# FAKIH: A Method to Teach Deaf People 'Reading' Quran

Nor 'Aziah Binti Mohd Daud<sup>1</sup>, Nazean Jomhari<sup>2</sup>, Nur Izzaidah Abdull Zubi<sup>3</sup>

SMK Temerloh Jaya<sup>1</sup>, Faculty of Computer Science & Information Technology University of Malaya<sup>2,3</sup>

## **ABSTRACT**

Allah revealed the Quran to be practiced by all human beings irrespective of whether the humans are normal, or mentally or physically challenged. According to the Department of Malaysian Special Education, in 2002, there were 663 blind students and 3649 deaf students, all over Malaysia. However, in terms of Quran education, deaf students are far behind compared to blind students. This is because they could not hear and therefore posed a difficult situation for the teachers to teach them. Based on this initiative, Fakih methods have been introduced to eight deaf students to learn Quran in within two months. The result is very promising where six of them managed to recite Quran through hand code using Fakih method. We propose iPad application called iFakih in the future to cater the needs of disabled people to read Quran. Keywords: Deaf, Quran, FAKIH

# 1.0 Introduction

There are over 3890 students with hearing problems who sat in the primary and secondary mainstream in Malaysia [1]. A friend who suffers from hearing impairment expresses how he is at a disadvantage when it comes to reciting the Quran:

"We feel so "distant" with our Quran. We can hold, look and touch but we are unable to read and recite it. No religious teacher is able to guide us to read the Quran using sign language. At school we were taught only the Arabic alphabets (Hijaiyah letters) but upon finishing school, everything is forgotten."

As Muslim brother and sister, the grievance makes us ponder and realize how this group of people has been overlooked. They are not exposed to the same basic knowledge that normal children receive in their early education. Accessibility to such learning materials and teaching aids are also limited. Yes, teaching the Quran using sign language will not be one easy feat but somebody has to take the responsibility.

Special children are children who have been identified and confirmed by clinical professionals as having problems that interfere with the learning process. Special education programs must be designed to specifically meet the diverse needs of special students, including the use of special materials, special equipment, and techniques of teaching and learning according to the abilities & capabilities of students. There are five categories of special children

in Malaysia: visual disabilities, learning disabilities, physical disabilities, cerebral palsy and hearing disabilities,

In the categories, hearing disabilities are categorized into three types: mild (50-70 dB), moderate deafness (71-90dB) and severe (90 dB). Meanwhile, learning disabilities include special children who have had autism, ADHD, slow learner, down-syndrome, and dyslexia. In the meantime, physical disabilities can be divided into two sub-categories: maimed and muscular dystrophy.

# 2.0 Current Situation for Teaching Quran in Deaf School

Malaysian Sign Language, developed by Malaysian Federation of the Deaf (MFD) is the main language used by the deaf community as a medium to communicate with normal people. However, sign language is not a language that is mastered by all deaf people especially children. This is because there is no standard version for sign language and there is also limitation in movements when it comes to representing special or scientific terms [2]. However, having said that, sign language is the only medium for teacher to teach deaf student in school. Verbal and written languages are easily learned by normal people because it is taught in school and experienced in daily life. Unfortunately, deaf children do not have the same privilege of being exposed nor have an access to verbal, written and sign language. This leads to deaf children experiencing slow progress in learning any language compared to normal children [3][4]. For the deaf, a proper approach needs to be taught to enable them to converse and communicate with the society in a fluent manner.

Based on the first author's experience of 16 years teaching the deaf in school, the Islamic teachers in deaf school in Malaysia teach Ibadah, Akidah and Feqah. Unfortunately, when it comes to teaching Qur'an they have implemented 'skip' method, meaning that they are not teaching Quran to these students due to some constraints, which will be explained below.

#### 2.1 Students Constraint

Disabled students with hearing impairment face difficulty in mastering the skill of reading the Quran using sign language because: Firstly, there are limited sign codes available for the verses in the Quran. Secondly, there is no proper method to memorize the signaling of phrases contained in the tajweed of the Quran. Finally, the awareness of the importance of reading and reciting the Quran amongst students are still very low. The mind-sets of these students are that, they think that they do not have to read and recite the Quran due to their disability, and that reading the Quran is not easy.

