

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews the literature related to the use of interactive multimedia device in PAI learning. The chapter covers several aspects. First, education in the Indonesian context. Second, the researcher discusses the concepts of Islamic education and its scope, Third, the interactive multimedia learning subsection will discuss how interactive multimedia device theoretically affects learning. This subsection also discusses the findings of previous studies, the advantages of interactive multimedia, and the procedures and techniques to develop interactive multimedia for learning. The review includes references from education and learning multimedia experts to reveal operational concepts that can be adapted as research instruments for this study. Fourth, the researcher discusses the concepts of perception and its theoretical effects on learning outcome and student participation. Fifth, participation. Sixth, competence.

2.2 Education in Indonesian Context

Education in Indonesia is regulated by the National Education System Law No. 20 of 2003. The Law divides formal education into three stages, namely basic, middle, and higher education. More specifically, it states that basic education includes Elementary School “*Sekolah Dasar (SD)/ Madrasah Ibtidaiyah*

(MI)” and Junior Secondary School “*Sekolah Menengah Pertama (SMP)/ Madrasah Tsanawiyah (MTs)*” (UU NO 20, 2003). Thus, secondary school (SMP) is included in the basic education stage.

Education should be implemented in an equitable and just manner. The National Education System Law emphasizes that the implementation of education must prioritize and be carried out in a democratic, fair, and non-discriminatory manner and uphold human rights (UU NO 20, 2003). This means that all children or students have the right to equal treatment in education. They also have the same rights to adequate facilities and infrastructure that are up to the standards defined in the National Standards for Educational Infrastructure. However, field data indicate that many inequalities remain in the implementation of education.

Education inequality in Indonesia can be observed in clear differences between education in urban, rural, and remote or border areas. Education inequality also occurs between gender and socio-economic class. For example, the Worldbank as said Noah & Rythia Afkar (2020) states that in Kalimantan, 61 percent of boys participate in education. For girls, the figure is 95 percent (Noah & Rythia Afkar, 2020). This means that more than 38 percent of boys in the island do not continue their education, and this share is disproportionately higher than girls. In contrast, the enrollment rate is higher for boys in East Java.

Education inequality also occurs on basis of socio-economic class. World Bank data shows that junior-secondary-school-aged youths from poor families are four times more likely to drop out of school than those from rich families. Additionally, children from remote areas have the same likelihood of dropping out as those from poor families (World Bank, 2020). These suggest that access to

education In Indonesia is still unequal for children from poor families and remote areas.

Other forms of inequalities in education include discrepancies in learning approaches, teacher quality, education infrastructure or facilities, quality of education received by students, and access to textbooks and other learning sources, manually and digitally (ACDP Indonesia, 2013; Ishak, 2022). One reason for the final issue, in particular, is the lack of public information and communication technology (ICT) facilities and infrastructure in remote areas. Indonesia's Human Development Index (HDI) score is 71.39 percent. Around 17.79 percent of districts are below the national average, such as Papua and West Nusa Tenggara. Educational inequality, education quality, management efficiency, equity, and issues of educational autonomy and community participation in education are common in those districts (Ishak, 2022). Some schools have much access to ICT and interactive multimedia learning tools because their students come from wealthy families and they are located in an urban area. In contrast, rural schools with students from poor families have no supporting facilities, and education is mostly carried out using traditional media. The teachers also lack technological literacy.

The government has attempted to reduce some of these educational gaps, such as providing scholarships, implementing a zoning system, promoting educational autonomy, and other such policies (Muttaqin, 2018). The government has also tried to provide similar facilities to schools (Ishak, 2022). The government has given autonomous authority to each region in terms of education governance and policies, so that they could be adapted to the needs and particularities of each region (UU No 22, 1999). This allows local governments to develop schools that are compatible with their regional particularities.

The National Education System Law No. 20 of 2023 states that the implementation of education at all stages of education is carried out based on the principle of school-based management (UU NO 20, 2003). This principle means systematic decentralization of education to school-level authorities and responsibilities to make decisions and change or transform schools (Rini *et al.*, 2020). These changes are very necessary because science and technology continue to develop. Therefore, schools can innovate and transform in the implementation of education according to developments in knowledge and technology. Based on the above, it is very possible for schools to carry out transformations, for example implementing a digital-based learning system, such as implementing an interactive multimedia device in learning. Of course, these changes are adjusted to the uniqueness, advantages, and disadvantages of the technology. Finally, the government should encourage schools that are lagging behind in terms of infrastructure, resources, teacher quality, learning quality, and education costs.

2.3 Islamic Education (*Pendidikan Agama Islam*, PAI)

Education is a life-long process of fostering, nurturing, and cultivating, indicating its attention to growth. In other words, education is the lifetime development of an individual (Adesemowo, 2022). Islam 20qidah20zes three terms for education: *al-tarbiyyah*, *al-ta'dib*, and *al-ta'lim*. *Al-tarbiyyah* means to grow, develop, maintain, care for, regulate, and keep. *Al-ta'dib* is interpreted as the impartation of science, wisdom, justice, fair, teaching, and parenting, while *al-ta'lim* relates to the transfer of knowledge (Rahmat Hidayat & Nasution, 2017). PAI is the process of developing children through teaching, guidance, coaching,

and training in a structured and planned manner to enable them to live according to Islamic values.

Meanwhile, other opinions suggest that the term Education in Islam is not or not commensurate with *al-tarbiyah*. *Al-Tarbiyah* when interpreted with education is only concerned with the physical material (Al-Attas, 2018). According to al-Attas, the word *al-tarbiyah* comes from the root word *rabba*. The meaning of this word is to feed, nurture and nurture. This meaning refers to everything that grows, in the context of education is children. So, *al-tarbiyah* is defined as caring for, bearing, feeding, developing, maintaining, and increasing. In fact, this word is not only addressed to humans but extends to all other creatures of Allah SWT. Such as plants and animals. In Islam the right term to mention the term education is *al-ta'dib*. Because this term contains knowledge and charity.

Islamic Education (PAI) is a process of instilling something into human beings which refers to methods and gradual inculcation by guiding students to the introduction and recognition of Allah SWT (Al-Attas, 2018). PAI is indispensable in preparing individuals of knowledge, faith, piety, and nobility who tolerate cultural, religious, and racial diversities. Muhammad Alim (2011) stated that PAI is a program designed to prepare students to recognize, understand, appreciate, and believe in the teachings of Islam, while at the same time respecting adherents of other religions to foster harmony and unity between religious communities. However, the accomplishment of these objectives partly depends on the learning process of PAI itself.

PAI is a compulsory subject for both primary and secondary education. This is based on Article 37 of Act No. 20/2003 on the National Education System, which stipulates that primary and secondary education curricula must include religious

education (UU NO 20, 2003). Chapter 2, Article 2 of Government Regulation No. 55/2007 on Religion and Religious Education states that, “Religious education is intended to produce Indonesians who believe in and are devoted to God Almighty, who possess good character and are able to maintain peace and harmony between religious communities” (PP No.55, 2007).

PAI is a combination of several religious subjects commonly taught in Islamic schools or madrasahs. According to Abdul Madjid (2012), PAI is a collection of several Islamic sciences, namely al-Qur’an, Hadith, creed (*22qidah*), ethics (*akhlaq*), *fiqh*, and history. Additionally, it instills into students the necessity to balance and harmonize their relationships with God, fellow humans, and the world. Teachers must be able to carry out the lesson well to achieve this goal. The subject is taught for three hours a week.

