CHAPTER 4

MULTIMEDIA REPRESENTATION LEARNING MODEL (EZHIFZ) BASED ON VARK LEARNING STYLE

4.1 Introduction

The Multimedia representation learning model (EzHifz) was developed based on previous studies as discussed in Chapter 2. The adapted elements in the Cognitive Theory of Multimedia Learning (CTML) in the application design form are important to produce an EzHifz prototype that can use to memorize the Quran. The EzHifz model is based on the studies of Hwang et al., (2020); Stankovic et al., (2018); F. Wang et al., (2019). The process of integrating EzHifz model elements in the application design needs to be achieved from the beginning of the phase, throughout the development process until the evaluation process. The EzHifz model contains five main components namely Quran memorization techniques, multimedia presentations, sensory memory, working memory, and long-term memory.

The design of the EzHifz model is important to solve the problem and needs of the students for memorizing the Quran verse and translation. The elements of the components in the EzHifz model have been chosen from the literature review, comparative analysis, and preliminary study conducted in this study. An appropriate selection of elements for each component in the model is important to be implemented in the EzHifz model. The comparison with previous studies was implemented to identify appropriate Quran memorization technique elements that can be used for memorizing the Quran. This study has reviewed previous studies on Cognitive Theory Multimedia Learning (CTML) elements and universal principles design for designing the EzHifz model in motivating a student to memorize the Quran. The adapted elements of the

EzHifz model were identified and used in the EzHifz model design. The elements in this model have been validated and verified by experts in the Quranic and the Educational Technology field.

4.2 EzHifz Model Elements

The EzHifz model adapts Mayer's original theory with new elements added called sign channels to enhance the two existing channels of auditory and visual channels. In this study, memorizing Quran verses and translation based on the VARK learning style needs to consider kinesthetic modes of learning. Kinesthetics is known as the motor skill area of the brain and needs to be activated by movement or action from the body motions and hand gestures through the gestures channel. Therefore, memorizing Quran verses and translation in multimedia learning through auditory and visual channels only seems to be insufficient. Movement or actions through body motions and hand gestures must be emphasized, thus making memorizing the Quran based on the VARK learning style more comprehensive. Furthermore, since signs were thought to be a critical aspect of kinesthetic learning, new elements were added to this model. The next section discussed in detail each of five (5) components in Mayer's model to form a Multimedia representation learning model (EzHifz):

4.2.1 Quran Memorization Techniques Component

Memorizing Quran with different techniques and approaches in each method give a different impact on the quality of memorization. All the theories and techniques have their advantages in practicing to preserve the memorization of Quran. But students must choose an efficient techniques that suitable to memorize Quran within a short time and

commit it to long term memory (Nor et al., 2016). The first new component added to Mayer's model is Quran memorization techniques with thirteen (13) elements namely reading, listening, pointer, highlight, keyword, visual map, association, zooming, comprehension, open-close, repetition, segmentation, and movement as shown in Figure 4.1.

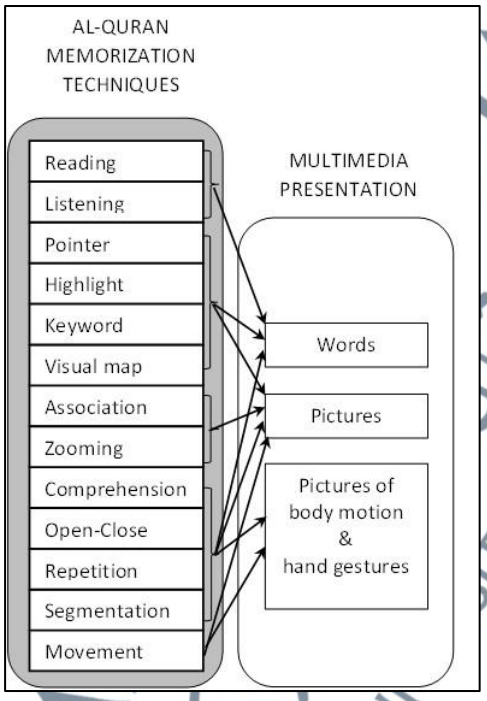

Figure 4.1: Quran Memorization Techniques Elements

Based on Figure 4.1, the researcher relates the elements of Quran memorization techniques with multimedia presentation elements based on the previous multimedia learning development as the following: reading and listening techniques were applied to words elements that were represented as printed words and spoken words; pointer, highlight, keyword, and visual map techniques were applied to words and pictures elements; association and zooming techniques were applied to pictures element; comprehension, open-close, repetition, and segmentation techniques were applied to all

elements in the multimedia presentation and movement technique were applied to pictures and pictures of body motion and hand gestures.

