

Developing Multilingual Learning Application to Arabic Elementary Learning

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Abstract — Nowadays, Learning Arabic is perceived as drab by students, with 2.4% finding it very drab, 25.3% finding it drab, and 34.9% finding it quite drab. This research is a development of the MLATS ARABIC for easy Arabic language learning. The functional testing showed a 100% success rate for all 7 test cases, and the application performed well on five different computer browsers. The user satisfaction survey yielded a 95% average satisfaction rate for each indicator.

Keywords — Arabic language learning, MLATS ARABIC, user satisfaction.

I. INTRODUCTION

ARABIC is an international language that is widely used by people, especially those who are Muslim. In Malaysia, Arabic is the third primary language studied and used to study Islamic knowledge [1]. In Brunei, Arabic is taught as a functional language, like in senior high schools [2].

Arabic in Indonesia, Malaysia, and Brunei Darussalam is not the primary language. However, Arabic is studied as the language of instruction and reinforcement of Islamic studies [3]. Besides that, Arabic is also taught as a functional language [4].

The Internet is one of the richest sources of providing information and sharing knowledge [5]. There are many conveniences in understanding language instantly provided on the Internet, such as machine translation. However, language learning with teachers cannot be replaced because teacher knowledge of this will make it easier for learners, so they only infrequently depend on the Internet [6]. Instant ways of understanding language via the Internet often do not include a sense of language itself, so that needs to be

corrected and learned with the teacher [7].

Nowadays, many learning media are used to learn languages. Learning media are all tools or materials used in the learning process to help students understand the subject matter [7]. Learning media allow teachers to increase student learning motivation because learning is monotonous [8]. So, methods and media for learning Arabic must be designed in such a way as to be easy to understand and apply in communication [9] because the function of the learning language is to teach language-oriented communication [10].

Several factors hinder Arabic language learning, including inadequate time allocation, network limitations, insufficient motivation among students, subpar instruction from instructors, and limited teacher capacity to manage the learning process within the online learning system because Arabic language teachers are more dominant in teaching reading and writing than listening and speaking [11]. So, the approach to the learning of the Arabic language needs to be revised to achieve its goal.

This research developed an application of multilingual learning to Arabic learning by developing a web-based application named 'MLTAS Arabic,' which stands for Multilingual Auto Translation System; we aim to address the challenges in learning Arabic. Such as insufficient motivation among students, subpar instruction from instructors, and limited teacher capacity to manage the learning process within the online learning, tested in 3 countries in Indonesia, Malaysia, and Brunei.

II. RELEVANT THEORY

A. Related Work

There have been several previous studies conducted by researchers on Arabic language learning in the form of research findings.

A paper entitled "Abjad: Towards Interactive Learning Approach to Arabic Reading Based on Speech Recognition" presents learning on Arabic speech recognition using the Application Programming Interface (API) Android Speech Recognizer [12].

The research "Effectiveness of Android-Based Arabic Learning to Improve *Mufradat* and *Qawa'id* Learning Achievements" shows that Android-based media can improve vocabulary and grammatical arrangement learning achievements in the Arabic language by as much as 30.30%, and there is a difference in Arabic language learning achievements between students who use Android-based media and vice versa [13].

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More research has been done in the paper entitled “An Android Application to Teaching Arabic Language and Arabic Literacy”. This research developed an application to help blind people learn the Arabic language. This application can help in three factors, i.e., hearing, visual, and kinesthetic [14]. Afterwards, the Cloud-Based Learning Service Platform for Multilingual Smart Classes shows the benefits of this computing paradigm. It implements it as a learning service platform and can help a student enhance fluency in speaking in a formal environment [15].

The research that has been done entitled “Android-based application for fast learning of Arabic language for beginner involved testing and measuring the usability level using the People at the Center of Mobile Application Development (PACMAD) model [16].

B. Learning Media

Learning media involve anything that can convey a message, stimulate the mind and feelings, and so on, thus encouraging the creation of a learning process for every student [17]. During the fourth industrial revolution, the development of internet-based information technology influenced the world of education, leading to the creation of interactive media [18]. Whereas education 4.0 is a general term educational theorists use to describe various ways to integrate physical and non-physical cyber technology into learning [18].

