Research Article

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AUGMENTED REALITY TO MEMORIZE AL-QURAN FOR HEARING IMPAIRED STUDENTS: A PRELIMINARY ANALYSIS

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ABSTRACT

Quran learning among the hearing impaired has not been given much attention and exposure. This is due to the difference in the learning method among the hearing impaired compared to the non-hearing impaired. In lieu with this, a preliminary study has been conducted by using a qualitative approach. An interview was conducted with five experienced teachers to identify hearing impaired students' behaviours and the method used to learn Al-Quran. Meanwhile, an observation with the hearing impaired students was also conducted. The findings show that the Tahfiz Akhyar method is used to memorize the surahs of Al-Quran by orderly arranging the verses using numbers. The memorization technique is based on the teaching of Prophet Muhammad when He taught the companions to learn Al-Quran. However, the result shows that, there are still errors in arranging the verses of the surahs in the correct order using the existing teaching aid. Therefore, these findings will be used as a guideline to develop the teaching aid application integrated with the Augmented Reality technology to help hearing impaired students to memorize the surahs of Al-Quran.

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Keywords: Augmented Reality, Quran learning, Hearing Impaired, and Memorization.

1. INTRODUCTION

Al-Quran is a life guide for Muslims. It covers all aspects of life. Hence, it is an obligation for Muslims to learn Quran because they need to understand the content of each surah (chapter) and the verses that they read. In addition, in performing the daily solah, one needs to read chapters or verses of Quran and usually, these are read with tajweed[1]. Due to the importance of learning Quran, every Muslim should learn it from early childhood. As mentioned by many education scholars, children absorb what they learn like sponges absorb water[2], [3]. Children tend to listen and read the Hijaiyah letters better at an early age with their parents or in preschool by using books, flash cards or singing. Unfortunately, among the hearing impaired community, learning Quran is not given much exposure and emphasis[4]. This is due to the notion that many people believe that having hearing impairment is an acceptable excuse to not read the Quran and furthermore, most parents have limited sign language knowledge to teach their hearing impaired children[1], [4], [5]. To make it worse, the hearing impaired has difficulty to listen to and to utter the sounds correctly according to the good makhraj and tajweed[5]. Consequently, this creates a communication barrier among the hearing impaired to learn the Quran[6].

Due to the limitation,[7] the Fakih method has been proposed. Hijaiyah sign language, colours and numbers are used to differentiate the line and eventually attract the hearing impaired students' attention. The Fakih method has been introduced and implemented in *Kurikulum Standard Sekolah Rendah Pendidikan Khas* (KSSRPK) and is widely used to teach hearing impaired students to learn the Quran in school[8]. However, according to Muhammad Sayuti et al. and Sabdan[8], [9], there is still a weakness of the current method where it causes confusions among students by using the sign language with the complex numbering system while reading the Quran. Thus, it affects their motivation to learn Al-Quran. Hence, this article helps to strengthen those with hearing problems community to memorize and understand the Quran by using technology.

The research questions of this paper are seek to address important findings. They are; a) What is the hearing impaired students' learning behaviours in learning the Quran? b) What is attributes or criteria for the interface of the Augmented Reality application?. Meanwhile, the

research objectives of this paper are to identify the hearing impaired students' learning behaviours in learning the Quran and to identify attributes or criteria for the interface of the Augmented Reality application.

2. PREVIOUS STUDIES

KSSRPK has been implemented by Ministry of Malaysian Education which emphasizes the importance of Islamic education among students with disability[8]. Based on KSSRPK, the Fakih method is used for the hearing impaired students to learn Al-Quran. Colours and numbering systems are employed in order to help the students to differentiate the lines and enable them to read Al-Quran easily [7], [9] Nevertheless, according to Muhammad Sayuti et al. and Sabdan[8], [9], there is a disadvantage of the Fakih Method. This method was found to cause difficulty to the students to read the Quran using the sign language and the complex numbering system. Therefore, to overcome this disadvantage, this study proposes the implementation of the Prophet Muhammad memorization method to learn Al-Quran among hearing impaired students as it has been stated in surah al-Ahzab verse 21 that highlighted Prophet Muhammad as a role model in all aspects of life. He is the main reference for all Muslims when there are arising matters or issues in either the world aspects or hereafter[11]. Therefore, the prophet teaching method should be employed as it has a significant value due to the effectiveness of the teaching practice[13].

