THE DESIGN OF MULTIMEDIA E-BOOK FOR SECONDARY SCHOOL: CHEMISTRY IN MEDICINE AND HEALTH

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THE DESIGN OF MULTIMEDIA E-BOOK FOR SECONDARY SCHOOL: CHEMISTRY IN MEDICINE AND HEALTH

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

FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
UNIVERSITI TEKNIKAL MALAYSIA MELAKA

2020/2021

DECLARATION

I hereby declare that this project report entitled

THE DESIGN OF MULTIMEDIA E-BOOK FOR SECONDARY SCHOOL: CHEMISTRY IN MEDICINE AND HEALTH

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

STUDENT : _____ _____ Date : 15/3/2021

(NUR ANISS BINTI NORDIN)

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

SUPERVISOR : _____ Date : _____

([NAME OF THE SUPERVISOR])

DEDICATION

This report is dedicated to my beloved parents, friends and my supervisor who consistently gave me support and help me in completing my studies.

ACKNOWLEDGEMENTS

Bissmillahirahmanirrahim,

First, I would like to thanks Allah S.W.T for give me the strength and good health to complete the whole process of this project. Without blessings, this project cannot be developing and complete.

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Thank you.

ABSTRACT

Multimedia e-book for secondary school: *Chemistry in Medicine and Health* is a multimedia e-book that was designed to help the students to grasp the subject of Chemistry in Medicine and Health more thoroughly and feel interested in studying. With this e-book, the student is easy to comprehend and review at the end of school time. Moreover, during this COVID-19 pandemic, the student movement would still be minimal and this might lead to a large number of students being left behind. The purpose of this project is to ensure that students receive adequate knowledge, thoroughly understand the subject they have learned, and can apply it in real life. This e-book provides interactive widget such as video, pop-up image, quick quiz that can help the students to catch up everything they have learned and remember it. The platform uses to develop this e-book is Adobe InDesign that can create various type of e-book and multimedia content. Next is Adobe Illustrator which help in develop the interactive background. The research method that has used for this project is the Rapid Application Development Methodology. Rapid application development methodology enables developers to make changes, compete with trends in evolution and add new features of interactive textbook. The analysis of this project has been made by comparing the other product based on the design and content that need to improve when develop this interactive book for effectiveness in learning chemistry especially for school students. These results are the findings from questionnaire that was conducted for target user. Some improvement of this interactive textbook need to added for better performance in future.

ABSTRAK

E-book multimedia untuk sekolah menengah: Kimia dalam Perubatan dan Kesihatan adalah kandungan multimedia yang direka untuk membantu para pelajar memahami subjek Kimia dalam Perubatan dan Kesihatan dengan lebih mendalam dan merasa berminat untuk belajar. Dengan e-book ini, pelajar mudah difahami dan dikaji selepas waktu persekolahan. Lebih-lebih lagi, di musim pandemik COVID-19 ini, pergerakan pelajar masih minimum dan ini mungkin menyebabkan sebilangan besar pelajar ketinggalan. Tujuan projek ini adalah untuk memastikan bahawa pelajar mendapat pengetahuan yang mencukupi, memahami dengan teliti subjek yang telah mereka pelajari, dan dapat menerapkannya dalam kehidupan sebenar. E-buku ini menyediakan widget interaktif seperti video, gambar pop timbul, kuiz pantas yang dapat membantu pelajar mengejar semua yang telah mereka pelajari dan mengingatinya. Platform yang digunakan untuk mengembangkan e-book ini ialah Adobe InDesign yang dapat membuat pelbagai jenis e-book dan kandungan multimedia. Selanjutnya adalah Adobe Illustrator yang membantu mereka latar belakang interaktif Kaedah penyelidikan yang telah digunakan untuk projek ini adalah *Rapid Application Development Methodology*. *Rapid application development methodology* membolehkan pembangun membuat perubahan, bersaing dengan trend evolusi dan menambah ciri baru buku teks interaktif.. Analisis projek ini telah dibuat dengan membandingkan produk lain berdasarkan reka bentuk dan kandungan yang perlu diperbaiki semasa membangunkan buku interaktif ini untuk keberkesanan dalam pembelajaran kimia terutama bagi pelajar sekolah. Hasil ini adalah dapatan dari soal selidik yang dilakukan untuk pengguna sasaran. Sebilangan penambahbaikan buku teks interaktif ini perlu ditambah untuk prestasi yang lebih baik pada masa akan datang.

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FYP	**-**	**Final Year Project**

LIST OF ATTACHMENTS

CHAPTER 1: INTRODUCTION

1.1 Introduction

Nowadays, E-learning platforms have exploded in significantly in recent years, due to technological developments. The e-learning platform differed from the traditional classroom that people normally use for learning and teaching purposes. E-Learning conveys knowledge to students by using graphics and animated videos that make it easier for students to understand and adapt to the real world. The teaching and learning process is frequently challenged with tough situations beyond the educators' own experience, making the scenario or subject difficult to explain and even more difficult to grasp for students. Therefore, according to Saraso (2008), visual is one of the ways in which something is difficult to explain. One of the teaching tools that can be used by the teacher is using an interactive book.

By using this e-learning method, it is more interesting and beneficial in ensuring that students remain focused in their learning sessions. By just clicking the widget given, students will be able to interact with the information more interactively and have a better understanding of the subject matter. This interactive book (e-Book) also provides sound, animation, and good graphics. For quiz and exercise it will be conduct by using quiz widget. This will inspire students to complete the task and make it easier for them to recall the content. In addition, students will be able to describe topics and respond to some of the exercises at the end of each session without worry of making a mistake.

So, in my project, which was designed specifically for the Form 4 students who took the Science subject in secondary school, I want to make sure that these students will grasp the subject of Chemistry in Medicine and Health more thoroughly and feel interested in studying. With this e-book, the student is easy to comprehend and review at the end of school session. Moreover, during this COVID-19 pandemic, the student movement would still be minimal and this might lead to a large number of students being left behind. The purpose of

this project is to ensure that students receive adequate knowledge, thoroughly understand the subject they have learned, and can apply it in real life.

The multimedia content is designed to make it easier for students to understand and experience these subjects in an immersive and memorable way. As we know, this subject, Chemistry in Medicine and Health, is a subject that is very difficult for secondary school students. To learn about free radicals, antioxidant substances, health goods need a fascinating and accurate method of distribution. This e-learning approach can help students understand it quickly and take additional notes when reading and watching it.

1.2 Problem Statement

These days, students are more drawn to something more fascinating and straightforward to understand than textbooks, which is why textbooks are less effective in helping students achieve outstanding grades. With eBooks simply requiring a device to use, they are much more convenient to use than the standard paperback books. Besides, this technique can aid the instructor in the teaching strategies in an interactive way.

These multimedia e-books are developed for students who are taking science subjects in secondary school and it focuses on Form 4 Science (Chapter 10: Chemistry in Medicine and Health). I preferred this title because considering the perspectives of school students on chemistry-related topics is tough. Students may become bored and unwilling to concentrate if words are difficult to comprehend and memorize. Therefore, by using e-books I can design multimedia content that can help students understand the subject by illustrating the substance of the topic.

Hence, using e-books as an interpretation tool will help students to understand the benefits of e-books and correctly use them. E-books are also one of the simplest and fastest platforms for students to do a quick review before they do any exercises. Also, this project will aware students of the uses, and benefits of e-book.

1.3 Objective

To ensure that the project works correctly, the project's objective must be clearly stated.

The objectives of this project are:

i. To study the features of e-books that can be apply in developing The Design of multimedia e-book for secondary school: Chemistry in Medicine and Health.
ii. To develop the multimedia e-book by using suitable software.
iii. To evaluate the effectiveness of the e-book.

1.4 Scope of the project

The scope of this project is focused on the two fields which are specific user and module or functionality.

1.4.1 Specific user

The target user for this project is Form 4 students in secondary school who are taking Science subject and it focuses on topics (Chapter 10: Chemistry in Medicine and Health). This interactive book can be uses in desktop version, make it very compatible for teacher and the student to use in their laptop and iPad. Aside from that, teachers may apply the learning tools as a guide to teach their students in more innovative ways.

1.4.2 Specific functionality

The specific functionality is to describe about the widget that have in this interactive textbook. This widget can help to interact students to learn this topics, Chemistry in Medical and Health. Table 1.1 shows the specific functionality.

No.	Module	Description
1.	Media	Allow users to watch the video included in this interactive book. Video is made and edited by the developer.
2.	Interactive	Allow users to touch the images, playing image with them to gain more information.
3.	Quiz	Allow assessment to be done to understand the level of understanding of the students.

Table 1.1 Specific functionality

1.5 Project significant

The project significant is an interactive book of Chemistry in Medical and Health for form 4 secondary schools' students who are taking this subject. This interactive book will assist the students to understand the content of the topic with the aid of simple explanation, animation videos, quiz and interactive widget. Parents also can simply use this e-Book at home to teach their children. Hopefully, this iBook will capture students' attention by assisting them in the learning process in a relaxed and enjoyable environment

1.6 Conclusion

The global COVID-19 epidemic has prompted innovative approaches to online teaching and learning. E-learning appears to be one of the safest and simplest ways to impart education for the acquisition of new skills. This chapter are explaining about interactive book for Chemistry in Medical and Health Form 4 students more about the project introduction, problem statements, objectives, scope, and project significance.

