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English is Fun! – English Strange and Funny: The Development of E – Learning System for Secondary School Student

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Abstrak*: Kosa kata adalah salah satu aspek bahasa Inggeris yang paling menyeluruh tetapi sukar untuk dikuasi oleh pelajar asing termasuk perkataan yang dikategorikan sebagai homophone dan homograph. Homophone merujuk kepada perkataan yang mempunyai sebutan yang sama dengan perkataan yang lain tetapi mempunyai makna dan ejaan yang berbeza. Manakala, homograph merujuk kepada perkataan yang mempunyai ejaan yang sama tetapi mempunyai sebutan dan makna yang berbeza. Namun, kebanyakan pelajar Malaysia tidak boleh bertutur dalam bahasa Inggeris dengan yakin kerana kekurangan kosa kata. Pengetahuan terhad pelajar tentang perkataan bahasa Inggeris adalah salah satu sebab mereka tidak mahir dalam kewujudan perkataan yang berbeza dalam bahasa Inggeris. Oleh itu, Sistem E – Pembelajaran untuk pelajar sekolah menengah ini dibangunkan. Objektif utama adalah untuk mereka bentuk Sistem E – Pembelajaran bahasa Inggeris mengguanakan struktur dan pendekatan sistem web. Sistem ini disasarkan kepada pelajar sekolah menengah yang berumur 16 tahun. Model ADDIE digunakan untuk menjalankan kajian ini dan beberapa perisian digunakan untuk membangunkan sistem. Projek ini akan dijalankan bertujuan untuk pelajar mempelajari homophone dan homograph dalam bahasa Inggeris sekaligus akan membantu mereka mempunyai pelbagai kosa kata dalam bahasa Inggeris.*

Kata kunci*: Sistem Web E - Pembelajaran, Homophone, Homograph, Model ADDIE*

Abstract: Vocabulary is one of the most comprehensive but difficult aspect of English for foreign learners to master thoroughly including the words categorized as homophone and homograph. Homophone refers to any word with the same pronunciation as another word but has a different meaning and spelling whereas, Homograph refers to words with the same spelling but different pronunciation and meaning. However, most Malaysian students cannot speak English confidently due to lack of vocabulary. Students' limited knowledge of English words is one reason they are not well-versed in the existence of different words in English. Hence, an E – Learning System for Secondary School Student is developed. The main objective is to design English E – Learning System using structures and web system approach. This system is targeted to secondary school students aged 16 years old. ADDIE models are used to conduct this study and a few software's are used to develop the

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system. This project will be conducted to allow students learn homophone and homograph in English language and so will help them to have a wide range of vocabulary.

Keywords: E-Leaning Web System, Homophone, Homograph, ADDIE model

1. Introduction

Digital technologies manage IR 4.0, presenting future education models that emphasize intelligent, mobile, comprehensive, and virtual education and skill development. As a result, teachers must adapt their teaching techniques to meet the needs of IR 4.0. Malaysia is a developing country, yet despite the government's declaration that 21st Century Learning Method (PAK-21) must be completely adopted beginning in March 2018, most schools in Malaysia continue to use conventional/outdated learning methods. Therefore, the developer decided to develop an E - Learning web system which offers better understanding regarding homophone and homograph specifically for English language.

English language is a common second language for many Malaysians. However, past research has shown that many Malaysian students are facing problem in grasping the language. Vocabulary is one of the most comprehensive and difficult aspects of English for foreign learners to master thoroughly. Other difficulties in learning and using English vocabulary include the words categorized as homophone and homograph. Hence, it is understandable that Malaysian students often face problems when learning English as there are many words in English language could be confusing.

Based on past research, most Malaysian students cannot speak English confidently due to lack of vocabulary. Students' limited knowledge of English words is one reason they are not well-versed in the existence of different words in English. Unfortunately, English vocabulary for a daily living requires more time and is more difficult to master by foreign learners than English grammar. Thus, the developer decided to design English E - Learning Web System using structured or web system approach. the fact that students are required to write more extended essays and encounter more complicated language questions. Therefore, this project's scope is limited to secondary school students, especially form 4 students.

This report is divided into six chapters. The project of the system that is going to be built is discussed in Chapter 1. This chapter will analyze the problem and the aim of the project. Chapter 2 will discuss the literature review done for the system and the current system used by users. Furthermore, this chapter will include suggestions and recommendations for the study that is to be carried out. Chapter 3 discusses the methodology used to develop the system and activities carried out in each phase. Chapter 4 will explain in detail the requirements needed in the system and the process that works in the system. This chapter also provided a Context Diagram, Data Flow Diagram Level 0 (DFD Level 0), Data Flow Diagram Level 1 (DFD Level 1) and Entity Relationship Diagram (ERD). Chapter 5 will discuss the implementation and testing phases, applying the test cases and interface accordingly. Lastly, Chapter 6 will review the advantages and disadvantages of the system, as well as provide recommendations for future improvements and make conclusions about the project.