4.2.2 Multimedia Presentation Component

A multimedia presentation uses different types of media to engage a student and eventually communicates. It is an effective way to capture and maintain the attention of students. Multimedia elements is a combination of more than one media type namely text (alphabetic or numeric), symbols, images, pictures, audio, video, and animations usually with the aid of technology for the purpose of memorization and enhancing understanding (Guan et al., 2018). It supports visual and verbal instruction with the use of static and dynamic images in form of visualization technology for better expression and comprehension (Alemdag & Cagiltay, 2018; Mutlu-Bayraktar et al., 2019). Therefore, multimedia presentation in multimedia content helps to vary and enhance the learning process and leads to better knowledge retention and provide more opportunities for students to engage with the content.

The second component of Mayer's model is a multimedia presentation. The new elements added in this model are pictures of body motion and hand gestures instead of existing elements of words and pictures as shown in Figure 4.2.

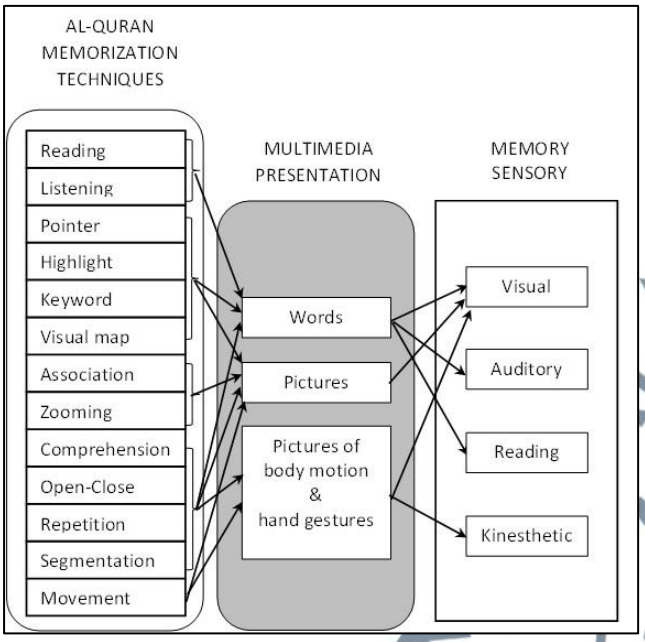

Figure 4.2: Multimedia Presentation elements

The word element that integrates with reading, listening, pointer, highlight, keyword, visual map, comprehension, open-close, repetition, and segmentation techniques will act as information of word input. These words' input is captured by the memory sensory components of visual, auditory, and reading elements. These are later translated into the form of images and sounds within working memory as shown in Figure 4.3. The pictures element that integrates with pointer, highlight, keyword, visual map, association, zooming, comprehension, open-close, repetition, and segmentation techniques will act as information for picture input. These pictures' input is captured by the memory sensory components of visual elements. These are later translated into the form of images within working memory. The pictures of body motion and hand gestures element that integrates with comprehension, open-close, repetition, segmentation, and movement techniques will act as information of pictures of body motion and hand gestures input. These pictures of body motion and hand gestures input are captured by

the memory sensory components of visual and kinesthetic elements. These are later translated into the form of images and signs within working memory.

4.2.3 Sensory Memory Component

Sensory memory holds exact copy of information provided for <0.25 seconds. As a student is learning, the new material first gets logged in their sensory memory. For instance, the image is captured in its entirety, or the spoken words are logged in their entirety. After that initial moment, the student must begin to work with the information in order to process it and learn. Multimedia or digital learning resources assist learners to get on well with mental representations with the use of different media elements, which support information processing (Mahajan et al., 2020).