From the problem statement, this can help to come out with an objective for this project. There are three objectives that need to achieve the goal which are to study the features of e-Book that can be apply in developing The Design of multimedia e-Book for secondary school: Chemistry in Medicine and Health, to develop the e-Book by using suitable software and to evaluate the effectiveness of the e-Book. The user scope of this project is students in secondary students of form 4. The specific functionality for this iBook have a media, interactive, audio, quiz and gallery.

Next chapter will be discussing about the literature review and project methodology. This chapter will be show the previous project or product that has been discussed in relation to this project. The methodology applied to the development also will be explained.

CHAPTER 2: LITERATURE REVIEW AND PROJECT METHODOLOGY

2.1 Introduction

This chapter discusses the literature review involved in conducting this project. To achieve the project's objectives and ensure that the process runs smoothly, a better understanding of the idea and approach is required.

Literature review is involved in collecting data from related published information and materials from anywhere example like internet, books, journals, published papers and so on. The result from finding will cover the objectives of this project. This chapter focus on finding the previous project, research and technique which related to the project, to prove that this project could really working and function well based on the previous evidence. Besides, this chapter also covers the project methodology to show the process and direction of the development and also the requirements such as software and hardware in order to develop the application.

2.1.1 Literature Review

Over the last decade, the e-learning business has grown at a rapid pace. As a result, an increasing number of students and businesses choose e-learning platforms over traditional classrooms. E-learning has been implemented within higher educations for the past years. In fact, online learning has become more popular (Shahzad et al., 2020) where universities all around the world, including Malaysia, do have their online learning portals to support day-to-day learning processes. A study conducted by Aboagye et al. (2020) stated teaching can be inside or outside the classrooms, the use of computer technology and the Internet is the main component of e-learning. However, another study by A. Pauline Chitra*& M. Antoney Raj (2018) proposed that the term e-learning comprises a lot more than online learning, virtual learning, distributed learning, networked or web-based learning. Many colleges have now acknowledged the importance of E-learning as an important part of the educational system. Due to its effectiveness as an alternative way of learning to the classroom teaching approach, several higher education institutions in Malaysia have

embraced e-learning. Online education opportunities for those who cannot attend or access the traditional method of education for one reason or the other. As a result, even before the outbreak of COVID-19, students were exposed to many forms of online learning, such as Massive Open Online Courses (MOOCs), distant learning, blended learning, and so on. The e-learning platform differed from the traditional classroom that people normally use for learning and teaching purposes. E-Learning conveys knowledge to students by using graphics and animated videos that make it easier for students to understand and adapt to the real world. Many colleges and universities have acknowledged the use of interactive video as a teaching medium as an alternative to or supplement to traditional classrooms. However, in compared to other developed countries' higher education institutions, this innovation is not being applied as effectively. While there is a larger awareness and availability of video content, its practical application is still questionable due to the association of videos with passive learning.

All of the above research examined the literature on e-learning in the subject of language teaching. Each of them took a different approach to e-learning and interactive video, whether it was to give a broad overview of how it is used in practice or to provide a larger framework for evaluating the use of interactive video in e-learning for educational purposes. However, a more thorough review of previous relevant research throughout the years is necessary to appreciate the use of e-learning in language teaching and what findings tell about the benefits and costs of using e-learning in educational settings.

2.2 Domain

2.2.1 E-Learning

Nowadays, technology is used in eLearning to ease, enhance, and expand educational material, access, and training progress monitoring. E-Learning, which began as a computer-based content delivery system for schools, is today used by a wide range of institutions, including major corporations, small enterprises, government, non-profits, and trade associations. The top industries using eLearning include Healthcare, Technology, Retail and eCommerce, Education, and Construction. Today, E-

Learning means much more than just delivering information. E-Learning is interactive and on-demand, and it is available on a range of digital platforms ranging from desktop computers to smartphones and other portable devices. This greatly enhances learning participation and engagement. E-Learning happens in a variety of ways, and a variety of terms are associated with it. For example, blended learning or hybrid learning, online learning and digital learning. Blended learning or hybrid learning involves ensuring competence by offering learning information across a variety of venues and styles over a long period of time. Face-to-face instructor-led classes, online modules and videos, self-study, and on-the-job training are all examples of blended learning. Online learning is referring to courses delivered online. These are modules that a user interacts with directly and feature material, interaction, simulations, and quizzes. These have also been referred to as Computer-Based Training (CBT) or Web-Based Training (WBT), while "eLearning" is a far more popular term that includes both. Digital learning is education delivered through a digital device in any environment, including classrooms, conference rooms, industrial plants, at a desk, or at home. There are a lot of benefits of using E-Learning because of it flexibility, speed and effectiveness. E-Learning provides flexibility for users. Content may be provided on-demand to teams and individuals on their preferred devices, at any time and from any location. Learners may revisit content, retake exams, and keep track of their progress with the more self-paced, interactive access. Content chosen by a small number of subject matter experts can reach a far broader audience through eLearning than if those experts were educating individuals in person. Because it is visual and participatory, eLearning improves brain function. According to research, participants in eLearning acquire up to five times more content than those in traditional teaching while spending the same amount of time in training. The first testing machine was created in 1924. Students might use this gadget to put themselves to the test. Then, in 1954, Harvard Professor BF Skinner created the "teaching machine," which allowed schools to provide pupils pre-programmed lessons. However, the first computer-based training programme was not presented to the world until 1960. PLATO-Programmed Logic for Automated Teaching Operations was the name of this computer-based training software (or CBT

programme). It was created for University of Illinois students, but it has since been adopted by institutions all around the region.

2.2.2 E-Book

An Electronic Book, or eBook as it is commonly referred as, is a text-based digital publication. While they may contain images and graphs of some kind, mostly their formats lead them to be text-based. eBooks are meant to be read on an electronic device such as an iPhone, a Kindle eReader, a tablet, or a computer. While eBooks are the actual text and document being read, an E-Reader is a device that makes this possible. E-books are electronic files that are tiny, portable, and simple to distribute and purchase. They're small, light, and have a large storage capacity, making them ideal for trip reading, electronic notes, and character descriptions. Angela Ruiz Robles created the world's first automatic reader, which was the forerunner of today's e-readers. In 1949, Angela had a brilliant idea in Spain. Angela Ruis Robles was a teacher who saw her kids carrying textbooks to and from school every day. The idea was that her reader would be far easier to carry for school children, than a number of different textbooks. In Angela's first design, smaller amount of text was printed onto spools and were operated by compressed air. In 1949, she created her first prototype. While this book was not electronic it is still hailed as the first automated reader. E-books have many advantages and disadvantages over traditional print books. The great advantage of eBooks is that they allow users to store a large number of books in a little amount of space. This makes it much easy to travel with reading materials. Many eReader devices also include a built-in light source, making reading in the dark a breeze. However, many individuals still prefer conventional print books. Some people prefer the feel of paper books over that of electronic literature. Next is, searchable. A Search button may be found in a lot of e-books, allowing you to swiftly navigate to the page containing the term you're looking for. The most advantage of electronic books is Unlike your usual printed books, e-books can contain not only text and images, but also audio and even video. This manner, if the reader does not enjoy reading paragraphs of text, he or she can select to listen to the audio version instead. You may

convert pdf to text if your e-books are in pdf format and you wish to read them as text. It is simple to get e-books. Some e-books even include flash apps that allow the reader to "interact" with the information.

Furthermore, the goal of this research is to modify and expand learning methods on learning chemistry from traditional text books to e-Book for secondary school students. This e-book can help the students to comprehend and review at the end of school time. Moreover, during this COVID-19 pandemic, the student movement would still be minimal and this might lead to a large number of students being left behind. The purpose of this project is to ensure that students receive adequate knowledge, thoroughly understand the subject they have learned, and can apply it in real life. In addition, this e-Book can help students learning easier and interactive because this book is containing all the resources that contain in textbook. By that, they can learn at everywhere and anywhere they want. In this e-Book also can make students interact with the book because this book contains a questions that allow students to answer questions and understand what they are learning. Other than that, this book are also has live media such as, pictures and movement videos that can reduce boredom and appeal to them. Teachers can also exhale a sigh of relief because the implementation of this e-Book will make it easier for them to teach this subject without wasting time looking for or opening teaching materials on Google to present to students, because the content in this iBook is fully available to teach and the lesson will be more interactive. The teacher merely has to keep a close eye on students' use of the iBook in order for this material to be implemented properly. This e-Book will be available in EPUB version, so the students and the teacher need to install the EPUB reader to use it.

2.3 Existing system

2.3.1 Traditional system learning ways

In the traditional way, students learn Chemistry in Medicine and Health using printed textbook. Teacher need to find resources by self when to start teaching because in textbook just provide a static image with text

instruction for the activities. Sometimes a teacher does not know how to teach a certain lesson from a topic, therefore the teacher must research first, which wastes time. In chemistry they need to memorize every term and watch how the particles move to have a better understanding. When students want to practice some topic for this subject students just can read and view the static image but they do have video to watch because for the textbook are just provide video for teach in the classroom only so that student are difficult to learn better. To make learning sessions more successful, a new strategy must be updated to resolve the difficulty that teachers and students have experienced.

