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Malay Language Learning for Kindergarten Students through Interactive Web-based Application

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Abstract

Multimedia education is an effective teaching method for children, as it makes learning more interesting and enjoyable. In this study, the researcher developed Interactive Malay Language Learning, a web-based application to determine the effectiveness of multimedia education in teaching Malay Language to preschool children. The Web Development Life Cycle methodology was employed, consisting of five phases which are planning, data collection and analysis, design, development, and testing. The web-based application development involves programming languages such as PHP, JavaScript, HTML, and CSS, while the MySQL software is used as a database to store information on the results of kindergarten children's quizzes. Functional testing was conducted at a Kindergarten with the students, teacher and the teacher assistant to assess the efficacy of the system with teaching and learning process. The interface was positively received by students due to its interactive design and ease of use, particularly the navigation bar and video. However, limitations such as a limited number of quiz questions and 3D flashcards without audio for the alphabet may impact its effectiveness for reinforcing learning and testing knowledge. Interactive Malay Language Learning is an alternative for helping children master Malay Language through fun learning that can be done at any time and from anywhere. The use of multimedia education should be widely adopted, especially among children, as it has been shown to improve their learning.

Keywords: E-Learning, Kindergarten, Interactive Learning, Web-Based, Application

Introduction

Multimedia is defined as a technology that combines multiple sources of information (media) such as texts, graphics, sounds, animations and videos, in which information is delivered and controlled by an interactive computer system (Liu & Huang,2020). According to research reports, it has been discovered that teaching of children through the use of multimedia has numerous benefits for children's education, such as the development of language, social behaviour, abstract thinking, and the ability to think (Lin et al., 2015). Because of the positive feedback it provides, multimedia is widely used in teaching, especially among children.

Many activities and skills in the curriculum emphasize aspects of language skills. This subject is given special attention in order to achieve the goal of teaching Malay, which is to

enable students to listen, speak, read, and write in the language. The ability to read and write, which is part of language skills, is the foundation for effective teaching and learning in a variety of academic disciplines (Nazirah & Rasid, 2017). Some important aspects must be included to provide effective interactive web learning that is appropriate for children. Firstly, there is the use of flash cards. Because they are basic with moving visuals and short statements or words, flash cards help children learn quickly. This makes it easier for children to recall or recognize things. The usage of flash cards in interactive web learning will supply children with audio so that they can learn the correct pronunciation sound. Conventional use of multimedia content in education focuses on subject knowledge but not on cognitive skills. Each person has seven intelligence aspects linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, and intrapersonal (Cheng et al., 2021). Secondly, after completing a learning lesson, the children will be given a quiz to assess their comprehension. This quiz is significant because it allows them to determine whether they are skilled or need more practice. Malay Language language is used equally as much as other languages. Children are encouraged to learn Malay Language from an early age. It is not easy for children to learn the Malay Language language. Because interesting multimedia features of many types have proven to be effective in helping children learn, interactive web learning can make it easier for children to learn Malay Language language. If we could effectively utilize technology in education, we would be able to give a richer early childhood learning experience (Lin et al., 2015). If the learning includes interesting audio, video, and pictures, children would not be bored.

According to (Bétrancourt & Chassot, 2008), children prefer animated videos for learning. The disadvantage of animated videos is that children focus solely on the animation rather than the content of the lesson. Furthermore, animated videos are costly and unsuitable for children reading and writing. Interactive web learning that is developed to be user-friendly, is free, and allows students to learn through engaging multimedia features while also increasing their comprehension of learning activities. In terms of web pages, its design plays an important role in the process of visual communication, and as a conventional mode of conveying text and graphic language, this design allows the audience to feel the visual impact and give different visual feelings during ordinary browsing (Baharudin et al., 2011). The animated video must be relevant to the preschool curriculum and simple enough for children to grasp in order for them to learn to read and write. It can be concluded that multimedia components such as animation and videos to be a powerful tool to communicate facts, explain concepts and trigger emotions (Kahbi et al., 2017). The application of multi-media technologies ensures a very productive, interesting, motivating, interactive, and quality delivery of classroom instruction while addressing diverse learners' needs (Abdulrahaman et al., 2020). This web application has included multimedia elements such as animated videos, digital storybooks, flash cards, and quizzes designed for kindergarten children. If the teacher does not apply computer in teaching and learning, then the teacher's teaching process will be tedious, unpleasant and boring for the children (Mamat et al., 2020) . Multimedia is effective in education because of the interactivity, versatility and integration characteristics of multiple media that can promote learning, take into account differences between learners and increase motivation (Aloraini, 2005).