2.4 Interactive Multimedia for Learning

2.4.1 Definition of Interactive Multimedia

Multimedia is defined in many ways. It is a digital product that displays and combines texts, sounds, images, animations, and videos (Abdulrahaman *et al.*, 2020). This definition suggests that there are five types of media in multimedia: text, graphic, audio, video, and animation. Multimedia is also defined as not only the combination but also the integration of the five types of media (Made Rajendra & Made Sudana, 2018). Thus, the five types of media must be integrated with one another in delivering the intended message. Multimedia is also the presentation of words (such as printed or spoken texts) and pictures (such as illustrations, photos, animations, or videos) (Mayer, 2021). These definitions thus agree that multimedia

contains texts, graphics, animations, videos, and sounds in an integrated way, and the content can be structured and presented differently (Brink, 1993).

According to Mayer (2021), multimedia is the use of two types of media, namely words and pictures. Multimedia when used in learning is called “multimedia learning”, which means learning using words and pictures. Multimedia learning helps the construction of mental representations from words and pictures. If the multimedia is followed by instruction, it becomes “multimedia instruction”, which means presenting materials using both words and pictures with the intention of promoting learning (Mayer, 2021). Multimedia can be used not only in the teaching and learning process in the classroom, but it can also be used more flexibly and independently by students. In the education process, multimedia can be used as a teaching medium, either in the classroom or independently (Farida *et al.*, 2018).

As the above definitions show, multimedia can be understood as the combination and integration of media in the form of texts, sounds, graphics, animations, and videos. It is packaged into a digital form, used in the classroom learning process, and operated using tablets, laptops, and smartphones either online or offline.

In general, multimedia is divided into linear and non-linear. Linear multimedia presents material sequentially so that users have less interaction with the media that they operate. Non-linear multimedia, on the other hand, allows users to fully control the contents (Dwi Surjono, 2017). Vaughan (2011) stated that multimedia is interactive when users are allowed to control what and when the contents and elements are shown using the navigation buttons. The term interactive multimedia is more often used compared to non-linear multimedia. Thus,

interactive multimedia is the use of several types of media that allow users to control materials and elements using the navigation buttons.

Interactive can be defined as the integration of several media (audio, video, graphic, text, animation, etc.) into a synergistic and symbiotic unity that results in more benefits for end users than which may be individually given by any of those media elements (Deliyannis, 2012). Interactive multimedia means that the user can control every element of multimedia at any time (Vaughan, 2011). Interactive multimedia come in several forms, which differ from each other in terms of user control. At the reactive level, the producer/designer has total control over the content, its presentation, sequences, and practical assignments (Deliyannis, 2012).

Interactive multimedia comes with tools and connections so that users can navigate, interact, work, and communicate (Sari *et al.*, 2018). According to Reimann (1997) (as cited in Brink, 2013), there are several possible forms of interactivity to influence the learning process: (a) manipulating objects, (b) linear navigation, (c) hierarchic navigation, (d) interactive help functionality, (e) feedback, (f) communicative interactions, (g) constructive interactions, (h) reflective interactions, (i) simulative interactivity, (j) non-immersed contextual interactivity, and (k) immersed contextual interactivity. Interactivity, therefore, affords students the choice of activity (reading, listening, watching, discussing, asking/answering questions, etc.) and enables them to search for whatever material and information online using the available tools.

There are six criteria that must be considered in interactive multimedia: ease of navigation, cognitive content, information presentation, media integration, aesthetics, and overall function. Another important part of interactive multimedia is quality content, which is critical for achieving learning objectives (Thorne, 2006;

Munir, 2012). Multimedia can be said to be interactive if the students can easily control, direct, and determine the choice of information and subjects that they want by clicking on the available navigation buttons. Furthermore, it should not only be limited to cognitive content but also affective and psychomotor aspects. For example, instructional videos on daily prayers, bathing and shrouding of the dead, and so forth. Religious speeches and advice in the form of text, video, and audio can also foster the affective competency of students; many users have changed their attitude after continually listening to those speeches and advice. Interactive multimedia can also present information and content online or offline, integrating texts, images, videos, animations, and audios. For example, when talking about the prayer, the text explains its pillars (*rukun*) and conditions (*syarat*). The video clarifies how to pray, the picture displays the prayer tools, and the audio plays the recitations of the prayer. The texts, videos, and images are thus integrated in such a way to present information in order to achieve the learning objectives. The last criterion is aesthetics of the multimedia presentation, which should be appealing for students.

Interactive therefore means two- or multiple-way communication between a student and his peers, his teacher, and the tools. The user is afforded more flexibility, and he or she can navigate, interact, work, and communicate using multimedia. Students can control multimedia elements, communicate with teachers, ask questions and give answers, and participate in discussions, presentations, and other learning activities using the available tools and channels.

Based on the above discussions, interactive multimedia can be summarized as the use of information and communication technology in teaching and learning.

It can display text, sound, image, animation, and video that the user (student) can control anytime and anywhere.

2.4.2 Definition and Determinants of Learning

Learning is a process of interaction between students, educators, and learning resources in a learning environment (Zhou *et al.*, 2017). Learning is a process that is directed towards achieving the planned goals. Learning is therefore a series of activities carried out by the teachers to educate students. It is divided into the planning, implementing, and evaluating stages (Zhou *et al.*, 2017). There will be clear differences between learning with and without interactive multimedia (Mayer, 2021). According to Mayer (2021), interactive multimedia learning differs in meaning from multimedia presentation.

In addition, the definition of learning differs across learning theories, such as behaviorism, cognitivism, constructivism, and others. According to Anderson (2011), in the view of behavioristic theory, learning is seen as an observable change in behavior due to an external stimulus from the environment. This means that behavioral change can be an indicator of whether students have learned something. Meanwhile, cognitivism claims that learning is an internal process that involves the use of cognitive elements (memory, motivation, perception, thinking, etc.). Thus, the success of learning according to the cognitive theory depends on the cognitive capacity of each student.

Constructivism views that learning is a process in which students interpret and visualize the information obtained in accordance with their reality. Students learn by observing, processing, interpreting, and then personalizing the information into personal knowledge (Anderson, 2011). In this view, learning is obtained by

how students interpret the information they get only in the context of their own knowledge, experience, needs, backgrounds, and interests. This theory views that students can easily understand new materials if they have a connection with their own experience. The three theories clearly have different conceptions of learning. Synthesizing the above, learning can be defined as a process of change that occurs in an individual in the cognitive, affective (social and interpersonal), and psychomotor aspects in the form of new experiences resulting from an external environmental stimulus that involves memory, motivation, observation, interpretation, and perception.

There are some factors that influence learning outcomes. In general, experts divide these factors into two: internal characteristics, such as intelligence and self-concept, and external characteristics, such as family, social status, and environment (Gray, 1918; Mahmood, 2019). Thus, interactive multimedia can affect learning due to two factors essential to learning (Brink, 1993):

- a. Social contacts and relationships with others (family members, classmates, teachers, friends) i.e., communities of practice, communities of communication, and cooperation.
- b. Learning objects i.e., learning materials (books, videos, tapes, and multimedia products), physical objects and artifacts, and virtual learning spaces.

The second factor suggests that multimedia can influence learning. Therefore, the use of multimedia is important to increase learning quality and learning motivation. According to Neo (2008, p. 4), students “generally find multimedia mediated web-based learning environments to be fun and motivating, and able to demonstrate their subject’s learning and domain skills through their weblogs”.

Online interactive multimedia learning is also preferred by students (Mamattah, 2016). In addition to multimedia applications, information can be presented in media format to stimulate various human senses (Made Rajendra and Made Sudana, 2018). Interactive multimedia is also an effective learning tool because it allows users to participate and engage with the contents of the application (Munir, 2012; Mayer, 2021). According to Mayer (2021), there are several ways to modify multimedia messages to improve student engagement and perception, including personalizing the words used in multimedia learning.

Multimedia features, such as graphics, simulations, videos, sounds, and texts, allow instructors to use many modes and representations to build understanding and conceptual changes to enhance student knowledge, in addition to accommodating diverse learning styles (Butcher-Powell, 2005). There are many ways of learning, but in general, they can be classified into four, namely independent learning, individual learning, cooperative learning, and collaborative learning (Kawachi, 2003, as cited in Butcher-Powell, 2005).