2.3.2 Learning ways using interactive textbook (iBook)

The use of a new technology tool to create an interactive textbook. An interactive textbook is an e-Book (electronic book) that includes interactive content. An eBook is a book that is accessible via computer or other electronic device (including iPad, Mac, iPhone etc.). An interactive textbook can include multimedia, such as videos or interactive graphics, as well as review quizzes, photos with labels, photo/graphic galleries and more. These technologies not only make students' interactions with textbooks more engaging, but they also serve to reinforce the principles that the book is trying to illustrate. For example, in this Chemistry in Medicine and health e-Book, the text may explain an example and refer to figures, just as in a traditional text. However, this e-Book also includes a video demonstrating on how movement of particle for example. Each of the 7 subtopics has widget that can user interact with an explanatory concept of pictures, quizzes, demonstration video to show the step of movement using media. So that interactive textbook is the best way to use in this new technology to increase that learning and teaching method process that will be more fun and interactive to students.

2.3.3 eTextbook Kimia dalam Perubatan dan Kesihatan KSSM (2019)

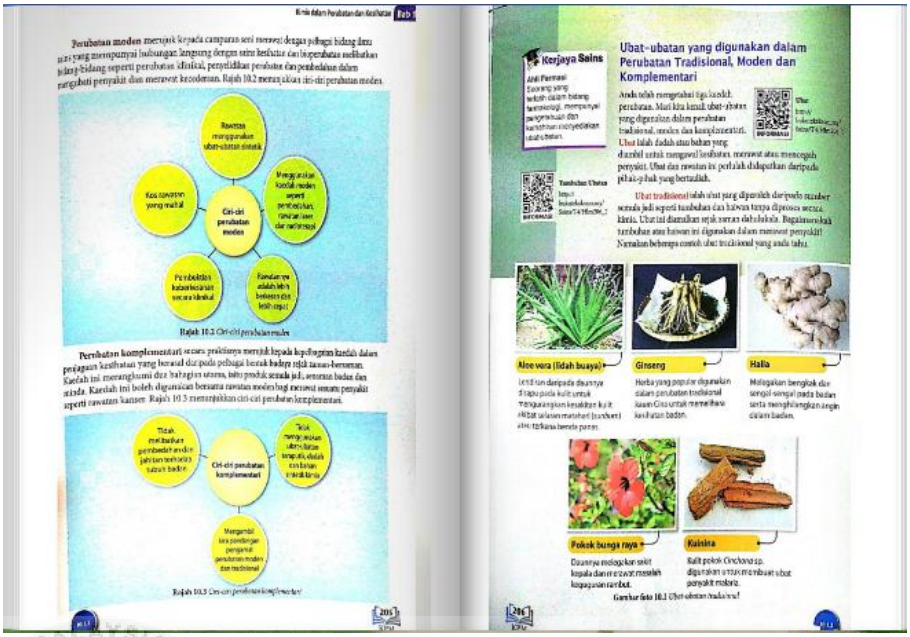


Figure 2.1 Interface eTextbook Kimia dalam Perubatan dan Kesihatan Tingkatan 4 KSSM (2019)

The introduction of digital textbooks was part of the Malaysian Education Development Plan (PPPM) from 2013 to 2025, and was introduced in three phase by the government. For the beginning phase, the printed version of the textbook will remain in use as usual. Students can download their textbook as PDFs. This e-Book is an electronic book and most of e-books are not interactive.

Figure 2.1 shows the eTextbook for *Kimia dalam Perubatan dan Kesihatan* Form 4 are simply electronic copies of the paper version of a textbook, usually delivered in PDF format. Generally, these PDF documents are carbon copies of the paper versions of the textbooks. These books are identical to their paper twins, but simply accessed via computer or devices technology. No interactive content is provided. The use of this e- textbook is very simple because students just typing a book title or issue, in just a few seconds, will reveal the information in book's. The rationale for the introduction of this e-Book is due to various benefits, including the ability to save money on textbook printing, the ability to bring a lighter and easier bag to school, and the fact that students are now generation. This e-Book also easier

to store and download for all kind of devices type and also not depends on the internet and interactive to students learn. Teachers must be able to manage electronic textbooks effectively so that pupils do not become confused throughout the learning process.

2.3.4 eTextbook Kimia dalam Perubatan dan Kesihatan KBSM (2018)

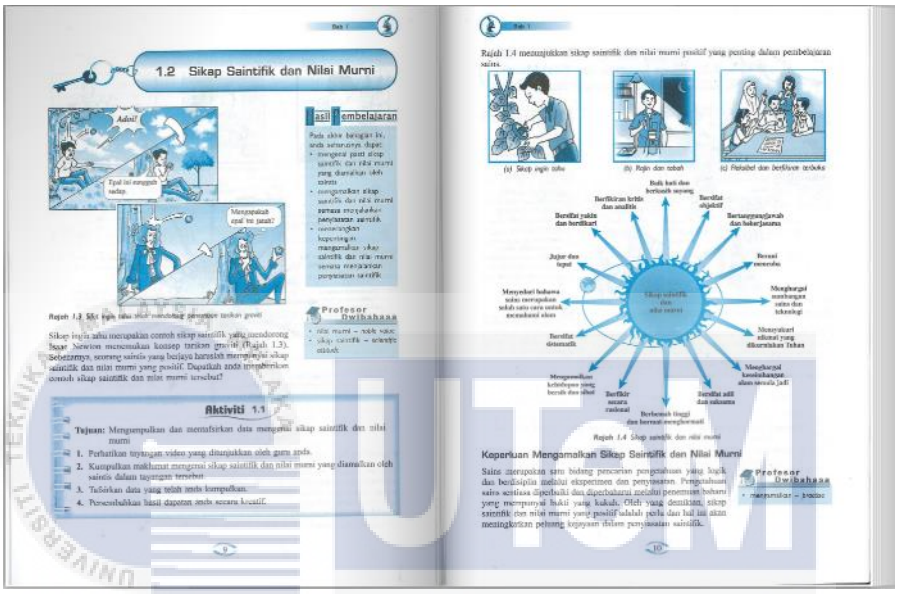


Figure 2.2 Interface eTextbook Kimia dalam Perubatan dan Kesihatan Tingkatan 4 KBSM (2018)

Figure 2.2 shows that eTextbook Kimia dalam Perubatan dan Kesihatan. KBSM (2019) which are simply electronic copies of the paper version of a textbook, usually delivered in PDF format. This version of eTextbook do not have color in the PDF files. As a result, pupils find learning less appealing. Furthermore, there are few chances for students to get this version of the textbook.

2.3.5 Comparison existing system

The aim of comparing current book is to evaluate the difference between these book in terms of interactivity, multimedia element, usefulness of each book.

Table 2.1 shows the comparison of existing book. This table will explain for more detail about each book such as target user, platform that use for the book, price,

multimedia element that has provide in this book, language, strength and weakness of the book.

Existing book	**ETextbook Kimia dalam Perubatan dan Kesihatan Tingakatan 4 KSSM (2019)**	**ETextbook Kimia dalam Perubatan dan Kesihatan Tingkataan 4 KBSM (2018)**	**E-Book Kimia dalam Perubatan dan Kesihatan Tingkatan 4**
Target user	Form 4 Students	Form 4 Students	Form 4 Students
Platform	PDF/ All devices	PDF/ All devices	Desktop view
Price	Free	Free	Free
Multimedia component	Image, Text, Colour	Image, Text	Graphics,video, audio, game.
Language	Malay	Malay	Malay
Strength	Easy to use and can download for all type of devices	Have a QR code to access audio and video	Interactive, easy to use, have all multimedia element that make fun more understand to learn music.
Weakness	Only copy paste from textbook and that not interactive to use.	Not provide audio and video on that book.	Only for desktop version.

Table 2.1 Comparison of existing book

2.4 Project methodology

To finish this project, the ideal strategy for giving project guidance and enhancing the quality of deliverable projects must be determined. The methods to be used are the Waterfall model. This method will be to make sure that this undertaking could be conveyed and created. The waterfall model is a linear,

sequential approach to the software development life cycle (SDLC) that is popular in product development.

Figure 2.3 shows the Waterfall model flow. It is termed as waterfall because the model develops systematically from one phase to another in a downward fashion. This model is divided into different phases and the output of one phase is used as the input of the next phase. Every phase has to be completed before the next phase starts and there is no overlapping of the phases.