According to study, the benefits of multimedia elements or tools in learning are the ability to turn abstract concepts into concrete contents, the ability to present large volumes of information within a limited time with less effort and the ability to stimulate children's interest in learning (Abdulrahaman et al., 2020). In addition, with web-based learning, children can occupy their free time by learning in innovative ways. Because the web can only be

accessed via a laptop, this indirectly protects children's eyes. Actually, the part of the brain that used to process visual images is larger than the part that used as a word processor (Kouyoumdjian, 2012). Furthermore, because the screen size of a laptop is much larger than that of a smartphone, using interactive websites with a laptop can provide a clear picture for learning. This interactive website can also be used as a medium of learning in kindergartens by preschool teachers for the subject of Malay Language. Through quiz activities, this interactive website can help teachers identify children who are still weak or have mastered Malay Language, and there are also other features such as digital storybooks and flashcards for children to learn while playing.

Review of Literatures

Early childhood education is an important teaching and learning session for the intrinsic and extrinsic development of children. Exposure to various basic principles in the teaching of the Malay language should be given attention, such as basic reading and writing. This is so that education and mastery of the Malay Language can be applied well at an early stage and further help to elevate the Malay Language. This proposed web application uses engaging multimedia to help children aged four to six years old learn the fundamentals of Malay Language.

Based on concept map in Figure 2.1, this research focuses on multimedia education. There are five different types of multimedia education: narrative media, communicative media, interactive media, adaptive media, and productive media. Reflection, confirming understanding, stimulating discovery, and offering feedback are all roles of interactive media (Sahet, 2018). With the advent and the advance of computer science and multimedia, modem education may efficiently organize knowledge by using texts, sounds, images and graphs materials (Mirzakarimova & Fayziev, 2021). For the research domain, it focuses on kindergarten. Kindergarten is defined as a school or class for young children aged four to six years old that prepares them for first grade by developing basic skills and social behaviours through games, exercises, music, simple crafts, and other activities (Collins, 2019). According to the "Department of Statistic Malaysia in 2020", children in 2020 declines by 78.1 thousand to 9,247.5 thousand as compared to 9,325.6 thousand in the previous year. Malay Language is part of the kindergarten domain, and the major goal is to make Malay Language learning interactive. The fundamental components of writing and reading have been designated as the primary factors for learning this web application.

Preschool education is the beginning of lifelong learning, an important part of the national education system, and an important public welfare cause. The minds of young children are far more complex and intelligent than their outward behaviour suggests. Early learning occurs on two levels: the visible and obvious expansion of knowledge for example, language learning and learning about how objects work and the rise of implicit learning, which is more difficult to detect (Miller & Almon, 2019). Therefore, it is easier for children to acquire the language, particularly Malay Language, because at this age they learn quickly. This study focuses on the Malay Language in order to improve kindergarten children's language skills in terms of communication and skills. Kindergarten has some components such as Malay Language and English. Because Malay Language is paid less emphasis to mastering than English, the research domain is concentrated on Malay Language. With globalization and the spread of English, there is a growing demand to teach it at all levels, including to kindergarten children. (Al-Yaseen, 2021) confirms that English is undeniably the language of knowledge, science and mathematics, politics, business, media and allied technology. According to the information provided above, students are encouraged to learn English because it is an

international language that is widely used in school, industry, and other fields. Malay Language is the official language of Malaysia, so children should be given the chance to learn it first. Malay Language needs to be implemented on to children so that this language doesn't die out.

