

## DESIGN FACTORS OF POTENTIAL ASSISTIVE TECHNOLOGY FOR MEMORIZING AL-QURAN LEARNING EXPERIENCE AMONG TAHFIZ STUDENTS

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### ABSTRACT

*In common practice of al-Quran memorization, Tahfiz students spend up to eight hours daily to memorize al-Quran. Many things can happen within those eight hours, affecting their learning experience and performance. This research paper was conducted to investigate the design factors and to suggest a model of potential assistive technology for memorizing al-Quran among Tahfiz students. Qualitative method of case study was used. Two well-experienced teachers were interviewed through focus group discussion. Verbatim transcript of the interview was transcribed and keywords were identified. To analyse the data, the researchers identified themes for further exploration. The results were validated by two experienced inter-raters. The findings indicated nine themes that were classified into three categories: (1) Factors before memorizing al-Quran, (2) Factors during memorizing al-Quran, and (3) Factors after memorizing al-Quran. The research finding suggests the assistive technology that can be planned for further research development and testing.*

## 1. INTRODUCTION

The approach of memorizing al-Quran at Tahfiz school mostly requires spending time to memorize Quranic verses from morning until evening as a daily routine. The Quran memorization is conducted in stages to ensure that students can memorize a large amount of verses. In Malaysian Tahfiz, the morning-to-evening routine is separated into three sessions (Ariffin et al, 2013). In the morning, Tahfiz students are required to memorize and submit one new page everyday (known as Sabak). In the afternoon, Tahfiz students are required to progressively retain the previous pages they have memorized (known as Para Sabak). In the evening, Tahfiz students need to sustain the complete Quran memorization and make sure that the memorization is smooth and without mistakes (known as Mokhtar). Other than the cognitive challenge, Tahfiz students consider their physical and psychological aspects as part of their learning experience. According to Hashim (2017a), Tahfiz students'

achievements in memorizing Quran is influenced by the etiquette of memorizing Quran. As outlined by Imam Al-Nawawi (2012), there are etiquettes to obey when interacting with the Quran including sincerity, sitting properly, focused, strive hard, clean mouth, purity, humility, clean place, reciting distinctly, beautifying the voice, melodious and safeguard the Quran.

Knowing the intensive effort of the daily learning experience, Tahfiz students' emotions are challenged. According to Nik et al (2018), among the challenges faced by the Tahfiz students when memorizing Quran are the lack of motivation, emotional challenge, and external noise. This situation is aligned to the need of assistive technology by considering design consideration (Pramod, 2022). Responding to this phenomenon, this research paper sought to investigate the design factors of the potential assistive technology for memorizing al-Quran among Tahfiz students.

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## 2. LITERATURE REVIEW

In the Malaysian traditional Tahfiz school learning experience, there are three stages commonly practiced known as Sabak (new memorization, about one page daily), Para Sabak (previous memorization of about five to ten pages), and Mokhtar (old memorization of about twenty pages) (Ariffin, et al, 2013). The practice requires long and constant efforts by the students in the early stage to identify their own pattern of recitation and clarify their Makhraj (articulation) weakness, breathing limits, Tajweed (rules of pronunciation), knowledge application (independent learning) as well as Fasohah (fluency). Independent learning can develop creativity and intellectual curiosity, but the process takes a long time. To submit their memorization, tahfiz students will sit according to the etiquette in front of the teacher, recite without looking and be monitored in terms of Makhraj, Tajweed and Fasohah (fluency of memorization). A Malaysian study was conducted (Aziz, et al, 2019) to compare between the traditional method and modern technology in Al-Quran memorization, revealing that the latter almost fulfilled all the categories compared to the former. Utilizing modern technology in al-Quran memorization is useful as an alternative method to the teaching and learning process in the traditional Islamic school. Mustafa and Basri (2018) also affirmed the potential use of technology to facilitate techniques in traditional methods, including Talaqqi (copying the Quran recitation verbally from a teacher), Musyafahah (mouth lip-reading), Takrar (regular repetition), Tadarus (reciting Quran together), Semaan (hearing quran recitation), Tasmik (submit new memorization), and Muraja'ah (resubmission). Azmil (2013) found that the practices of teaching at Tahfiz schools needed to be in line with the evolution of technology.

