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THE USABILITY OF ARABIC-KAFA APPLICATION FOR LEARNING ARABIC VOCABULARY AT KAFA INSTITUTION

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Abstract

In the recent past, teaching and learning languages, especially Arabic language has emerged into the utilization of advanced technology like augmented reality in order to provide students with a better learning environment. However, the utilization of such technology in education experienced some issues regarding available educational products in the market that are not designed on the basis of appropriate instructional design approach. Therefore, this study aimed to investigate the usability of ARabic-KAFA augmented reality application to learn Arabic vocabulary at KAFA institutions. A questionnaire with a five-point fuzzy scale was employed for the usability testing in this research project so that the experts could reach to a consensus. After that, the results were examined by something called the Fuzzy Delphi Method (FDM). The findings indicate that all specialists in related fields have reached the conclusion that the ARabic-KAFA mobile application's design, contents, user experience, and performance all have outstanding usability and are very helpful in assisting students of basic level to acquire Arabic vocabulary.

Keywords: Arabic vocabulary, augmented reality, fuzzy delphi method, KAFA, usability

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1. Introduction

One of the required subjects taught at KAFA (Quranic & Fardhu Ain Class) institutions is Arabic language or also commonly known as Lughatul Quran (Quranic language). Compared to other schools and institutions run by the Ministry of Education, this one under the management of the Department of Islamic Development of Malaysia (JAKIM) has a unique Arabic language curriculum (Rasdi et al., n.d.). JAKIM was established in 1990 with the intention of promoting fundamental Islamic education in general and the mastery of Al-Quran and Fardhu 'Ain in particular (Garis Panduan KAFA, 2006). In order to maximise student accomplishment both within and outside the classroom, curriculum at KAFA institutions was designed to be in line with the utilisation of educational technology approaches to enhance existing teaching and learning processes (Mahat et al., 2021).

Due to the lengthy phrases or wordings and unappealing learning materials, language learning in particular has in some cases caused students to lose interest and motivation in learning (Liono et al., 2021). According to Gunawardhana and Palaniappan (2016), the usage of multimedia platforms in teaching and learning has proven to have the ability to increase student knowledge and motivation. However, commercially available educational resources that weren't developed using the right instructional design methodology presented a number of issues for the usage of such technology in education (Zainuddin & Sahrir, 2015).

The trend of utilizing augmented reality as a multimedia platform, particularly in language teaching and learning, is growing (Tulgar et al., 2022). The advantages and distinctiveness of this platform appear to be beneficial for users among students who wish to learn languages in a more engaging and interactive way (Lin & Yu, 2023; Mardasari et al., 2021). The benefit of augmented reality as a tool to help students to understand challenging topics is also highlighted (Ewais & Troyer, 2019; Wang et al., 2022). According to previous studies, multimedia augmented reality in language learning places a greater emphasis on vocabulary teaching and learning (Punar et al., 2022).

The usage of augmented reality platform related to Arabic language outside of education field includes extraction of Arabic text, recognition and translation service (Saudagar & Mohammad, 2018). The acceptance from students at various levels towards augmented reality application is high due to the employment of multimedia features that are often used in augmented reality including animations, 3D objects, as well as the use of graphics, audio and video that have high potential to attract students in their learning. At the same time, this way of learning creates education with entertainment “edutainment” concept as an added value to attract more attentions to the students in learning in a better environment (Hashim et al., 2017; Martínez et al., 2018).

Malaysian schools have embraced multimedia augmented reality platforms at certain institutions from basic level of Arabic language teaching and learning to university level. A study on Arabic mobile application was carried out by Hashim et al. (2017) related to early Arabic language education. The researcher integrated printed text book with digital information through augmented reality platform. According to the study, using of augmented reality platform at the primary level along with appropriate multimedia elements effectively assisted students to learn Arabic more quickly within 5-7 years of learning. Augmented reality is also a contributor to the mastery of four fundamental Arabic skills, especially reading and speaking skills. The new environment created by augmented reality gives students

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a fun and joyful experience in learning Arabic language skills (Kamaruddin et al., 2019; Karacan & Akoğlu, 2021). Other benefits that most Arabic students derive from their learning through augmented reality include the increase of their learning motivation apart from compensating the lack of teaching and learning resources by integrating multimedia augmented reality in current teaching aids using various multimedia elements including images, audio, video and three-dimensional (3D) animation (Nordin, 2018).