There are some points about multimedia instruction that the teacher must be aware of. One of them is preparation before the teaching process. The teacher needs to seek and select the materials that will be used. He should also be aware of the criteria in selecting the teaching material. Mayer (2021) listed five criteria for effective multimedia instruction design: (1) Select relevant words from the presented text or narration, (2) select relevant images from the presented illustrations, (3) organize the selected words into a coherent verbal representation, (4) organize selected images into a coherent visual representation, and (5) integrate the visual and verbal representations with prior knowledge.

According to Harasim et al. (1997, as cited in Brink, 2013), the teacher's activities in the classroom when guiding the learning processes are:

- a. Plan and follow conversations. Plan lessons carefully in advance before using any strategies to support learning.
- b. Offer guidance. Guide students through the content by breaking down different assignments and helping them to arrange the order of assignments.
- c. Play a facilitative, observant background role. Give students a learning environment that allows them to learn actively and individually. Also, give control to students so they can learn according to the learning objectives and their needs.
- d. Monitor and encourage participation. Monitor and control the learning process of students during the process of knowledge construction so that active students can learn both individually and in groups. The use of interactive multimedia can foster a way of independent learning: Students can plan, comment, and evaluate their own learning process from the meta-level. The term "metacognition" refers to the knowledge and experience of their individual cognitive processes and their conditions and prerequisites: to know and understand why, when, and where to apply learning strategies in effective and useful ways.
- e. Form groups. Interactive multimedia can be used in collaborative and cooperative learning. The teacher can assign students in groups to work on assignments given by the teacher or problems found by students.
- f. Assign roles and responsibilities. The teacher has the role and responsibility to foster student passion and participation in learning. In line with the constructivist view of learning, one must enable students to develop self-direction and not impose "right" construction on them.

- g. Moderate and facilitate group processes. The teacher assumes the role of the moderator of group discussions. If the discussion or argument turns out to be unresolved, the teacher must act as a moderator. This does not need to mean setting aside class discussions and forcing solutions, but to listen to arguments and show possible ways to continue the discussion, satisfying as many points of view as possible.
- h. Coordinate interaction, set up guidelines and expectations. The teacher arranges student interaction in learning so that the process is carried out in accordance with the target objectives. This can be done by outlining the rules made in the learning process.
- i. Pace interaction. The advantage of interactive multimedia is that students can control their learning activities and interactions through tools according to their abilities. Therefore, the teacher must also be able to control the rate of interaction so that all students can understand the presented material.
- j. Organize interaction by relating inputs. The teacher manages the content, quiz, time, and others in learning. The discussion, question and answer, and assignment are arranged according to the situation and condition. The teacher must be able to provide equal opportunities for all students to be active in learning.
- k. Stimulate meta-communication. Meta-communication supports the development of meaningful knowledge and understanding of knowledge. Meta-communication simulations can be done by giving students an explanation of how to build their metacognition, for example by asking questions on how to divide tasks and how to study well.

As mentioned above, teachers receive new competencies and roles in a multimedia-learning environment. Besides having a broad knowledge base, teachers have to offer pedagogical guidance and supervision by inspiring, motivating, and guiding students in their search for knowledge, as well as to stimulate their continuous process of asking questions. It is important that teachers have the competency to support students by constructing learning strategies, meta-learning strategies, and strategies for developing information-handling skills (McFarlane, 1997, as cited in Brink, 2013).

According to Brink (2013), multimedia provides many opportunities for effective learning, namely: a) Using several perception channels during the learning process; b) visualizing abstract contents; c) simulating complicated real experiments; d) presenting processes in a dynamic manner in the broad context of environment, society, history, and by relating to the interpretation made by the learner; and e) fostering collaborative learning through online discussion in blogs, web groups, etc.

The models commonly adopted by research in the use of information technology are cognitive multimedia (Mayer, 2021), Technology Acceptance Model (TAM) (Fred and Davis, 1989) and Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh *et al.*, 2003). The UTAUT model explains technology acceptance based on eight theories or technology acceptance models. Specifically, UTAUT refers to the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), the Motivational Model, Theory of Planned Behavior (TPB), combined TAM and TPB, the Utilization Model of Personal Computers, the Innovation Diffusion Theory, and Social Cognitive Theory (Venkatesh and Smith, 2003). UTAUT was developed based on a

comprehensive synthesis of previous technology acceptance models. UTAUT has six main constructs, that is, performance expectancy, effort expectancy, social influence, facilitating conditions, attitude, and behavioral intention (Venkatesh and Smith, 2003). The theory of cognitive multimedia (Mayer, 2021) is widely referenced in research on interactive multimedia.

Mango (2015) found that students not only enjoy using interactive multimedia but also believe that they help them learn. Students also believe that the devices facilitated their participation and collaboration in class. These results are significant because the more students are engaged with their learning, the more likely they will succeed in college. There is a link between student engagement and academic achievement and persistence in college (Kuh, Kinzie and Buckley, 2006). Collaboration is also linked to student success as it “enhances academic achievement, student attitudes, and student retention” (Prince, 2004). Therefore, in this study, the perception of the students towards interactive multimedia were found to enhance their learning and to facilitate their collaboration with each other and participation in classroom activities.

2.4.3 Using Interactive Multimedia for Learning

Using interactive multimedia, learning can be done face-to-face or remotely. The effectiveness of face-to-face and remote learning is highly dependent on the students. Learning becomes effective if students are actively involved with the material and have the opportunity to practice with feedback (Basilaia, 2020). Perception, motivation, and positive attitude towards the use of interactive multimedia will affect student participation (Abdullah et al., 2012). Students who participate actively in learning will read, listen, understand the material, discuss,

ask, answer, practice, and provide feedback properly. The active participation of students can in turn improve the effectiveness of learning (Abdullah et al., 2012). It is therefore expected that the use of interactive multimedia could increase the effectiveness of learning PAI and improve the students' spiritual, social, cognitive, and psychomotor competencies (Nofrianti and Arifmiboy, 2021).

In addition to face-to-face and remote learning, interactive multimedia can be used in other settings and contexts, such as blended, structured independent study, and unstructured informal study (Heinich et al., 2012). Face-to-face interactive multimedia learning is carried out in regular scheduled classes by the teacher, whereas remote learning is when the students and teachers are not in the same room or place. Blended is a combination of both: some of the classes are done face-to-face while the others remotely. In a structured independent study setting, students learn on their own, without any direct instruction from the teacher, through information technology and structured materials created by the school to facilitate self-study. On the other hand, an unstructured informal study setting is where students use information technology to increase their knowledge without any instructions from the teacher. Students learn informally from the internet at home or anywhere, as opposed to formal learning at school.

Students can use interactive multimedia in various ways to enhance learning. Interactive multimedia provides information on learning objectives (competencies), guides, structured materials, and evaluation tools (Heinich et al., 2012). Other tools not found in other media or in traditional learning include the interaction process and direct and instantaneous generation of evaluation results and feedback, interaction process and facilitates feedback. Furthermore, according to Munir (2012), students are able to select an appropriate and preferred topic

during the learning process. Freedom to choose a topic is one of the characteristics of the interactive multimedia learning process. Lesson materials and learning process data can be easily and quickly redisplayed and stored. Such learning processes have long been explored in the world of education, such as those used in hypertexts, databases, and other related multimedia.