# 2.2 Teachers' Constraint

Special Education Teachers face some limitations and constraints in teaching Quran to their students. Firstly, there is no training course or workshop for them to obtain the exposure on the proper method of teaching disabled students how to read the Quran using sign language. Teachers still adopt the conventional way of teaching (chalk and talk), which results in students facing difficulty in understanding how to read the Quran using sign language. Secondly, evaluation and measurement on the effectiveness of the teachings are based on written questions rather than verbal of practical approach. These teachers have a pre-determined mind set, where they think that it is hard and challenging for them to teach the students how to read and recite

the Quran, and thus assume that these students are excluded from the obligation of reading the Quran.

# 3.0 Objective of innovation

The objective of this research is to assist the teachers in obtaining the knowledge and also the hands-on skills that is needed to teach reading the Quran using sign language. It will certainly simplify things for the teachers when it comes to evaluating and measuring the effectiveness of the method through written or verbal approach. For the students with hearing disability, using the right technique will enable the students to master the skills of reading the Quran using sign language in an easy and systematic way. It will also make the practice of reading the Quran a part of their daily routine.

#### 4.0 FAKIH Method

Fakih is defined as a person who is an expert in the knowledge of Fiqh and other recognized domain knowledge in Islamic Studies. We name the method as FAKIH which represents the acronyms as F: Faham/ Understand, A: al-Quran, K: Kehidupan/ Life, I: insya-Allah, H: Hebat/Great. Fakih method could help Quran literate by applying coloured and numbered techniques to represent each Arabic alphabet in the Quran. However, Quran recitation for the deaf is by using sign language as a skill to recite Quran.

This method addresses the issue of lack of teaching material and learning aids in the field of Islamic knowledge for children with learning disability such as the hearing impaired children. In addition, reading or reciting the Quran using sign language is also difficult to be mastered by these students. Unfortunately, the teaching and learning is still constrained to the conventional method of drilling the students solely on exercises. To solve this constrain, a numbered and coloured system is adopted as a method to teach the students how to read the Arabic alphabets. The contents (words and phrases) are selected based on a deductive approach to make it more systematic, focused and understandable to students.



Figure 1: Fakih kits

### 5.0 Methodology

The target group for testing Fakih method is hearing impaired students who can be either mild, moderate or severe in hard hearing categories, of which they have problem with communications. Two of the participants have multiple disabilities namely down-syndrome and autism. Table 1 shows the details of the participants in this study, along with gender, age and category to the entry. A total of three girls and five boys were involved. In the table, Effandi and Aziz were identified as having multiple disabilities, where Effandi does not have hard hearing problem but having articulation problem that prevent him to communicate with others, in addition he is also having mentally handicapped, while Aziz he is deaf and slow learner.

The duration of the implementation of Fakih method is from early January 2009 until end of March 2009. Table 2 shows the chronology of the implementation methods of Fakih period to the eight students involved.

Teaching material and learning kit contain: a).user guide book, b).teaching technique transparency slides, c) mini magnetic whiteboard with magnetic numbered buttons, d) module worksheet, and e) individual lesson plan. To gain maximum effectiveness of teaching and learning process through individualized teaching, the teacher should read thoroughly and understand the user guide book. Teacher then follows the teaching steps outlined as proposed, according to the students' ability in processing knowledge. Then guide the students through each systematic steps that have been described the steps in section 4.0 above.

Teaching aids needed is an A4 size magnetic board, magnetic buttons of different colours and transparent plastic sheets. All the listed items can be obtained from any bookstore or stationery shop.

Table 1: Eight of the students involved in the testing methods of Fakih.