2. Methodology

In this research, researchers employ the FDM because it works well to reach consensus among experts on a product's usability (Mohd Ridhuan et al., 2017) such as the usability of "ARabic KAFA" augmented reality application. In this study, a five-point Likert-scale usability evaluation was used to test how well the augmented reality application "ARabic KAFA" worked. The experts rate each evaluation question based on how they respond to it and evaluate how useful the "ARabic KAFA" application represents.

Fuzzy set theory, which is also incorporated in the classic Delphi method, is used in this technique. To get a more precise outcome, the expert's chosen scale (0,1) will be turned into a fuzzy scale through fuzzy numbering, which involves assigning numbers to binary words. The outputs of this fuzzy number integration are as follows: the minimum value, the value that is most likely to occur, and the highest value. When presented with a number of options, a knowledgeable person will select the one that offers the highest potential return.

2.1. Instrument

Lewis (1992) application usability questionnaire was used in this study. Application usefulness, information quality, and interface quality were all evaluated using three main constructs in this questionnaire. The questionnaire asked the decision-makers to give a rating on the usability for every item on a scale from 1 to 5, with number 5 being the best.

2.2. Experts respondents

According to Ocampo et al. (2018), when utilising the Delphi method, the quality of group decisions does not increase as the number of experts increases. Therefore, a small number of specialists are required for the Delphi technique. The accuracy of the results might be impacted by adding more experts with less relevant expertise (Saaty & Özdemir, 2014). Accordingly, this study chose 10 experts in total, as suggested by Adler and Ziglio (1996) in their study. They assert that a decent number of experts to be chosen for the study is between 10 and 15 experts if the number of experts chosen are substantially homogenous.

The experts selected should have a doctorate or extensive expertise in a relevant subject, and they should have been picked because of their suitability to the study's goals and their willingness to reconsider their original assessments in order to reach a consensus. As a result, the following criteria were used to select the experts for this study:

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1. Knowledge and experience in the area of study in addition to having a Master's or higher in Arabic as a second language, educational technology, or another topic that is very closely related.

2. Well-versed in the field studied and having at least five years of experience in a field that is related.

3. Be in a position to devote one's whole attention to the study until it has been completed.

4. Does not have any personal stake in the findings of the study or how it turns out.

Listed in the table below (table 1) are the details of the experts who were asked to answer the ARabic-KAFA application usability questionnaire.

Table 1. Expert Respondents

Experts	Qualification	Expertise	Experience (Years)
E1	PhD	Computer Assisted Language Learning Teaching Arabic as a Second Language	12
E2	Master	e-Learning m-Learning	9
E3	PhD	Teaching Arabic for Tourism Purpose	18
E4	PhD	Arabic Language Education	18
E5	PhD	Arabic Language Education	18
E6	PhD	Arabic Language and Literature Criticism	23
E7	PhD	Arabic Language Translation Lexicography Corpus Teaching Arabic as a Second Language	23
E8	PhD	Arabic Language Instructional Technology	21
E9	PhD	Instructional Technology Teaching Arabic as a Foreign Language Teaching Arabic as a Second Language	25
E10	PhD	Arabic Language Arabic Lexicography Arabic Discourse Analysis Teaching Arabic As Second Language	16

2.3. Data analysis

The FDM includes a number of steps. Ten professionals were polled on how helpful the found the ARabic-KAFA apps to be for acquiring KAFA Arabic terminology. According to the research that has been conducted on this issue (Mohd Ridhuan et al., 2017), the FDM may be broken down into the steps that are listed below.

Step1: Identifying the Experts

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To establish a consensus on the usability of the ARabic KAFA applications, ten experts were chosen for this study. One of three methods to get in touch with experts is through seminars, one-on-one conversations, or email. Participants in this study were emailed a series of application usability surveys.

Step 2: Choosing a Linguistic Scale

Language-related variables are converted to fuzzy integers using the fuzzy scale (see table 2). For the fuzzy scale to work effectively, the number of linguistic scales it employs must be odd. A five-point scale was thus employed in this study, as may be seen in the table below.

Table 2. 5-points Fuzzy Scale

Linguistic Variable (5 points)	Likert Scale	Fuzzy Scale
Strongly agree	5	(0.60, 0.80, 1.00)
Agree	4	(0.40, 0.60, 0.80)
More or less disagree	3	(0.20, 0.40, 0.60)
Disagree	2	(0.00, 0.20, 0.40)
Strongly disagree	1	(0.00, 0.00, 0.20)

Step 3: Getting the Average Value

For each item (n1, n2, n3), the Fuzzy scale's average value is identified and calculated.