According to Mayer (2021), there are several principles that can be used as guidelines by interactive multimedia designers when making learning or presentations to optimize learning. Each principle has been examined using various multimedia learning conditions to determine which results are best for students' learning (Clark and Mayer, 2016):

1. Multimedia principle. Mayer (2021) stated that the principles of activities in learning using interactive multimedia are more conducive to learning when compared to those consisting of texts or pictures only. The results of the study conducted showed that students were not deeply engaged in learning when the media consisted of text only. They were unable to connect what they read in the text with new or existing information. The results of the study also show that there are two channels to process this information, namely auditory and visual. The auditory tract is attracted to the sounds that a student hears, and the visual tract is attracted to whatever he sees. By combining these two processes, the results of the study showed that students can carry out learning more deeply and the results are stored in students' memories for a longer time. The results also showed that too many visuals or texts make students feel tired. There must thus be a balance between visuals and texts, and both elements must be interconnected.

2. Contiguity principle. This principle is defined as aligning the text with the appropriate graphics (Mayer, 2021). This means that the main subject cannot be physically separated from the text. This contiguity principle also implies that the audio should also be adjusted to the associated graphics. One example is when a graph contains a diagram, the text must physically be placed near it.
3. The third principle is modality (Mayer, 2021). Interactive multimedia should display more narration (words) rather than on-screen text. Students will learn better when new information is explained using audio narration, especially if the graphics displayed are very complex, the words narrated sound familiar, and learning goes fast. It is very important to note that the modality principle will be more useful when the learning material is so complex for students.
4. The fourth principle is redundancy. In multimedia learning scenarios, there are texts and audios that run simultaneously. The principle of redundancy states that students can learn better if there is only animation and narration. Text information that is displayed visually becomes redundant material. Eliminating redundant materials, such as eliminating identical narratives and texts, can enable students to learn well. The reason is that people cannot focus if they hear and see verbal messages at the same time during a learning presentation.
5. Coherence principle. Mayer (2021) said that one of the common mistakes made when e-learning developers design a project or course is to use background music, content, and irrelevant on-screen graphics. The principle of coherence is stated as: all information (sound, images, words) that is not needed in the delivery of multimedia must be eliminated because they can interfere students' learning process. Adding interesting but irrelevant material to e-learning can confuse users (Clark and Mayer, 2016).

6. Personalization principle. This principle uses a conversational style and virtual coaches. This principle involves students by presenting content in a conversational tone in order to enhance learning. Clark dan Mayer (2016) also found that the use of pedagogical agents could help students to focus on the given learning. Conversation must be used in place of formal writing in learning so that students can interact with computers and others. Characters in the interactive multimedia can act as dialogue partners for the students.
7. Segmenting principle. Segmentation is a very simple principle, where a larger segment is simply divided into smaller segments. The method commonly used in this segmented material is by inserting the “Continue” button on each frame on each slide. This can be useful for students to move from one slide to another according to their individual preference, and they can digest the information at their own pace, so that they can learn more efficiently. According to Clark and Mayer (2016), the rationale for using segmentation is that it can help students to digest information without having to overload their cognitive system.
8. Pre-training principle. In general, this principle means that users know the names and characteristics of key concepts before they learn something. This principle is relevant to situations when users are trying to process essential materials when learning but they are overwhelmed because the materials may be complex. Pre-training can help users, especially beginners, in terms of reducing the time to learn some knowledge and help them to manage some complex materials. Key concepts are identified and explained at the beginning of the lesson. Pre-training can make it easier for beginners to understand certain concepts and skills. For example, when illustrating how to use a microscope, the

pre-training part explains the parts of the microscope so students can understand how to use it (Mayer, 2021).

In general, the cognitive theory tries to overcome the problem of how to structure multimedia learning practices and use more effective cognitive strategies to help students learn efficiently. These are indicated in the principles of designing instructional multimedia. If learning multimedia is selected, developed, and used appropriately and properly, it will significantly benefit teachers and students. In general, these benefits are more interesting and more interactive learning process, lower teaching time, improvement of quality of learning of participants, and improvement of learning attitude of participants, and accessibility of the learning process anywhere and anytime.

According to Munir (2012), there are several rationales to support interactive multimedia learning:

- a. The messages conveyed in the material feel realer because it is presented in plain view.
- b. Stimulate various senses so that interaction occurs between the senses.
- c. Visualizations in the form of texts, images, audios, videos, and animations will be more memorable and can be captured more easily by students.
- d. The learning process is more mobile, practical, and controlled.
- e. Save time, money, and energy.

The use of interactive multimedia, such as iPads, in learning can affect the competency and participation of students (Al-Bogami and Elyas, 2020). There are also examples where interactive multimedia enhance, augment, and support deeper learning (science, mathematics), authentic learning (foreign languages), and virtual

visits (astronomy, history). Personalized access and individual ownership are crucial elements for the successful adoption and effective use of interactive multimedia (Burden *et al.*, 2012).

A study found that students believe that Interactive multimedia play a significant role in their learning engagement, thus promoting active learning in the classroom and paving the way for student success (Mango, 2015). While there has been much research related to the research theme, the author has not found any that specifically examines the effects of interactive-multimedia-based applications and student perception on student competencies, mediated by student participation. The use of interactive-multimedia-based applications, perceived through some of the abovementioned theories, needs to be studied so that students' learning outcomes and quality of education can be further improved.

The use of Interactive multimedia in learning can increase student's productivity and involvement in the learning process. Students have the time flexibility to do the given assignments, which they can do anywhere, thus the quality of student work increases (Benton, 2012). Another study found that students exhibited higher engagement and collaboration. It was also found that students with low and high ability showed better learning performance when using interactive multimedia (Tay, 2016). The same study found that the use of the iPad in learning was significantly more effective than traditional learning. With iPads, students do more digital activities to access class materials and are more interactive during class (Al-Mashaqbeh, 2016). Students become more independent during the learning process (Morgana and Shrestha, 2018). Learning English using iPad-based interactive multimedia is more productive than learning through textbooks (Grigoryan, 2016).

There is much evidence that proves the effectiveness of interactive multimedia. The effectiveness of the iPad cannot be separated from the effectiveness of interactive multimedia. Kareem (2018) investigated the effectiveness of using interactive multimedia on students' learning outcomes in biology. A total of 180 students were randomly selected from three secondary schools and were randomly divided into three groups. The author employed the quasi-experimental design in the study. The experimental groups were taught with the help of multimedia presentations, whereas the control group was taught traditionally. The treatment was given for 10 weeks. The data were collected using Validated Attitude Towards Biology Scale (ATBS) and Biology Achievement Test (BAT). They were analyzed using descriptive and inferential statistics. The results indicated a statistically significant difference between students' learning outcomes by mode of instruction. Students in the treatment group had better outcomes than their colleagues in the control group.

Another study about the influence of multimedia on students' competencies concluded that: (a) multimedia learning can improve students' achievement in robotics courses; and (b) the learning achievements of students of the multimedia learning class were better than those of the conventional class (Iskandar *et al.*, 2018). Besides competencies, interactive multimedia can also affect participation. Baharudin *et al.* (2019) implemented multimedia learning to create active learning experiences for students learning literature components. They developed an innovative learning application to assist secondary school learners to better understand literature. The authors created videos using the Powtoon application to teach learners literature. These instructional videos were found to be effective in encouraging the active participation of learners in class and improving their results.

The findings have positive implications for the field of English language teaching, as the study provided empirical evidence to the success of language learning using videos.

The use of interactive multimedia in PAI can help students learn repetitive knowledge and increase their understanding because the device can be used anytime. This makes it easier for students to do repetitive tasks, such as memorizing a hadith or verse of the Qur'an and understanding the history of the prophet. According to Mustafa (2012), the use of audiovisual materials and multimedia as teaching tools can increase students' interest and understanding of PAI. However, a recent finding suggested that most PAI teachers (72%) agreed that they do not know how to use multimedia effectively (Amin and Ahmed, 2021). This means that the majority of PAI teachers still use traditional teaching and learning methods, and that the use of technology makes the learning process more complicated (Nofrianti and Arifmiboy, 2021). In another study, students stated that very few PAI teachers use multimedia presentations or audiovisual materials when teaching PAI (Mustafa and Salim, 2012). This problem causes the failure of Islamic education and the bad mindset of students towards PAI in schools (Amin and Ahmed, 2021). Another study found improved affective competence after the use of interactive multimedia. Initially, 60% of students had a negative attitude, decreasing to 30% after experiencing distance learning using online-based multimedia with a commitment learning establishment. These results indicate that the use of e-learning, accompanied by a commitment to learning between students and educators, can improve the competence of students in PAI (Prawira, Ayundhari and Kurnia, 2021).