Education 4.0 is a general term educational theorists use to describe various ways to integrate physical and non-physical cyber technology into learning. That is a leap from Education 3.0, where Education 3.0 includes the intersection of neuroscience, cognitive psychology, and educational technology, using digital, mobile, web, hardware, and software technologies [19].

There is a correlation between the development of the fourth industrial revolution and the world of Education 4.0, which forces the education sector to adapt to the changing times [19]. Similarly, in the field of Islamic education, the development of the fourth industrial revolution will significantly affect the development of Islamic education learning media.

C. Learning Media Language

Learning a language always requires a series of steps to be taken by learners. The concept of language proficiency during these stages has become well-known among language experts and observers, ranging from listening skills, speaking skills, reading skills, and writing skills [20].

In the new learning media, students no longer directly interact with teachers, but they will interact with computer systems. One of the axiomatic dimensions of this approach is a series of concepts regarding the nature of language and language learning. Assumptions directly related to learning include four aspects of language skills or proficiency [21].

D. E-Learning Web Application

E-learning applications are a platform that facilitates online learning and teaching by providing access to educational materials, interactive learning tools, and communication tools that enable learners and instructors to interact remotely [22]. The platform can be accessed through the internet using a computer or mobile device,

making it a convenient option for students who cannot attend traditional classroom-based learning [23].

There are various types of e-learning applications, including learning management systems (LMS), massive open online courses (MOOCs), and educational social networks (ESN), each designed to cater to specific learning needs and goals [24]. E-learning applications have become increasingly popular due to their flexibility, cost-effectiveness, and accessibility [25].

E. Research & Development (R&D)

The research and development (R&D) method is a systematic approach to designing and developing new products, processes, or systems through a series of phases, including problem identification, idea generation, concept development, prototyping, testing, and commercialization [26]. This method is commonly used in fields such as engineering, technology, and education, where there is a need for innovation and improvement.

The R&D method is often used to address specific problems or challenges and involves a multidisciplinary team of experts, including researchers, designers, engineers, and subject matter experts. The process is iterative, meaning that each phase builds on the previous one and allows for continuous feedback and improvement.

III. METHODOLOGY

This research employed the research and development (R&D) type 3 approach. This approach is characterized by the involvement of end-users, customers, and other stakeholders in the R&D process to ensure that the final product or service meets their needs and expectations [27].

This approach ensures that the final product or service is usable, practical, and meets the needs of the target audience. This research aims to test and refine the existing 'ArabEasy' application, both in terms of its form and function, to make it more optimal. The development design phase of the application using the R&D approach is presented in the following diagram shown in Fig. 1.

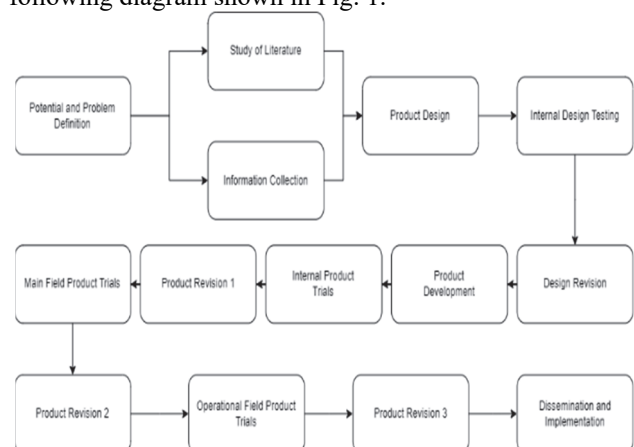


Fig. 1. Research Flow.

The purposive sampling method was utilized as a non-probability sampling technique to select the target sample from the population used in this research. The population and sample consisted of students, university students, and the general public within the Southeast Asian region, with representatives from three countries, namely Indonesia (227

people), Malaysia (58 people), and Brunei Darussalam (26 people).

IV. IMPLEMENTATION

A. System Design

This section provides a detailed overview of the application's system. The flow used in the application is described based on the identification of system goals, the definition of its components and their interactions, and the development of a plan for testing and implementation. The application usage map flow is shown in Fig. 2.