			Multiple	Hard of hearing Categories				
Name	Gender	Age	disabilities	Mild	Moderate	Severe		
1. Nora	F	13	No			/		
2. Nadia	F	13	No		/			

3. Haslin	F	13	No		/	
4. Faruq	M	13	No	/		
5. Hafiz	M	13	No		/	
6. Effandi	M	13	Yes			
7. Suhud	M	13	No	/		
8. Aziz	M	13	Yes			/

Table 2: Chronology period of the implementation of Fakih

Bil	Date	Chronology
1	4 Jan 2009	Diagnostic testing of students in order to identify their knowledge.
2	5-7 Jan 2009	Read the single and double sign, for example ( o o o o o o o o o o o o o o o o o o
3	12 Jan – 2 Feb 2009	Read the word marked with sukun.
4	9-11 Feb 2009	Read the word marked for syaddah
5	18 Feb – 4 Mac 2009	Read short texts from various verses. Read Surah Al-Fatihah.

### 6.0 Result

In this situation, the skills tested using the Fakih is, firstly, read word line and a variety of tanwin ( 5 5 5) Secondly, read the word marked with sukun. Then, read the word marked for syaddahand finally, read short sentences and Al-Fatiha. In this circumstance, the researchers will provide performance results for each of the eight students, starting with Nora, Nadia, Haslin, Faruq, Hafiz, Effandi, Suhud and Aziz.

Nora is a severely deaf student. She cannot hear anything at all, but does not have multiple disabilities. Nora can easily gesture the verse on the very first meeting on 5 January 2009 (see Table 3 below). She can use the code for the letter hijaiyah hand sign with ease. However, when the researcher introduced sukun and syaddah signs together, she gets a little bit confused. Nora takes nearly five weeks to differentiate sukun and syaddah. Later on, she can easily use sign language to read short sentences and surah al-Fatihah after memorizing these two symbols – sukun and syaddah.

Table 3: Nora's performance

N	Stude	Skills	Start date	Performance		nce	Notes
0	nt			9			
1	Nora	1. Signaling one verse	05			/	Alhamdulillah.
		into multiple phrases	/01/2009				

with simple signs.				
2. Signaling one verse	12/01/	/		Need more exercises
into multiple phrases	2009	/		Alhamdulillah.
with sukun	19 /01 /		/	
	2009			
	02 /02 /			
	2009			
3. Signaling one verse	10 / 02 /	/		She is a bit confused
into multiple phrases	2009		/	between syaddah and sukun.
with syaddah	17 / 02			Need more exercises.
	/2009			Alhamdulillah
4. Read short sentences	23 /02 /		/	Alhamdulillah she
and Surah Al-Fatihah	2009	/		successfully signalled
	25 / 02 /		/	correctly.
	2009			-
	03 / 03 /			
	2009			

Nadia's result is greater than Nora. She only has a medium-deaf. However, teachers should speak during using sign language because some of them could hear. Nora has no confusion over syaddah and sukun, but has trouble signalling for some long sentences. Table 4 shows the performance of Nadia.

Table 4: Nadia's performance

N	Stude	Skills	Start date	Perfo	rma	nce	Notes
0	nt			7	W.		
2	Nadia	1. Signaling one verse into multiple phrases with simple signs.	05 / 01 / 2009			/	Alhamdulillah.
		2. Signaling one verse into multiple phrases with sukun	12 /01 / 2009 19 /01 / 2009			/	Able to understand easily
		3. Signaling one verse into multiple phrases with syaddah	02 /02 / 2009 17 /02/ 2009		/	/	She is a bit confused when the sentence is too long. Need to be assisted. A positive student.
		4. Read short sentences and Surah Al-Fatihah	23 /02 / 2009 26 / 02 / 2009 03 / 03 /		/	/	Alhamdulillah she successfully signaled correctly.

		2009		

Haslin also has a moderate hearing but slightly weaker than Nadia and Nora. The problem that she faces is the difference between single and tanwin.

Table 5: Haslin's performance

N	Stude	Skills	Start date	Perfo	rma	nce	Notes
0	nt			9	W	8	
3	Haslin	1. Signaling one verse into multiple phrases with simple signs.	05 / 01 / 2009 12 /01 / 2009		/	/	Keep on changing the single and double sign. Alhamdulillah objective achieved
		2. Signaling one verse into multiple phrases with sukun	19 /01 / 2009	/			Too weak to memorize the sukun sign, need guidance
		3. Signaling one verse into multiple phrases with syaddah	02 /02 / 2009 17 /02/ 2009		/	/	Need more practice, can read only words not syaddah. Need more practice
		4. Read short sentences and Surah Al-Fatihah	23 /02 / 2009 26 / 02 / 2009 03 / 03 / 2009		/	/	Still have mistakes when signaling Need guidance Can read short surah

Faruq is an excellent student because he is able to understand all four skills very quickly. In addition, he experiences only a mild hearing impairment. All the skills are very well understood when the teacher introduced it to him. He has never studied Quran before, the same as the others.