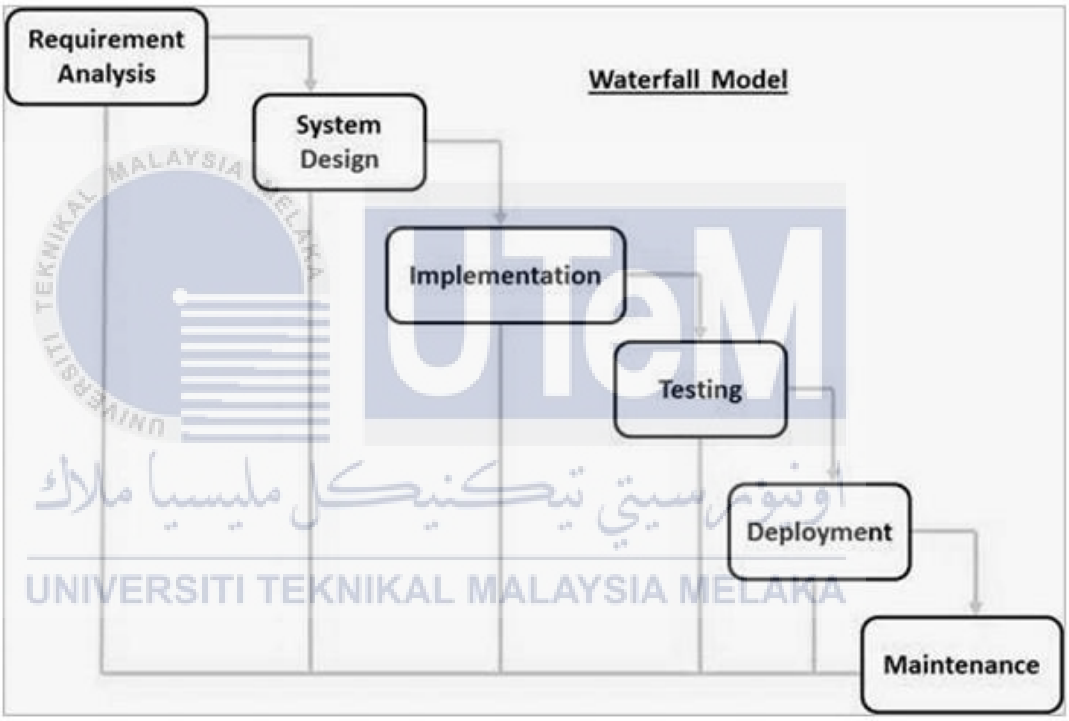


Figure 2.3 Waterfall Model

i. Requirements analysis

Requirements is the fundamental and most important phase in Waterfall Model. At this point, you should have a clear understanding of the project's requirements. This data may be gathered in a variety of

ways, including interviews, questionnaires, and interactive brainstorming. This must be relevant, detailed and quantifiable. At the conclusion of this phase the project needs should be defined.

ii. System design

The design phase is developers had to consider what the product or solution would look like in this phase, as well as the test strategy or plan, depending on the requirements provided in the previous phase. In this project, a proper e-Book engine need to be selected such as Adobe InDesign. Design the video, image, sound and animation using Adobe Illustrator, Adobe Premier and Adobe After Effect in this project.

iii. Implementation

Purpose of this phase is to create and test the features of e-Book. This project use Adobe InDesign CC 2020 as a platform to create the e-Book. Adobe InDesign is a desktop publishing software application for creating flyers, brochures, magazines, newspapers, and books. Projects created using InDesign can be shared in both digital and print formats. Interactive features for example media, quiz and also pop-up widget also some of the features that can be added In this e-Book.

iv. Integration and Testing

All the units developed in the implementation phase are integrated into a system after testing of each unit. The software designed, needs to go through constant software testing to find out if there are any flaws or errors. Testing is done so that the client does not face any problem during the installation of the software. To check the functionality and credibility of the e-Book, the teacher or the student need to try.

v. Deployment of system

Once the functional and non-functional testing is done; the product is deployed in the customer environment or released into the market. This means that, the e-Book is ready to be use by the teachers and the students for learning purposes.

vi. Maintenance

There are some issues which come up in the client environment. To fix those issues, patches are released. Also to enhance the product some better versions are released. Maintenance is done to deliver these changes in the customer environment.

2.5 Project Requirement

There are two project requirements that use software and hardware requirements for e-Book applications. Furthermore, the following are several lists with which this e-Book application needs to be developed.

2.5.1 Software requirement

- Adobe InDesign CC 2020
- Adobe Illustrator CC 2019
- Adobe After effect CC 2019

2.5.2 Hardware requirement

- Laptop
- Mouse and Keyboard

2.6 Conclusion

This chapter's conclusion summarizes the whole review of the existing implementation as well as the technique that will be utilized to build this project. This step is critical to ensuring a smooth and successful development process. The project methodology that was used for this interactive textbook is Waterfall Model development. This methodology is allowing developer to plan and requirement gathering and analysis, system design, implementation, integration and testing, deployment of system and maintenance. This chapter also describe about domain of the book with an comparison of existing product that already in the market. There are several products which is digital textbooks was part of the Malaysian Education Development Plan. Students can download their textbook as PDFs. This e-Book is an electronic book and most of e-books are not interactive incompatible for students to use it. Students can only view the static image and the instructions.

In addition, this chapter also state the complete requirement for software and hardware use to develop this project. All the analytical process will be explained in the next chapter which is analysis.

CHAPTER 3: ANALYSIS

3.1 Introduction

In this chapter, the method used for multimedia e-book development is being analyzed. The chapter covers the project requirements, software requirements and hardware requirements. This chapter also will cover the project schedule and milestones of the development of the project. The schedule and milestones will be list and described by stages to fully show the progress of the multimedia e-book throughout the development.

The analysis chapter's major goal is to figure out what elements and features are required for multimedia material. This chapter also determines the approach on how the multimedia e-book been implemented. Thus, the information will be recognized and applied in multimedia e-book.

3.2 Current Scenario Analysis

Developing a Design of Multimedia E-Book for Secondary School in Chemistry in Medicine and Health is to increase performance in Teaching and Learning using digital platform EPUB reader. Interactive textbooks for Chemistry in Medicine and Health is books that you can download and play by using a desktop whenever user want to. The interactive textbook that applies content from traditional textbook but the delivery method is different from previous textbook. The e-book contains the clickable function that can user interact with the e-book.

The multimedia material is appealing to the eye due to the use of a simple style and clear typography. Furthermore, the multimedia material has a clickable capability, which makes it more interactive by allowing users to engage with the information according to their preferences. As example, student can choose to the subchapters that they want.

Quizzes are also offered for each lesson to make the learning experience even more fun. Quizzes can assist students refresh their recollection on important facts.

3.3 Requirement Analysis

The purpose of requirement analysis is to determine the user expectations to create or improve the project. Due to the aim, requirement analysis must be combined to identify specific features, expectations, and development processes.

3.3.1 Project Requirement

This project falls into the category of E-learning material. The present disadvantage encountered by students and teachers is the absence of multimedia material that contributes to a more pleasurable learning environment. Furthermore, typical Science textbooks are densely packed with text and lack multimedia features. It will excite students' interest in understanding the subject utilizing this multimedia e-book by using images, videos, and audio resources. The language used is Bahasa Melayu.

3.3.1.1 Need Analysis

The traditional books or online materials available are inert materials. As a result, the students found it difficult to stay concentrated and considered it less fun. As a result, this multimedia e-book seeks to assist pupils become more interested in studying.

Once the user opens the multimedia e-book, the user can interact with the button that bring them t the subchapters they want. The multimedia e-book will provide the multimedia elements such as text, image, audio, animation, and video. This multimedia e-book will help students to increase their understanding through the interactivity of the content.

3.3.1.2 User Analysis

The objective of this stage is to determine the approach needed for the development of The Design of Multimedia E-books for Secondary School in Chemistry in Medicine and Health. Users' attention is stimulated by the addition of interactive elements. Clickable buttons, audios of the classes, a gallery of photos, quizzes to aid with comprehension, and questions from the previous year are all available in the multimedia material.

3.3.1.3 Technical Analysis

The multimedia e-book is developed using the Adobe InDesign CC 2020. The graphical elements are designed by using Adobe Illustrator CC 2019. For the video in the multimedia e-book was created using Adobe After Effects CC 2019.

3.3.1.4 Resource Analysis

Multiple resources have been used to develop this multimedia e-book. For the content sources, Buku Teks Sains Tingkatan 4, Buku Latihan Sains Tingkatan 4 and Buku Latihan TP Sains Tingkatan 4 was used as references. All the references are in PDF materials. Most of the graphics are created using Adobe Illustrator CC 2019. Other resources used was from the Unsplash website for the free stock photos used to create more engaging multimedia e-book. The animation is animated using the Adobe After Effects CC 2019.

3.3.1.5 Requirement gathering

Requirement gathering is an essential procedure in the development of multimedia e-book. Through requirement gathering, the project aims can be achieved. Multiple ways were used in gathering the requirements, such as interviewing the students and teachers about the problems they face regarding the subject, making an observation, brainstorming, and analyzing the documents related to the project. Plus, making the comparison of the existing projects.

3.3.2 Software requirement

This Multimedia E-Book for Secondary School in Chemistry in Medicine and Health is developed by using multiple types of software. A proper and suitable software have been using to come out with the fantastic outcomes. The main software used is Adobe InDesign CC 2020. This software can be used to create and designs the multimedia materials such as brochures, interactive PDF, e-books, books and more.

Then, the graphical materials were created by using the Adobe Illustrator CC 2019. It includes the design of the cover, images of the topics and others. The animation in the multimedia e-book is made using the Adobe After Effects CC 2019. Finally, the project also utilizes Microsoft Word as the software for the project documentation. All the purposes of each software are explained in Table 3.1 below.