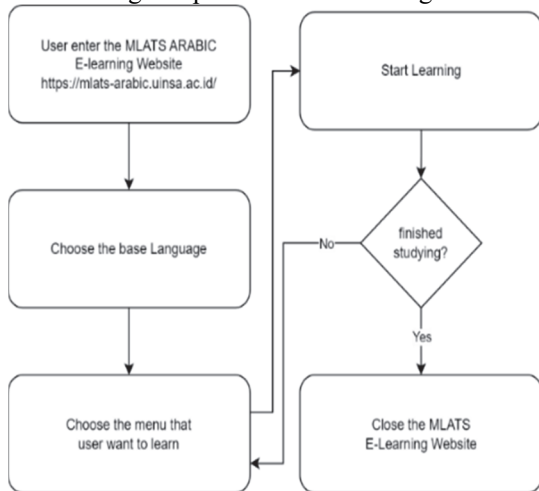


Fig. 2. Application Usage Map Flow.

A flowchart depicting the system design is presented in Fig. 2, which depicts how the application is utilized. Notably, users can select their preferred language from a choice of three options without the requirement of logging in. The menu offers a variety of learning materials that users can select based on their interests or preferred learning paths to meet their needs. The learning menu map in this research is shown in Fig. 3.

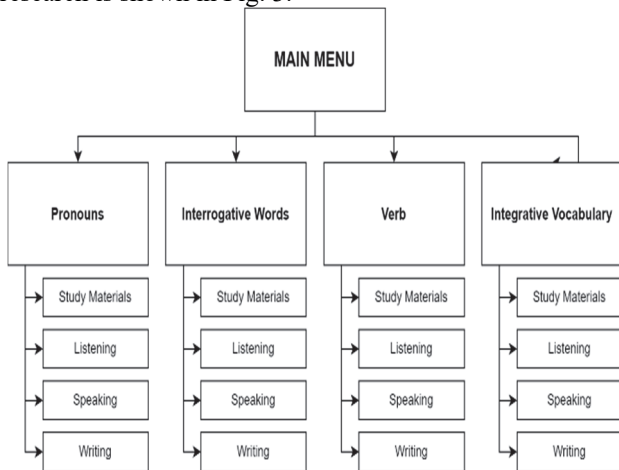


Fig. 3. Learning Menu Map.

Several fundamental language learning materials are provided in Fig.3, including Pronouns, Interrogative Words, Verbs, and Integrative Vocabulary. Based on Fig. 4, the technology architecture utilized in the application employs a combination of several available framework technologies. This combination of technology utilized in the application leverages excess of each, so an effective and

efficient system has been developed.

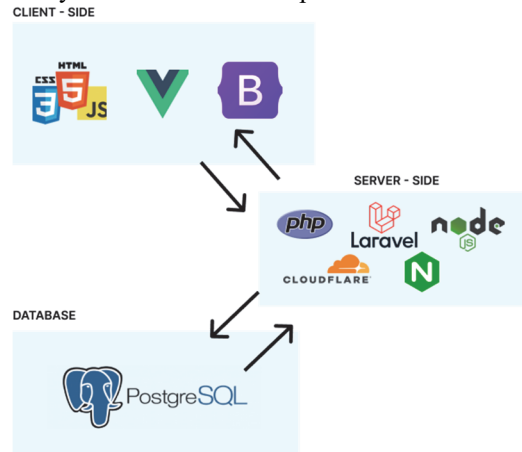


Fig. 3. Architecture Technology Stacks.

B. User Interface Design

The results of the user interface design on each page are shown in Fig. 5.

