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The Design and Implementation of Web-Based Multimedia Learning Content Management System for Arabic Vocabulary Pronunciation

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HIGHLIGHTS

- The web-based learning application with multimedia elements was designed and implemented to enhance and enrich the learning experience of Arabic vocabulary pronunciation for non-native speakers.
- Two experiments involved in this study, which is Expert Review and User Acceptance Test with positive and encouraging results.
- It has been discovered that a majority of students display a higher level of readiness in accepting web-based learning with multimedia elements, the implementation of such learning approach will make it easier to learn Arabic vocabulary pronunciation.

ABSTRACT

Arabic vocabulary is one of the important areas of knowledge in learning Arabic language. In fact, that in the current world, almost 80% of Muslim are non-native speaker of Arabic language. Some people found that Arabic vocabulary is difficult and confusing to learn and subsequently failed to master the knowledge. Besides, most of the higher education in Malaysia has introduced Arabic subjects in their curriculum or plan of study. On the other hand, learners faced difficulties in learning Arabic vocabulary, especially the pronunciation due to limited hours of learning in the class and less attractive teaching materials. The purpose of this study is to design and develop a web-based multimedia learning content management system (LCMS) to enhance the learning of Arabic vocabulary pronunciation. The proposed system was developed using Articulate Storyline for implementing interactive learning in which all multimedia elements can be blended in the system. The development process follows the System Development Life Cycle (SDLC) as a methodology. Then, the proposed system is evaluated using expert reviews by distributing questionnaires among five expert users, and User Acceptance Test (UAT) contributed thirty respondents to determine the effectiveness of the system. The result from the Expert Review shows that the proposed system is suitable to use but still needs some improvements. While the result from the UAT indicates that the proposed system has a positive impact and to be well accepted by the majority of the users. Therefore, the most significant potential is the ability of the proposed system to help, assist, enhance and enrich the experience of learning Arabic vocabulary pronunciation more effectively and efficiently.

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Keywords: *Web-based, learning content management system (LCMS), interactive learning, multimedia, Arabic vocabulary pronunciation*

INTRODUCTION

Learning is influenced by participation in a community and also involves the use of many resources. In order to sort and select the suitable resources, learners seek guidance and recommendations to enhance their learning experience. Meanwhile, learners construct their knowledge through social interaction with peers, through applying ideas in practice, and through reflection and modification of ideas (Rafaeli, Barak, Dan-Gur, & Toch, 2004). The requirements for understanding languages and different cultures are becoming more and more important due to world-wide communication. Zimmermann (2004) stated that the first thing people would notice about a language is pronunciation because it is crucially important for the language learners. Therefore, much attention is to be paid to pronunciation, as it contributes to convey the right message in oral discourse. If the message is not properly articulated, pronunciation might restrict communication or lead to the wrong understanding of what is said.

In Malaysia Arabic subjects have been introduced at all levels of education, including tertiary education. For instance, UiTM has also introduced Arabic subjects as one of the elective subjects in the university. Students need to learn and enroll in this course according to their plan of study as one of the subjects offered for the third language subjects. As a result, the number of students studying Arabic at various levels has increased over time. However, there are many challenges and limitations to be faced by students, when the students' mastery of the language is still quite weak (Riwanda et al., 2021). There are still many lecturers who use traditional methods as well as face-to-face educational processes between lecturers and students. This kind of learning does not provide wider opportunities for students to study independently and determine time choices freely. Therefore, the potential of computer technology using web-based learning with multimedia elements can be utilized and maximized to enhance the learning experience of Arabic subjects, especially for students. Besides, the study with quite a large population shows that university students do want their Arabic language lecturers to support the teaching and learning of this third language using technological apps and tools (Mohd et al., 2019). According to Petra et al. (2016), web-based learning offers the potential to support the development of the struggle in the twenty-first century skills, which contribute to autonomous learning.