NO	Software	Purpose
1.	Adobe InDesign CC 2020	To create the multimedia e-book
2.	Adobe After Effects CC 2019	To create animation video
3.	Adobe Illustrator CC 2019	To create graphics materials
5.	Microsoft Word	To create documentation of the project.

Table 3.1 Software for The Project

3.3.3 Hardware requirement

Apart from software, hardware is also required for the development of this project. As a result, a personal laptop, smartphone, mouse, and keyboard is needed to develop the project. This hardware is required to ensure that the software that will be used can be run smoothly and in good condition. The role of each of the hardware is explained in Table 3.2 below.

NO	Hardware	Purpose
1.	Personal Laptop	To runs all the required software and develop the multimedia e-book.
2.	Mouse and Keyboard	Helps in developing process and exploring process

Table 3.2 Hardware for the Project

3.4 Project schedule and milestone

This project is implemented around fourteen weeks. Project Gantt Chart and milestone are very important and need to be well planned to ensure the achievement of the objective. This can help to prevent us from be overdue that can give a lot of loss for the project.

No	Milestone	Weeks															
		15	16	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1.	Project briefing																
2.	Brainstorming and Preparing																
3.	Proposal submission																
4.	Research for the content																
5.	Planning the content																
6.	Create the design of the project																
7.	Create the content																
8	Testing the project																

9	Make adjustment																
10	Documentation																
11	Presentation																

Table 3.3 Gantt Chart of the project milestone

Table 3.4 below shows the milestone of the project activities. This milestone will explain about the started date and end date for every activity. The project will start at 29 January 2021 until 1 July 2021. The project takes around 6 months to complete all the development.

No	Milestone	Start Date	End Date
1.	Project Briefing	29 January 2021	29 January 2021
2.	Brainstorming and preparing the proposal	1 March 2021	3 April 2021
3.	Proposal submission	29 March 2021	4 April 2021
4.	Research for the content	15 March 2021	25 March 2021
5.	Planning the content	26 March 2021	30 March 2021
6.	Create the design of the project	30 March 2021	18 May 2021
7	Create the content	30 March 2021	18 May 2021
8.	Testing the project	31 May 2021	13 June 2021
9	Make adjustment	31 May 2021	20 June 2021
10.	Documentation	22 March 2021	23 June 2021
11.	Presentation	21 June 2021	2 July 2021

Table 3.4 Milestone of the project activities

3.5 Conclusion

For the conclusion of this chapter, analysis process is an important thing to define the working system. The requirement analysis was describing about the problem and was come out with the solving idea to developed this interactive textbook. Aside from that, this section also discusses the project requirements and user requirements, with the goal of determining who the project's target users are. The technical analysis is also necessary to ensure that the whole development process runs smoothly without any interruptions or damage that might cause the development process to terminate or be abandoned.

The hardware and software also need to be chosen whether it is suitable for multimedia e-book development. The Gantt chart and project milestones have also been described to increase the efficiency of the project's development. The Gantt Chart and project milestones can help keep on track in the project's development to avoid any incidents.

CHAPTER 4: DESIGN

4.1 Introduction

In this chapter, the design of the of the project will be explained. The design of a project plays a main role and have an impact on attracting the user's attention. As a result, the interface must be eye-catching and provide a good initial impression in order to persuade people to continue utilizing the multimedia e-book. The discussion focuses on preliminary design, system architecture, and user interface design.

4.2 System architecture

The system architecture is a conceptual model that describes the structure, behavior, and other aspects of the system. A formal description and representation of a system that is organized in such a way that reasoning about the system's structures and behaviors is made easier.

Figure 4.1 below shows the flow of the system architecture for the multimedia e-book. It started with the user need to open the multimedia e-book using a device. Next, the user can view the cover and interactive multimedia e-book. Then, the user also can view the content of the subchapters. After each subchapter, the quiz is prepared for the user to answer.

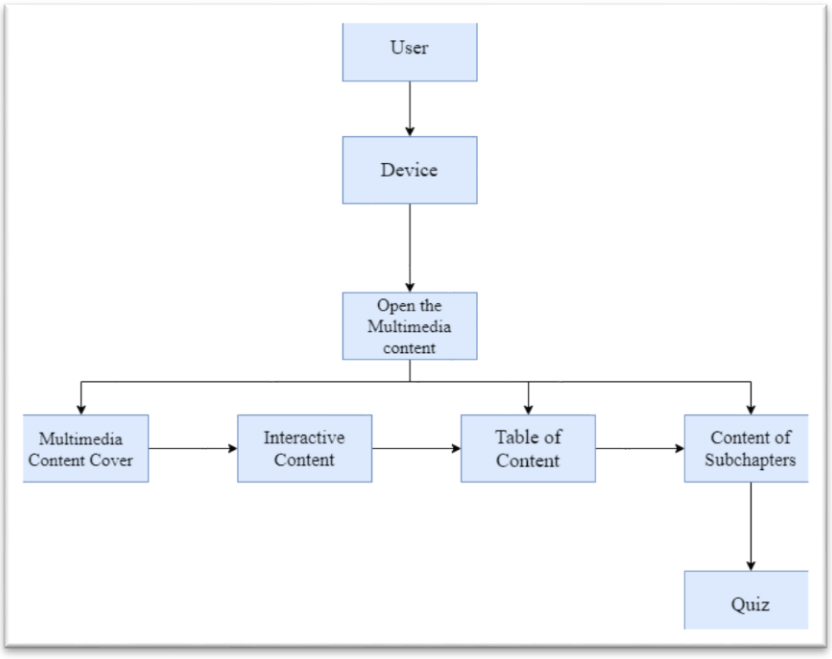


Figure 4.1 System architecture

4.3 Preliminary design

The initial step of design is preliminary design, often known as theoretical design. The general design principles for the multimedia material are displayed in this phase. During this phase, a higher-level design product is created. The purpose of this effort is to develop a thorough storyboard for multimedia e-book.

4.3.1 Storyboard design

The project's storyboard is prepared to ensure that the development process runs well. It also is done to keep the schedule of the development progress is on track as scheduled. Figure 4.2 below shows the storyboard of the multimedia e-book.

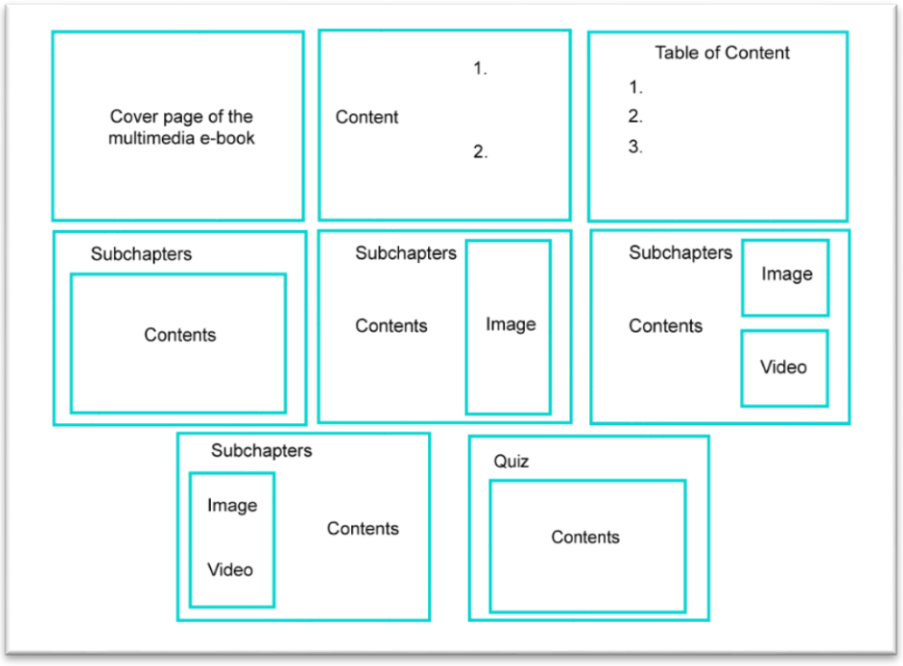


Figure 4.2 Storyboard design

4.4 User interface

The user interface is a method for interacting with multimedia material that allows the user to engage with it. Because the user must comprehend the material that the author wants to convey to them, user interface process is important. As a result, the user interface must be properly developed in order to provide an engaging and efficient environment for users to engage with multimedia information. The diagrams below show the many types of user interfaces and their functions.

Figure 4.3 E-Book for Secondary Schools: Chemistry in Medicine and Health cover page

Figure 4.3 shows the multimedia e-book main interface. The cover page created on the minimalist theme with an image.

Figure 4.4 Table of Content

Figure 4.4 shows the list of content of multimedia e-book. This list of content can assist the user in which page is the topic they wish to see, and it is clickable for them to straightaway go to the desired page.

Figure 4.5 The title page for each topic

Figure 4.5 shows the title page for each topic in the multimedia e-book. The design interface shows the text, which is the title of the topic. The font used for the title is TW Cen MT (Bold).