The third component of Mayer's model is sensory memory which existing elements in the model are the ears and eyes. It is a brief memory store for text and pictures (for eyes) and sounds/spoken words (for ears). The new elements that replaced these two elements are visual, auditory, reading, and kinesthetic as shown in Figure 4.3.

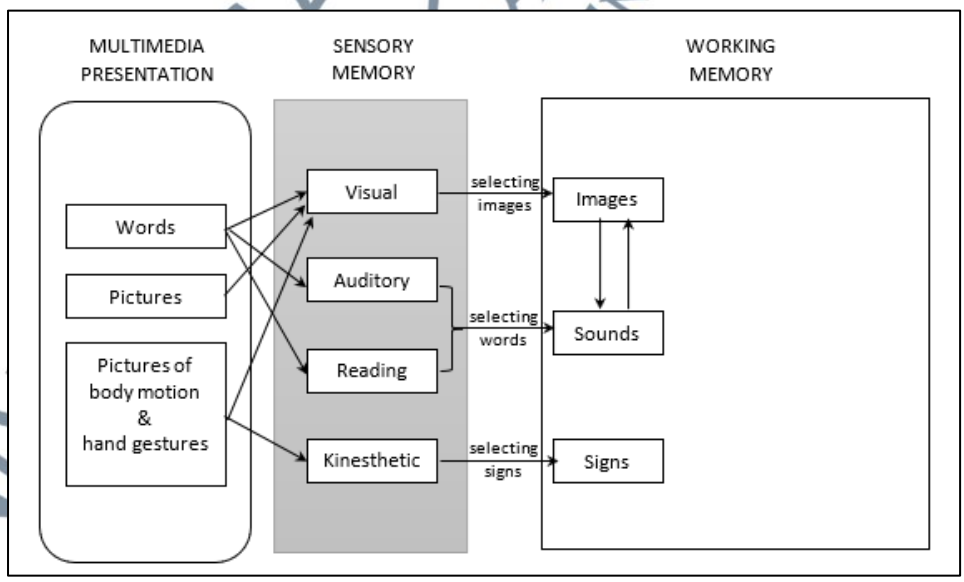

Figure 4.3: Sensory Memory elements

The elements of ears and eyes have different terms but have the same function with the new elements added that are more specific in memory sensory namely visual, auditory, and reading. The kinesthetics element was added to give more function to this model that represents the new channel for the selection of signs to organize the gesture model. All combination elements in memory sensory will act as sensory modalities that support cognitive intelligence. In the context of this study, cognitive intelligence is referred to as human mental ability and understanding developed through senses and generating knowledge by using existing information with intellectual functions namely attention, memory, and learning (Slamet, 2019) to support the student's differences as discussed in Chapter 2.

The visual element will receive the multimedia presentation in words (spoken words or printed words), pictures, and pictures of body motion and hand gestures form. The visual element then selects the images to process with sounds in working memory. The visual element in this model also acts as sensory modalities that replaced the eye elements in Mayer's model to receive the words, pictures, and pictures of body motion and hand gestures information. The auditory and reading elements will receive the multimedia presentation in word form either in spoken words or printed words. The auditory and reading then select the words to process sounds with images in working memory. The auditory and reading elements that replaced the ears elements in the existing Mayer's model are more specific in sensory modalities to receive the word's information. The kinesthetic is a new element added to the existing Mayer's model that will complete the function of sensory modalities in this model. The kinesthetic element then selects the signs to process a sign mode in working memory.

4.2.4 Working Memory Component

Working memory stores more processed version of the information provided for <30 seconds, with limited capacity. As working memory has limited capacity, so for effective multimedia learning to happen, student must be active learners, seeking meaningful learning. On the other hand, students will be aware of their information processing limitations or capabilities. Active processing proposes that when it comes to information selection, organization, and integration, human beings are active agents and are capable of managing the forms of information they are interacting with (Mahajan et al., 2020; Alemdag & Cagiltay, 2018; Mayer, 2019).