Table 6: Faruq's performance

Stude **Skills** Start date Performance N **Notes** nt 0 1. Signaling one verse 05 / 01 / No problem Faruq into multiple phrases 2009 with simple signs. 2. Signaling one verse 12 /01 / Alhamdulillah can easily / into multiple phrases 2009 understand with sukun 19 / 01 / Well done 2009

3. Signaling one verse into multiple phrases with syaddah	02 / 02 /2009 17/02/ 2009	/	OK Well done
4. Read short sentences and Surah Al-Fatihah	23 /02 / 2009 26 / 02 / 2009 03 / 03 / 2009	/ /	Can read without teacher's help Can read without teacher's help Can read without teacher's help help

Hafiz has a moderate hearing impaired. His achievement is also average for all four skills except when he is first introduced to the sukun. He is confused in understanding the method of reading. He needs teachers to read and more training is needed to strengthen his reading and signaling. However, eventually, he managed to read short sentences without the teacher's assistance.

Table 7: Hafiz's performance

N	Stude	Skills	Start date	Perfo	rma	nce	Notes
0	nt			9	W	6	
5	Hafiz	1. Signaling one verse	05 / 01 /		/		Cannot remember hijaiyah
		into multiple phrases	2009		/		words
		with simple signs.	06 / 01				Need guidance
			/2009				
		2. Signaling one verse	12 /01 /	/			Weak in understanding the
		into multiple phrases	2009				method of reading
		with sukun			/		Can read with the help of the
			19 / 01 /				teacher
			2009				
		3. Signaling one verse	02 / 02		/		Can read with the help of the
		into multiple phrases	/2009		/		teacher
		with syaddah	17/02/				Need more exercises
			2009				
		4. Read short sentences	23 /02 /		/		Can read with the help of the
		and Surah Al-Fatihah	2009		/		teacher
			26 / 02 /				Can read but still have
			2009			/	mistakes in signalling the
							sukun and syaddah
			03 / 03 /				Can read short verse only
			2009				

Effandi has multiple disabilities. He is not deaf, but he has articulation problem that makes it difficult for him to talk. In addition to that, he is mentally handicapped, and as such, he has difficulty in managing himself. When he is introduced to hijaiyah letters, hetakes time to memorize the hand code. He is also confused when the single hijaiyah shifts to joint hijaiyah. The teacher needs to find an alternative way that is interactive that could help him to quickly remember the hand code. One of the methods is by using computer-based intervention that will be discussed in a discussion section.

Table 8: Effandi's performance

N	Stude	Skills	Start date	Perfo	rma	nce	Notes
0	nt			7	W	8	
6	Effand i	1. Signaling one verse into multiple phrases with simple signs.	05 / 01 / 2009 06 / 01 /2009	/	/		Cannot identify hijaiyah . Hand code is incorrect
		2. Signaling one verse into multiple phrases with sukun	12 /01 / 2009 12 / 01 / 2009	/	/		Need more exercises Need more guidance from the teacher
		3. Signaling one verse into multiple phrases with syaddah	19/01/2009 02 / 02 /2009 17/02/ 2009	/	/		Confuse with sukun and syaddah Cannot understand the signalling method Cannot read joint hijaiyah
		4. Read short sentences and Surah Al-Fatihah	23 /02 / 2009 26 / 02 / 2009 03 / 03 / 2009	/	/		Confuse and forgets Can read short verse only Need more exercises

Suhud is experiencing mild hearing disabilities. However, his performance is similar to Effandi. Therefore, the teacher should be patient and not to judge the student. This is because the understanding of the knowledge is from God. Teachers should try their best to deliver the knowledge.

