinking and acting. It is critical to understand how to position and use them effectively. According to studies carried out by Özdestici (2016), approximately 92.6% of respondents agree that the visual dimension is the most important aspect influencing their purchasing choice, ahead of other factors like as taste, and smell. This shows that when designing a mobile application, it is important for the developers to take consideration on what colors to use for their application as it effects the emotions of our users. According to Özdestici (2016), researchers discovered that colors alone account for up to 90 percent of all product assessments made by consumers When asked to identify the hue that they identified with certain terms in a survey, participants responded with a variety of options such as Orange was the most popular color (28 percent), followed closely by yellow (26 percent) and finally purple (14 percent) (17 percent).

In creating educational mobile application for students' colors needs to align with their interests. So, that both the students and teachers feel comfortable using the mobile application.

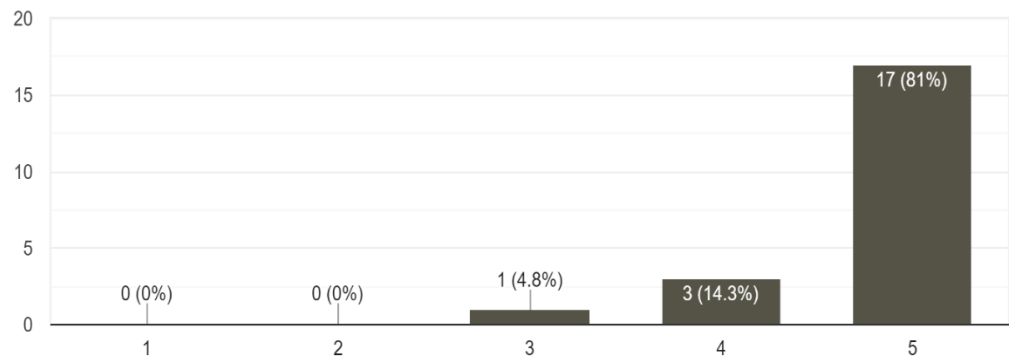
## Image (Teachers)

Gambar  
10 responses



## Image (Students)

Gambar  
21 responses



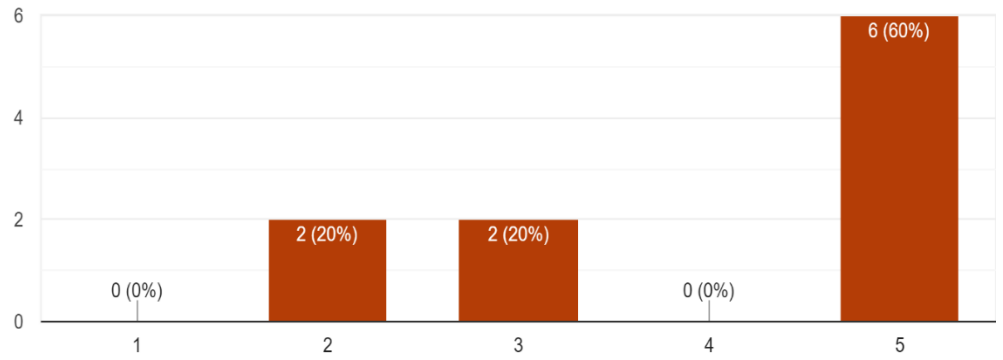
Both teachers and students have different perspectives. For teachers approximately 30% of them responded with 5 rating, 30% responded with 4 rating, 20% responded with 2 rating and the remaining percentage rated 2. As some of the application provided in the google sites does not have much visual content for the students to make learning process more fun but instead the application is full of reading content which could leads to the user not interested in using the application. Meanwhile, for the students approximately 81% of the students rated 5 for the picture that are being visualize within the application, 14.3% rated for 4 and the remaining 4.8% voted for 3.

The usage of visual content on websites and mobile applications should be encouraged wherever feasible to engage and retain users. Visual material is the most effective way to capture people's attention these days. Using relevant images and other visual information in the right way might be the differentiator of other mobile application competition. Image also an important element in User Experience design (UX). The use of imagery that sends the incorrect message is one of the most harmful parts in any design project. Because of this, the user may be perplexed or may have concerns about the dependability or trustworthiness of the application. Image selected must has a strong link with the aims of our application and make sure that they are appropriate to the context in which they are shown. For example, visuals may transmit precise information that is simple to understand and absorb in a short period of time.

## Font (Teachers)

Font

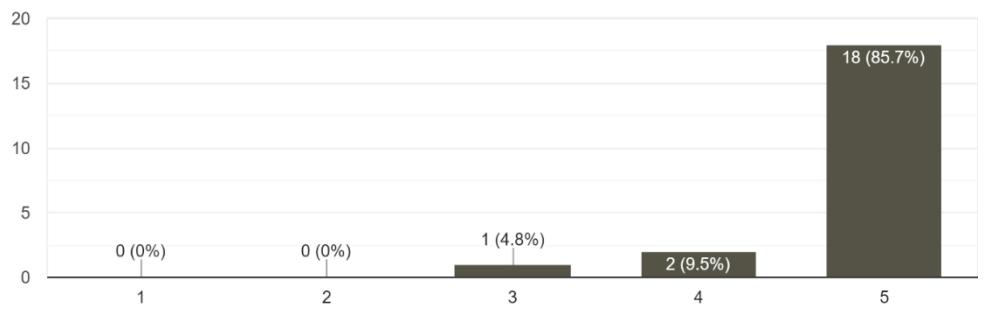
10 responses



## Font (Students)

Font

21 responses





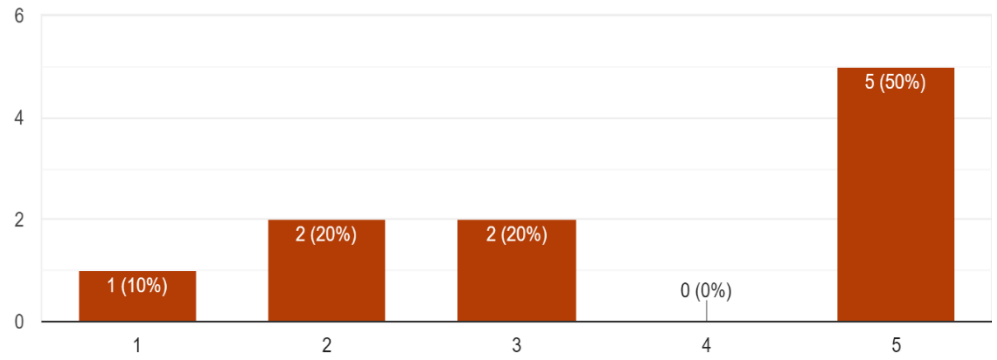
Font is a visual communication tool that may be used to visually communicate and express the goal and message of a mobile application. Both teachers and students have different perspectives. For teachers approximately 60% of them responded with 5 rating, 20% responded with 3 rating, 20% responded with 2 rating. The right selection of font is crucial when designing an application especially for educational purposes. To make sure users understand well their topic in science it is important to survey the right fonts that matches the user's interest and the size of the font. Meanwhile, for the students approximately 85.7% of the students rated 5 for the font that are being visualize within the application, 9.5% rated for 4 and the remaining 4.8% voted for 3.