The amount of time spent in a day (Ariffin et al, 2013) sitting in a specific posture (Al-Nawawi, 2012; Yazit *et al*, 2020; and Jalil et al 2020) to perform specific tasks (Ariffin et al, 2013; Ab Jalil et al, 2021) and solve possible challenges (Nik et al 2018; Awang, 2019) can affect the Tahfiz students' achievements (Hashim, 2017a). This necessitates finding out how assistive technology can improve tahfiz students' learning, including issues with daily learning activities (through learning procedure, User Experience (UX), as well as learning module), possible technologies to support learning (ergonomics, emotional design, as well as audio technology), and etiquettes. Assistive technology is defined as a system/services/assistive product that enhances functioning (Smith *et al*, 2018). He affirmed that an assistive technology service is described as "any service that directly assists an individual with a disability in selection, acquisition or use of an assistive technology service." The fact that assistive technology is made to support specific situations, individuals without disabilities can also benefit from it. According to Al-Dababneh and Al-Zboon (2020), assistive technology enables students to compensate in areas where they lack the necessary skills

for learning. It can help improve certain skill deficiencies. Some students may not be able to function academically without the use of assistive technology whereas others only need assistive technology as a support. Unlike many education sectors that have widely applied assistive technology, Tahfiz schools are still behind times in term of developing its technology in education (Azmil, 2013). Tahfiz students' performance might be decreasing without assistive technology (Azmil, 2014; Azmil et al, 2014).

Therefore, in this research paper, assistive technology is defined as support tool or system or product that compensate tahfiz student's learning experience of memorizing al-Quran. **Further investigation has been conducted to identify the design factors (such as User Experience (Lin & Cheng, 2017), behaviour (Norman, 2004), ergonomics (Norman, 2004), as well as instruction (Wang *et al*, 2018)) of the potential assistive technology.**

## 3. METHODOLOGY

To investigate the design factors phenomenon, this research paper used qualitative methods and exploratory case study approach. **According to Yin (2018), exploratory case studies are used to explore each phenomenon in the data to serve as an attractive place for researchers.** General questions are intended to open the possibilities for further examination of the observed phenomenon. Thus, this research paper used exploration case study in qualitative method to understand the design factors of the potential assistive technology for memorizing al-Quran among Tahfiz students.

### 3.1 Informants

The informants were two teachers from a Malaysian Tahfiz school, hereby called TS. The school was chosen because of its reputation as a well-established Tahfiz school. TS is a social organization established as a learning institution based on Islamic education where memorizing al-Quran is the foundation of curriculum. TS is centralized in Turkey for more than eighty years ago and it has more than ten thousand branches all over the world, including fourteen branches in Malaysia. The first informant was one of the branch schools' headmasters with three-year experience teaching Tahfiz students. The second informant was also one of the branch schools' headmasters with two-and-a-half-year experience teaching Tahfiz students. They both were Malaysian, and had gone through the same system of teaching and learning until they graduated from the MTS Turkey headquarters. It was believed that more than two informants could lead to the same pattern of answers because of their background similarities. The researchers wanted to investigate the design factors of the potential assistive technology for memorizing al-Quran among the Tahfiz students. The researchers applied anomaly detection to maintain the confidentiality of the informants' information. The codes used for the respondents were Informant 1 and Informant 2.

### 3.2 Instrument

This research paper applied a qualitative method using case study and employed a focus group discussion (FGD) to collect data from informants to discover phenomenon and encourage them to share their beliefs. Three research questions were formulated based on the aim. Thus, a semi-structured interview was conducted with probe questions to introduce the discussion topics, follow-up questions to further explore the discussion topics, as well as exit questions to ensure that the researcher did not miss anything. FGD is one of the qualitative research approaches to answer such questions. It is meant to gather the issues, experience, opinion, and attitude from the informants. **The topic guide should include open ended questions that elicit in depth information and offer participants the opportunity to talk about issues important to them (Gill & Baillie, 2018).** The researchers ensured that the findings and interpretations were accurate and valid throughout the process of data collection and analysis so that the results were comprehensive. Jeffries *et al* (2019) affirmed that validating findings through strategies such as member checking or triangulation meant that the researchers could determine the accuracy or credibility of the findings.

### 3.3 FGD Procedure

FGD was conducted with two experienced teachers via Google Meet. During the global COVID19 pandemic, Google Meet ensured that the appointment could be set according to the participants' time. It is a compatible application that can be performed using a mobile phone or computer. Moreover, the session can be audio and video recorded. A semi-structured interview was systematically prepared for the FGD to answer the research questions. **Semi-structured interview allows for discovery, with space to follow topical trajectories as the conversation unfolds (Magaldi & Berler, 2020).** The interviewer was equipped to guide the conversation during the interview session within sixty minutes.