During the time of Prophet Muhammad, many members of the Arab community were illiterate. In order to learn and read Al-Quran, they used memorization method. This method was used by the Prophet to learn the Al-Quran from Jibrail[10], [11]. This is stated in Al-Quran in al-A'la surah, verse 6[12]. It was the method used among the companions to learn Al-Quran. This technique resulted in Al-Quran surahs or chapters to be conserved amongst the companions[11]. Allah has stated in surah al-Hijr that He will guard and preserve those who memorize the al-Quran. Thus, the memorization technique of learning Quran among the hearing impaired students should be employed so that the students will be able to learn, understand and memorize the content of the surahs or chapters and eventually, Quran are conserved in their soul just like the companions did[10].

Tahfiz Akhyar is a memorization method introduced by Hj Norakyairee Hj Raus and Zaharatul Sophia Mohamed Amir Abas in 2014[14]. This method is based on the Prophet teaching that can be used to memorize the Al-Quran, *doa*, zikr, *selawat* and solah based on the student's strengths and their capability. There are three phases of Tahfiz Akhyar which are a basic phase, memorization phase and evaluation phase[14]. In memorization phase, students need to arrange the flashcard that contains the pieces of surahs verses until they get the correct sequence. Learning method should be noted as the teaching aid between the typical students and special students are different due to the level of students' cognitive, sensory, interest and learning functionality aspects[14]. Teaching aid helps the student to understand the topic, gain interest and focus to learn the topics[10]. Furthermore, the uses of technology as a teaching aid is believed to improve the memorization quality[10]. Hence, the appropriate and suitable teaching aid should be used to teach the hearing impaired students to help them learn the al-Quran in interesting ways.

With the emergence of technology, our life routines become easier and more efficient. Al-Quran can be taught and learned interactively and innovatively by employing the integrated technology of the digital Quran. At present, most of the digital Quran software applications have been developed based on the auditory, in which sounds of the letters are produced. Hence, for the hearing impaired students, this can be an obstacle for them since they are not able to listen or hear efficiently as a result, they are not able to learn or read the Quran effectively.

To achieve the second objective, so as to identify the interface attributes or criteria, there have been several previous studies conducted among the hearing impaired students on learning using technology. Table 1 illustrates the applications that have been developed for the hearing impaired students. In this article, there are three categories of application were developed based on the mobile, web-based and Augmented Reality (AR) that are related to hearing impaired learning. Colors, texts, images and sign language are the main criteria used in these applications to capture the students' interest and also to create a user-friendly interface as the hearing impaired students are visual learners[13]. Other attributes such as number, sounds and video were also used in those applications. Moreover, the applications were run on the

various platform such as Android, IOS, desktop, mobile, PDA and Head-Mounted Display (HMD) in which some of the applications combine a gesture recognition and both Automatic Speech Recognition (ASR) and Text-to-Speech Synthesis (TTS) technologies to help and improve the hearing impaired learning experience.

Table 1. List of application software

Author, year	Application Name	Colour	Text	Image	Sign	Number	Sound	Video	Platform	Extra Technology
Mobile										
Hussain et al., (2014)[4]	mFakih	√	√	√	√	√			Android	
Nor Azizh Binti Mohd Daud, Nazean Jomhari, (2012)[7]	iFakih	√	√	√		√			IOS	
Hussain & Mutalib, (2014)[15]	jFakih	√	√	√	√				Android	
Web-Based										
Zafrulla et al., (2010)[16]	CopyCat	√	√	√	√			√		Gesture recognition
(Mokhtar & Shamsul Anuar, 2014)[17]	Islamic module	√	√	√	√			√		
Augmented Reality (AR) Technology										
Mohd Zainuddin, Zaman, & Ahmad, (2010)[18]	AR-Book		√	√	√			√	Desktop	
Mirzaei et al., (2012)[19]	Ultra-Mobile PC (UMPC)	√	√	√			√		Mobile	Automatic Speech Recognition (ASR) & Text-to-Speech Synthesis (TTS)
Jones et al., (2014)[20]	Vocabulary acquisition		√		√			√	Head-mounted-display (HMD).	Fingertip detection
Nazareth, Alencar, & Netto, (2014)[21]	ELRA		√	√	√				PDA	
C.-J. C. Chien-Yu Lin , Hua-Chen Chai, Jui-ying Wang and Y.-M. Huang, (2016)[22]	Chinese tangram puzzles	√		√				√	Mobile	
	TOTAL	7/10	9/10	9/10	7/10	2/10	1/10	5/10		