Step 4: Determining the threshold value (d) and obtaining a 75% consensus score from the experts

The threshold value is used to gauge the level of consensus or agreement among all expert responders. Individual specialists do not agree with one another to reach a consensus over whether the threshold value (d) should be equal to or larger than 0.2 (d 0.2) (Cheng & Lin, 2002; Mohd Ridhuan et al., 2017). Chen (2000) provides the following summary of the computation for this number.

$$d(\tilde{m}, \tilde{n}) = \sqrt{\frac{1}{3}[(m_1 - n_1)^1 + (m_2 - n_2)^2 + (m_3 - n_3)^2]}$$

Additionally, the degree of consensus 0.2, which exceeds 75% for each item, is utilised as the basis for the criteria used to evaluate the expert consensus. If the data is acquired in another way, the FDM must be used again, failing which the item must be deleted (Mohd Ridhuan et al., 2017). The formula for calculating the 75% expert consensus is as follows.

$$\frac{\sum d - \sum d}{\sum d} \times 100$$

$\sum d$ total number of values of the expert's answer threshold.

$\sum d_1$ total number of ambiguous values that exceed 0.2.

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Step 5: Fuzzy Evaluation

It is important to sum up all of the fuzzy numbers in order to determine the aggregate value of the fuzzy assessment.

Step 6: Defuzzification (method of assigning score)

Defuzzification method involves the process to obtain rankings for each variable. The formula for the defuzzification process is as below.

$$nmax = \frac{1}{3}(n1 + n2 + n3)$$

In conclusion, FDM can be summarized in the table below:

Table 3. Summary of FDM Steps

Steps in FDM	Purpose
Step 1: Identifying the number of experts	Ten experts were identified according to their area of expertise respectively in order to ascertain the data's validity and reliability.
Step2: Selecting linguistic scale	Chosen on a 5-point scale
Step3: Getting the average value	To calculate each expert's average deviation (d), the threshold d value is chosen.
Step 4: Determining the value of d	The threshold value (d) indicates expert consensus. The expert group's consensus d must surpass 75% for each item category to be approved.
Step5: Fuzzy evaluation process	Defuzzification relies on a certain set of triangular fuzzy integers, which may be obtained by a specific procedure.
Step6: Defuzzification process	To arrange everything according to the highest score obtained during the Defuzzification procedure.

3. Findings

Ten experts were given a set of usability questionnaires in order to get their consensus on the usability of the educational mobile applications, ARabic-KAFA. As a criterion, the FDM uses the terms of the consensus, for example, the value of the expert consensus needs to be at least 75%, and the threshold value (*d*) needs to be at least 0.2 or below. The consensus among experts on the usability of the ARabic KAFA applications is summarized in the table below.

Table 4. Expert Consensus Through FDM

No	**Item**	***Triangular Fuzzy Numbers***		***Fuzzy Evaluation***				**Expert Agreement**	**Item Accept**
		***d* value**	**Consensus Value (%)**	**m1**	**m2**	**m3**	**Skor *Fuzzy (A)***		
1	This application can be used as fixed.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720

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2.	This application can be used easily.	0.153	100	0.500	0.700	0.900	0.700	Accept	0.700
3.	This application allows to learn the meaning of Arabic vocabulary in less time.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
4.	This application is easy to use in Arabic teaching and learning activities	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
5.	This application has a user-friendly interface.	0.153	100	0.500	0.700	0.900	0.700	Accept	0.700
6.	The application performance is consistence.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
7	This application can be used without the assistance of others.	0.128	100	0.540	0.740	0.940	0.740	Accept	0.740
8	I am satisfied with the application's functioning.	0.153	100	0.500	0.700	0.900	0.700	Accept	0.700
9	This application supports all of the features I was looking for.	0.171	90	0.460	0.660	0.860	0.660	Accept	0.660
10	This app can aid in the teaching and learning Arabic.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
11	This application is fun.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720

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12	The theme of character design is appropriate for the level of elementary school students.	0.128	100	0.540	0.740	0.940	0.740	Accept	0.740
13	This application responds to flash card markers immediately.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
14	Vocabulary audio pronunciation is clear.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
15	Character audio is clear (Example: Tiger roaring sound).	0.128	100	0.540	0.740	0.940	0.740	Accept	0.740
16	Background music is appropriate.	0.153	100	0.500	0.700	0.900	0.700	Accept	0.700
17	3D pictures shown smoothly.	0.128	100	0.540	0.740	0.940	0.740	Accept	0.740
18	Animation shown smoothly.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720
19	This application's buttons operate properly.	0.147	100	0.520	0.720	0.920	0.720	Accept	0.720