Initially, the researcher sought approval in advance to conduct the FGD session. The consent was obtained from the two informants prior to getting the appointment date. During the interview session, introductory questions, follow-up questions, probing questions and exit questions were systematically approached. **Note-taking, sound recording, as well as video/screen recording were also made to clarify the conversation. In the methodological triangulation, the researchers collected data from documents, interviews, and observations (Renz *et al*, 2018).** The recorded audio was documented into verbatim transcription and translated using professional service. After the verbatim transcription was clarified with the notes and recorded-video, coding was made with precision and consistency. As a result, it quantified data that could be processed into meaning manipulation.

**This research paper used thematic analysis to analyze the data Kiger & Varpio, 2020).** This analysis was used to analyze

classifications and present themes (patterns) related to the data. Through interpretation, the researcher could describe data in detail and relate it to a variety of subjects (Alhojailan, 2012). Furthermore, the researcher used thematic analysis to represent the level of response patterns or meanings of data related to the existing research questions. To begin analyzing the data, the researcher identified themes for further exploration stages. Then, the themes were listed to get all the information needed to answer the research questions. Inter-rater reliability was measured by two experienced inter-raters. The first inter-rater was a researcher with ten years of experience in Islamic design and learning research. The second inter-rater was a design researcher with fifteen years of experience in Islamic design research including Tahfiz. The percentage of agreement was 100%.

## 4. FINDINGS

The findings were presented into three sections following the research questions. Every section presented the themes and main ideas. The first section described the factors before memorizing alQuran. The second section described the factors during memorizing al-Quran. The third section described the factors after memorizing al-Quran. These findings were based on the analysis of the interview transcript that was transcribed, themed and inter-rated. Overall, there were nine themes emerged as explained below.

The following findings described all information about factors that affected Tahfiz students before the memorization practice. The research question was examined together with themes and main ideas as shown in Table 1.

*Table 1: The Themes Obtained from Research Question 1*

Research Question 1	Themes
What are factors that encourage assistive technology before memorizing al-Quran	<ul style="list-style-type: none"> <li>· Behaviour feeling</li> <li>· Ergonomic posture</li> </ul>

The informants provided explanation related to the factors that affected Tahfiz students before memorizing al-Quran. The factors then became the two themes listed above.

### 4.1 Behaviour Feeling

Based on the FGD, the informants affirmed that the Tahfiz student's motivation is enhanced by getting up early in the morning and sitting quietly in the classroom. As stated by the informant, it was important for the Tahfiz students to cleanse themselves internally and externally. For the internal point of view, the Tahfiz students were encouraged to do Dhikr as a way to cleanse their inner self before memorizing the Quran. As for the external, it was important to perform siwak (mouth cleaning usually with tooth stick) and ablution (ritual purity state condition to respect the purity of the Quran).

### 4.2 Ergonomic Posture

Tahfiz students needed to understand how to place the Quran, to sit with the Quran, to get up (from sitting) with the Quran, to hold the Quran, to carry the Quran, to put down the Quran, and to read the

Quran carefully. The fundamental understanding was to respect the holy book by not placing it at the bowel level or below. It would be better if it was placed at the chest or higher. The other posture was to raise the Quran before sitting. When sitting down, the Quran had to be lifted or held parallel to chest level. Once the sitting posture was firmed, put the Quran on Quran-holder/rehal that was placed at height level to chest. Placing the rehal lower than chest level (like stomach level) was as if we were degrading the Quran. Similarly, when carrying the Quran, it should be at the chest level and above.

To respect the al-Quran when sitting on the floor, it was advisable to close both thighs. In this posture, the Tahfiz students were advised to place their knees on the floor. After doing such, the buttocks must be rested directly on top of the feet. Since the tops of the feet were facing down, the buttocks were supported by the heel and sole of the feet. This sitting posture is also known as Seiza in Japanese. Meanwhile, the findings about the factors that affected Tahfiz students while performing hafazan practice (Table 2) was described in the themes and main ideas below.

**Table 2:** The Themes Obtained from Research Question 2

Research Question 2	Themes
What are factors that encourage assistive technology during memorizing al-Quran	<ul style="list-style-type: none"> <li>· Rehal matters</li> <li>· Behavior control</li> <li>· Voice Control</li> <li>· Mentoring</li> </ul>

Rehal matters Quran-holder/rehal height must be at the chest level to respect its dignity. Thus, there was a need to measure the chest-height level for the sitting posture.