2.4.4 Advantages of Interactive Multimedia Device

The use of interactive multimedia offers several advantages. It has some distinct characteristics not found in other instructional and learning media. Kotevski and Tasevska (2017) claimed that multimedia is beneficial in education due to its characteristics of interactivity, flexibility, and integration of different media that can support learning. These account for individual differences among learners and can therefore increase their motivations. Its interactivity allows control over the presented content to a certain extent, as learners can change parameters, observe their results, or respond to certain options. They can also control the speed of the application and the number of repetitions to meet their individual needs. Furthermore, the ability to provide feedback tailored to the needs of students distinguishes interactive multimedia from any other media. As Dwi Surjono (2017) stated, interactive (non-linear) multimedia devices allow users to have greater control over navigation, and they can freely choose or decide which part they want to visit through buttons and hyperlinks provided in multimedia. They can control the speed of their use according to their own ability. They can interact intensely, concentrating on recognizing and understanding the materials that they have mastered or not repeatedly according to their needs at a certain time. Therefore, in the development of interactive multimedia, experts consider the best way to create interactive multimedia navigation.

Interactive multimedia also has the advantages of easy to use, intuitive interface, immersive experience, self-paced interaction, long retention, increasing understanding, effective, and fun (Dwi Surjono, 2017). However, there are several aspects that must be considered when using multimedia. These include access to learning material and computing equipment and teacher's skill, as his role is not

just that of information provider but also a guide, supporter, and facilitator. Multimedia can appeal to a variety of learning preferences, since some students profit more from learning by reading, while others perhaps by hearing or watching. Multimedia can thus suit the students' different interests, social and cultural backgrounds, learning preferences, learning pace, and so forth (Brink, 1993).

According to Munir (2012) and Abdulrahaman *et al.*, (2020), there are several advantages of interactive multimedia learning, namely:

- a. More innovative and interactive learning systems.
- b. Educators will always be required to be innovative in finding creative breakthroughs in learning.
- c. Able to integrate mutually supportive texts, images, audios, music, animated pictures, or videos into a unit to accomplish the learning objectives.
- d. Increase students' motivation during the teaching and learning process to accomplish the set learning goals.
- e. Able to visualize materials that are difficult to explain with conventional explanation or teaching aid.
- f. Train students to be more independent in gaining knowledge.

Additionally, Munir (2012) listed some advantages of multimedia, namely:

- a. Using various types of media to convey messages to students.
- b. The submitted information is more up to date.
- c. Multisensory in nature, stimulating students' attention and retention.
- d. Able to attract students' interest.
- e. Able to combine diverse types of media, such as texts, sounds, images, videos, and animations.
- f. The delivered information is of higher quality.

- g. Interactive, that allows two-way relationships.
- h. Beneficial for students and teachers.

Using interactive multimedia for learning offers many advantages. This device offers digital access to class materials and digital activities. It enables students to become more interactive during class or during the learning process. It is also flexible in the sense that it is easy to carry inside and outside the classroom (Al-Mashaqbeh, 2016). The iPad is safe and easy to use compared to similar technological media, such as Facetime and Skype. Pre-recorded video on iPads has the advantage of being available around the clock and not requiring access to the internet (Hung *et al.*, 2018).

According to Kennedy *et al.* (1998), there are several criteria as indicators to assess multimedia in the learning process. The assessment can be grouped into three domains, namely instructional and conceptual multimedia design, interface and graphic design, and user attitudes. Regarding instructional and conceptual design, Kennedy *et al.* (1998) mentioned five criteria: (1) introductory objectives and direction, (2) navigation and orientation, (3) interactivity, (4) sequencing, and (5) consistency between learning objectives and content of instruction. However, not all the criteria stated above can be used as a basis for evaluating interactive multimedia. Teoh and Neo (2007) identified five domains to evaluate interactive multimedia: (1) learning motivation, (2) content organization, (3) navigation and graphical user interface GUI, (4) multimedia and interactivity, and (5) web features.

2.4.5 Cognitive and Acceptance Theory of Multimedia Learning

Multimedia cognitive theory is information processing theory. The cognitive theory provides a general framework for learning designers to control

learning conditions in an environment or learning material (Mayer, 2021). In particular, this theory provides an empirical reference that helps learning designers to reduce cognitive load during learning. In multimedia learning, multimedia cognitive theory and acceptance model are two important theories, and they serve as the basis for this research.

Mayer (2021) has proposed the Cognitive Theory of Multimedia Learning (CTML). It assumes that the cognitive system is composed of two channels: auditory-verbal and visual-pictorial. The systems must be adapted to, and take into account, the cognitive limitations of the learner. Mayer (2021) stated that the interaction between multimedia and cognitive processes during the learning process is known as the Cognitive Theory of Multimedia Learning. The model is shown in Figure 2.1.

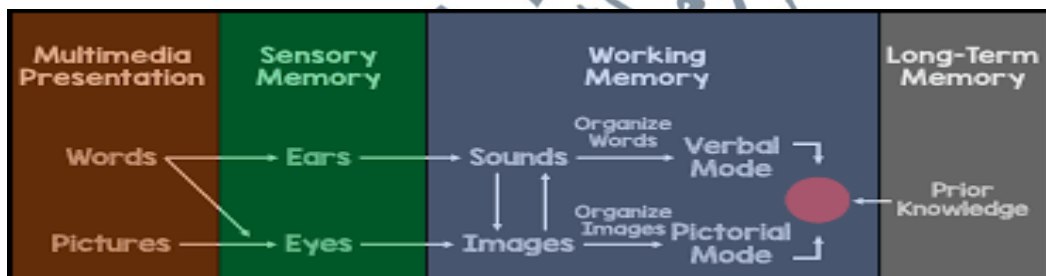


Figure 2.1: Multimedia Cognitive Theory Framework (Mayer, 2021, p. 40)

As the above figure shows, CTML is based on three assumptions:

1. Two channels assumption (Mayer, 2021). Mayer explained that humans use separate processing lines for visual and auditory information. Information processing occurs in three stages. First, information enters the information processing system either through visual channels or through auditory channels. Second, this information is then processed separately but simultaneously in working memory, where both auditory speech cues, as well as images (including

video), are selected and organized. Then, in the third stage, information from the two channels is combined and linked to other information that has been stored in long-term memory. This third stage is responsible for how the same information can be interpreted differently by each learner. The reason is that the learning experience that each learner has is not the same.

2. Limited capacity assumption (Mayer, 2021). Humans have limited abilities, someone processes information in each channel at one time. In one presentation session, the audience can only store some visual information (pictures, videos, diagrams, etc.) and some speech information (auditive). It is this assumption that underlies research and a theory called cognitive load theory. Although the maximum load for each individual varies, several studies have shown that the average human is only able to store five to seven “chunks” of information at a time.
3. The last assumption according is active processing. Humans actively perform cognitive processing to construct mental images of their experiences. Humans are not like tape recorders who passively record information but continuously select, organize, and integrate information with the knowledge they already have. The result is the creation of a mental model of the information presented. There are three main processes for active learning, namely: selection of relevant materials or materials, arrangement of selected materials, and integration of these materials into the structure of knowledge that has been previously possessed. This process occurs in working memory which is limited in capacity.

The second theory is the theory of acceptance model (TAM). This theory was first developed by Fred and Davis (1989) with the constructs perceived usefulness, perceived ease of use, and user acceptance of information technology.