The importance of using a learning content management system (LCMS) in an educational or learning institution nowadays is undeniable, due to its crucial role and support for learners, especially in this digital era. Learning with technology or e-learning has been taking place in all areas of education, including in learning and teaching Arabic subjects using a web-based platform known as web-based learning. Web-based learning depends on material delivered through a web-browser over the public Internet, private Internet or extranet. Web-based learning is frequently called online or e-learning since it incorporates online course content (Chiu & Wang, 2008). According to Abbad et al., (2009) characterized that e-learning to mean any learning that enable electronically defined as the utilization of information and communication technologies in different procedures of education to help and upgrade learning in the institution of higher education, and include the use of information and communication technology as a complement to traditional classrooms, online learning or blended the two modes. Besides, web-based learning promotes active and independent learning and can be an efficient way of delivering course material. All of the information is structured in an organized way in the same place, making it accessible to all users at any time and anywhere with the Internet. Web-based learning is commonly used for general learning and also specific learning like language learning such as Arabic language.

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Meanwhile, the multimedia elements used in the teaching are generally to help students to understand more about the course, besides the books were prepared by the lecturers. Therefore, the web-based learning application integrated with multimedia elements is the key factor in enhancing the learning experience, especially to learn Arabic vocabulary pronunciation for non-native speakers. Based on the observation, the lecturer needs to keep repeating the pronunciation when the student asks how to pronounce it. So, it shows that the current conventional learning material is not enough since the student is unable to pronounce the Arabic word properly.

In this paper, the main sections are organized as follows: section 2 provides the related works. In section 3 discusses the details of the methodology. In section 4, discusses the finding and results based on the experiment conducted. Finally, section 5 concludes the paper.

RELATED WORK

Recently, many researchers found that Arabic language education in Malaysia is unsuccessful and needs extreme changes from multiple points. According to Ritonga et al. (2021) learning Arabic as a foreign language is still faced with various problems. Therefore, utilization of e-learning is probably going to have the option to beat the issues looked by the past. Nowadays, online education still lacks confidence in the effectiveness as education material is being created without appropriate thought as their structure and content representation. Therefore, a group of researchers reports an investigation directed to evaluate the effect of using genuine learning standards into an online sight and multimedia learning module, and inserting it inside an understudy focused learning condition on the student learning process (Tan et al., 2010). The researchers continue the description that the focus of online interactive multimedia modules is frequently the interface structure and including intelligent multimedia. According to Alsadhan et al. (2014), e-learning can be characterized as an instructive framework that conveys the information utilizing the data innovation assets like the Internet, intranet, satellite broadcast and multimedia applications. During development all multimedia content objectives characterized in the plan stage are utilized to compose storyboards, which characterize each and everything that will be appeared on screen and everything that will be heard.

Aljojo et al. (2019) presented a mobile application for children aged 3-5 to learn Arabic letters, pronunciation and the short vowel in order to improve their skills and abilities. This application focuses on preschool children to teach them the Arabic letters with simple signs and words. The application was developed using Android Studio. Furthermore, the application has been developed considering some theories about learning skill, such as Theory of Cognitive Development, Dale's Cone of Learning and Bloom's Taxonomy of Cognitive Goals. Meanwhile, Roslan and Sahrir used ThingLink, an interactive image annotation tool, as an intervention to teach Arabic vocabulary to beginners (Roslan & Sahrir, 2020). ThingLink is a Web 2.0 image annotation tool that can be used to create an interactive platform embedding sound, graphics and videos appropriate for teaching Arabic vocabulary. They suggested that it was an effective tool for language teachers and students to use.

Saleh and Alja'am presents an innovative and user-friendly alternative for children with learning difficulties (LD) with a multimedia system to help children overcome their Arabic learning problems (Saleh & Alja'am, 2019). The system proposed an adaptive multimedia learning system by automatically converting Arabic language text into an appropriate personalized multimedia content to enhance understanding skill for children with LD. The system can be adopted in school environments as well as at home where parents can support their children by revising the content they learned in schools. Meanwhile, a group of researchers attempts to design, develop and integrate a game-based learning application in an online platform using a

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web-based system to learn Arabic vocabulary in order to explore the potential of use for the game-based learning prototype in teaching and learning methods (Sahrir et al., 2012).