#### 4.3 Behaviour control

When the teacher was in front, the Tahfiz students needed to see the teacher to observe what he wanted to convey. According to the etiquette, the Tahfiz students were not advised to move their sight to other things nor fidgeting their hands.

#### 4.4 Voice control

When reciting the Quran, the voice level had to be maintained. The reciters should recite at a level where they could hear so that they could read carefully. To reach that level, mouth must be opened. For not disturbing the other students next to them, the reciters should recite at the level where only a few students next to them could hear. The benchmark of loudness level was similar to Imam, which was not too loud nor too soft.

#### 4.5 Mentoring

To monitor the memorization, the Tahfiz students needed to jot down the mistakes as per the feedback given by their teacher. Corrective feedbacks were given when the students submitted their memorization by showing signals for each mistake. By doing so, both Tahfiz students and teachers could see the pattern of recitation mistakes in terms of articulation (Makhraj), rules of pronunciation (Tajweed), as well as fluency (Fasahah) and strive to gradually improve the recitation.

On the other hand, the findings about the factors that affected Tahfiz students after performing memorization practice (Table 3) were described in the themes and main ideas below.

**Table 3:** The Themes Obtained from Research Question 3

Research Question 3	Themes
What are factors that encourage assistive technology after memorizing al-Quran	<ul style="list-style-type: none"> <li>· Performance</li> <li>· Satisfaction</li> <li>· Confidence</li> </ul>

#### 4.6 Performance

After recognizing the pattern of mistakes, the Tahfiz students needed to pay attention to the fluency. Fluency could be obtained by performing Khatm (complete recitation of compilation all the memorized verses) every day to get reward as well as to accustom the mouth and tongue to be flexible to the Quran. When the recitation was fluent, the students would be more confident. For weak students, it was suggested to recite together on the day before or more until they got confident. To add more confidence, expectation could be set lower to half page instead of one page of submission per day.

#### 4.7 Satisfaction

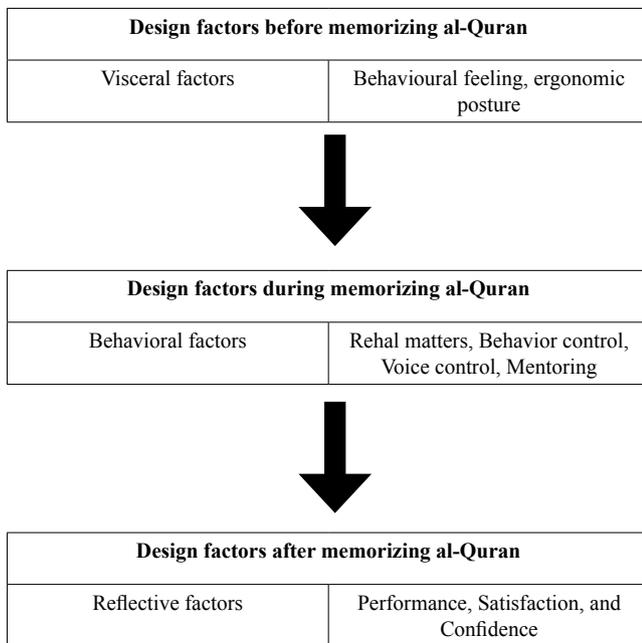
When the routine of memorization was performed, the Tahfiz students not only obtained reward from God the Almighty for the Quran recitation, but also were technically trained to be sensitive in terms of thinking and lifestyle. The brain was believed to react faster because of the practice to foresee what came next. When that brain activity was repeated, in the long term, it could affect their lives as one of the intercessions of the glory of the Quran. When the Tahfiz students got used to practicing like that, they would be satisfied of their own achievements in memorization.

#### 4.8 Confidence

The memorization achievement could motivate the Tahfiz students to increase their productivity. They can practice their memorization in pray recitation by increasing the recitation quantities. As the quantity increases, they become more confident. Then, they need to be kept motivated to sustain their confidence.

## 5. DISCUSSIONS

This research paper attempted to examine the design factors of the potential assistive technology for memorizing al-Quran for Tahfiz students, including the practices before memorizing the Quran, during memorizing the Quran, and after memorizing the Quran. Based on this case study, the researchers discussed all the themes and categorised them as they were related to the emotional **design** (Norman, 2004; Wang *et al*; 2022) based on the user experience literatures (Peng & Martens; 2018, Tosi, 2020; Lin & Cheng, 2017; Morris, 2021; Chawana & Adebessin, 2021). These categories were the design factors before memorizing the Quran, during memorizing the Quran, and after memorizing the Quran.