3. METHODOLOGY

To achieve the first objective, a preliminary study was conducted to identify the current method used among the hearing impaired students to learn Quran and the problems that occurred while using the method. To gather this data, the researcher conducted an interview with teachers and carried out an observation with hearing impaired students.

3.1. Respondents

In this study, five respondents (three males and two females) answered the interview questions. They are teachers who have the experience for more than two years in teaching Quran to hearing impaired students. Moreover, there were four hearing impaired students (two males and two females) were observed. Their average age is between 12 – 19 years old with severe deafness and they got an average mark which is between two to three marks during Al-Quran memorization diagnostic test for surah Al-Ikhlas, as the highest marks are from the students who are able to produce sounds and able to speak with the help of hearing

aid. The size of the respondents is small as the hearing impaired students are a minority group of people.

3.2. Respondents

First instrument was an interview with the teacher. Four interview questions were prepared to get the relevant information and to identify the problems. The questions focused on the current method used to teach Quran among the hearing impaired students, the difficulties faced by them in using the current method, and suggestions to improve the current method. The questions asked are as below:

i. What is the method that is currently being used?

ii. From your observation, what is the difficulty faced by the students in learning the Quran using this method?

iii. If the Tahfiz Akhyar method is employed to teach Quran, would there be a problem in arranging the verses of the surah according to the correct sequence number?

iv. In your opinion, what is the way to improve the method for students to learn the Quran?

The second instrument was an observation with the hearing impaired students. A flash card that contains pieces of the Quranic verses was used during the learning session. The respondents were observed based on the following criteria:

i. Does the student face difficulties in arranging the verses of surah?

ii. Does the student make mistakes while arranging the verses of surah?

3.3. Research Procedures

Conducting the preliminary study, an interview with the five teachers has involved these steps:

i. Identifying the respondents for the preliminary study.

ii. Arranging for an appointment with the respondents.

iii. Meeting and interviewing the respondents.

iv. Analyzing the answers given by respondents.

v. Gathering important information from the analyzed data which will be used to develop the AR application.

While the procedures for observation with hearing impaired students were as follow:

i. An explanation was given by the teacher before starting the learning session.

ii. Students open the al-Quran and search for surah al-Fatihah.

iii. Students need to point the surah and follow the teacher to read the al-Fatihah for a few times.

iv. Students need to close the Al-Quran and a flash card that contains pieces of surah al-Fatihah was taken out from the envelope.

v. Students need to arrange the pieces of verses surah al-Fatihah correctly.

4. RESULTS

Based on the interviews conducted among the five respondents, relevant data has been gathered. Figure 1 shows the existing methods used to teach the students. Forty percent (40%) of the teachers use the Fakih method and 20% use the Tahfiz Akhyar, whereas 40% used both methods. Tahfiz Akhyar is a method to memorize the surahs in Al-Quran while Fakih method is a method employed to read Al-Quran using the sign code.
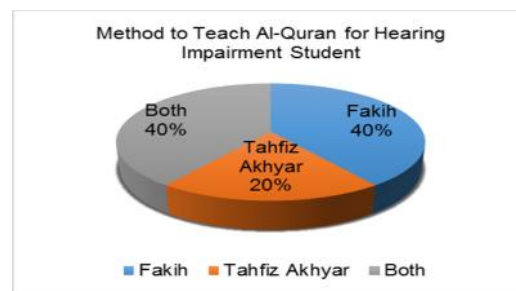

Fig.1. Current methods to teach al-Quran for hearing impaired students.