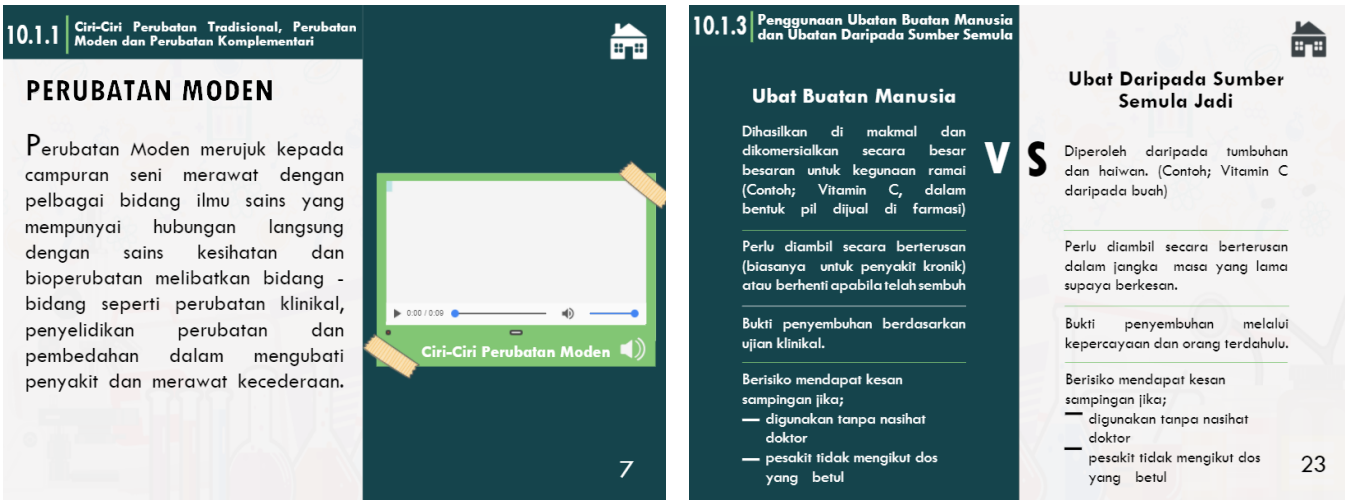


Figure 4.6 The content/learning interface

Figure 4.6 shows the information for the topic in the multimedia e-book. There is text, images, animation, and audio used for these interfaces.

Figure 4.7 Quiz interface

Figure 4.7 shows the quiz interface of a topic in the multimedia e-book. The user can answer the question to test their understanding of the topic.

4.4.1 Navigation Design

The navigation design shows the flowchart of the multimedia e-book from the main page to the topic of the multimedia e-book. Figure 4.9 below shows the navigation design for this project.

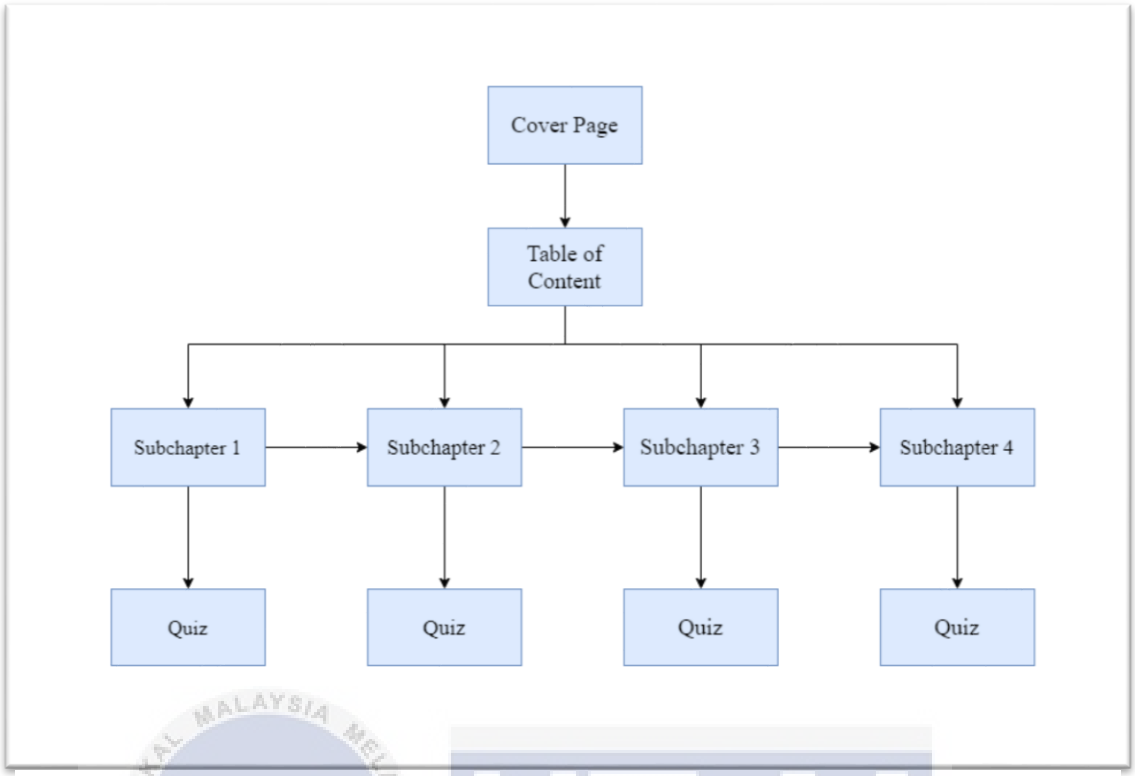


Figure 4.8 Navigation design

4.5 Conclusion

This chapter will be covered in an interactive textbook design. Design is a crucial step in the development of a project. Every page of interface designs is produced in the design process to generate a nice design. The user interface and system architecture were both part of the high-level design.

The usage of system architecture tells the system's structure which will help underlines the overall flow needed for the storyboard planning. The planning of the storyboard design helps to investigate the necessary features to deliver the contents successfully to the user. The user interface design is then displayed as a result of the multimedia material in terms of design progress from start to finish.

Next chapter will continue with the implementation of multimedia e-book. The chapter on implementation involves the progress of the project and the activities during the implementation of the multimedia e-book.

CHAPTER 5: IMPLEMENTATION

5.1 Introduction

The implementation phase, project where development process of a Multimedia E-Book for Secondary Schools: Chemistry in Medicine and Health using Adobe InDesign CC 2020 will be elaborate. All the process will be described in this chapter which is about the media creation, media integration, product configuration management and implementation status.

5.2 Media creation

Multimedia E-Book for Secondary Schools: Chemistry in Medicine and Health using Adobe InDesign CC 2020 will go through in media element such as text, graphic, video, audio and simple animation for more attract to user using this interactive textbook. The process for every element as document for this chapter will be describe and all of the element will be used to produce this final e-book project.

5.2.1 Production of text

Text is also a multimedia element to completing this multimedia e-book project. Texts provide the better understanding to and deliver information to users knows what this project is really about. The words used in this project are given description to learn music and the title for each topic to make reader easy to handle this book direct so that the reader understand better.

Figure 5.1 shows the process in text manufacturing that provide in this multimedia e-book. There are several steps by selecting the suitable font to use as well as generating more interesting and suitable text to display the text, the correct text size and the suitable color to display in information and more. The font type and text were created by using Adobe InDesign CC 2020.

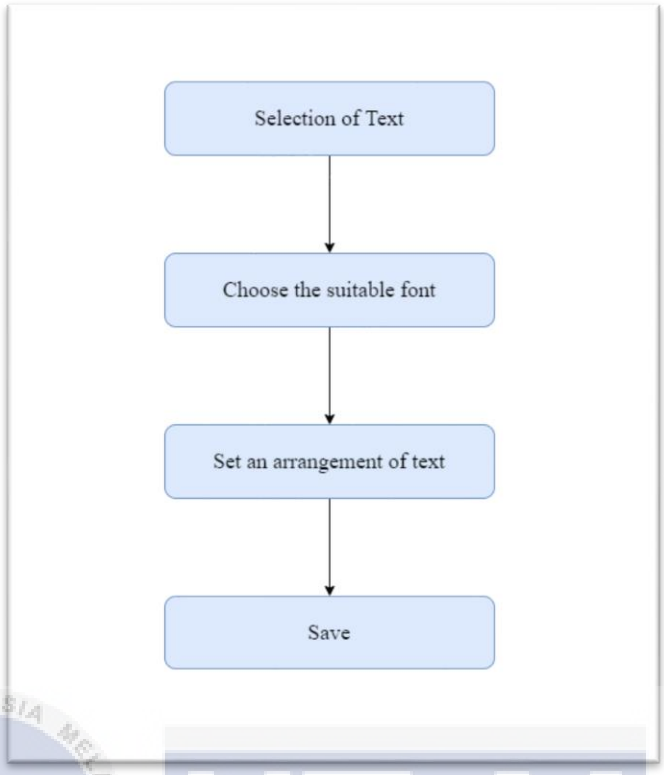


Figure 5.1 Process text manufacturing

Table 5.1 shows the sample of text that was created by using Adobe InDesign CC 2020. From that table text are be using on the title and description. The font type that already use to design the text is marker felt for title and time new roman for the description. So that user can distinguish between title and description.