It is crucial to understand that having a font and visual hierarchy implies that the type is displayed in such a manner that the most important and significant words and content are exhibited in a way that directs people toward the most pertinent information. Users may be underwhelmed by the material if it does not have a clear visual hierarchy and contrast between various types of content. When font is applied effectively, it may improve the app's design while also increasing engagement, retention, and response levels. It can also express tone, mood, and voice, which can help to give overall texture to the mobile application.

## Video (Teachers)

Video

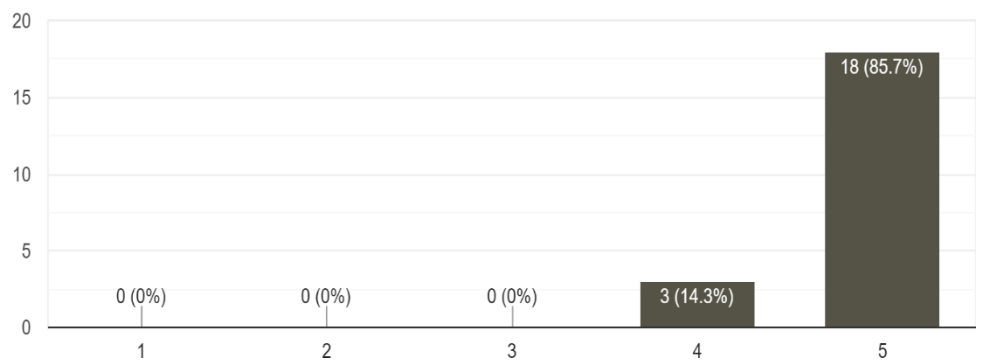
10 responses



## Video (Students)

Video

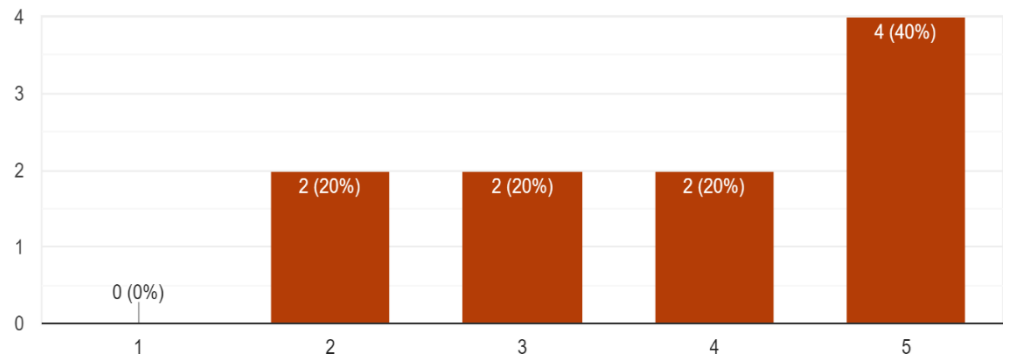
21 responses



For this question, about 50% of the teachers rated 5 for how the application provided video for them to watch. 20% teachers voted for 3 ratings, another 20% voted for 2 ratings and the remaining 10% voted for 1. From the student's side, 85.7% of them voted for 5 for the video in the application. This shows that videos are important for them for learning process. When it comes to developing children's knowledge, learning is the foundation. For school children to enjoy learning, the learning process must be more engaging and more fun-oriented. Video sessions are one of the accessible instructional tools for school children that may be used to make them more fascinating while they are in school. The video learning sessions are more intriguing and engaging for the youngsters who participate in them than regular classrooms are for the adults who teach them. These days, there are several advantages to using instructional films in the classroom. Children and their development benefit from instructional movies that are both entertaining and informative.

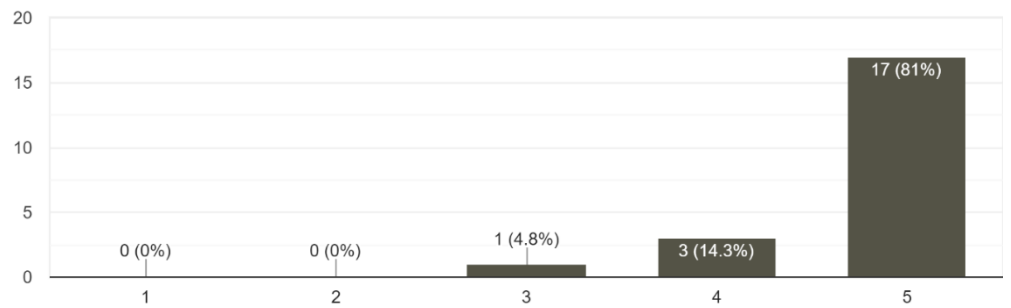
## Animation (Teachers)

Animasi  
10 responses



## Animation (Students)

Animasi  
21 responses



For the last question, respondents are required to rate on how the animation functionality within the application. For the teachers approximately 4 respondents rated 5 for the animation. Meanwhile, for the students about 17 respondents with 5 rating for the animation. When it comes to User-Experience (UX), animations are critical components of any digital product, such as websites and mobile apps, to consider. The reason for this is straightforward animations have the power to transmit ideas and emotions in a way that is simple to understand and fascinating to watch. If implemented with correct inventiveness, animations have the potential to be the most effective tool a developer can employ to create an unforgettable user experience for their product.

### 4.3 SWOT Analysis

SWOT stands for Strength, Weakness, Opportunities and Threats. Some people might think that SWOT analysis are only for company to understand their internal and external environment. But SWOT analysis can also be used for mobile application development processes.

<p style="text-align: center;"><b>STRENGTHS</b></p> <ul style="list-style-type: none"> <li>• Based on Malaysia science syllabus</li> <li>• Developed based on UX model and user's preference.</li> <li>• Online access anywhere</li> </ul>	<p style="text-align: center;"><b>WEAKNESSES</b></p> <ul style="list-style-type: none"> <li>• Having many competitors that applies the same concept of the application.</li> <li>• Focuses on Year 6 science syllabus might expand more in the future</li> <li>• Users demands more topic within the application</li> </ul>
<p style="text-align: center;"><b>OPPORTUNITIES</b></p> <ul style="list-style-type: none"> <li>• Improving year 6 school children interest in learning science</li> <li>• Covid-19 pandemic, there will be a possibility of increase in users in Malaysia that will use the application during this PDPR.</li> <li>• Educational mobile application developed in Malaysia are not user friendly.</li> <li>• Users will be more willingly to contribute to local application.</li> </ul>	<p style="text-align: center;"><b>THREATS</b></p> <ul style="list-style-type: none"> <li>• Login credential might be threatened</li> <li>• Saturated market – new educational mobile application is emerging.</li> <li>• Will have low customer as there have many existing applications that provide similar functions.</li> </ul>

Table 1: SWOT Analysis

#### **4.4 System Architecture**

In computer science, system architecture is the theoretical model that describes the behavior, perspective, and structure of a computer system. The diagram depicts services, components, layers, and an interaction between the layers and the services. When designing a system, one of the most significant structures to consider is system architecture. This structure may aid in communicating with stakeholders since it is a common abstraction of the system that can be used as a foundation for shared understanding with them. It may also aid in the decision-making process since it is the early design that can be examined by the stakeholder group. It is also implemented in this research as system architecture, which may assist the stakeholder in better understanding and serving as a guide for what this study will be doing.