The issues faced by the hearing impaired students in learning Quran are shown in Figure 2. These issues have been identified by the teachers who were interviewed. The highest percentage of the issue is 60% in which the students forget easily the surahs that they have learned and 40% of the students need to repeat what they have learned. Whereas, about 40% of the students got confused with the line used in the method.
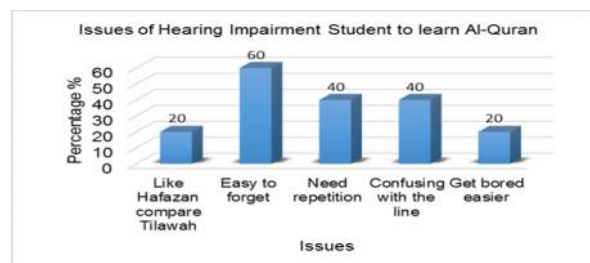

Fig.2. Issues of hearing impaired students.

Tahfiz Akhyar is a memorization technique used by hearing impaired students to learn Al-Quran by arranging the sequence of verses and surahs. Based on the interview, 100% of the respondents said that there is a problem in arranging the surah sequences in the correct order. Figure 3 shows this result.
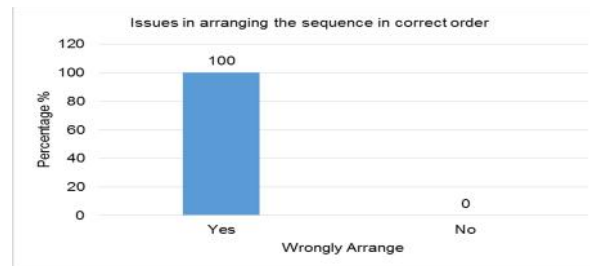

Fig.3. A wrongly arrange of the verses and surahs sequence using Tahfiz Akhyar.

There is a need to improve the current method to be more effective, thus 80% of the respondents agree that the current method can be improved by using a visual technology to help the students learn the Quran better. Another 20% said that the memorization of new surahs needs some improvement too. Figure 4 shows the suggestions to improve the current method.
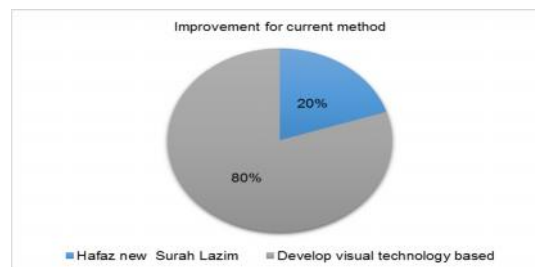

Fig.4. Improvement for current method

From the observation with the hearing impaired students, it is found that 50% of the respondents have a difficulty in arranging the verses pieces of surah al-Fatihah. The respondents need to change the arrangement for a few times until they get the correct sequences. From the researcher view, 100% of the respondents had made a mistake while arranging the verses of the surah in a correct order as they forgot the sequences of the surah and needed a repetition to memorize the surah.

5. DISCUSSION

Based on the preliminary results, 100% of the respondents agree that the students still make mistakes while arranging the verses and the surahs in the correct order as they forget easily and repetition is needed during the learning process. Therefore, employing a current technology may help the students to memorize the content in more effective and interesting ways.

In order to develop the application, several attributes or criteria should be considered. From the previous studies on the courseware for learning Al-Quran for students with hearing impairment, several important attributes have been highlighted. Below are the strategies to develop an AR application for memorizing the Quran:

i. Employ different colours.

ii. Use simple text.

iii. Add images for real-time feedback.

iv. Add a sign language.

v. Need a repetition for better understanding.

6. CONCLUSION

Al-Quran is a gift from Allah that contains blessing, *syifa'* and *rahmat* to humankind. Al-Quran is not specified to any group of people as it can be learned by normal or disabled people. Thus, there is no exception for the disabled people to learn the Quran. The learning method should suit the level of hearing impaired students in order to help them learn al-Quran according to their capability. With the advancement of technology, it helps to fill up the rooms for a better improvement of the learning method for hearing impaired students. Therefore, this study has fulfilled the objectives of identifying the hearing impaired students' learning behaviours and highlighted the criteria of the interface needed for AR application development. Hopefully, this application will provide more opportunities for the hearing impaired students to learn Al-Quran easily and interactively in which eventually, it helps the community to be more successful in the future, as a result of the benefits of learning and memorizing the Quran.

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