2. Related Work

2.1 E – Learning System

In general, computer and internet were introduced not too long ago and allow learning tools and methods being expanded. The first computer introduced by MAC in 1984 has enabled the existence of computers in every household. In addition to that, the establishment of internet has allowed

individuals to learn about certain subjects and develop certain sets of skills. Hence, people all over the world have started to gain access towards online information, which then create e-learning opportunities. Clark and Mayer (2015), refers the E-learning as instructions delivered through digital devices with the intent of supporting learning**.**

E-learning has allowed the use of information and communication technologies as resources in enabling access to online teaching and learning (Arkorful and Abaidoo, 2015). The utilization of electronic technologies in learning has now been widely used all over the world and commonly known as the e-learning. E-learning is referred as electronic learning where the acquisition of knowledge takes place through technologies and media. The development of E-learning systems everywhere has now allowed unlimited access of educational curriculums outside of traditional classrooms.

The are many different E-learning systems being used now. Along with locational restrictions, time is one of the issues that learners and teachers both have to face in learning. In the case of face-to-face learning, the location limits attendance to a group of learners who have the ability to participate in the area, and in the case of time, it limits the crowd to those who can attend at a specific time. E-learning, on the other hand, facilitates learning without having to organize when and where everyone who is interested in a course can be present.

2.2 E – Learning and Learning styles

Learning style has always been the main focus when it comes to teaching methods and deliveries. As teaching style has evolved and will keep evolving, teachers or instructors will need to find ways of coping with their teaching methods to ensure effective teaching. Even though there is a transition from traditional learning method to online learning, there has always been the same concern when it comes to students' learning styles. The word "learning style" refers to the process by which the learner organizes, processes, represents, and combines this information and stores it in his cognitive source, then retrieves the information and experiences in the style that reflects his technique of communicating them.

There are many models of learning styles including the VARK model, which is one of the most well-known models used to classify learning styles. The VARK model offers better thought about information processing preferences (Johnson, 2009). Fleming and Baume (2006) developed the VARK model, which consists of four students' preferred learning types. The letter "V" represents for visual and means the visual style, while the letter "A" represents for auditory and means the auditory style, and the letter "R/W" represents "write/read", means the reading/writing style, and the letter "K" represents the word "Kinesthetic" and means the practical style. Moreover, VARK distinguishes the visual category further into graphical and textual or visual and read/write learners (Murphy et al., 2004; Leung, et al., 2014; Willingham et al., 2015).

According to the findings of (Akbulut & Cardak, 2012; Alshammari & Qtaish, 2019; Alzain et al., 2018a, b; Shi et al., 2013; Truong, 2016), adaptation based on a combination of learning style, and information level yields significantly better learning gains. Researchers have recently initiated to focus on how to personalize e-learning experiences using personal characteristics such as the student's preferred learning style. Personal learning challenges are addressed by adaptive learning programs, which provide learners with courses that are fit to their specific needs, such as their learning styles.

2.2 E – Learning and English Vocabulary Learning

Research on the use of e-learning tools in the classroom has shown that ICT makes a supportive and encouraging environment for the students to increase their basic skills in terms of quality and quantity (Pandey & Mishra, 2016). The findings of the research were reinforced by Zorío (2018) who conducted a study on an effective online resource called Kahoot, an online game resembling a quiz that is very popularly used by teachers. Overall, most of the students were involved during the lesson and used e-learning devices such as their computers and mobile phones which promotes their motivation towards learning English.

Licorish et al., (2017) agreed, stating that students will be able to learn better and independently as they are being motivated continuously throughout the teaching process. Sharma (2018) claimed that e-learning has undeniably helped improve students' basic skills as it increases participation in classroom activities. The result of the study showed that the students picked up various strategies throughout the lesson such as memory, cognitive, compensation, metacognitive, affective, and social strategy to accomplish their goals with the help of e-learning. Harris & Rutledge (2007) have resolved that the forecasters of teacher quality and effectiveness are reasoning ability, character attributes, and educational background based on e-learning.

It is also mentioned that teachers have to be dedicated and motivated towards the teaching process if they want to see improvement in the students' academic performance. Most of the schools, both primary and secondary have been restructuring the education methods and approaches to increase the teaching effectiveness that will enhance the English language teacher's motivation as depicted by Sikand & Kauts (2016). In the 21st century, teachers are gearing towards adopting and adapting new teaching strategies and approaches to have a balance and positive learning environment through e-learning (Tehseen & Hadi, 2015).