Multimedia education can be a great tool to achieve the goals of inclusive education because it related to multimedia (sound, image, computer graphics, interactivity of the mentioned media) to pedagogical goals is particularly poor (Žalytė- linkuvienė, 2021). Multimedia technology or education has some characteristics like integration, diversity, and interaction that enable people to communicate information or ideas with digital and print elements (Abdulrahaman et al., 2020). There are two components to multimedia education: interactive media and narrative media. Any computer-delivered electronic system that allows the user to control, combine, and manipulate different types of media, such as text, sound, video, computer graphics, and animation is known as interactive media. "Narrative media," as defined by the term "narrative," is media that aims to tell a story. Interactive video games and call-in radio shows are examples of narrative media that include active audience participation. Multiple media use can have a positive effect on education when properly designed compared to traditional academic achievements instruction (Bagui, 1998).

For this research, interactive media has been chosen. Scenarios, quizzes, simple games, and click-through e-learning are all features of interactive media (content is input to the learning process). Under interactive media, there are multimedia elements that are important to produce various interesting features, such as animated videos and others. Unlike traditional media, the web interface includes new multimedia elements such as sound, video, and animation except for text, images, and colors, and various interactions realized by programming in code language (Liu, 2021). Text contains words and symbols. It's the most common way to store and send data. Textual information sparks imagination. It's used to describe concepts, definitions, principles, problems, titles, menus, etc. In multimedia software, an image is one of the most important ways to show information. It is one of the most important things that affects how multimedia software looks. Animation uses human visual persistence to quickly play graphic images of continuous motion changes, including zooming, rotating, transforming, fade-in, and fade-out. Animation can make abstract content vivid and exciting. Sound is one of the most convenient and familiar ways for people to communicate information and emotions. According to its expression, sound in multimedia courseware can be divided into three categories: explanation, music, and effect. Time series and rich information connotations are common in video images, which are frequently used to explain the evolution of things. The video is very similar to movies and television shows that we are familiar with, and it is an important part of multimedia.This paper discusses the decision making factor of the students in choosing physics or biology, with analysis scope limited to the two main factors which are the environmental and emotional factors.

Methodology

This project methodology outlines the steps required to complete the project successfully from start to finish. In other words, it assists the researcher in understanding each process at each stage of developing the chosen project. WDLC is an organizational process of developing and maintaining Web Site (Kamatchia et al., 2013). Figure 1.1 represents the five phases of the chosen methodology, namely the Web Development Life Cycle (WDLC).