E-learning systems using web-based give students the opportunity to learn freely and independently by accessing the learning material at any time. Students can access the content repeatedly so that the students can improve their mastery of learning material. According to Zubaidah at el, (2021) website has an important role in spreading and learning Arabic language. Their study shows that the ability of students to study Arabic language was improved by using a few specific official websites focusing on Arabic language. These websites facilitate students and materials, students and lecturers and students to students.

METHODOLOGY

The main objective is to construct the design elements for a web-based learning system with multimedia elements that can be used to enhance the learning process of Arabic vocabulary pronunciation. Arabic language course is one of the elective subjects undertaken for the third semester student as a third language. The course was divided into three levels, which is Arabic Level 1 (Basic), Arabic Level 2 (Intermediate) and Arabic Level 3 (Difficult). Each level is made up of a set of topics. The proposed system is a web-based learning system that provides:

1- A web-based LCMS with multimedia elements for learning Arabic vocabulary pronunciation.
2- An efficient and easy learning system that students can interact with.
3- A simple user interface that facilitates the interaction with the system.
4- An efficient LCMS that presents all the functions required by the student to fully implement the concept of the distance learning system through web-based.

According to the System Development Life Cycle (SDLC) Model, the system life cycle passes six phases: Planning, Information gathering, Analysis, Design, Implementation and Testing.

A. System Object Design

The object design involves Entity Relationship Diagram (ERD) and Data Flow Diagram (DFD). The DFD diagram represents the graphical flow of the data and describes what the framework does. Meanwhile, ERD shows entities in a database and relationship between tables within the database. Figure 1 and Figure 2 represent the respective object design.

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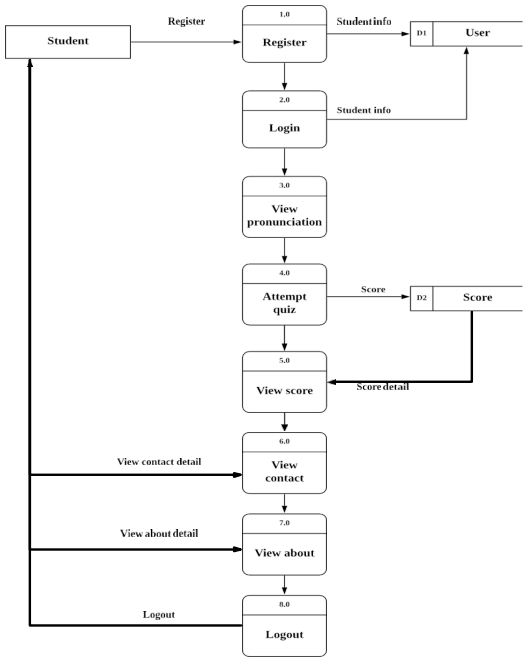

Figure 1: Data Flow Diagram

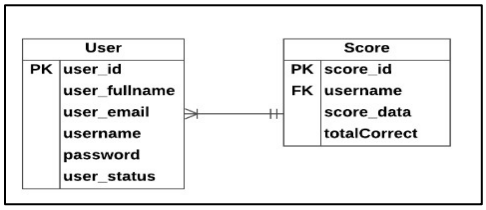

Figure 2: Entity Relationship Diagram

B. Web-Based Design

Figure 4 shows the suggested web-based structure for the proposed system. This structure clarifies the pages of the web-based system, and the navigation paths that the user can go through while navigating the site.