Table 9: Suhud's performance

N	Stude	Skills	Start date	Performance		nce	Notes
0	nt			7	W.	8	
7	Suhud	1. Signaling one verse	05 / 01 /	/			Does not know the hijaiyah

into multiple phrases with simple signs.	2009 06 / 01 /2009		/	Hand code is incorrect
2. Signaling one verse into multiple phrases with sukun	12 /01 / 2009 21 / 01 / 2009	/	/	Need more practice Need more exercises
3. Signaling one verse into multiple phrases with syaddah	19/01/2009 02 / 02 /2009 17/02/ 2009	/	/	Confuse with sukun and syaddah Cannot understand the skill Cannot read if the hijaiyah is joint
4. Read short sentences and Surah Al-Fatihah	23 /02 / 2009 26 / 02 / 2009 03 / 03 / 2009	/	/	Confuse Can read short verse only Need more guidance

Aziz suffers from multiple disabilities which are deafness, blindness and a slow-learner. He can manage himself and do not have any behavioural problem. His deafness is severe where he cannot hear at all. Every time he is introduced to the new skill, it is very hard for him to understand. However, his performance is improving every week, where he eventually manages to read a short verse in al-Fatihah.

Table 10: Aziz's performance

N	Stude	Skills	Start date	Performan		an	Notes	
0	nt			ce				
				7	W.	\$		
8	Aziz	1. Signaling one verse into multiple phrases with simple signs.	05 / 01 / 2009 07 / 01	/	/		Can't remember hijaiyah signs Need help from the teacher	
			/2009	,				
		2. Signaling one verse into multiple phrases	12 /01 / 2009	/	/		Tend to forget, can read hijaiyah word only	
		with sukun	21 / 01 / 2009 02 / 02 /2009		,	/	At last he can read - words and signs	
			12007					
		3. Signaling one verse	09/02/2009	/			Weak in memorizing	
		into multiple phrases	11/02/2009		/		Can read with the help of the	

with syaddah	18/02/	/		teacher
	2009			Need more exercises
4. Read short sentences	23 /02 /	/		Cannot read the long verse
and Surah Al-Fatihah	2009		/	Can read short verse
	04 / 03 /			
	2009			

#### 7.0 Discussion and conclusion

Based on the results of these students' achievements, the researchers are satisfied with the progress of the students. Table 11 shows the summarized results of the students' achievements using the Fakih methods. Four skills are tested, namely 1) Signaling one verse into multiple phrases with simple signs 2) Signaling one verse into multiple phrases with sukun 3) Signaling one verse into multiple phrases with syaddah and 4) Read short sentences and Surah al-Fatihah. Compared to the past, the students who are thirteen years of age had never been introduced to Quran, and Alhamdulillah with the innovative Fakih, the deaf students can now read Quran using hand code.

Based on Table 11, it can be concluded that almost all students can master the first skill, which is 'Signaling one verse into multiple phrases with simple signs'. When the second method is introduced, only three people understand it the first time. However, in the second week, all students manage to recognize the sukun signs. The third skill is syaddah sign, where only two of the eight students can understand it the first time it is being introduced. In the second week of introducing syaddah, seven out of eight successfully differentiate syaddah and sukun. More time is needed to distinguish the sukun dan syaddah. Researcher would recommend an additional week to master the syaddah and sukun. The final and fourth method is reciting the al fatihah surah using hand code. Only one person manages to signal it the first time, of whom is Faruq. Faruq has minor deafness, thus he is able to hear a little bit. After one or two weeks of training, seven of the eight students successfully read short verses of surah al-Fatihah.

After our research study, Nora's father died. She was depressed and did not want to go to school. Her mother was worried and contacted the first author, who is also her Islamic teacher, where she was asked to let Nora recited the Quran. Alhamdulillah, she managed to do that and her emotion was stable and she was ready to go back to school. It shows us that deaf people also need the Quran, and as for us who are normal, we have the responsibility to find ways to help them to reach the Quran.