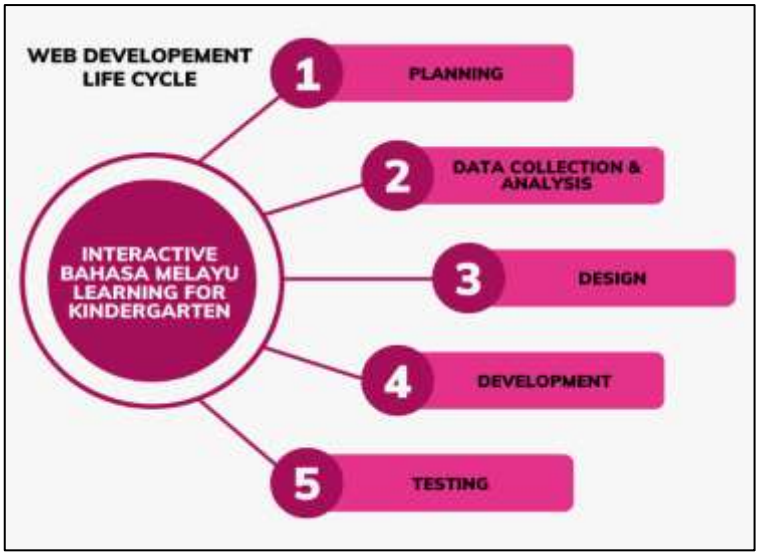

Figure 1.1: Diagram of web development life cycle

Planning is the initial step in system development. Planning is the process of generating ideas for the organized development of a study. It is essential to ensure that the study implementation procedure can be executed precisely and in a systematic manner. Making good decisions about website organization and page design begins with planning (Kamatchia et al., 2013). Typically, the planning stage begins with the identification of the study area, problem statement, objectives, study scope, and project significance. This study focuses on multimedia education, which refers to the use of various multimedia elements to make learning more engaging. Before beginning a study, it is beneficial to have more information about its design and development.

The data collection and analysis phase follow the planning phase in the project methodology. The process of gathering data as project input is known as data collection. To identify the data to be collected for this study, a data collection phase is required. The data that will be used for the study is critical to ensuring that the study is completed successfully and on time. This phase also includes determining the process for collecting data. A search for journals and articles on how children's learning styles can be adapted to the project that will be developed. In addition, interviews with kindergarten children and their teachers are conducted so that the study can be tailored to their preferences. This study makes extensive use of video as a medium.

Next is the design and development phase. The design phase involves narrowing down the many potential solutions to determine the most effective and efficient approach to develop the solution (Sarkar, 2018). The design of the Web Development Life Cycle (WDLC) methodology model is being implemented during this phase. This step depicts the project's process flow as well as a simplified summary of the process. This WDLC methodology model will be used in this study to ensure that the process runs smoothly, and that problems and solutions are identified for each phase. This phase also includes the implementation of system architecture design. System architecture is used to help people gain a better understanding of the entire system being built. This architecture describes the learning process as well as the web application's elements. The Canva web app was used to create the system architecture as well as the WDLC methodology. Furthermore, the storyboard is intended to aid in the development of interactive learning so that the web application is clearer.

The development phase follows the design phase. The process of developing a system is referred to as the development phase. The processes required to support website features are identification site map, determination of the structure of the website, finalizing the contents to be placed on the web page, etc. (Sarkar, 2018). Coding is completed to support study development. The development process in this phase is based on the objectives stated in the planning phase, and coding is done in this project to display flash cards, videos, and even quizzes. To demonstrate basic Malay language learning, multimedia elements have been chosen. Programming languages such as PHP, JavaScript, HTML, and CSS are used to display this interactive learning. Furthermore, MySQL is used as a database to store information on the results of kindergarten children's quizzes.

The summary of the introduction concludes with the test phase. The testing phase must be identified and test the system's functionality. In addition, the testing phase is a process for evaluating the characteristics of the study. This phase is crucial for determining whether the study is proceeding as planned. This phase of testing involves functional testing and performance testing. Using this method, it is possible to determine whether the study is functioning properly or requires further maintenance. When the system successfully displays both interactive web features and quizzes, it is considered to be functioning properly. Thus, a web application for interactive kindergarten Malay Language learning is produced.