3. Methodology

ADDIE model is a general instructional design model, and it helps instructional designers and application developers who develop and maintain learning products. This is an iterative feedback approach, which implies that the outcomes of the evaluation phase are returned to the feedback, thus completing the cycle, and allowing for further improvement of the learning product (Ngussa. 2014).

3.1 Analysis Phase

The developer's attention is focused on the targeted users and the characteristics of the system. Another essential element of the application is adapting to each student or teacher's degree of ability and understanding. This is to ensure that the student's prior knowledge will not be repeated, and the emphasis will be placed on subjects and lessons that they have not yet had the chance to discover and learn. This system will help students understand more about vocabulary, especially in homophones and Homographs in English. The targeted user for this system is a secondary school student aged 16 years old. Most students in Malaysia have difficulties differentiating a few words with the exact spelling but different pronunciations and have different spelling but the same meaning. Hence, the developer must ensure the goals and objectives of this project will be achieved at the end of this project.

The analysis and design explore the analysis and design of the 'English is Fun!' system. System design is very important in this process. Design is the process of identifying sub-problems and designing solutions to those sub-problems. In contrast, the analysis identifies inputs, outputs, and the entire process to solve problems (Miller, 2004). Context diagrams, entity-relationship models and data flow models are some of the model designs that have been used. The context diagram will be briefly discussed, and the level 0 data flow diagram will be used to explain it in further detail. An entity-relationship diagram is also created for this system's database design, which will be used to develop the system.

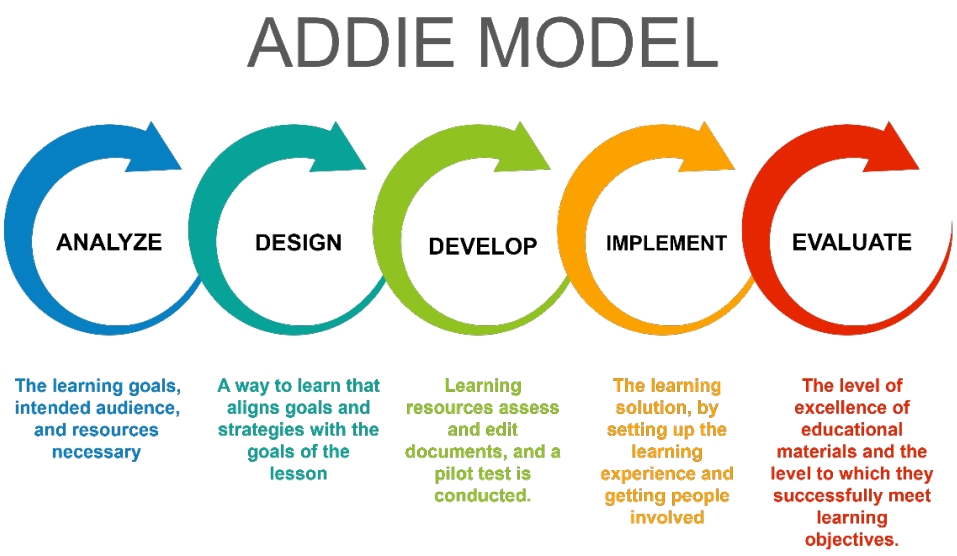

Figure 1: ADDIE Model

3.1.1 Requirement Analysis

Table 1 shows the functional requirements to develop this system such as User, Homophone Words module, Homograph Words modules and Quizzes module. Whereas Table 3 shows the non-functional requirements divided into three: hardware, performance, and security.

Table 1: Functional Requirements

No.	Modules	Functionalities
1.	User	This module need user to login into the system by entering username and password.
2.	Homophone Words Module	• Shows the meaning of homophone. • Shows examples of the word, the meaning of the words and short sentence. • Users allow to choose any words.
3.	Homograph Words Module	• Shows the meaning of homograph. • Shows examples of the word, the meaning of the words and short sentence. • Users allow to choose any words.
4.	Quizzes Module	• Displays a few types of quiz. • Allow user to answer the quiz. • It will show the result of the quiz.

3.1.2 Requirement Analysis

Table 2 explains the user requirements analysis and explains how the system works between client and admin.

Table 2: User Requirement Analysis

Requirements	
Student (Client)	• Students allow to choose Homophone or Homograph words for learning process. • Student should be able to answer the quizzes provided by admin to know the level of knowledge about homophones and homographs. • Student will get the result of the quiz.
Teacher (Admin)	• Teacher needs to input the username and password for login process. • Teacher be able to add, update and delete the quiz in the system.