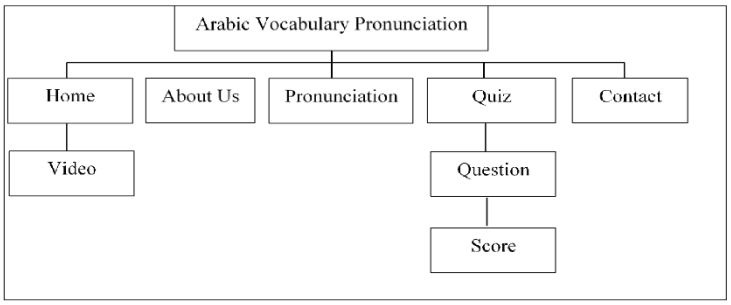

Figure 4: Site Map Navigation

Layouts of interfaces for the web-based development were created using Articulate Storyline 3 software that allows the creation of interactive learning, which allows the developer to add and trigger for each multimedia element such as image, sound and animation. Besides, Adobe Photoshop software is used to design and edit graphics such as image, text and logo. MySQL is used for the database, while Apache runs a web server software using Xampp package. Meanwhile, for coding Sublime Text is used as a text editor.

C. Interfaces of Web-Based LCMS for Arabic Vocabulary Pronunciation

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This subsection explains about the interfaces of the proposed system. Figure 5 shows the main interface of the proposed system. This page contains five tabs, which will redirect the user to Home which consist of Register and Login, About, Pronunciation, Quiz and Contact. When users click on the selected tab, it will be redirected to the specific page as follows:

Figure 5: Main Interfaces for the Proposed System

Register/Login Page

Users need to register for the first-time user or login in order to access the pronunciation and quiz pages. Register tab requires the users to fill in the full name, matric number and password. Meanwhile, for the login tab, the user needs to fill in the matric number and password. An alert message will appear when the user is unable to fill in the correct information.

About Page

This page contains a description about the web-based LCMS for Arabic Vocabulary Pronunciation, including the main objective and the significance of the proposed system.

Quiz Page

This page contains the selected quizzes that users are allowed to attempt in order to test their level of knowledge. The users need to answer the questions and multiple choices of answers are provided. Besides, the score will be displayed to the user based on the correct answer given.

Contact Page

This page provides the developer contact information such as email, address, phone number and message that can be used to send any information to the developer.

Pronunciation Page

This page provides multimedia support in order to learn and understand the Arabic vocabulary pronunciation. Figure 6(a) shows the main page and when the user clicks the button *'Click Here'* will redirect the user to the Level page, which the user needs to select the level of Arabic language and the topic provided in each level as shown in Figure 6(b). Meanwhile, Figure 6(c) shows the page to learn Arabic vocabulary pronunciation by clicking the image to listen to the audio of the pronunciation.

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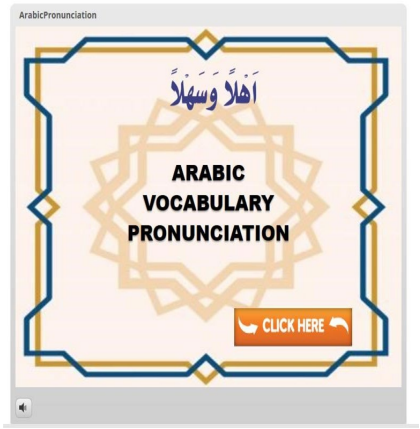

Figure 6(a): Main page

Figure 6(b): Page Level and Topic

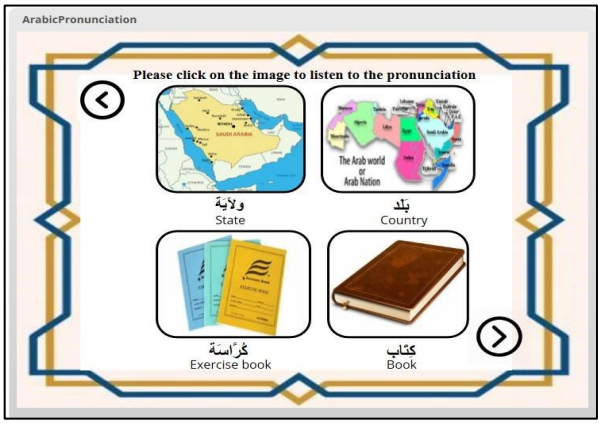

Figure 6(c): Page Arabic Vocabulary Pronunciation

FINDINGS AND DISCUSSIONS

Two tests were conducted including Expert Review and User Acceptance Test (UAT).