TAM provides a basis for studying and understanding user behavior in receiving and using an information system (computer) and the like, such as tablets, iPads, smartphones and others, both in learning and in other activities. TAM predicts a person's attitude and acceptance of technology and can provide necessary information about the factors that drive the behavior or activity of the individual in utilizing technology. This theory is based on the Theory of Reasoned Action (TRA) developed by Fishbein dan Ajzen (1975). This model assumes that behavior is based on the individual's intention to engage in a particular action. Intention is determined by two factors, namely the individual's attitude towards the results of the action and the opinion of the individual's social environment. This theory suggests that people often act on their perceptions of what others think they should do.

TAM states that students tend to use a system if it is easy to use and useful. Therefore, a person's intention to use technology is determined by two factors: (1) perceived usefulness: a person's belief that using technology will improve performance, and (2) perceived ease of use: a person's belief that using technology makes it easier to solve an issue (Venkatesh *et al.*, 2003).

TAM explains that a user's perception will determine his attitude toward the use of information technology and describes more clearly the use of technology, which is determined by the perception of usefulness and the perception of ease of use. There are four constructs in TAM: perceived ease of use, perceived usefulness, attitude toward using, and actual usage. These are explained as follows.

a. Perceived ease of use

Perceived ease of use is a measure in which a person believes that the technology is easy to understand and easy to use (Davis, 1993).

b. Perceived usefulness

Perceived usefulness is a measure of whether the use of technology is believed to bring benefits to the user (Davis, 1993). According to Wang et al., (2009), perceived usefulness is the belief of a user of whether using a particular system will improve his performance. Perceived usefulness can be measured using several indicators, such as improving performance or productivity or other benefits of technology (Fred and Davis, 1989).

c. Attitude toward using

It is conceptualized as the user's attitude towards the use of a technology (Fred and Davis, 1989) A person's attitude consists of cognitive, affective, and behavioral components.

4. Actual use

Actual use is a "a form of an external psychomotor response measured by a person with real use" (Davis, 1989). Actual usage is measured based on repeated use and more frequent use.

TAM was further developed into the UTAUT model. The UTAUT model initially had four key constructs. It was then further developed into seven constructs (Venkatesh *et al.*, 2003). The four constructs are performance expectancy, effort expectancy, social influence, and facilitating conditions, all of which influence behavioral intention to use technology.

Performance expectancy is the degree to which an individual believes that using the system will help him or her to achieve an advantage in a particular job or activity. Effort expectancy is the level of ease associated with the use of the system/technology by users. Social influence is the extent to which a person perceives that others believe that it is better to use the system/technology.

Facilitating conditions are the extent to which an individual believes that the technical and organizational infrastructure is in place to support the use of the system/technology (Venkatesh et al., 2003). The UTAUT model states that performance expectancy, effort expectancy, social influence, and facilitating conditions theoretically and empirically affect behavioral intentions to use a system/technology. Meanwhile, behavioral intention and facilitating conditions determine the use of the system/technology (user behavior). In addition, gender, age, and experience variables are used as differentiating variables to observe whether they affect facilitating conditions, price values, and habits on behavioral intention. Experience is also used as an individual differentiator to see the effect of behavioral intention on user behavior.

UTAUT was further extended with the addition of three new constructs: hedonic motivation, price value, and habit (Venkatesh, Thong and Xu, 2012). Hedonic motivation is the pleasure or pain felt when using technology. It has been shown to play an important role in determining the acceptance and use of the system/technology (Venkatesh and Smith, 2003; Chang, 2012). Price value refers to the extent to which the cost and price structure have a significant impact on the use of the system/technology. Habit is the extent to which individuals tend to perform behaviors automatically to learn (Chang, 2012).

2.5 Student Perception

2.5.1 Definition of Perception

Perception is the process through which people receive, organize, and interpret information from the environment (Schermerhorn, 2013). Kotler (2002) defined perception as a process by which an individual chooses, organizes, and

interprets information to create a meaningful description of something. Perception is therefore a process that begins with something that is captured by sight, hearing, and other sensory devices before going to the next stages, organizing and interpreting. Another opinion says that perception is an individual's process of regulating and supervising the impressions he sees in order to give meaning to his environment (P. Robbins and Judge, 2013).

Perception is also defined as a process of cognition used to interpret and understand the world or the objects around it (Gibson, Ivancevich and James H. Donnelly, 2011). This is slightly different from the two previous definitions, as Gibson and colleagues did not specify the stages of perception. Meanwhile, Epstein and Rogers (2008) suggested that perception is the process of recognizing, organizing, and understanding sensory responses that are received from environmental stimuli. The Dictionary of Psychology (Chaplin, 2006, p. 45) provides at least five definitions of perception:

- a. The process of knowing and recognizing objects or events with the aid of sensory devices.
- b. Awareness of the process of organizing what is captured by the senses.
- c. Adding meanings derived from previous experiences.
- d. Variables that hinder or intervene.
- e. Intuitive awareness of direct truth or beliefs about something.

Based on the above definitions, perception can be summarized as a process in which a person receives and regulates an object or event introduced by his environment that is captured by the five senses, which he then interprets so that it becomes meaningful. Perception can be classified into two types, namely positive

perception and negative perception (P. Robbins and Judge, 2013). The difference between positive and negative perception is explained below.

- a. Positive perception comes from the satisfaction of a person with a particular object, as well as individual knowledge and individual experience about the object he perceives. Positive perception is a mood dimension with high levels of positive emotions, such as joy and self-assurance, and low levels of boredom, lethargy, and fatigue.
- b. Negative perception is the lack of satisfaction of a person about a certain object, lack of knowledge, and lack of experience related to the object he perceives. Negative perception is a mood dimension consisting of nervousness, stress, and anxiety at the high end and relaxation, calmness, and poise at the low end.

Positive and negative perception, therefore, depend on individual expectations about certain objects. Positive and negative perceptions affect the dimensions of an individual's mood. This perception can be a reality that is possessed by the individual.

2.5.2 Factors of Perception

There are two main factors that influence perception, namely internal and external. Internal factors are those that come from within the individual. They come in several parts, including:

- a. Physiological: the different capacities of senses affecting the process of perception.
- b. Attention: a very important part in forming perception. One's perception of an object depends on his level of attention.
- c. Interest: A person's tendency to pay attention to the stimulus.

- d. Aligned needs.
- e. Experience and memory.

In contrast, external factors of perception are those that come from outside the individual. They are the size and placement of the object, color of the object, uniqueness and contrast, intensity and strength of stimulation, and motion or movement (Gibson, Ivancevich and James H. Donnelly, 2011). Generally, larger and taller sizes increase the attraction of individuals. Larger fonts on media or layer devices will catch someone's attention more easily. The size of the object affects the attention of the perceiver. Likewise, color affects the attention of the perceiver. The better the color used on a particular object, the better the perceiver's response to the object he sees. Contrasting objects also externally affect one's perception. When there is a collection of objects that are mostly the same color, while one of them looks different from the others, this will certainly attract the attention of the viewer. Perception is also influenced by the intensity of the perceiver in using the object. The higher the intensity of external stimulation, the more likely the perception will be positive (Gibson, Ivancevich & Donnelly, 2011).

Another opinion says that perception is influenced by three factors. The first is the factors within the perceiver. When an individual perceives an object and tries to interpret what he sees, his interpretation will be strongly influenced by his own characteristics, such as attitude, motivation, interest, experience, and expectation. The second factor is situational factors, such as time, work setting, and social setting. The third factor is the factors in the target, such as novelty, motion, sound, size, background, proximity, and similarity (Robbins & Judge, 2013). The factors that can affect individual perceptions can be seen in Figure 2.2 below.