3.1.3 DFD Context Diagram (DFD CD)

Figure 2 shows the context diagram for English is Fun! E – Learning Web System. This system requires student and teacher to log into the system. Following that, the users are allowed to choose modules provided by the system. Student is required to answer some types of questions designed to determine the level of knowledge about homophones and homographs. Then, the result of quiz will display.

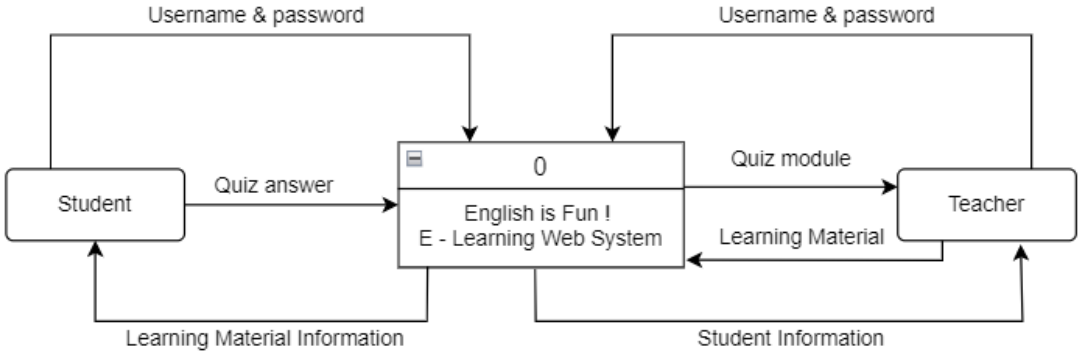

Figure 2: DFD Context Diagram (DFD CD)

3.2 Design Phase

This phase is a standard design to prepare to meet the application development needs. this phase gives a hint to the developer on how the application's structure through storyboard. For example, it shows how the application works. Also, context diagrams, entity-relationship models and data flow models are some of the model designs that have been used. The system requirements analysis will be conducted during this chapter through diagrams that will help assess the real application needs. The context diagram will be briefly discussed, and the level 0 data flow diagram will be used to explain it in further detail. An entity-relationship diagram is also created for this application's database design, which will be used to develop the system.

3.2.1 System Architecture

The DFD Level 0 is a process detail from Context Diagram. The purpose of this diagram is to provide a more detailed explanation of how an application works. The DFD Level 0 has four processes: login process, module process, quiz process, and result process. The database is divided into the following

tables which Teacher, Student, Class, Topic, Question and Quiz. Figure 3 shows a DFD Level 0 diagram from which entities and context diagrams may be collected to see the process in more detail.