Type of text	Example	Font Type	Font Size
Title		TW Cen MT	112 pt 60 pt

Description		TW Cen MT	50 pt 32 pt

Table 5.1 Sample text created using Adobe InDesign CC 2020

5.2.2 Production of graphics

Production of Graphics could be used to attract reader to read the book. The great and attractive graphic can make the interface and make the product easier to understand for the user. The Adobe InDesign graphic components are made by using Adobe Illustrator.

Figure 5.2 below shows the step to create the image graphic for the multimedia e-book material. This process is started from import the image into the editing software for sketching, redraw the sketching and texture the image.

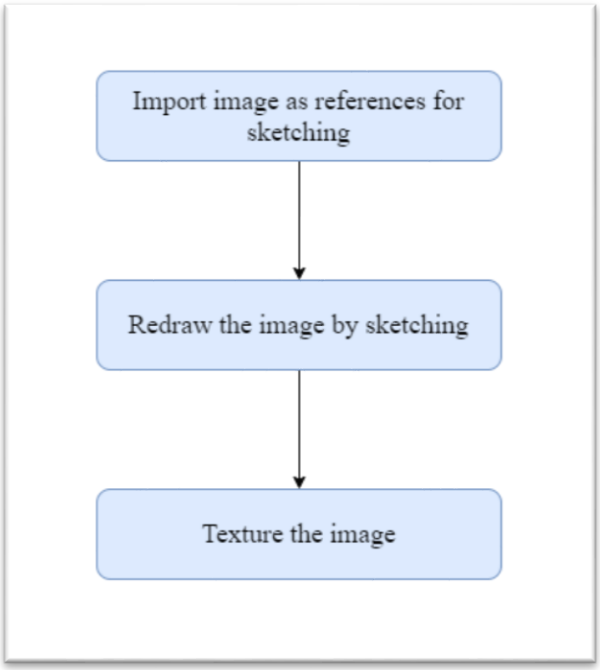


Figure 5.2 Process in graphic manufacturing

Table 5.2 showed the sample graphic created using Adobe Illustrator. There are several type of graphic that already design for this interactive textbook which is click here icon, decoration of interface, sub-title design and other.

Type of Graphics	Example
Click here icon	
Home icon	

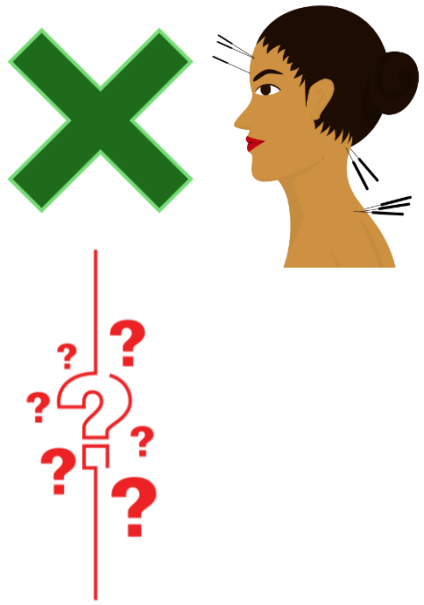
Decorative of interface	

Table 5.2 Sample graphics created using Adobe Illustrator

5.2.3 Production of audio

The production of audio is an important component in the e-book music. environment that will make more different than existing book style and also make reader more understand and fun when learn.

Figure 5.3 below shows the process flow in audio manufacturing. This process is started record the voice. After that the audio need to edit such as cut and trim. Lastly the audio can be imported into the Adobe InDesign CC 2020.

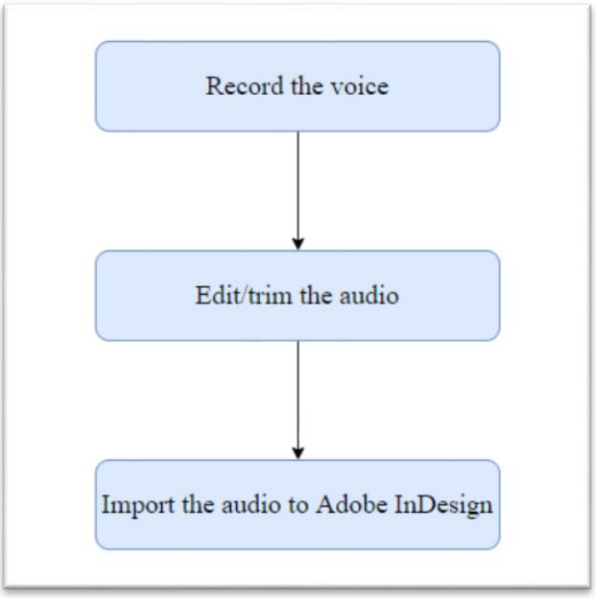


Figure 5.3 Process in audio manufacturing

Table 5.3 shows the detail information about sample of audio editing for this interactive textbook. This audio was implement for videos in this multimedia e-book. To make sure the user can hear clearly the editing must do properly and meticulous.

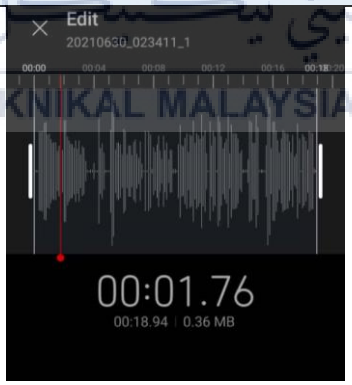
Type of audio	Example	Software Type
Description audio		Audio recorder

Table 5.3 Sample audio editing

5.2.4 Production of video

The production of video is also important part for this multimedia e-book that make description for the content easy to understand. The production of the video is carried out in Adobe After Effects CC 2019. The file is rendered in high quality and is exported using H.264 file format which is the common MP4 setting.

Figure 5.4 shows the process on video manufacturing. The process was started from editing the graphics text and shape in the Adobe After Effects. After that render and export the video. Lastly import the video into the Adobe InDesign.

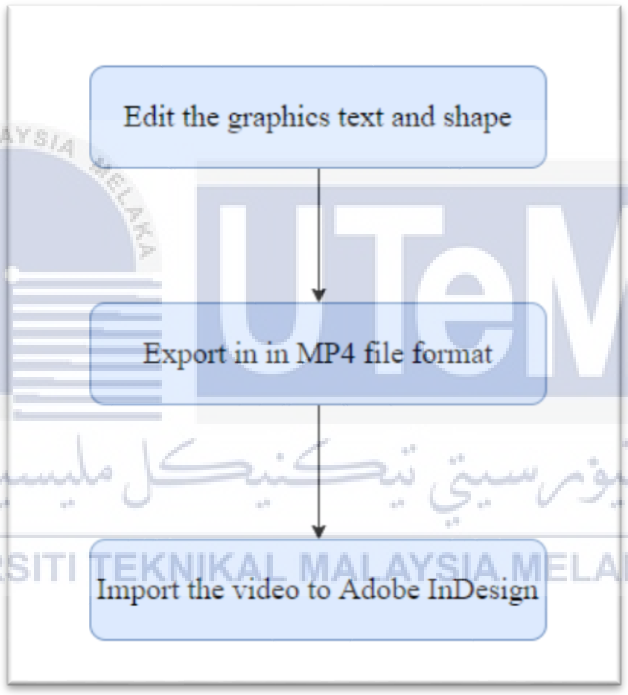


Figure 5.4 Process in video manufacturing

Table 5.4 below shows the sample of video that was created. All the video was edit by using Adobe After Effects for the better and quality on editing. Type of video that was include for this multimedia e-book is mind map video and example.

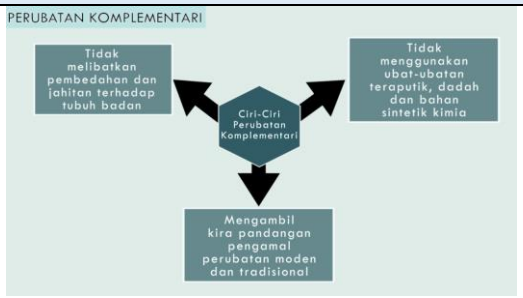
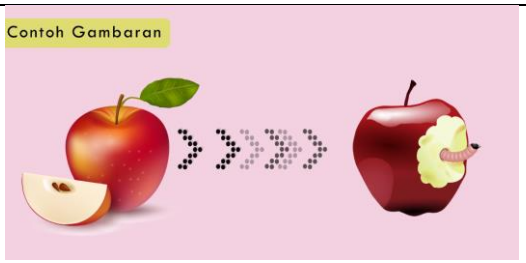
Type of video	Example
Mind map video	
Figure example	

Table 5.4 Sample video created using Adobe After Effects

5.3 Media integration

The media production process is to combine the earlier state manufacturing. This interactive textbook will contain all of the multimedia e-book content element material such as text, graphics, audio, and video that has been generated. Adobe InDesign is used as a platform engine to create a multimedia e-book that includes all interactive textbook content elements. Graphic and text is being important and set up in Adobe InDesign before ready to be published.