Besides that, when developing a software or application the main goal is to fulfill all functional, non-functional, technical, and operational criteria of the application. Hence, to fulfill those goals system architecture is the key solution to satisfy those criteria. Software or application that does not have a proper system architecture design tends to have a difficult time in determining all the required features and functionalities. Poor designs will result in implementations that do not meet the quantitative goals of quality characteristics, and they will be difficult to maintain, deploy, and manage because of the complexity of their designs.

Based on the figure, there are only one user that can use the application which are the students and the teachers. The system architecture describes the process flow of the mobile application from start to end. Below the details of the user:

Students: Students are the main user for this application as they are the one who will decide whether the application fits their preference or not. The students have to login into their account to access the material that are available inside the application. Once login, students will be directed to the main page, where all the Year 6 science Malaysia syllabus are display. Students can choose which topic they would like to learn. After that, when the topic has been chosen, students will be directed to the topic where it displays everything about the topic. Students must go through all the subtopic before proceeding to quiz. Finally, when students have done going through the sub-topic, they will be directed to Quiz section. Students will be asked about what they have learned throughout the topic. Once the quiz has been finished, student will have an option to reattempt the quiz or go back to the main menu.



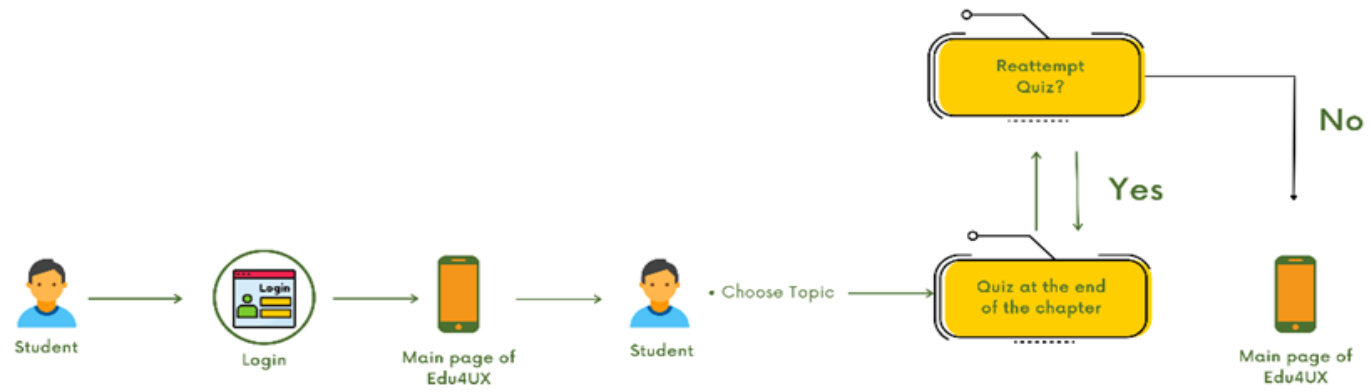


Figure 8: System Architecture of Edu4UX

## 4.5 Mobile Application Development Process

Based on the survey carried out for the school students and science teachers, Edu4UX was created using UX Experience-Centered Web Design Model by Fadel as the main key element in developing the application. All the user interfaces are developed based on the 4 elements within UX Experience-Centered Web Design model by Fadel which are Cognitive, Emotional, Functional and Aesthetic.

### 4.5.1 Development process

#### Step 1: Design using Figma

The application is first designed in Figma and taking consideration of the colors such as basic bright colours combination (red=ff0000, light yellow=ffff66, orange=ffa500, green=008000, purple=800080 and blue=0000ff) for better clarity while viewing the application. The user interface is design based on the UX guideline provided to meet the user's interest.