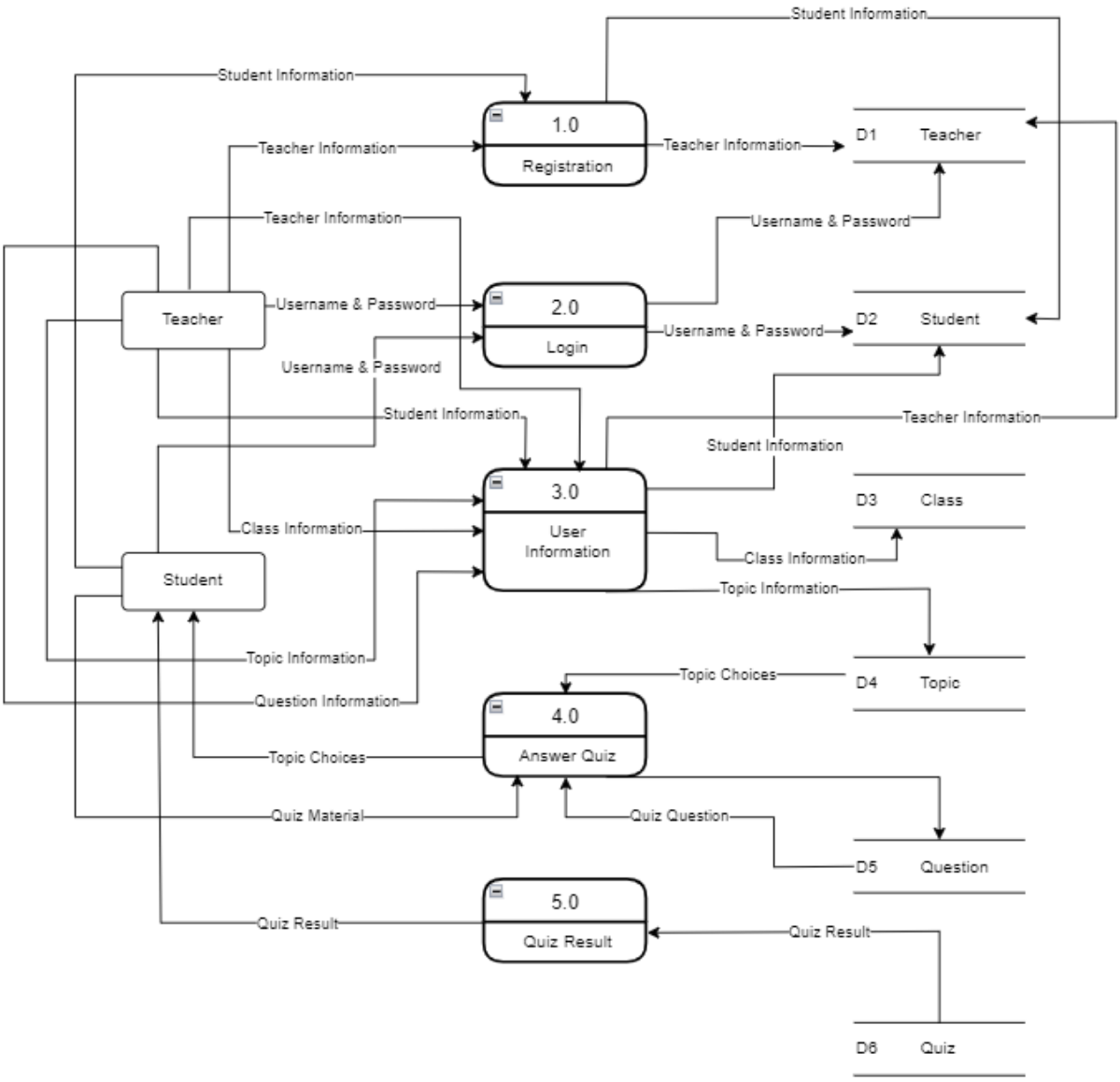

Figure 3: DFD Level 0

3.2.1 Database Design

The entity Relationship Diagram (ERD) represents the relationships between the entities involved in a system. Each entity has its own set of attributes and functions to support the other entities. For example, figure 4 shows the ERD for English is Fun! E – learning Web System.

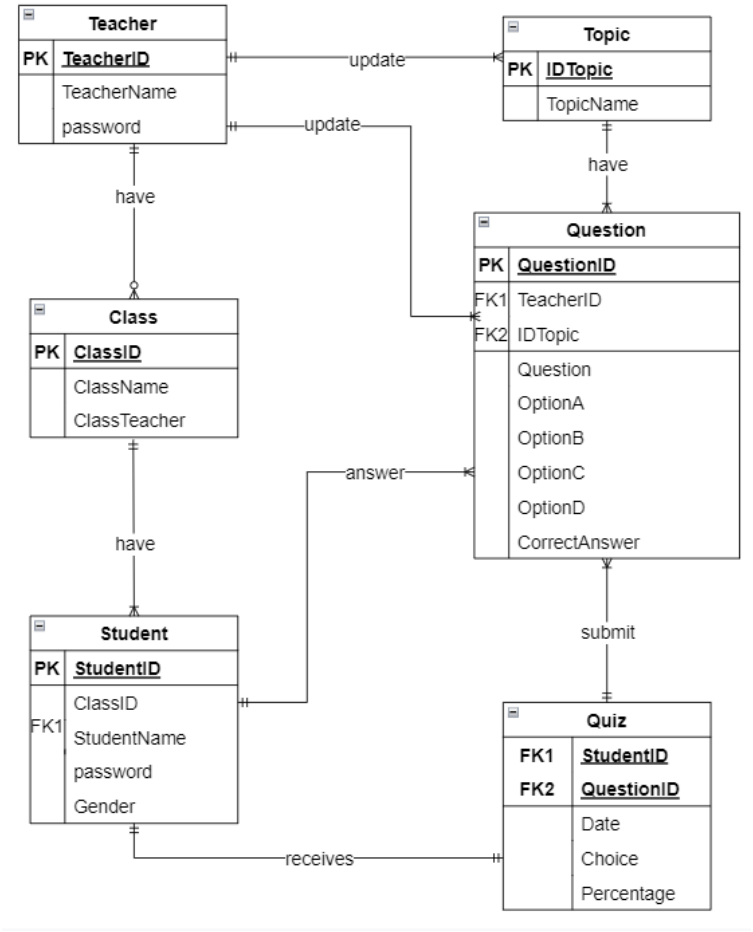

Figure 4: Entity Relationship Diagram (ERD)

3.2.1 Interfaces Design

There are three modules which homophones, homographs, and quizzes. Users need to learn about homophones and homograph modules before answering the quiz. Figure 5 shows user is required to log into the system using the correct username and password and the application will go to the following interface. Figure 6 show the homepage of the system and user is allowed to choose whether Homophone module, Homograph module or Quizzes module. For example, when user choose Homophone Module, the system will redirect user to next interface as shown in Figure 7. After finished the learning process, user is allowed to answer the quizzes provided and the results will be displayed.