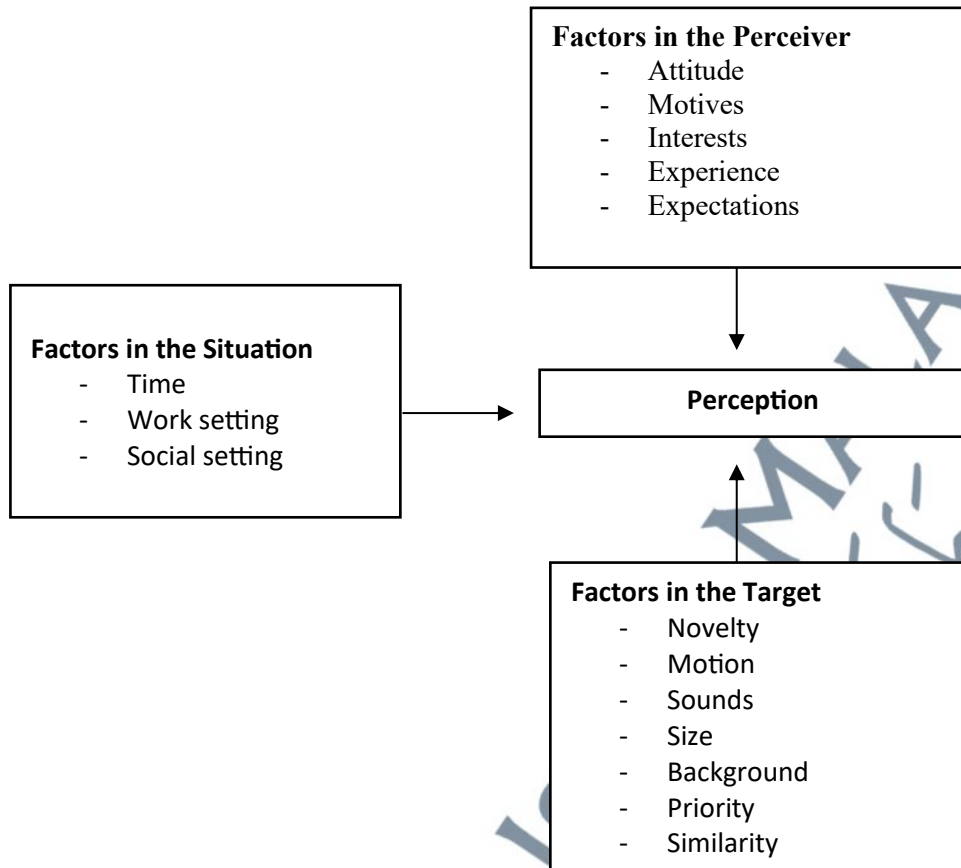


Figure:2.2. The Perception Factors

Meanwhile, Keller and Cernerud (2002, as cited in Tago, 2012) stated that age, gender, previous experience with computers, technology acceptance, and individual learning styles determine student perception towards technology acceptance. Student perception towards the use of interactive multimedia is very important, as it significantly determines whether students accept or reject the use of information and communication technology in learning (Fred and Davis, 1989). TAM suggests that there are two factors that influence the acceptance of the use of information and communication technology, namely perception of the benefits of technology and perception of the ease of using technology. There are two other factors that influence the acceptance of the use of information and communication technology, namely attitude towards technology and intention to use technology

(Tago, 2012). Thus, student perception towards the use of interactive multimedia in the teaching and learning process is influenced by the ease with which students use it, its usefulness, their attitude towards it, and their intensity in using it.

2.5.3 Process of Perception

Students will make a perception if certain conditions are fulfilled. First, there needs to be an object being perceived. The object will produce a stimulus that is captured by the five senses. The stimulus can originate from outside and be directly captured by the senses (receptors) or from within, which affects the receiving nerve (sensory). Second, there need to be receptors or sensory devices that are used to capture stimuli. A sensory device is needed to pass the received stimulus to the central nervous system, i.e., the brain as the center of consciousness. Third is attention, as there is no perception without attention (Walgitto, 2002).

Schermerhorn et al. (2010) described four stages of perception. The first stage is attention and selection. One's senses are constantly bombarded with so much information that failure to screen it will incapacitate the individual with information overload. Selective screening lets in only a tiny portion of all available information. Some of the selectivity comes from controlled processing, i.e., consciously deciding what information to pay attention to and what to ignore. The second phase is organization. Even though selective screening takes place in the attention stage, it is still necessary to find ways to organize the information efficiently. Schemas can help with this. They are cognitive frameworks that represent organized knowledge developed through experience about a given concept or stimulus. The third is interpretation. Once an individual's attention has been drawn to certain stimuli and he has grouped or organized this information,

the next step is to uncover the reasons behind the actions. Even if his attention is called to the same information and he organizes it in the same way as another individual, he may interpret it differently or make different attributions about the reasons behind what he has perceived. The fourth stage is retrieval. The information stored in an individual's memory must be retrieved if it is to be used. It is common to have trouble retrieving information stored in memories. More commonly, memory decays, so that only some of the information is retrieved. Schemas play an important role in this area, making it difficult for people to remember things not included in them.

Early studies have shown that perception has an important role in determining the success or failure of any learning situation (Dornyei, 2001). Consequently, perception is considered as a crucial factor in the teaching and learning process. John and Gifford (1985) pointed out that perception affects one's emotions and behaviors. In addition, perception helps to shape and skew one's beliefs of the existing situation. Perception is linked with an individual's senses or emotions that come naturally and influence his opinion about something. The term "perceive" in learning itself is the identification by means of senses that support the students in the learning process. Perception comes from the learners' innate feeling towards the learning environment. More importantly, the students have various personal perceptions or interpretations of the information which they are exposed to. In other words, perception is the feeling or opinion of individuals about something.

Perception is linked to action in some fairly obvious ways. To navigate the environment, manipulate objects, and interact with others, one must be able to perceive external stimuli and use this perceptual input for motor guidance. The

connections between perception and action are sufficiently intimate that some theorists have postulated that both systems rely on the same underlying representations (Bodenhausen & Hugenberg, 2015).

Some neuroanatomical evidence supports the possibility that perceptual input is indeed processed in two separate pathways, one to appraise its meaning and another to directly organize behavioral responses (Norman, 2002, as cited in Bodenhausen & Hugenberg, 2015). There thus appear to be good biological reasons for expecting both direct and indirect (construal-mediated) influences of perception on action. Evidence for direct perception behavior linkages comes from studies of automatic behavior (Dijksterhuis, Chartrand & Aarts, 2007, as cited in Bodenhausen & Hugenberg, 2015).

Marzano (1992) divided attitude and perception into two types. The first is attitude and perception about the learning climate. Climate means that it is related to the factors external of the learners. According to Marzano, the external factor is associated with the quality and quantity of the available resources, the classroom environment, and so on. In other words, it is about the students' feelings or opinions about the quality and quantity of the resource given by the teachers. These external factors therefore influence the effectiveness of a lesson.

2.6 Student Participation

Liu (2001, as cited in Abdullah et al., 2012) detailed four types of student behavior in the classroom: total integration, conditional interaction, marginal participation, and silent observation. In full integration, students engage actively in the class discussion, and they know what they want to say and what they should

not say. Students participate in class through such activities as discussions, asking, answering, and completing the task assigned by the teacher.

The behavior, nature, and skills of teachers are the most important factors that influence students to participate actively in class (Kazi & Aziz, 2019). There must be deliberate and conscious attempt on the part of the teacher to cause the students to participate actively in the lesson. For example, if a teacher is presenting a lesson on division, she would ask students to demonstrate their knowledge by asking them to hold up the correct answer or writing it on their papers. In such a case, the students are overtly participating and the teacher has implemented active participation (Pratton, 1982; Kazi & Aziz, 2019). The concept of student participation is based on the constructivist theory that learning is influenced by the activeness of an individual in educational activities. Student activeness does not solely depend on the conditions, opportunities, and hope for involvement from the institution and teachers, but it also depends on the students themselves as agents in learning activities (Trowler & Trowler, 2010). Therefore, the participation of teachers and students in learning cannot be separated (Abdullah et al., 2012). Student participation is very important in learning, especially in online learning, where students often feel isolated and disconnected (Dixson, 2015).