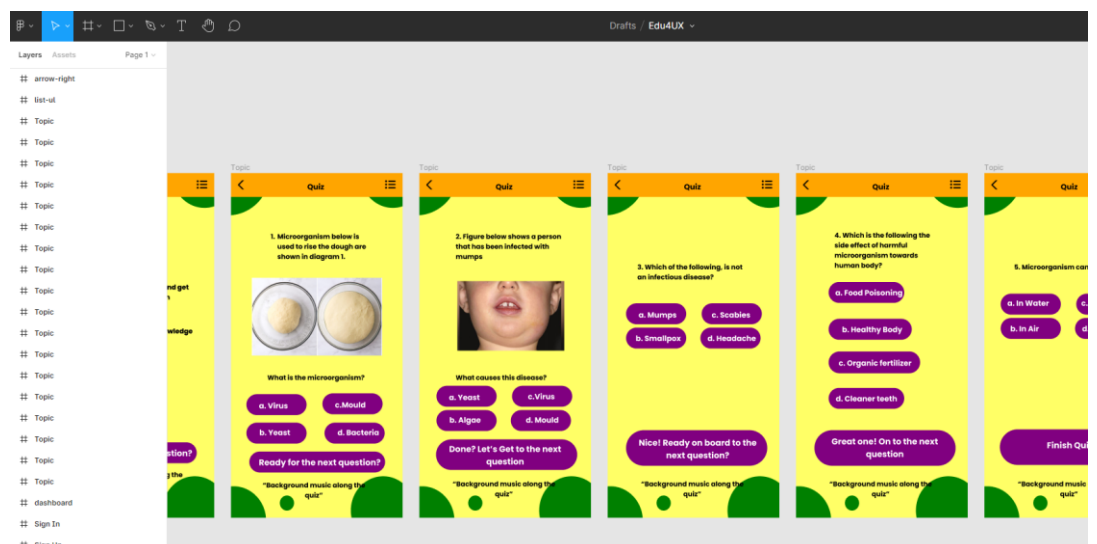


Figure 9: UI design using figma

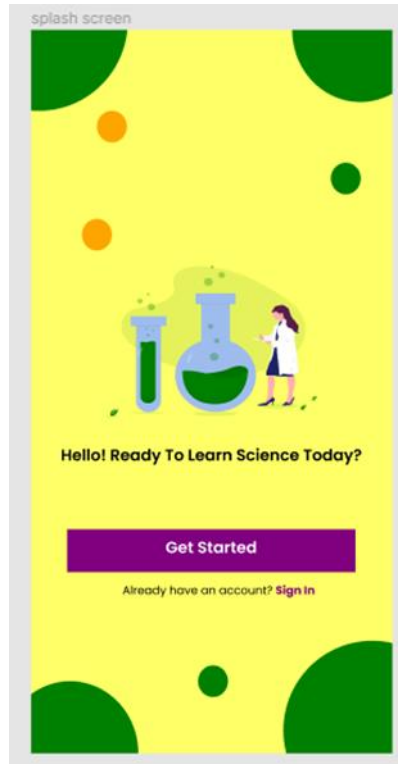


Figure 10: UI design Splash screen for Edu4UX

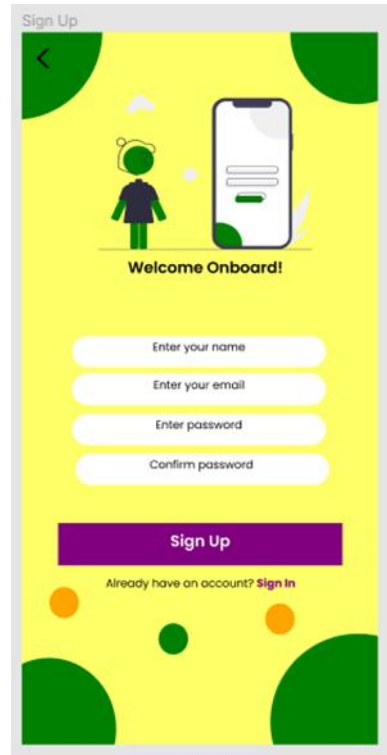


Figure 11: UI design for Sign Up page

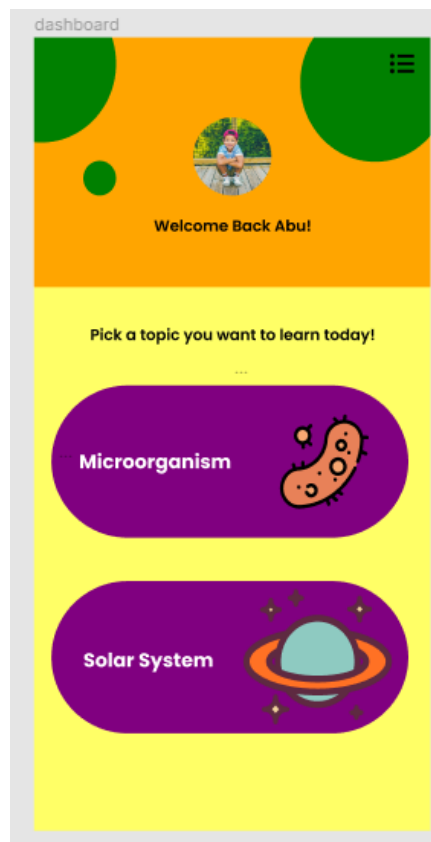


Figure 12: Main page

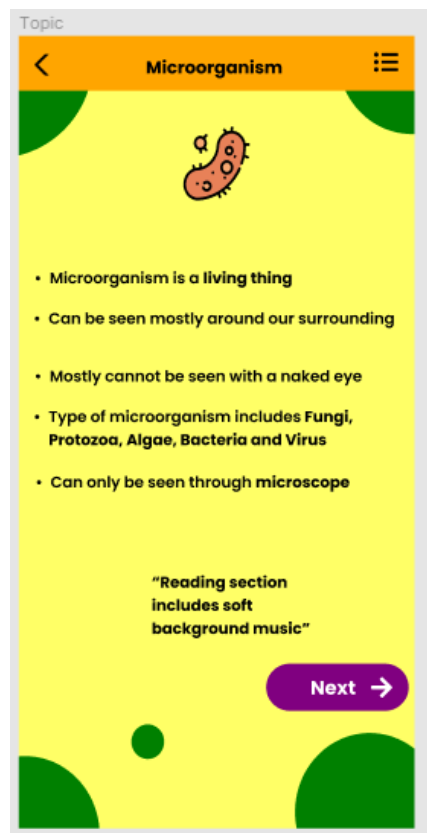


Figure 13: Topic page

## Step 2: Import the necessary image into flutter

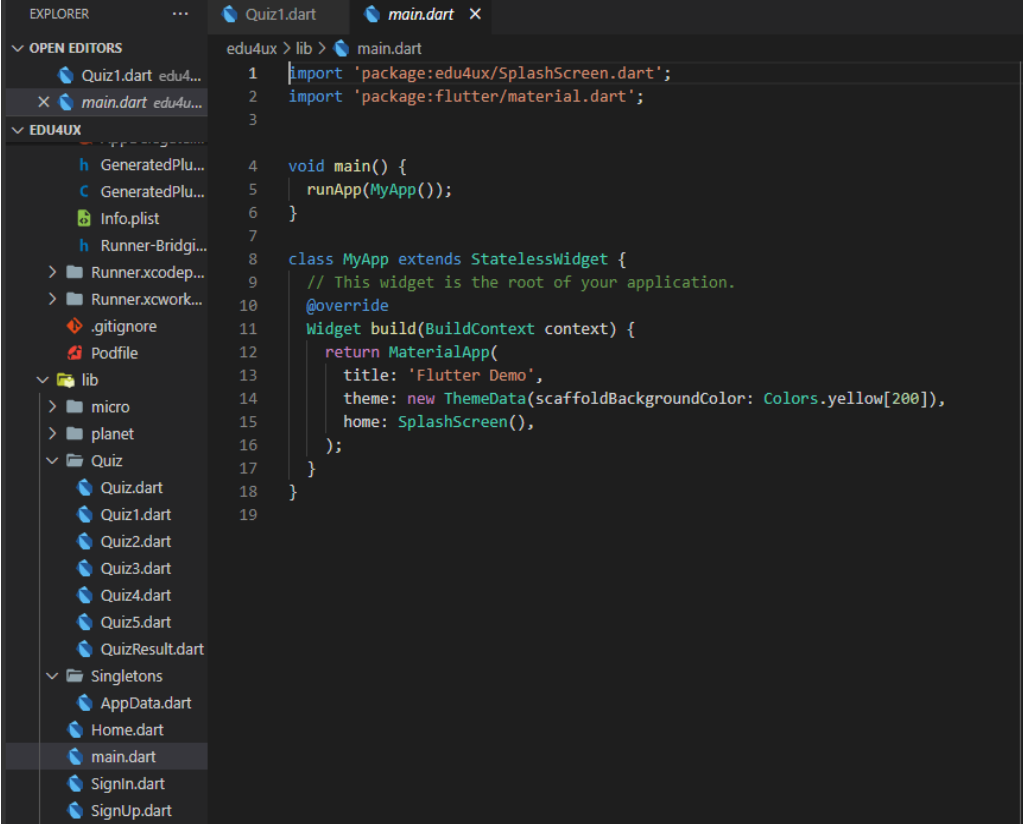
Before the development process of the application, all the assets must be inserted to a file called pubsec.yml. Once the assets have been insert, the development process begins. Where dart language was used to develop the mobile application. The mobile application for now available for android platform.

```
53 # To add assets to your application, add an assets section, like this:
54 assets:
55 - assets/image/mainPic.png
56 - assets/image/bg1.png
57 - assets/image/bg2.png
58 - assets/image/bg3.png
59 - assets/image/bg4.png
60 - assets/image/lab1.png
61 - assets/image/planet.png
62 - assets/image/micro.png
63 - assets/music/bensound-littleidea.mp3
64 - assets/image/fungi.gif
65 - assets/image/protozoa.gif
66 - assets/image/algae.gif
67 - assets/image/bacteria.gif
68 - assets/image/virus.gif
69 - assets/image/congratulation.gif
70 - assets/image/yeast.png
71 - assets/image/mumps.png
72 - assets/text/p1.png
73 - assets/text/p2.png
74 - assets/text/p3.png
75 - assets/text/p4.png
76 - assets/text/p5.png
77 - assets/text/p6.png
78 - assets/text/p7.png
79 - assets/text/p8.png
80 - assets/text/p9.png
81 - assets/text/p10.png
82 - assets/text/p11.png
83 # - images/a_dot_ham.jpeg
84
85 # An image asset can refer to one or more resolution-specific "variants", see
86 # https://flutter.dev/assets-and-images/#resolution-aware.
87
```