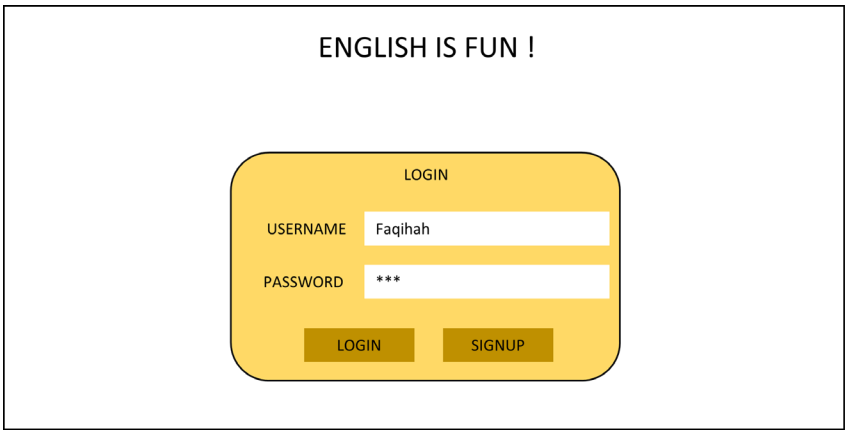

Figure 5: Login Page

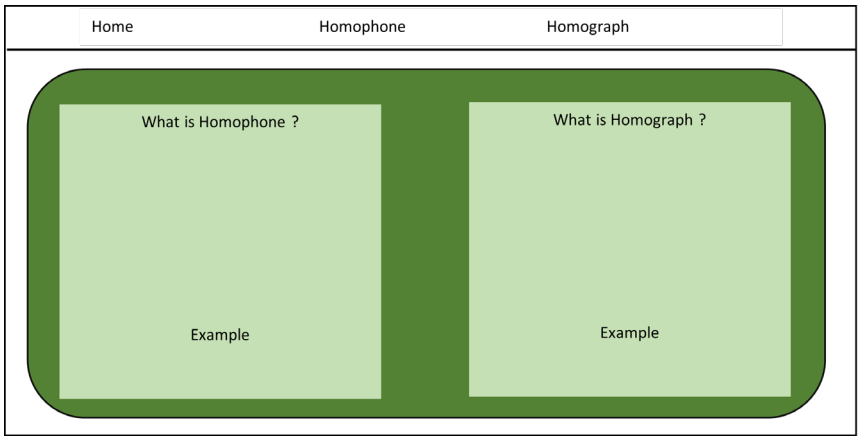

Figure 6: Homepage

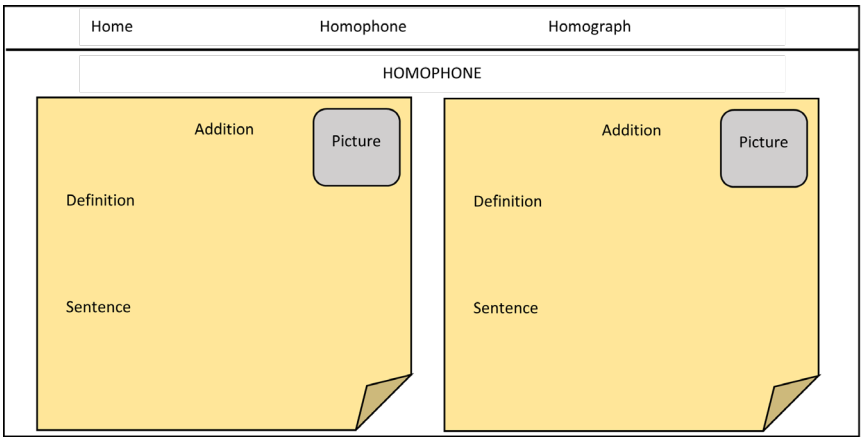

Figure 7: Homophone Word

3.3 Development Phase

This phase includes system development, planning and designing based on a built-in storyboard using a few software as following:

Table 3: Hardware and Software

Hardware	Software
Acer laptop intel core i5-62000U, 4GB (RAM)	Google Chrome
Wacom Pen Tablet (Standard USB Type-A port)	Xampp
	Bracket

3.4 Implementation Phase

The implementation phase aims to determine if the developed system meets the objective needs and is acceptable for usage by target users in secondary school age 16 years old, as determined in the objective. Also, in this phase, the systems ready to be implemented are installed on the smartphone or tablet. During this stage, the system will be tested by students and teacher in secondary school. The testing session will be limited to a maximum of 25 students and two teachers in order to gain experience and feedback from the respondents.