Researchers found that Fakih method has been successfully applied because it 1) Saves time, 2) Improves the effectiveness of teaching and learning process, and 3) Show improvement in both students' performance and teachers' satisfaction. In the first success factor, 'Saves time', the technique does not require spending much time in writing and labeling the numbers according to sequence. Besides the students focus more on the learning and teaching process as it requires hands-on practice where their understanding can be measured more concisely and efficiently. In terms of 'Improve the effectiveness of teaching and learning process', teachers are able to deliver their lesson easily, systematically, interactively and in a concise and fun manner.

Students will participate more because of its interactive feature, easier to understand and they are learning it in a happy environment. Lastly in 'Improvement in user's satisfaction' the teachers are satisfied because the lessons' objectives are achieved and they are assured that the technique can be practiced by the students in their everyday lives. The other user, of which are the students, they will be more confident and can feel a sense of accomplishment because they can now read the Quran just like everybody else, even with their own special technique.

Table 11: Summary of student's achievement data

Date	Skill	Total	Notes	Date	Skill	Total	Notes
		of stude nt				of stude nt	
5/1/2009	1. Signalling one verse into multiple phrases with simple signs.	5/8	There are 3 students who are still confused when the hijaiyah are joint	12/1/200	1. Signalling one verse into multiple phrases with simple signs.	8/8	All can understand the simple signs and the joint hijaiyah.
19/1/200 9	2. Signalling one verse into multiple phrases with sukun	3/8	Five students are confused when there is sukun sign	26/1/200 9	2. Signalling one verse into multiple phrases with sukun	8/8	Students acquire skills to read the word marked with sukun
2/2/2009	3. Signalling one verse into multiple phrases with syaddah	2/8	Many students fail to understand and cannot remember the correct method	9/2/2009	3. Signalling one verse into multiple phrases with syaddah	7/8	Students are able to read
16/2/200 9	4. Read short sentences and Surah Al-Fatihah	1/8	When applied to long sentences, students tend to forget	3/3/2009	4. Read short sentences and Surah Al-Fatihah	6/8	Training is effective

For hearing-impaired children, it is important that they get early literacy exposure to help them develop their cognitive, linguistic and social skills [5]. Researchers have experimented with different types of inventions to improve literacy among students with hearing disabilities. Their studies proved that multimedia education software or teaching aids that are being implemented in multimedia technology can increase student's motivation, self-esteem and achievement in academic performance [6].

Studies have been carried out in the inventions of software products which aim to improve literacy among students with hearing disability. Current available teaching aids are:

- a. iCALL (Intelligent Computer Assisted Language Learning) [7]
- b. Visual Cues [8]
- c. Visual aids as reading material [9]

In developing an academic software or courseware for children with learning disability, there are numerous additional considerations that need to be taken into consideration. Most teaching aids nowadays emphasize on exercises with semantic knowledge that are represented by pictures or visual aids to heighten the understanding of the children. This approach allows the students to make a connection between the printed text and its meaning. Nevertheless, there is still a shortage of teaching and learning aids to facilitate the deaf community in Malaysia for their learning process [9] including reading the Quran. One initiative to overcome the shortage of teaching material for deaf children is the development of Fakih courseware, which is based on the conventional Fakih method using magnetic board and then transferred into i-Pad application, where we named it "iFakih".

Our future work is to evaluate the usability of iFakih with children with communication disabilities. Figure 2 shows the transformation of Quran from printed paper to magnetic board (Fakih method) and into iPad application in the future to cater the needs of disabled people to read Quran.