Figure 14: Source Code to import assets

### Step 3: Import the Figma design into flutter

Once the design has been completed, import the design into flutter and the development process can begins.



```
EXPLORER
...
Quiz1.dart
main.dart
EDU4UX
GeneratedPlu...
GeneratedPlu...
Info.plist
Runner-Bridgi...
Runner.xcodep...
Runner.xcwork...
.gitignore
Podfile
lib
  micro
  planet
  Quiz
    Quiz.dart
    Quiz1.dart
    Quiz2.dart
    Quiz3.dart
    Quiz4.dart
    Quiz5.dart
    QuizResult.dart
  Singletons
    AppData.dart
    Home.dart
    main.dart
    SignIn.dart
    SignUp.dart

edu4ux > lib > main.dart
1 import 'package:edu4ux/SplashScreen.dart';
2 import 'package:flutter/material.dart';
3
4 void main() {
5   runApp(MyApp());
6 }
7
8 class MyApp extends StatelessWidget {
9   // This widget is the root of your application.
10  @override
11  Widget build(BuildContext context) {
12    return MaterialApp(
13      title: 'Flutter Demo',
14      theme: new ThemeData(scaffoldBackgroundColor: Colors.yellow[200]),
15      home: SplashScreen(),
16    );
17  }
18 }
19
```

Figure 15: Source code import Figma design into Flutter

## 4.6 Result of Edu4UX mobile application

Once the design has been completed, the design from Figma must be imported to Flutter to enable the development process.

### i. Splash Screen Page and Login Page UI

For the splash and login page, user must sign up before gain access to the main menu of the application.

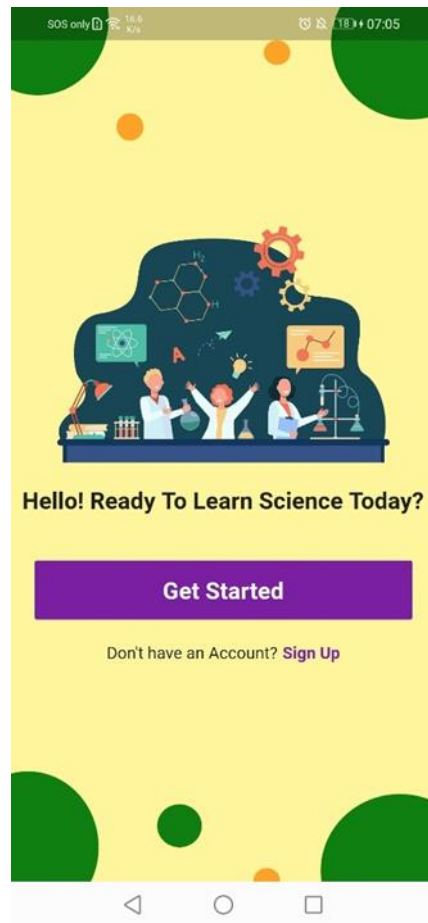


Figure 16: Splash screen

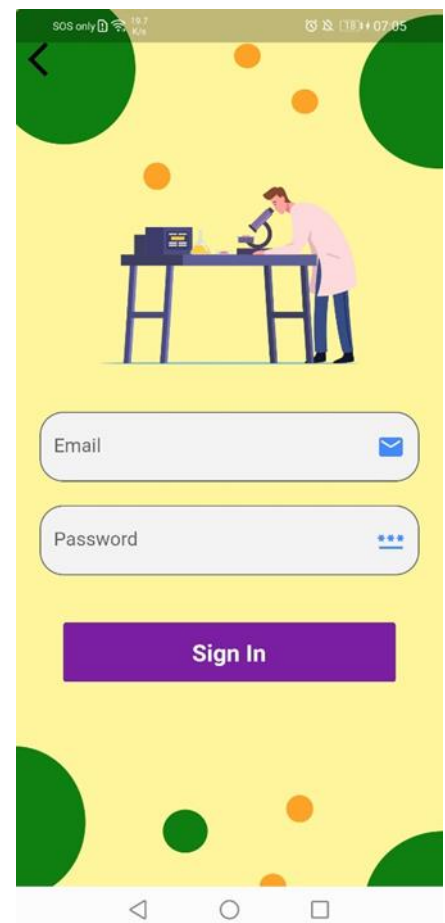
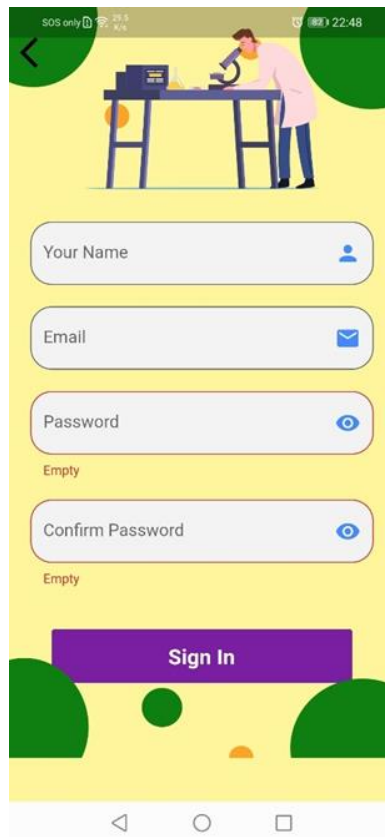


Figure 17: Sign in Page

## ii- Sign Up Page UI

Besides that, if the user does not have an account, user is required to sign up. When the user successfully signs up, they will be able to access any topic. To make sure the registration is a success, the system required for the user's name, email, password, and password confirmation.