A. Expert Review

This test involved five expert lectures from the Faculty of Computer and Mathematical Sciences and Academy of Language Studies. The expert lectures were selected from various fields in IT, including web development, multimedia, interaction design, information system, programming and database. Furthermore, an expert review from the Academy of Language Studies was evaluated and checked the pronunciation of the Arabic language in the system. The purpose of the test was to measure the effectiveness of the proposed system and to find any kind of improvements in the context of the user interface, components used, processes and design.

The experiment was conducted by giving a set of questionnaires, which consist of two items: a) main components of the proposed system and b) features in each of the main components. The result was calculated for the frequency of the three options provided in the form which include 1) needs very

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detailed explanations, 2) needs some explanations and 3) is easy to understand. Table 1 shows the frequency of the responses from the experts.

Table 1: Response from Expert Review

	Item	Frequency (n = 5)		
A)	**Main components of the web-based**			
	Criteria	**Scale**		
		1	**2**	**3**
1.	Pronunciation		1	4
2.	Quiz		2	3
3.	Login/Logout			5
B)	**Features in each of the main components**			
	Criteria	**Scale**		
		1	**2**	**3**
i.	**Pronunciation**			
1.	Instructions		2	3
2.	Image			5
3.	Sound (Pronunciation)		1	4
4.	Button			5
5.	Text			5
ii.	**Quiz**			
1.	Instruction		1	4
2.	Questions		1	4
3.	Button		2	3
4.	Interface			5
iii.	**Login/Logout (Exit)**			
1.	Button			5

The result shows most of the experts are easy to understand all features provided by the proposed system. However, some of the features need to be improved such as sound, instruction, questions of quizzes and buttons. All comments and suggestions have been taken into account by making improvements to the proposed system. Besides, two general questions were provided to the expert reviews involving the flow and the practicality of the proposed system. All of the experts agreed on the connection, and flow of the proposed system was relevant and logical. In addition, they also agreed the proposed system was useful to the students. Table 2 shows the result of the questions provided.

Table 2: Result of General Questions

	Question	Yes	No
1.	The connections and flows of all the scenes in the application are good.	5	
2.	Overall, the implementing Web-Based LCMS for Learning of Arabic vocabulary pronunciation is practicable.	5	

Based on the overall results, most of the expert reviews approved that the proposed system is a good learning tool to enhance the learning process, even though it needs some improvements.

B. User Acceptance Test

A User Acceptance Test (UAT) was used to measure the effectiveness and usefulness of the proposed system. The study was conducted to thirty (30) respondents of UiTM students. The students were randomly selected from different faculties and enrolled for the Arabic course. A quantitative research approach has been used for data collection by providing a survey questionnaire to the respondents. The experiment was conducted by giving the participants the opportunity to use and explore the proposed

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system independently. Then, they were required to answer a set of questionnaires, which consist of sixteen questions and divided into three categories. The study has successfully evaluated the effectiveness of the proposed system which includes user interface satisfaction, usefulness and content of system and usability. The score value which scale 1 to 5 was given for every type of criteria identified. Each scale represents strongly disagree (1), disagree (2), neutral (3), agree (4), and strongly agree (5). The data were analysed using arithmetic mean technique based on the ranking score value. Then overall mean was calculated and classified into three categories, which is negative, neutral and positive based on the range of mean value in between zeros to five as shown in Table 3.