System Architecture

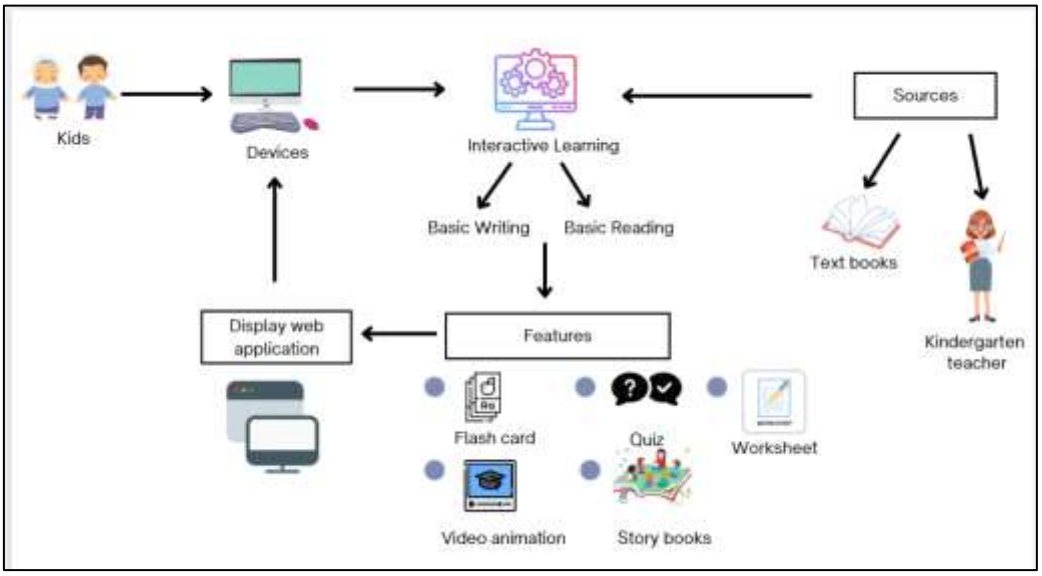

Figure 1.2: The system architecture

Figure 1.2 above depicts the system architecture. Each component in the web system is explained in more detail below.

- Target user

The Interactive Malay Language Learning program has been specifically designed for the purpose of facilitating language acquisition among kindergarten students who are typically between the ages of 5 and 6 years old. Through the utilization of innovative technologies, this web application endeavors to keep children engaged and motivated while they enhance their mastery of Malay Language. By enabling children to engage in interactive learning activities during their leisure time, this program provides them with an opportunity to learn and grow in a fun and productive manner.

- Devices

Laptops or computers are prioritized for this interactive learning because they are beneficial to children. They have several disadvantages when compared to mobile phones, such as inappropriate media and academic performance, such as playing video games. Using laptop computers, parents can effectively monitor their children.

- Interactive Learning

This interactive learning focuses on the fundamental subject of Malay Language. There is basic writing as well as basic reading in this learning. According to the research, children must master these two skills in order to be fluent in both speech and learning.

- Sources

The primary reference sources for this interactive learning reference source are textbooks and always referring to preschool teachers. This is because it is critical that this learning is appropriate for children and is included in the kindergarten curriculum.

- Features

This interactive learning includes features such as flash cards, storybooks, video animations, and even quizzes. Flash cards are one of the most effective learning tools because they contain pictures and words that children can easily understand. According to the study, children are also drawn to things with pictures, audio, and even bright colours. As a result, animated videos and story books are also chosen. Finally, quizzes will be given to children to assess their understanding of the level of learning attained. It provides data on children's understanding, whether they have mastered it or not, via the quiz.

Software Requirements

The web application Interactive Malay Language Learning was developed using Sublime Text 3, which supports programming languages like Javascript, HTML, PHP, and CSS. Flip PDF Professional was used to create digital storybooks with audio to aid children's comprehension. XAMPP was used as the local host to test the website before release, while Balabolka was used to record audio as a narrator for the storybooks. Canva was used to design flash cards, videos, and graphics for the web application.

Results

The snapshots from Interactive Malay Language Learning web system are as follows. Figure 1.3 shows the interface of the exercise page. This page contains several worksheets for students that will test their ability to match pictures and words.

Figure 1.3: Exercise Page

Figure 1.4 shows the flash card page. Playing flashcard games is a fun way for the kindergarten to learn new alphabet. This flash card page contains a sequence of letters arranged according to letter order from a to z. When the mouse goes over the letter, a picture to represent the letter will be displayed.