The image shows a mobile application sign-up page. At the top, there is a header with a back arrow on the left, a status bar showing 'SOS only', signal strength, Wi-Fi, and battery icons, and the time '12:28' on the right. Below the header is an illustration of a person in a white lab coat using a microscope at a desk. The main content area has a yellow background and contains four input fields: 'Your Name' with a person icon, 'Email' with an envelope icon, 'Password' with an eye icon, and 'Confirm Password' with an eye icon. Below the 'Password' and 'Confirm Password' fields, the word 'Empty' is displayed. At the bottom of the form is a purple button labeled 'Sign In'. The page is decorated with green circular shapes at the bottom. The Android navigation bar is visible at the very bottom.

Figure 18: Sign up page

### iii- Main menu page

Once user have login, they will be directed to main menu page, where user can select whichever topic, they want to study. But for now, the only available topic is microorganism year 6 syllabus as part of the prototype and majority students loves the microorganism topics. Hence, only one chapter were selected.



Figure 19: Main page



#### iv- Topic Page

When user selected the topic, they will have to browse and understand what the topic is all about. The reading material for the students are design in a simple and clearer making it much easier for the students to learn. The application also has a several videos that are prepared for the users to watch and sticker animation in GIF format.



Figure 21: Topic page 1



Figure 20: Topic Page 2

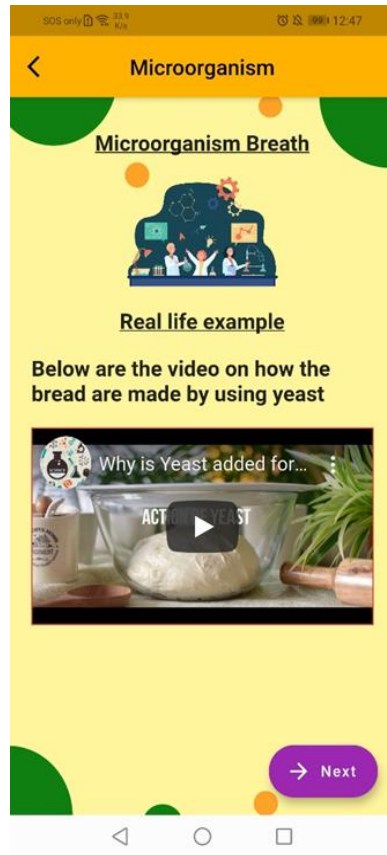


Figure 22: Topic page 3

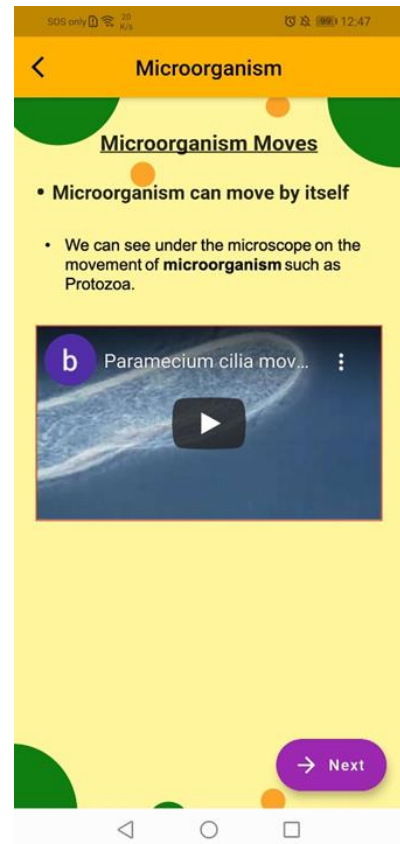


Figure 23: Topic page 4

The videos provided are imported from YouTube, where the link is inserted to Flutter enabling the user to watch the YouTube video through Edu4UX application.

v. **Quiz page**

Finally, once the user has read through all the assessment, congratulations will appear and at the same time will be directed to the quiz page if the user click on the button “Next”. During the quiz, there is a time limit of 10 seconds for each question to give a challenge for the users whether they truly understand the topic.

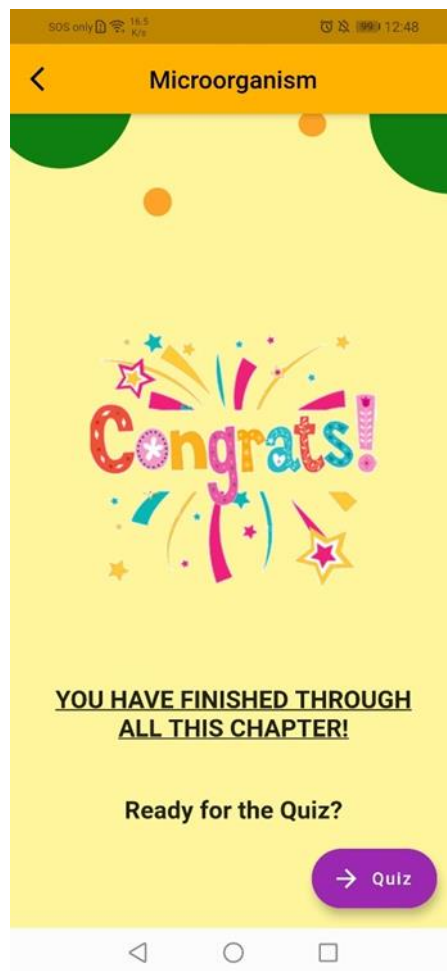


Figure 24: At the end of Topic page



Figure 25: Quiz page

## CHAPTER 5

### CONCLUSION AND RECOMMENDATION

#### 5. Conclusion and Recommendation

##### 5.1 Conclusion

To summarize, the three main objectives that are mentioned were successfully achieved and explained as below:

**Objective 1:** To make research on existing UX models that were used in developing mobile application and implementing the UX elements that needs to be adapted within the mobile application.

- This project has successfully developed a science mobile application for year 6 students called Edu4UX. Research and development from other similar application has led to this successful development. The science mobile application is developed based on the 4 important elements which are Cognitive, Functional, Emotional and Aesthetic. For the time being, only 2 students' year 6 has using the application and they are very happy with the usability of the application.

**Objective 2:** To design an educational mobile application based on a UX Model

- The mobile application is designed based on Fadel UX model which focuses on four main elements. The four elements have

been implemented during development of the application to satisfy the needs of the user.

**Objective 3:** To investigate the experience of students in using educational mobile application by developing video about any educational mobile application and send the video to the school children.

- To perform this research, google sites and two google surveys are created. Google sites are provided to put the survey link to ensure that students and teachers takes serious matter in following the steps required to answer the survey question. The Google Sites link are shared through Facebook Year 6 Science Communities also through a school located in Kampung Baru, Kuala Lumpur called Sekolah Kebangsaan Kampung Baru. From this effort, only 21 Students answered the survey and approximately 10 science teachers responded.

To summarize, the key elements that were expected from this project have all been identified and effectively implemented. Every target that has been identified inside the project and met during the development process may be deemed a success. When developing a mobile application for educational purposes, it is important to take consideration the main key elements of User Experience (UX) as we are not the one using the application. User's perspectives are matter when it comes to developing a mobile application. With the right element being implemented within the educational mobile application, school children will be more engage in learning new things. This project can serve as a guidance for developers to take note on the importance of User Experience Model (UX) when developing a mobile application in the future.