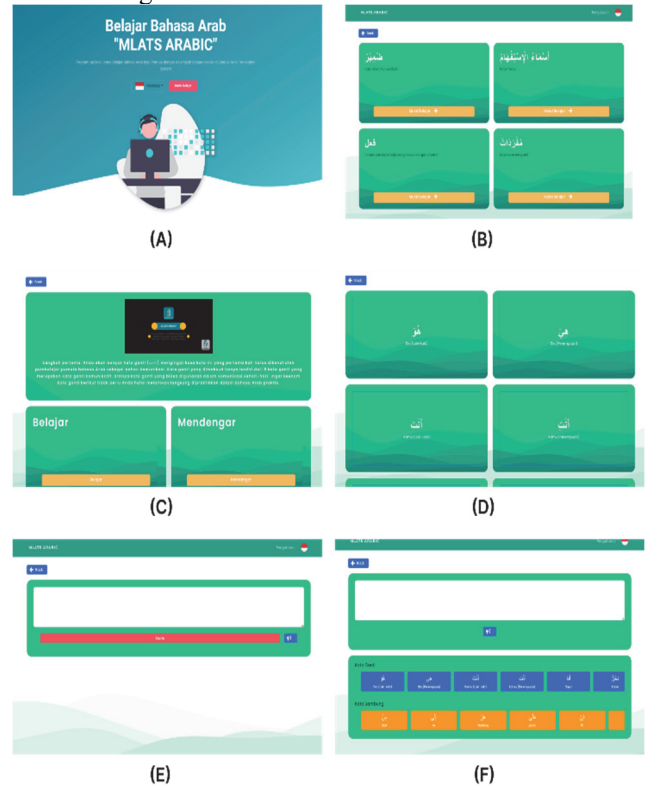


Fig. 4. (A) Home UI, (B) Main Menu UI, (C) Materials Menu UI, (D) Listening Menu UI, (E) Speaking Menu UI, (F) Writing Menu UI.

Fig. 5(A) shows the Home UI displayed to users upon accessing the web page. It features the primary language setting and a button to enter the application. Fig. 5(B) shows the Main Menu UI of this application; a selection of four primary learning materials is available to users. Fig. 5(C) shows the Materials Menu options for each of the four core learning materials available to users. Fig. 5(D) shows the displays of learning and reading sections in each learning material. Fig. 5(E) shows the writing displays in each learning material. Fig. 5(F) shows the displays of the writing section in each learning material.

TABLE 1: Result of Functional Testing Application.

<i>Menu</i>	<i>Expected Result</i>	<i>Fact Result</i>
Home	Displays the application's main page. Users are able to select their preferred primary language, including Indonesian, Malay, and English, through the 'Start Learning' button to proceed to the next page.	OK OK
Main Menu	Display and navigate the main material options in Arabic language learning, and translate them according to the selected language.	OK
Communicative Pronoun Menu	Displaying videos and step-by-step instructions for language learning. Displays a menu option for learning, listening, speaking, and writing materials.	OK OK
Communicative Pronoun Content	Displays and can run the expected learning materials. Displaying videos and step-by-step instructions for language learning.	OK OK
Interrogative Sentence Menu	Displays a menu option for learning, listening, speaking, and writing materials. Displays and can run the expected learning materials.	OK OK
Interrogative Sentence Content	Displaying videos and step-by-step instructions for language learning. Displays a menu option for learning, listening, speaking, and writing materials.	OK OK
Verb Menu	Displays and can run the expected learning materials. Displaying videos and step-by-step instructions for language learning.	OK OK
Verb Menu Content	Displays a menu option for learning, listening, speaking, and writing materials. Displays and can run the expected learning materials.	OK OK
Integrative Vocabulary Menu	Displaying videos and step-by-step instructions for language learning. Displays a menu option for learning, listening, speaking, and writing materials.	OK OK
Integrative Vocabulary Content	Displays and can run the expected learning materials.	OK

I. IMPLEMENTATION

During the testing and evaluation process of the application, it is crucial to determine the user experience and activities performed while using the application. Three stages of application testing were conducted. Firstly, functional testing was used to determine if the application was according to the expected features [28]. Secondly, to ensure the application's compatibility with different web browsers, the testing process included evaluating its performance in multiple browser options. Thirdly, user experience testing using the Customer Satisfaction Score (CSAT) was conducted to determine user behavior towards satisfaction [29].

The results of functional testing based on the features and functions on each application page and menu are presented in Table. 1, where the results indicate that for all tests, each function has run as expected.