The fourth component of the model is working memory which is an existing element in Mayer's model. It consists of the images that produce a pictorial model through organizing images and sounds that produce a verbal model through organizing sounds. It is a memory store that has a limited capacity for storing and manipulating images and sounds in active consciousness. The new element added to the working memory component is the element of the signs that will then organize the signs to produce a gestures model as shown in Figure 4.4. This pictorial model, verbal model, and gestures model will be integrated to form prior knowledge in long-term memory.

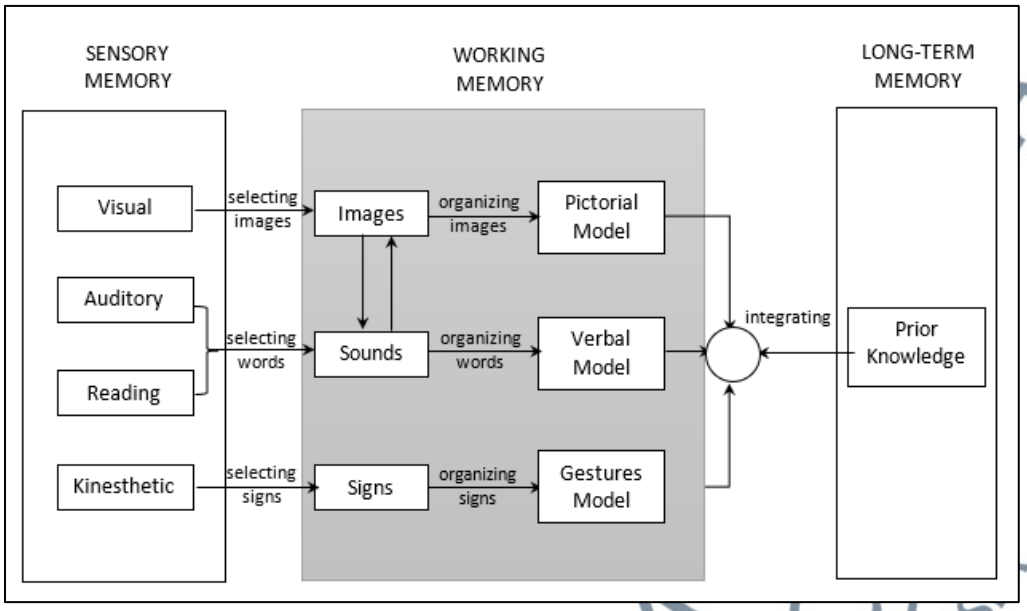

Figure 4.4: Working Memory elements

4.2.5 Long-Term Memory Component

Long-term memory stores knowledge for a longer period of time and have unlimited capacity. Long-term memory representations play a critical role in the top-down control of attention, enabling to guide attention based on the more continuing representations of this memory store the effect of the method on the learning and retention (Mahajan et al., 2020; Taheri & Davoudi, 2016).

The fifth component of the model is long-term memory which is an existing element in Mayer's model is prior knowledge as shown in Figure 4.5. It is a memory store that can hold a large amount of data. This prior knowledge is the memory retention that produces from the integration of the pictorial model, verbal model, and gestures model from working memory.