## **5.2 Recommendation**

Edu4UX needs continuous development to make sure users stays loyal to the application. Without a proper enhancement the application will failed. To fulfill the User Experience rules, Edu4UX needs to have all the 4 elements which are Cognitive, Functional, Emotional and Aesthetic to achieve the project objectives

One of the enhancements or improvement that can be made in the future is to put more science topic for Year 6 that will attract students in Malaysia to use the application. Currently, Edu4UX only have one topic available which is Microorganism because the application is only a prototype. Besides that, another enhancement that can be made is a multilingual support for the application. Where users can enjoy using the application in multiple language. Malaysia is a multiracial country where our population consists of Melayu, Chinese and Indian. With multilanguage support within Edu4UX it will surely be beneficial for them.

Currently, the application is only available in Android platform only due to iOS development requires Apple products. So, Android are the only option available to run the mobile application. Improvement can be made from this to make Edu4UX runs on Apple platform too both Android users and iOS users can enjoy the application.

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# Appendices

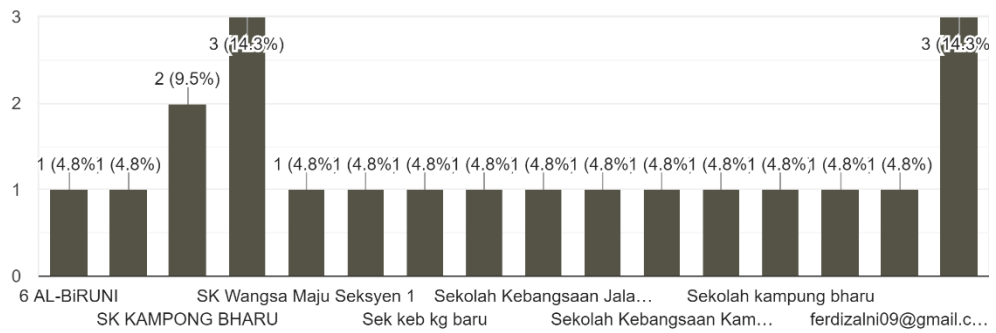
## Appendix A

### Online survey Question

#### Students Survey

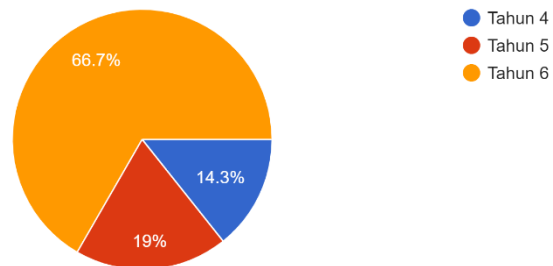
Sekolah

21 responses



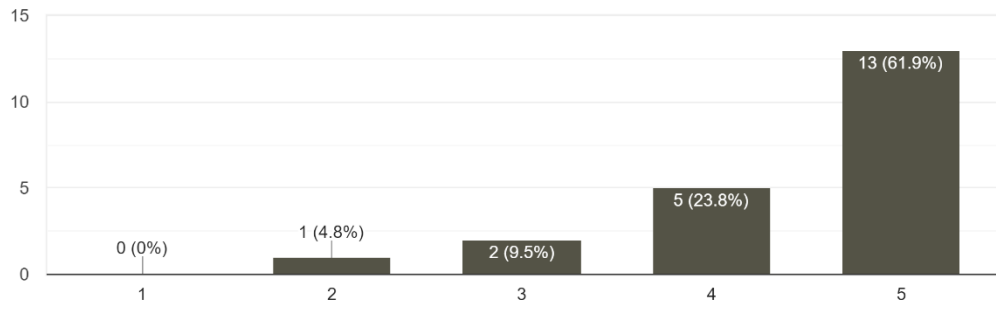
Tahun

21 responses



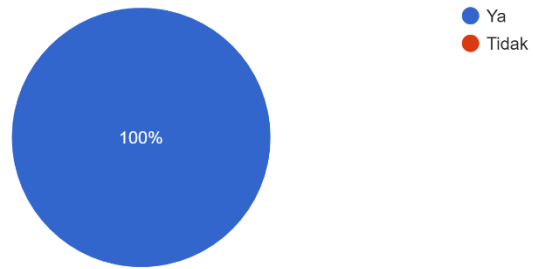
Pada Skala 1- 5 bintang adakah anda minat dengan subjek Sains?

21 responses



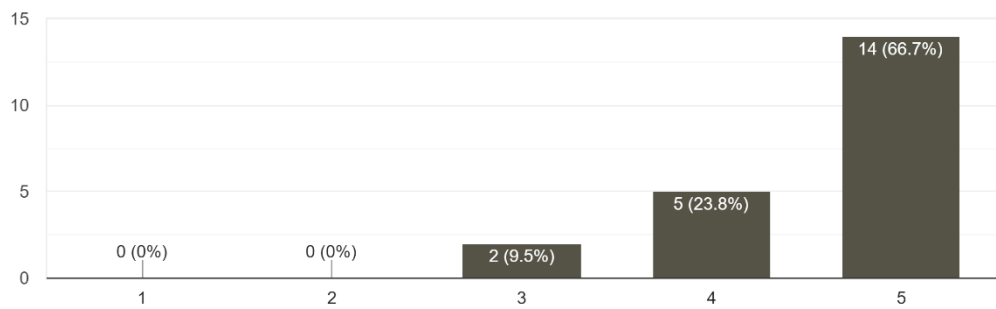
Bagi saya rasa aplikasi ini nampak menyeronokkan.