The results of the application usage comparison with several web browser options are presented in Table 2. The web browsers used were compatible with the operating system on the computer, including Google Chrome, Microsoft Edge, Apple Safari, Firefox, and Opera.

TABLE 1: Compatibility of the Application on Several Computer Web Browsers

<i>Web Browser</i>	<i>Expected Result</i>	<i>Fact Result</i>
Google Chrome	Running	OK
Microsoft Edge	Running	OK
Apple Safari	Running	OK
Firefox	Running	OK
Opera	Running	OK

The subsequent results of this study involved the evaluation of user satisfaction in using the application. The measurement was conducted by distributing an online questionnaire to three countries, Indonesia, Malaysia, and Brunei, based on the indicators of Webqual. These indicators contain Usability, Information Quality, and Service Interaction [30]. The presentation of the questionnaire and the compatibility of the Webqual indicators are presented in Table. 3.

The results of the questionnaire responses are presented in Table 4, where the questionnaire was completed by 312 respondents from the three countries where the questionnaire has five gradients. One is low, and five is the highest value. The statistical results are displayed in Fig. 6.

TABLE 2: Indicator and questionnaire

Indicator	Questionnaire Questions	Code
Usability	What about the user interface design of the MLATS ARABIC application?	Q1
	What about the features and functions of the menus in the MLATS ARABIC application?	Q2
Information Quality	How sufficient are the learning materials provided by the MLATS ARABIC application for beginners?	Q3
	How was your feel about information when learning Arabic Using MLATS ARABIC?	Q4
Service Interaction	What is the explanation (via video) about the steps for using the MLATS application?	Q5

TABLE 3: Questionnaire Responses

Question Code	1	2	3	4	5	Total
Q1	1	4	18	137	152	312
Q2	1	2	15	138	156	312
Q3	1	3	12	147	149	312
Q4	1	0	9	112	190	312
Q5	1	1	8	127	175	312

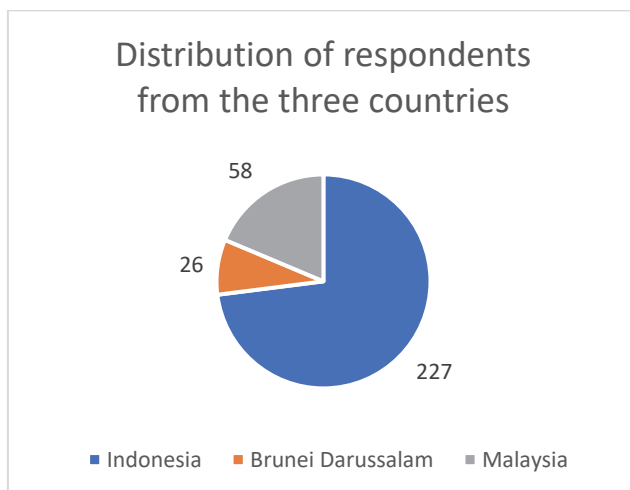


Fig. 5. Distribution of respondents for three countries.

The application development process has good results. The testing of the results for the application menu and functionality showed that all 7 test cases performed successfully. Furthermore, the application was tested on five different computer browsers, and all tests yielded positive results. The user satisfaction test resulted in an average satisfaction rate of 95% for each question indicator, indicating that users are delighted with the MLATS ARABIC application while learning the Arabic language. The result of the testing application is shown in Table 5.

TABLE 4: Result of CSAT Calculation

Question Code	Total Positive Response	Customer Satisfaction Score (CSAT) Calculation	Result
Q1	289	289/312x100%	92,6%
Q2	294	294/312x100%	94,2%
Q3	296	296/312x100%	94,8%
Q4	302	302/312x100%	96,7%
Q5	302	302/312x100%	96,7%
Average Result			95%

II. CONCLUSION

The application development process has yielded favorable results. The functional testing results for the application menu and functionality showed that all 7 test cases performed successfully. Furthermore, the application was tested on five different computer browsers, and all tests yielded positive results. The user satisfaction test resulted in an average satisfaction rate of 96% for each question indicator, indicating that users are delighted with the MLATS ARABIC application while learning the Arabic language.

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