Table 3: Range of mean value

Category	Range of Mean
Negative	0.00 – 1.66
Neutral	1.67 – 3.33
Positive	3.34 – 5.00

Table 4: The User Acceptance Test Result

No.	Criteria	Score (1-5)					Mean
		1	**2**	**3**	**4**	**5**	
Part 1: User interface satisfaction							
1	Graphical use is clear and interactive			3	17	10	4.2
2	Learning using web-based LCMS would be fun an intersting for me				18	12	4.4
3	The interface of the system is pleasant			1	19	20	4.3
4	The text used is readable and understandable				15	15	4.5
5	The suitability and consistently of the background color			1	20	9	4.3
					TOTAL MEAN		**4.4**
Part 2: Usefulness							
6	I like the idea of web-based LCMS which help the user to learn Arabic language course			1	13	16	4.5
7	All sound on the system works very clear and well		1	1	16	12	4.3
8	I think this web-based LCMS is very helpful			1	17	12	4.4
9	Using this system, it decreases my time to get the information and learn Arabic vocabulary pronunciation.			3	13	14	4.4
					TOTAL MEAN		**4.4**
Part 3: Content of the system and usability							
10	The quiz section provided very helpful for my study				23	7	4.2
11	I like the content and graphics in web-based multimedia learning of Arabic vocabulary pronunciation.			1	7	22	4.7
12	I seek to use this system as my guidance in learning Arabic Learning Course			3	20	7	4.1
13	The button provided easy to understand and workable			5	19	6	4.0
14	I can easily access from one page to another page in this system			3	22	5	4.1
15	Overall, I satisfy with the functionality and ease of use of this system.			2	22	6	4.1
16	This system has every function and capabilities that I expected to have.			1	22	7	4.2
					TOTAL MEAN		**4.2**

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	OVERALL TOTAL MEAN	**4.3**

The study was successfully done for each type of the criteria to evaluate the effectiveness of the proposed system. Table 4 summarises the results for the identified criteria and total means for each category respectively. The result showed that the respondents were satisfied and positively accepted all functionalities and features provided by the proposed work. This can be proven by the mean for each category calculated above the point of 4.0. Furthermore, the idea to develop web-based LCMS with multimedia elements to learn Arabic vocabulary pronunciation was accepted by the majority of participants with the score 4.5. Besides, the score for the content and graphics in the proposed system was 4.7, indicating that the participants were satisfied, and it can help them to enhance the learning experience for Arabic vocabulary pronunciation. Meanwhile, the overall total mean for the user acceptance test was 4.3, which means the participants positively accepted the proposed system to help them learn the Arabic language course, specifically for Arabic vocabulary pronunciation.

CONCLUSION AND RECOMMENDATIONS

This paper studied and discussed the potential use of Web-based Multimedia LCMS in assisting and enriching the learning of Arabic vocabulary pronunciation. The effort in generating this learning prototype attempts to design, develop and integrate multimedia elements in a web-based platform in order to enhance the Arabic pronunciation learning experience. It is meant to provide an interactive learning experience for learners who have been through traditional non-computer based Arabic teaching and learning methods. The evaluation on Arabic vocabulary pronunciation using web-based multimedia was done by expert review and user acceptance test using questionnaire method. The purpose of testing is to test if the proposed system is good, easy to use and effective. Fortunately, the findings from the survey that was conducted among students and expert users showed that the majority of the participants, after using the proposed system, were satisfied with it and this proved the effectiveness of the system. It has been discovered that a majority of students display a higher level of readiness in accepting web-based learning with multimedia elements, the implementation of such a learning approach will make it easier to learn Arabic vocabulary pronunciation. In conclusion, the overall proposed system was measured to be positively accepted by the users. Hence, it was able to assist, enhance and enrich the learning experience of Arabic vocabulary pronunciation. Furthermore, it can be a reference and teaching aid for students to study the Arabic vocabulary pronunciation. In the future, this system can be enhanced by including augmented reality as one of the elements for the learning process.

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CONFLICT OF INTEREST DISCLOSURE

All authors declare that they have no conflicts of interest to disclose.

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