21 responses



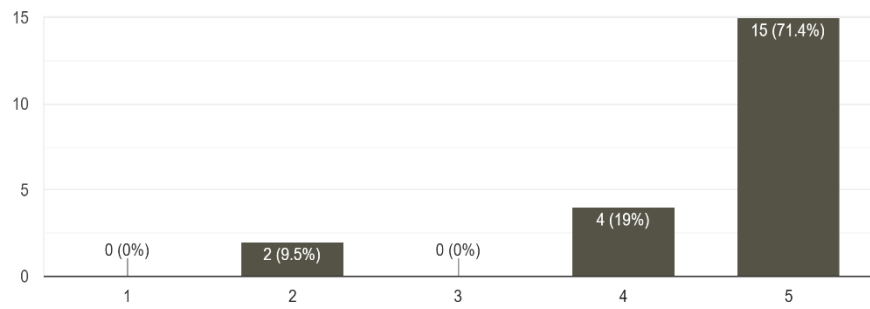
Icons

21 responses



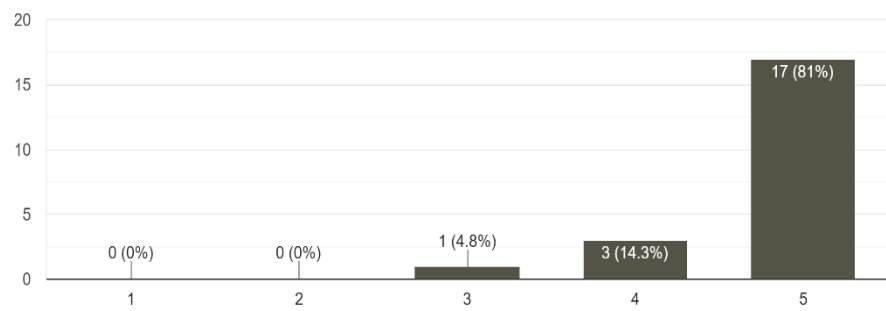
### Warna

21 responses



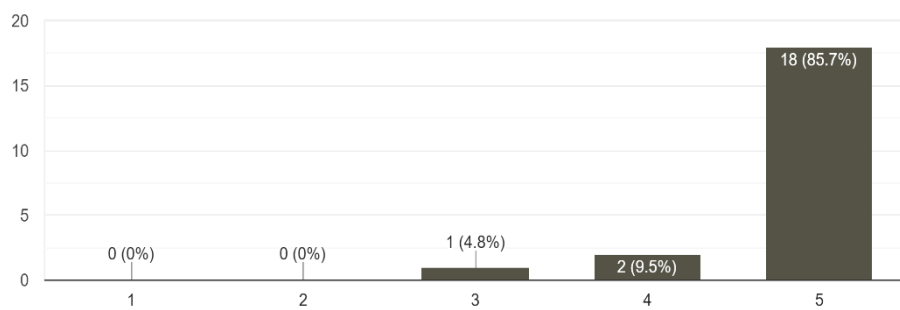
### Gambar

21 responses



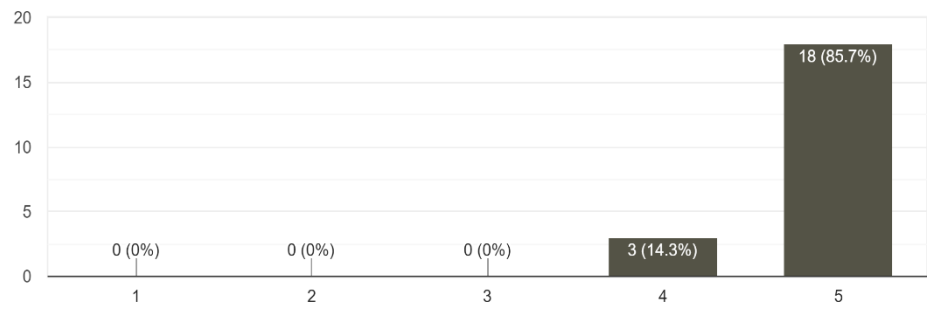
### Font

21 responses



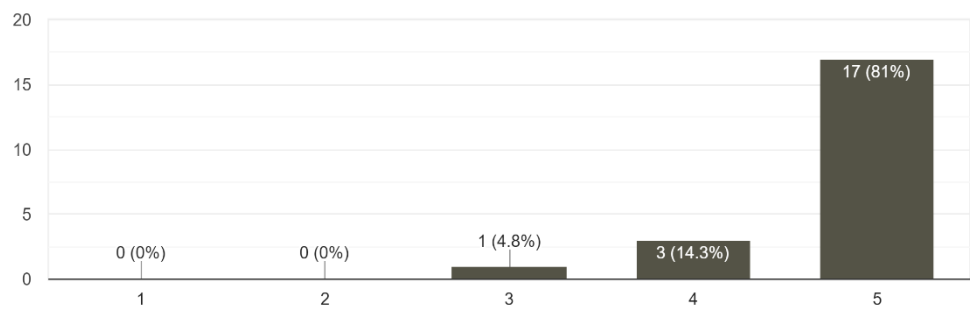
### Video

21 responses



### Animasi

21 responses



## APPENDIX 2: SOURCE OF CODE

### User Home Page

```
import 'package:edu4ux/Singletons/AppData.dart';
import 'package:edu4ux/micro/Micro1.dart';
import 'package:flutter/material.dart';
import 'package:transition/transition.dart';
import 'package:audioplayers/audio_cache.dart';
import 'package:audioplayers/audioplayers.dart';
import 'package:http/http.dart' as http;
import 'package:edu4ux/Sound.dart';

class Home extends StatefulWidget {
  @override
  _HomeState createState() => _HomeState();
}

class _HomeState extends State<Home> {

  @override
  void initState() {
    // TODO: implement initState
    super.initState();
    playerPlay.PlaySound();
    appData.TotalResult = 0;
  }

  @override
  Widget build(BuildContext context) {
    Size size = MediaQuery.of(context).size;
    return Scaffold(

      body: SingleChildScrollView(
        child: Container(
          child: Column(
            children: [

              Container(
                width: double.infinity,
                height: size.height,
                child: Stack(
```

```

alignment: Alignment.center,
children: <Widget>[

    Positioned(
      top: 0,
      width: 500,
      height: 230,
      child: Container(
        color: Colors.amber[700],
      ),
    ),

    Positioned(
      top: -10,
      left: 0,
      child: Image.asset(
        "assets/image/bg4.png",
        width: size.width * 1,
      ),
    ),

    Container(
      padding: EdgeInsets.only(left: 20, right:
20),

      child: Column(
        children: [
          SizedBox(height: 150,),
          Text("Welcome Back!\n"+appData.name,
            style: TextStyle(color:
Colors.black,

              fontWeight: FontWeight.w700,
              fontSize: 20,)),
          ),
          SizedBox(height: 80,),

          Text("Pick a topic you want to learn
today!",

            style: TextStyle(color:
Colors.black,

              fontWeight: FontWeight.w700,
              fontSize: 20,)),
          ),
          SizedBox(
            height: 20,
          ),

```

```

        Container(
          padding: EdgeInsets.all(20),
          child: ButtonTheme(
            minWidth: double.infinity,
            height: 100.0,
            child: FlatButton(
              color: Colors.purple[700],
              shape: new
RoundedRectangleBorder(
              borderRadius:
BorderRadius.circular(50.0)),
            onPressed: () {
              setState(() {
                Navigator.push(
                  context,
                  Transition(
                    child: Micro1(),
transitionEffect: TransitionEffect.LEFT_TO_RIGHT));
              });
            },
            child: Row(
              children: [
                Expanded(
                  flex:3,
                  child: Container(
                    padding:
EdgeInsets.only(left: 30),
                    child:
Text("Microorganism",
                    TextStyle(color: Colors.white,
                    FontWeight.w700,
                    fontWeight:
                    fontSize: 20,)),
                ),
                ),
                ),
                Expanded(
                  //flex:1,
                  child:
Image.asset("assets/image/micro.png")
                ),
              ],
            ),
          ),
        ),
      ),
    ),
  ),
)

```

```
    },
    ],
  ),
),
),
],
),
),
),
],
),
),
),
);
}
}
```