**Figure 1:** Proposed conceptual model for the potential assistive technology for memorizing al-Quran.

The proposed conceptual model has been validated by three Subject Matter Experts (SMEs). The first one was a Senior Lecturer from Kulliyah of Architecture and Environmental Design, International Islamic University Malaysia. He has more than five years of experiences in Islam and Applied Arts and Design. The second SME was an Associate Professor from Faculty of Art, Computing and Creative Technology, Universiti Pendidikan Sultan Idris. She has more than eighteen years of experiences in multimedia learning and Islamic content. The third SME was a senior lecturer from Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia. He has more than twenty years of experiences in educational technology and communication design. Below is the elaboration of the design factors

### 5.1 Design factors before memorizing al-Quran

Visceral factors are the user reactions when triggered by the initial sensory experiences. It allows the first impression to set the mood to explore everything about the design. Here, the potential assistive technology can be designed with the user experience factors that make it easy for the Tahfiz students to perform the behavioural feeling for at least these four simple steps in a proper manner: (1) easy for ablution, (2) Siwak proper placement, (3) sit down with manner in class, and (4) ergonomic al-Quran placement for recitation. It is crucial to measure the al-Quran placement to be at the height of chest level while engaging in the Seiza sitting posture as to respect the holy book. In visceral factors, the aesthetic outlook is very important. Thus, the design factors can be approached with psychographic features of the users, including the style and trend for that specific age group.

### 5.2 Design factors during memorizing al-Quran

Behavioural factors are the user interactions after getting engaged by the 'look and feel'. When the Tahfiz students feel comfortable with the initial reaction, they should be able to interact with the design by completing at least these four simple tasks: (1) place a Rehal (al-Quran holder) with manner including proper height as discussed earlier, (2) sit down, where the assistive technology can suggest or support the sitting posture with learning focus, (3) reciting and memorizing al-Quran with supporting tools, such as digital audio technology that provides repetition of Quranic verses with volume control, and (4) mentoring the learning by experience with supporting tools, such as notes to jot down the Makhraj, Tajweed and Fasohah mistakes. In behavioural factors, the 'usability' is very important. Thus, the design factors can be approached with ergonomic features of the users, including the mobility of carrying it as well as storing it.

### 5.3 Design Factors after memorizing al-Quran

Reflective factors are user satisfaction, where the experience evokes a sense of pride and encourages to repeat the experience again and again. A digital organiser application might assist the Tahfiz students to keep track of their performance by rewarding things like star, stamp, sticker or achievement recognition via gamification to give satisfaction and increase productivity. In reflective factors, the 'emotion' is very important. Thus, the design factors can be approached with positive surprise elements that evoke users with delightful feeling.

## 6. CONCLUSION AND RECOMMENDATION

From the three research questions, the researchers found nine emerging themes which have been conceptualized and discussed above. Based on the findings, it appeared that design factors for potential assistive technology for memorizing al-Quran were classified into three categories: (1) design factors before memorizing al-Quran (2) design factors during memorizing al-Quran, and (3) design factors after memorizing al-Quran. Another study can be approached by using the proposed conceptual model to test the potential assistive technology for memorizing al-Quran among Tahfiz students.

From the point of view before memorizing al-Quran, a technology support tool/product can be planned to compensate Tahfiz student's behavioral feeling when performing the four steps explained before. Rehal as a technology-based product can also be planned with ergonomic posture and suitable height that reflects the etiquette of respecting the holy al-Quran. This would impact to the next Tahfiz student's performance during memorizing al-Quran.

From the point of view during memorizing al-Quran, a technology support system can also be planned to control Tahfiz student's behavior (may be such as rehal design with proper size measurements

that suggests etiquette sitting posture), a multimedia system that manage audio control for memorization (such as repeat word/verses, volume control, Bluetooth earphone for privacy), as well as multimedia tracking system for jotting down performance (such as notes for mistakes of recitation, record for quantity of memorization, as well as etiquette checklist). This would impact to the next Tahfiz student's performance after memorizing al-Quran.

From the point of view after memorizing al-Quran, a technology support system such as gamification approach can be planned to monitor and motivate Tahfiz student's memorization achievements. This would give impact to the Tahfiz student's satisfaction and long-term performance, and gradually increase the overall learning performance.

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