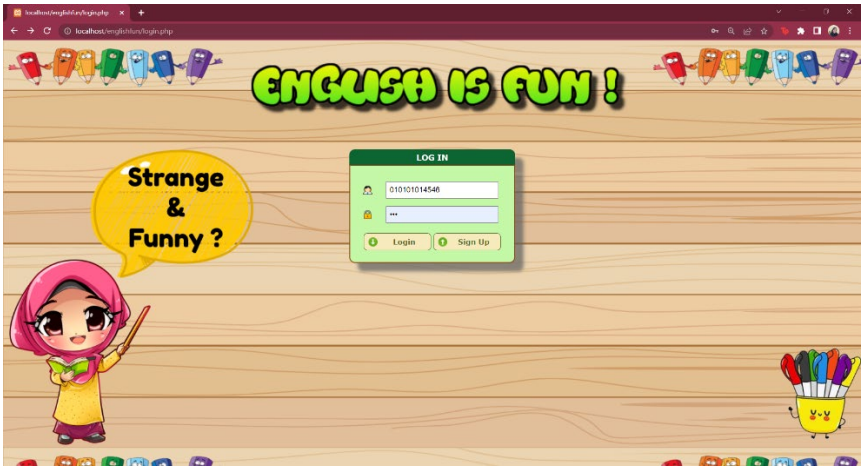

Figure 8: Login Page

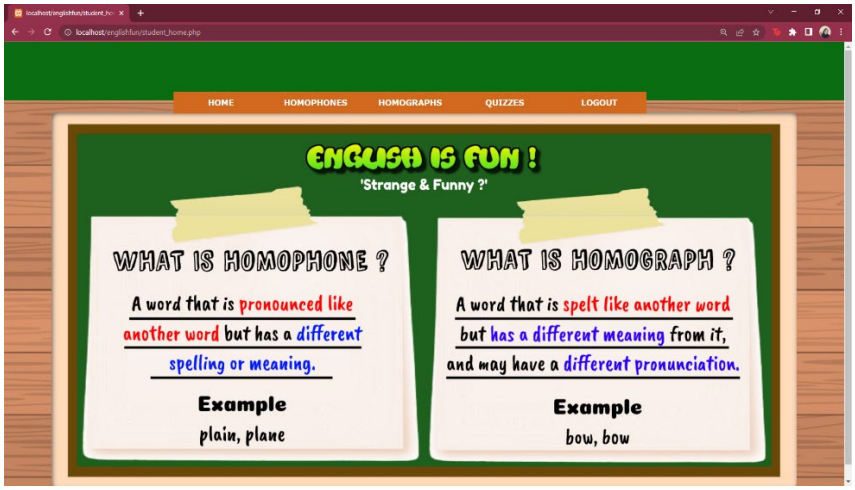

Figure 9: Homepage

Figure 10: Homophone Word

Topic	HOMOPHONE QUIZ - SET A
NUMBER OF RIGHT	3
NUMBER OF WRONG	2
TOTAL QUESTION	5
RESULT	60 %

Figure 11: Quiz Result

3.5 Evaluation Phase

The goal of the evaluation phase is to identify whether the objectives have been achieved. In addition, getting feedback or comments from targeted users in the previous phase will help the developer improve

the system's overall efficiency and success rate. For example, the developer's respondents to evaluate 'English is Fun!' applications are students and teachers in secondary school.

4. Results and Discussion

Testing phase executes once the whole system has been developed and is ready to use. Testing is necessary to guarantee that the system is capable of meeting the system requirements. The test table is created to examine the system's tests.

4.1 Test Cases

To complete the testing process, one must first test the developed system's function. The test cases have been compiled into a summary that can be seen in Table 4 below.