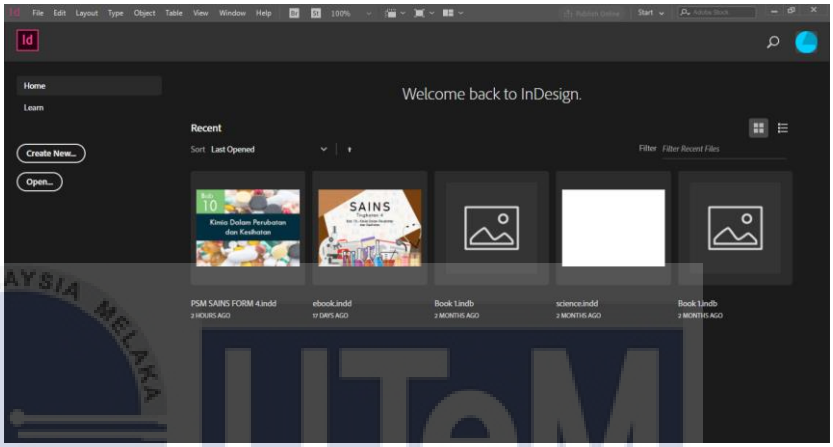
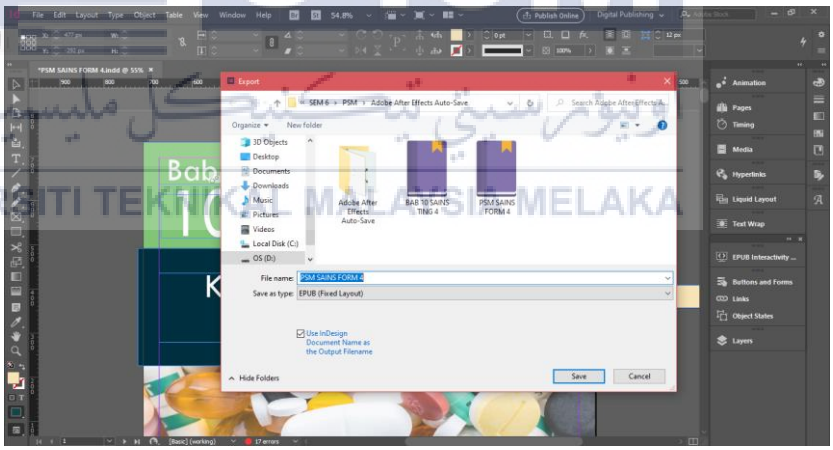
5.4 Product configuration management

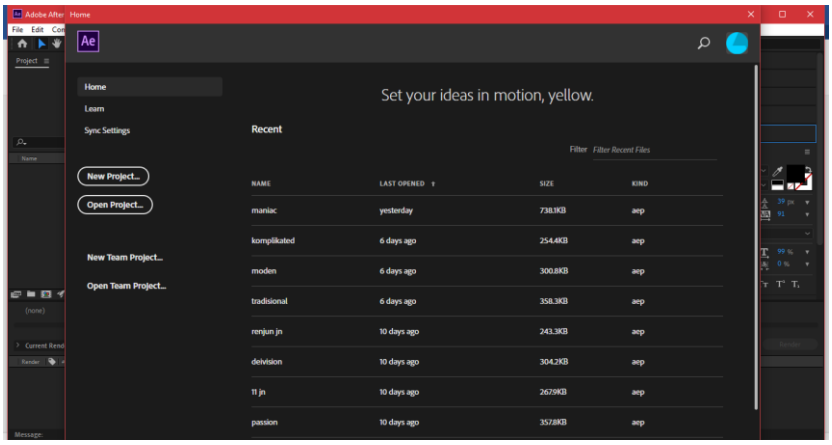
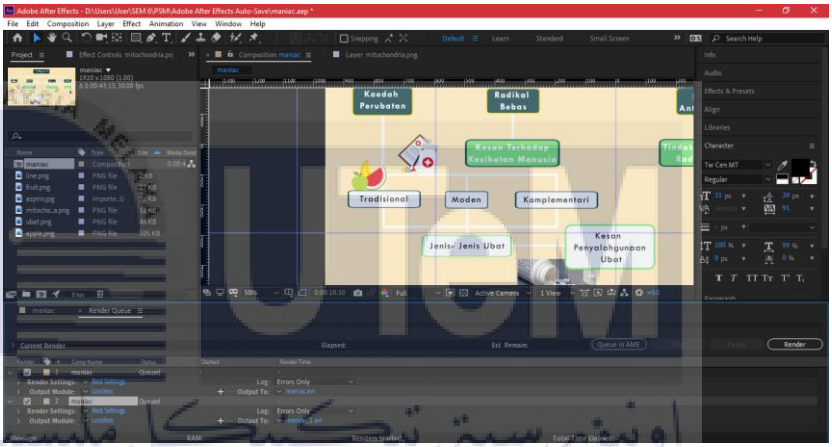
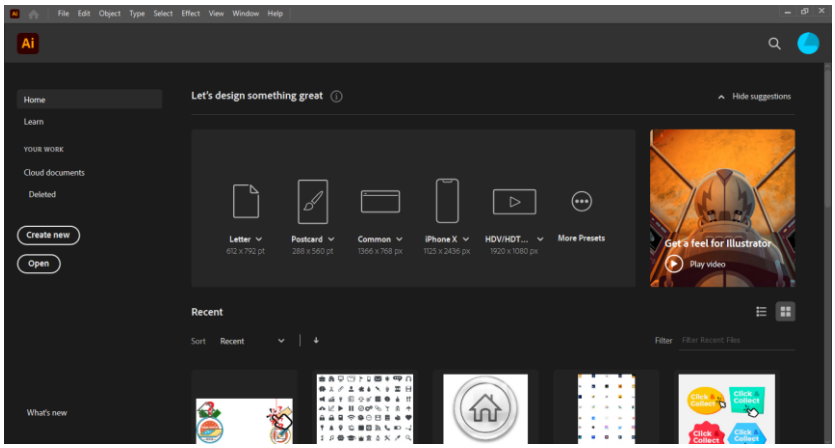
Product configuration management refers to the operations that need the product to be configured in order to get the expected goal. This method may include setting up Adobe InDesign, Adobe After Effect and Adobe Illustrator.

5.4.1 Configuration environment setup

The needed software settings for this project are specified in the configuration environment setup. The figures in the scene are gathered for a better view and comprehension of the situation.

This project's setup setting is shown in Table 5.5. Every programed has a distinct setup, but the elements to configure are more or less the same, such as the project name, video size, video format, layout, and other things. This table will show how to set up the programmed before editing and how to export the media after editing.

Type of Software	Setup
Adobe InDesign	Canvas setup  Export setup 

Adobe After Effects	Canvas setup  Export setup 
Adobe Illustrator	Canvas setup 

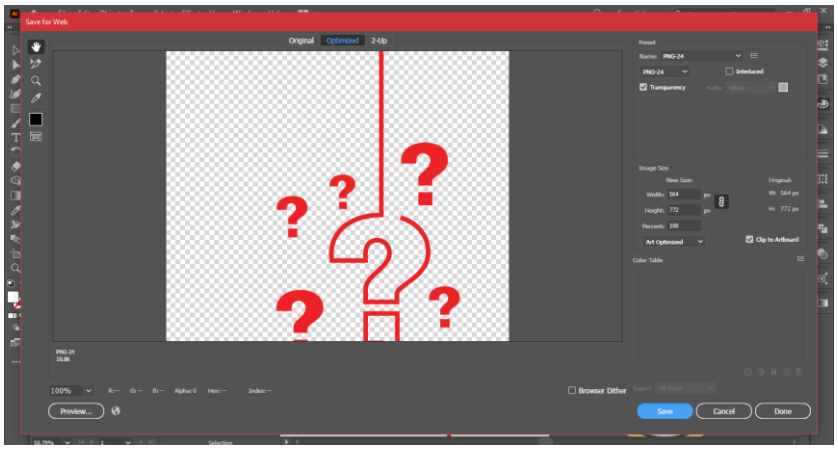
	Export setup 

Table 5.5 Setup configuration

5.4.2 Implementation status

In Table 5.6, the development progress of each multimedia e-book is detailed, as well as the project's implementation status. The table displays the length of each module that must be completed before the deadline. Design the multimedia e-storyboard, book's as well as build and design the interface for each page, are among the modules that must be completed.

Module	Duration	Status
Designing the storyboard of the multimedia e-book page	2 Weeks	Complete
Create the interface for the multimedia e-book for every page	5 Weeks	Complete
Create multimedia element	3 Weeks	Complete
Design the iBook for all page	6 Weeks	Complete

5.5 Conclusion

For the conclusion, this chapter will go through the specifics of the processes that were in use during the implementation stage of this interactive textbook project. The process is from the media creation, media integration, product configuration management and implementation status. In media creation show the production of media element such as text, graphic, video, and audio. Furthermore, the product configuration describes the setting of every application used for media editing, from canvas setup to export setup. Aside from that, when it comes to the implementation status, developers must adhere to the timeframes that have been established to ensure that the implementation in creating this multimedia e-book goes successfully.

After completing this stage, the developer will proceed to the testing step, which will be discussed in the following chapter. For this interactive textbook, the following chapter will test the project and focus on the final project testing procedures.

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