Figure 1.4: Flash Card Page

Figure 1.5 shows the video page in the web application. This page contains Youtube animated songs to attract students' interest. The selected video is a folk song that has scientific elements and advice. Kindergarten students can enlarge the screen for a full view.

Figure 1.5: Video Page

Figure 1.6 shows the story book interface. This page displays a story book view that can be flipped page by page. This is to provide an experience like reading a real book.

Figure 1.6: Story Book Page

Testing Procedures

It is imperative to follow a set of procedures for testing to ascertain the system's operability. Testing involves verifying that a system or program performs as intended. The present study incorporated functional testing, and the researcher performed functionality tests at with the students. The objective was to evaluate the level of contentment with the functional testing. Functional testing is a testing method that aims to determine if every feature of an application operates in accordance with the software requirements. It involves comparing each function to its corresponding requirement to confirm that its output aligns with the user's anticipated outcome. The kindergarten under scrutiny is situated in the Manjung district and caters to 21 students, one teacher, and an assistant teacher. Manjung is a district in the state of Perak, Malaysia. It is located on the western coast of Peninsular Malaysia, bordering the Strait of Malacca. The district covers an area of approximately 1,200 square kilometers and has a population of around 200,000 people.

Figure 1.7: Kindergarten Students Listen to Story Telling in Web System

Users Feedback

Malay language learning interface for kindergarten children was well-received by the kindergarten students. The students showed a strong interest in the interface, which was

attributed to its interactive design and ease of use. The navigation bar was specifically mentioned as a positive feature, making it easy for the students to choose the available features. Furthermore, the video included in the interface was found to be interesting and easy to understand, which likely contributed to the student's engagement in the learning process. Additionally, the use of various colors, audio, and images was found to be effective in attracting the children's interest in learning.

However, from the testing session reveals some limitations of the interface, including a limited number of quiz questions and 3D flashcards without audio for the alphabet. These limitations could potentially impact the effectiveness of the interface for reinforcing learning and testing knowledge. Overall, the result shows that the Malay language learning interface has several positive features that make it a viable option for kindergarten students. However, there is room for improvement, particularly in terms of increasing the number of quiz questions and adding audio to the 3D flashcards for the alphabet.

Conclusions

Communication is an essential aspect of daily life, and the ability to speak and write in Malay Language can open up numerous opportunities for individuals to succeed in both personal and professional realms. This study recognizes the significance of early childhood education in laying the foundation for lifelong learning. It is widely known that children can learn more quickly and easily at a young age, and therefore, the researcher seeks to collect data that is appropriate for children at the kindergarten level. It was discovered that multimedia education is currently the most effective form of education for young learners. Studies have shown that children are naturally drawn to multimedia elements, such as pictures, audio, video, and animation. These elements can help to keep children engaged and motivated in the learning process, making it more enjoyable and less tedious. Therefore, the researcher has designed a web system called Interactive Malay Language Learning, which incorporates a variety of multimedia resources to facilitate the learning of Malay Language. The Interactive Malay Language Learning web application includes various features such as self-paced worksheet activities, 3D flashcards with audio, animated videos, digital storybooks with audio, and quizzes. These resources have been carefully curated to ensure that they are age-appropriate and effective for young children. One of the most significant advantages of the Interactive Malay Language Learning web system is that it is accessible to children from any location. This makes it easy for children to learn at their own pace and on their own schedule, without having to attend traditional classroom sessions. This can be of great benefit to both educators and learners, especially in the twenty-first century, where technology plays a significant role in education.

In conclusion, the Interactive Malay Language Learning web application is a valuable tool for young learners who wish to acquire Malay Language proficiency. By incorporating multimedia elements, the program can make the learning process more enjoyable and effective for children. The accessibility of the program can also help to democratize education and provide equal learning opportunities for all children, regardless of their location or socio-economic status. Ultimately, the goal of the researcher is to help children master the skills of reading and writing in Malay Language, which can contribute to their future success in life.

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