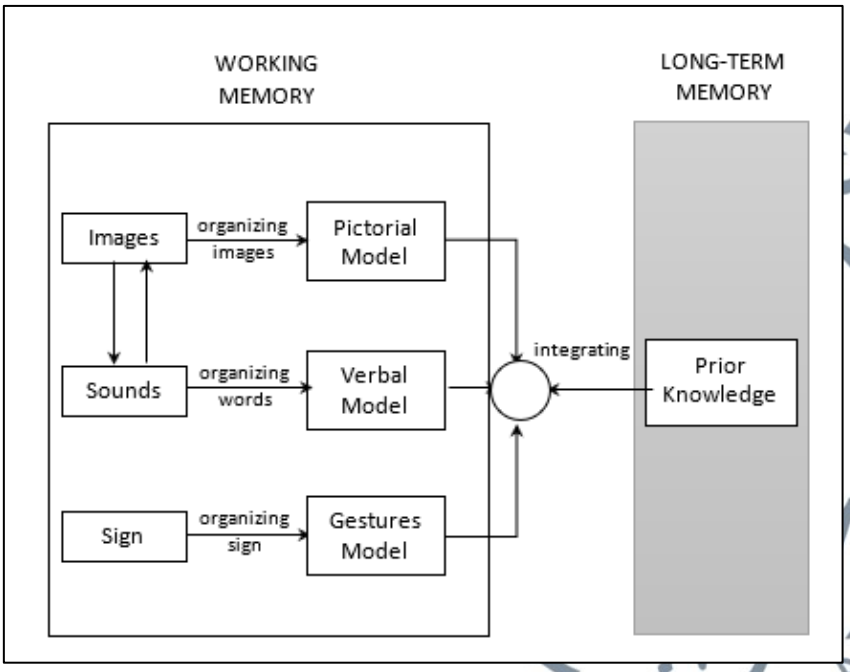

Figure 4.5: Long-term Memory elements

The multimedia principle makes the basis of theoretical rationale of multimedia learning. Accordingly, Mayer gave a cognitive theory of multimedia learning, stating that meaningful learning using multimedia is more likely to happen if multimedia instructional messages are designed keeping in view how the human mind works. (Mayer, 2005; 2019). Therefore, the process of integrating elements through adapting the Cognitive Theory Multimedia Model produces the Final EzHifz model design as shown in Figure 4.6.

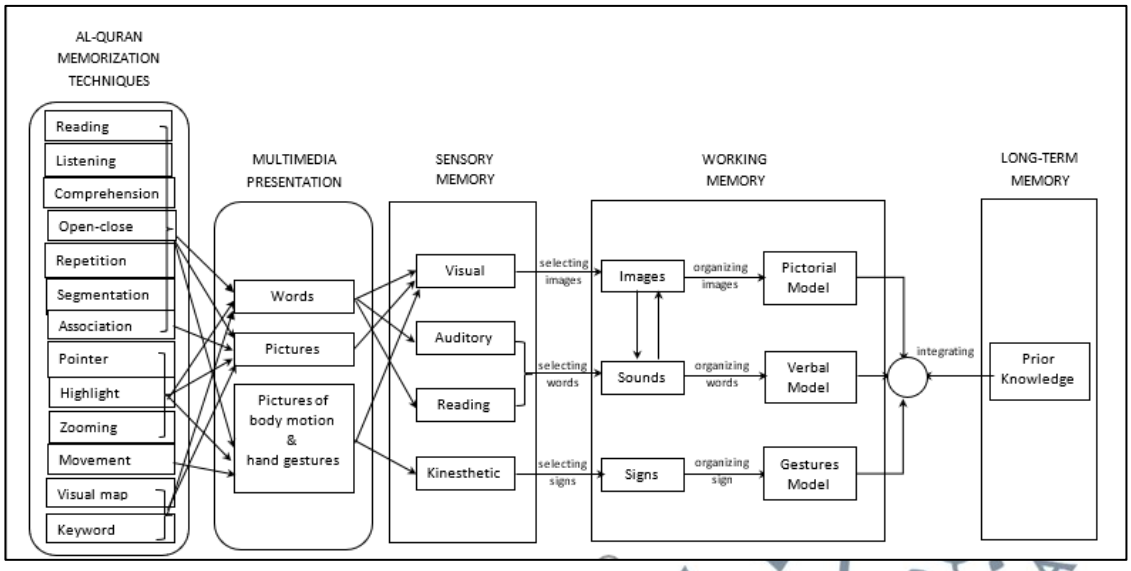

Figure 4.6: Final EzHifz Model Design

4.3 Conclusion

This chapter has discussed the Multimedia representation learning model (EzHifz) based on VARK learning style in detail. This model was developed based on previous studies as discussed in Chapter 2. The adapting elements in the Cognitive Theory of Multimedia Learning (CTML) in the application design form to produce an EzHifz prototype that represents EzHifz Model to memorize the Quran. The EzHifz model contains five main components namely Quran memorization techniques, multimedia presentations, sensory memory, working memory, and long-term memory.