Table 4: Example of presenting data using a table

No.	Test Cases	Description	Status
Test Case Login & Signup (TEST_01)			
1.	TEST_01_01	Teacher and student enter correct username and password.	PASS
2.	TEST_01_02	Teacher and student enter incorrect username and password.	PASS
Test Case Signup (TEST_02)			
1.	TEST_02_01	New teacher and student register new username and password.	IN PROGRESS
2.	TEST_02_02	New teacher and student register existing username and password.	IN PROGRESS
Test Case Homophones (TEST_03)			
1.	TEST_03_01	Student clicking on each word in homophone list.	PASS
Test Case Homographs (TEST_04)			
1.	TEST_04_01	Student clicking on each word in homograph list.	PASS
Test Cases Quizzes (TEST_05)			
1.	TEST_05_01	Students need to choose question set for evaluation.	PASS
2.	TEST_05_02	Students need to answer all the questions in each set.	PASS
3.	TEST_05_03	Students will receive the evaluation mark.	PASS
4.	TEST_06_04	Students allow to answer another set.	PASS
Test Case Teacher (TEST_06)			
1.	TEST_06_01	Teacher clicks 'Add' and redirect to add form to insert new teacher details with "Successfully Added" alert.	PASS
2.	TEST 06_02	Teacher clicks 'Update' to update teacher details in database with "Successfully Updated" alert.	IN PROGRESS
3	TEST_06_03	Teacher clicks 'Delete' to delete teacher in database with "Successfully Deleted" alert.	PASS
4	TEST_06_04	Teacher clicks 'List' to view the list of teachers added in the database.	PASS
Test Case Student (TEST_07)			

1.	TEST_07_01	Teacher clicks 'Add' and redirect to add form to insert new student details with "Successfully Added" alert.	PASS
2.	TEST_07_02	Teacher clicks 'Update' to update student details in database with "Successfully Updated" alert.	IN PROGRESS
3.	TEST_07_03	Teacher clicks 'Delete' to delete student in database with "Successfully Deleted" alert.	PASS
4.	TEST_07_04	Teacher clicks 'List' to view the list of students added in the database.	PASS
Test Case Class (TEST_08)			
1.	TEST_08_01	Teacher clicks 'Add' and redirect to add form to insert new class details with "Successfully Added" alert.	PASS
2.	TEST_08_02	Teacher clicks 'Update' to update class details in database with "Successfully Updated" alert.	IN PROGRESS
3.	TEST_08_03	Teacher clicks 'Delete' to delete class in database with "Successfully Deleted" alert.	PASS
4.	TEST_08_04	Teacher clicks 'List' to view the list of classes added in the database.	PASS
Test Case Topic (TEST_09)			
1.	TEST_09_01	Teacher clicks 'Add' and redirect to add form to insert new topic details with "Successfully Added" alert.	PASS
2.	TEST_09_02	Teacher clicks 'Update' to update topic details in database with "Successfully Updated" alert.	IN PROGRESS
3.	TEST_09_03	Teacher clicks 'Delete' to delete topic in database with "Successfully Deleted" alert.	PASS
4.	TEST_09_04	Teacher clicks 'List' to view the list of topics added in the database.	PASS
Test Case Question (TEST_10)			
1.	TEST_10_01	Teacher clicks 'Add' and redirect to add form to insert new question details with "Successfully Added" alert.	PASS
2.	TEST_10_02	Teacher clicks 'Update' to update question details in database with "Successfully Updated" alert.	IN PROGRESS
3.	TEST_10_03	Teacher clicks 'Delete' to delete question in database with "Successfully Deleted" alert.	PASS
4.	TEST_10_04	Teacher clicks 'List' to view the list of questions added in the database.	PASS

4.2 User Acceptance Testing

Testing for user acceptability is carried out by a person who really uses the system being tested. The purpose of this testing is to determine whether the application has met the requirement. This testing was done by secondary school students aged 16 years old and one teacher of Sekolah Menengah Kebangsaan Aminuddin Baki. The users were provided with a questionnaire that they could evaluate on depending on the system that was shown to them, and this questionnaire was produced and delivered to them. The result collected from application users is shown in Table 5.

Table 5: User Acceptance Testing

No	Acceptance Requirement	Test Result (Number of People)	
		Accept	Reject
1	Registration module functioning	26	
2	Login module functioning	26	
3	Homophone module	25	1
4	Homograph module	25	1
5	Quizzes module	25	1
6	Users add, update and delete functioning	1	26
7	Buttons in the system are functioning	26	
8	Interface is appropriate	26	
9	Colours and graphics are suitable	26	
10	User interface are user-friendly	26	

5. Conclusion

In conclusion, English is Fun! – English Strange and Funny will be developed as an E – Learning Web System that helps student to master in homophones and homographs in English language. This system used the ADDIE model as methodology to conduct this project. At this stage the objective of designing the English web system has been achieved. The software that is being used is Xampp and Bracket. This is an ongoing process which will continue until the system is complete.

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