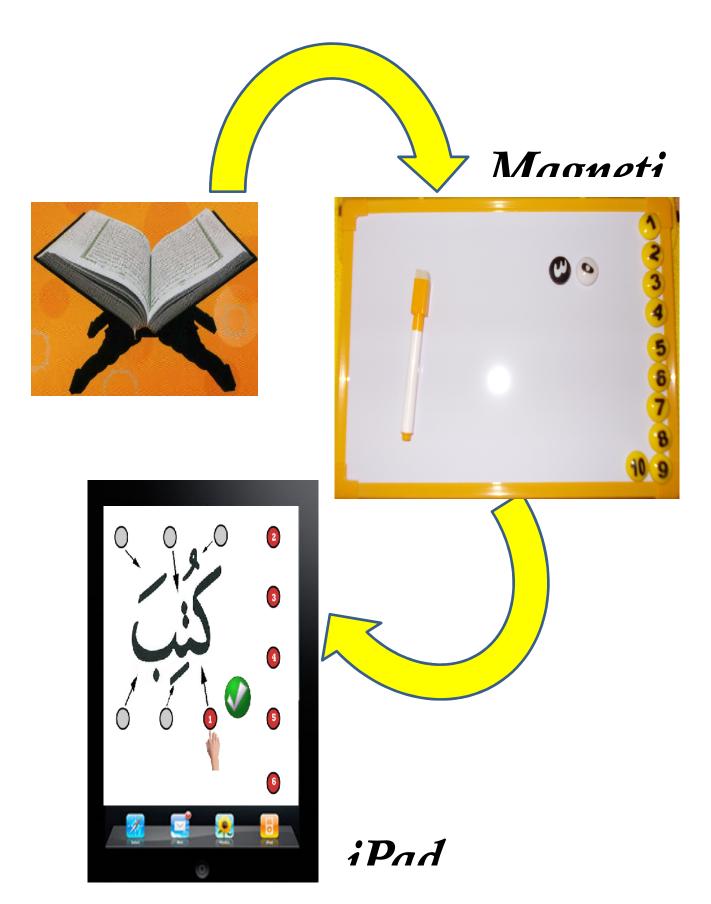


Figure 2: Transformation of Quran teaching

In conclusion, although reading the Quran using sign language is considered unorthodox for normal community, efforts and measures should be taken to make it a regular practice in the deaf community without disregarding the main principal of Quran reading or recitation: Musafahah and Talaqi.

Prophet Muhammad S.A.W said;

"The most superior amongst you (Muslims) are those who learn the Quran and teach it (to others)". Source: Sahih al-Bukhari.

With the innovation of FAKIH method, problems and difficulties faced regarding reading the Quran using sign language are overcome. Initiatives taken in terms of delivering the proper teaching technique and making the method accessible to students are to ensure the FAKIH method can be implemented successfully and effectively. In future, it can be used in strengthening the skills of students in reading the Quran and also act as a benchmark in evaluating the success of this method in improving the students' skills in reading the Quran. It is hoped that with this innovation, these people who are keen on learning, will obtain the same benefits and will make the Quran a part of their daily life, insya-Allah.

#### References

- [1] Ministry of Education Malaysia, retrieved on December 2009 http://www.moe.gov.my/
- [2] Savita, K.S., Athirah, N. (2011). Malay Sign Language Courseware for Hearing-Impaired Children in Malaysia. World Applied Science Journal 12 (Special Issue on Computer Applications & Knowledge Management): p59-64.
- [3] Ow, S.H., Mokhtar, S. & Roziati Zainuddin & Tolman (2007). A Review on the Teaching and Learning Resources for the Deaf Community in Malaysia. Chiang Mai University Journal. Vol 1(1). (p165-176)
- [4] Ow, S.H. (2009). User Evaluation of an Electronic Malaysian Sign Language Dictionary: e-Sign Dictionary. Journal of Computer and Information Science. Vol 2 (2).
- [5] Mohid, S.Z., Mat Zin, N.A. (2010). Courseware Accessibility for Hearing Impaired. Retrieved from IEEE database.
- [6] Burgstahler,S. (2008). Designing software that accessible to individual with disabilities. Retrieved from http://www.washington.edu/doit/Brochures/Technology/design\_software .html
- [7] Zafrulla, Z.; Brashear, H.; Presti, P.; Hamilton, H.; Starner, T. (2011). CopyCat: An American Sign Language game for deaf children. Automatic Face & Gesture Recognition and Workshops (FG 2011), 2011 IEEE International Conference
- [8] Ryan R. Dearing & Laurence R. Harris (2011) The contribution of different parts of the visual field to the perception of upright
- [9] Minor, Rebecca Fadem (2011) A comparison of deixis in interpreted lectures and signed lectures in ASL: An exploration of the structures of ASL utilized by interpreters and deaf teachers when referring to a visual aid, Ph.D Thesis., Gallaudet University.