In addition to the overall threshold value, the table above also includes individual threshold values depending on competence for the consensus group of experts about the practicality of the ARabic-KAFA application. There was widespread consensus among experts on every question, even though the level of consensus varied depending on the sample size. For the ARabic-KAFA application to be useful and usable, it must satisfy two requirements of the sanctioned FDM; expert consensus of more than 75% and a cut off value of (d) 0.2 for the threshold value.

Experts have reviewed the 19-item of ARabic-KAFA usability evaluation questionnaire that was successfully returned. The evaluation reached by the panel of experts was approximated. The disparity between two fuzzy numbers was found as the difference between the average fuzzy rating data and the expert assessment data. The findings show that there is sufficient group consensus on all items when the criterion value is less than 0.2 (range from 0.128 to 0.171). The next criterion was established on the condition that the majority opinion of the group of experts was larger than 75%. The majority opinion is

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somewhere between 90% and 100% which reach the overall consensus for every item and reflect the high usability of ARabic-KAFA application.

4. Discussion

This study details the usability of an Arabic KAFA mobile educational applications designed specifically for beginner students of Arabic language. These conclusions were reached using the consensus of the experts. Based on the findings, experts generally concur that the 3D images are displayed without any problems during the scanning to marker process and that the defuzzication value is 0.740. While the character design is appropriate for elementary students with defuzzication value of 0.740. In addition, majority of experts also agreed that the character audio is clear. Experts are attracted to and agree that augmented reality technology motivates students to participate and engage in learning because the application's integrated multimedia features, such as images, audio, and text, are appealing. Through the usage of the application's audio-visual elements, it would help students to learn new Arabic vocabulary. This exemplifies the value of augmented reality technology in Arabic language teaching and learning.

Additionally, the majority of experts come to a consensus that the ARabic KAFA application is user-friendly throughout the teaching and learning process. Indeed, this application may be mastered quickly due to its high responsiveness to flashcards markers and well-functioning buttons. Prensky (2001) discussed how digital natives' students are accustomed to getting information in real time and are more adept at multitasking. These learners are regarded to be more visual and dynamic than those who rely on text and tedious study. Thus, this instructional application satisfies the requirements of contemporary pedagogies and the contemporary needs of digital natives. Teachers cannot continue to employ traditional pedagogies; they must communicate with and reach out to digital native pupils (Prensky, 2001). Students need to be encouraged to learn Arabic vocabulary (Muhamad Khairul et al., 2019; Noor et al., 2016; Nabihah et al., 2021; Wu, 2018; Yasim et al., 2016) and to learn independently and actively using the available electronic materials (Rosni, 2017) through the use of a more interactive and engaging learning strategy.

Using multimedia platforms, such as an augmented reality-based approach, is one of the best ways to teach language vocabulary because it has the potential to help students by improving their attitude towards learning, boosting motivation, promoting critical thinking, and maintaining learning engagement. Additionally, Kalyuga et al. (2013) and Agca and Özdemir (2013) suggest that the incorporation of a range of multimedia components in this application may facilitate students' learning of new foreign words' pronunciations and meanings without the need for additional memorization. Unquestionably, these elements will enhance students' learning chances and offer more useful listening and speaking practise (Ramlan, 2016).

5. Conclusion

The usability of ARabic KAFA, a mobile educational application for students at KAFA primary school, is investigated in this study. Ten experts used the FDM to evaluate the usability of this

application, which was successfully launched in the Google Play Store. One of the greatest methods for determining expert consensus on a research project is the FDM. According to experts' opinions, which range from 90% to 100%, according to the findings of the study, the mobile educational application under consideration offers a high degree of usability for students in elementary schools to use in their education. This educational mobile application is also having the possible positive impact in teaching Arabic vocabulary due to the integration of augmented reality technology. A possible strategy that could have a favourable effect on students' achievement and motivation is augmented reality technology. The utilization of augmented reality-based learning has also been proven to have significant promise for enhancing factors like student involvement throughout the learning process and their attitude towards learning. As a result, this study suggests that future research conduct a quantitative study employing a quasi-experiment to ascertain whether students actually benefit from using the Arabic-KAFA application.

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