Participation can be analyzed through student behavior during interactions with groups. Student participation can be considered as the most essential path to building knowledge in learning (Kim & Ketenci, 2019). As a technique employed by the teacher to enhance student learning, Pratton (1982) suggested to carefully examine what active participation requires the student to do and to clarify the rationales for its use. First, active participation provides a focal point for learning for the total class. Second, it involves overt student behavior such as writing,

describing, or identifying. By involving the students overtly, their attention is more apt to be on the lesson. Third, active participation provides practice for the student during the lesson while a concept is being developed. This practice also provides feedback for teachers so they may monitor and then make adjustments following students' mistakes or misunderstandings rather than waiting until the lesson has been completed. Fourth, active participation provides "time on task".

When a class is given a short-term task and is actively participating individually or together, there will be higher likelihood of better classroom behavior (Evertson, 1978, as cited in Pratton, 1982). The engagement of students with their peers as well as learning materials and teachers is a characteristic of multimedia learning (Greeno, 1997).

Learning through interactive multimedia allows students to enquire, discover, and analyze problems critically, and they can learn quickly from a variety of available resources (Morrison *et al.*, 2009). Student involvement in the learning process through multimedia can be defined as his active participation in learning. The components of that involvement are students, instructor, and technology (Danaher, Gururajan and Hafeez-Baig, 2008). For these objectives to be achieved and for the content to reach the learners, their active participation in the learning process is essential. In a context where provision can be done using ICT tools, it is critical for learners to engage actively in the learning process on their own initiatives. This process of active engagement can be facilitated through the mobilization of peers, co-learners, instructors, and technology (Danaher, Gururajan & Hafeez-Baig, 2008).

Many researchers have discussed the use of technology in learning. Moseley (2010) found that it provides support for the students' learning processes

and outcomes. Additionally, Baker (1999) concluded that there is a positive relationship between a technology-rich environment and academic achievement, especially when students have the requisite skills to take advantage of the technology. Technology can create positive effects and grant certain advantages to the students in the learning process.

Participation can also be viewed as part of the overall student engagement process. Dancer and Kamvounias (2005) divided this process into five categories: preparation, contribution to discussion, group skills, communication skills, and attendance. Participation allows students to build on their knowledge, demonstrate that they have understood the curriculum, develop confidence, and apply theory. It teaches students to think critically and engage in dialogue with their colleagues and instructors by providing informed arguments based on retained information (Garside, 1996). These skills are important for their progression throughout their education and in preparing them for their careers. Rocca (2010) stated that as students participate more, they would memorize less and engage in higher levels of thinking, including interpretation, analysis, and synthesis.

Participation can be evaluated by the instructor, peer, or the student himself. However, several studies have noted that self-evaluation and peer evaluation introduce bias, as students tend to award themselves and their peers with higher grades than the instructor would allocate (Dancer and Kamvounias, 2005). Student activeness in learning can be seen and measured from four aspects: involvement of skills (following the reading, exerting efforts); emotional engagement (make the course interesting, apply it in their own life); participation/interaction (having fun, actively participating in small group discussions); and performance engagement (does well on exams, gets good grades) (Dixson, 2015). According to Abdullah et

al., (2012), past studies have shown that there are several factors influencing student participation in the learning process. They are the personality of the students, the traits and skills of the instructor, and the perception of classmates. Conversely, there are several factors that hinder participation in the classroom, including language problem, sitting arrangement, teaching methodology, lack of module accessibility, and shyness or fear of instructors and classmates (Worako, 2018). In this study, student participation was student activeness, including skills, emotional engagement, interaction, and performance, in interactive multimedia learning.

2.7 Student Competencies

2.7.1 Definition of Competencies

Competency means skill or ability. The Great Dictionary of the Indonesian Language (KBBI) defined it as the authority to determine something. The International Board of Standards for Training, Performance, and Instructions (IBSTPI) defined competency as “an integrated set of skills, knowledge, and attitudes that enables one to effectively perform the activities of a given occupation or function to the standards expected in employment” (Yaumi, 2014). Competency is the integration of skills, knowledge, and attitudes; they are interdependent and inseparable in the learning process. Fulfillment of these three aspects is the ultimate goal of learning.

Competency is a combination of knowledge, skills, values, and attitudes that are applied to thinking and acting habits. Competency and its cognitive, affective, and psychomotor domains must be mastered by students, and they should be evaluated as indicators of learning outcomes (Mulyasa, 2006). Ali Mudlofir

(2005) viewed competency as knowledge, skills, or abilities that someone acquires and exhibits in his cognitive, affective, and psychomotor behaviors. According to Mulyasa (2006), student competency is evaluated objectively by teachers through written, practical, or oral tests, or without tests, such as with the use of questionnaires, direct observations, grading scales, and interviews (Kemp, 1994).

Martin and Reigeluth (1999, p. 487) explained:

“Other important issues that have to do with teaching in the affective domain include: (a) affective development often takes a long time; (b) indoctrination or brainwashing can be an ethical concern; (c) sometimes the absence of behaviors is more important than the presence of behaviors; (d) classical conditioning, operant conditioning, and persuasive communications may be powerful methods to instill or maintain affective behaviors; I there may be some confusion about effect as a means for cognitive ends versus ends in their own right.”

Bloom et al. (2003) divided competency into cognitive, affective, and psychomotor. Cognitive is further classified into six parts, which are knowledge, understanding, application, analysis, synthesis, and evaluation. Anderson and Krathwohl (2001) then modified those six into remembering, understanding, applying, analyzing, evaluating, and creating.

The affective domain is divided into five categories: (a) receiving, which is the willingness to receive and pay attention to certain values; (b) responding, which refers to the tendency to show reactions to certain norms; (c) award/valuing, the tendency to accept certain norms; (d) organizing, the process of forming the concept of a value; and I characterization, the formation of lifestyle (Bloom et al., 2003).

Bloom and colleagues have not, however, introduced subcategories into the psychomotor domain. Dave (as cited in Assegaf, 2011) explained that this aspect consists of imitation, manipulation, precision, articulation, and naturalization. Junaidi (2011), on the other hand, divided it into six skills, namely reflex motion

(imitating involuntary movements), e.g., imitating prayer movements; basic movements (without training but patterned), e.g., running when performing *tawaf* and performing prayer movements; perceptual abilities, e.g., sound recitation of the Qur'an; skilled movements (agile, trained), e.g., ability to recite the Qur'an in a variant of recitation; and beautiful and creative movements that are performed by communicating through feelings, e.g., proselytizing with puppet art, drama, and music.

Competency in PAI covers knowledge, skills, and basic Islamic values that can be applied to thinking and acting habits so that they are consistent with Islamic teachings (Madjid, 2004). In learning theory, a person must first do (psychomotor) before understanding (cognitive) and adopt an attitude (affective). Likewise, studying Islam should begin with the practice of good character, for example saying thank you, being apologetic, dressing and speaking well, and so on; all these can improve one's empathy (Sarlito, 2005). In this study, student competence is the learning outcome of students in Islamic education, that covers three domains: cognitive, affective, and psychomotor.

2.7.2 Student Competencies in PAI

Regulation of the Minister of Education and Culture Regulation (Permendikbud) No. 24/2016 on the Core Competencies and Basic Competencies of Subjects in the 2013 Curriculum for Primary and Secondary Education explains that core competency (KI) is the level of ability that a student must attain at every level, class, or subject to reach the competency standard for graduates. It covers four aspects: spiritual attitude (KI 1), social attitude (KI 2), knowledge (KI 3), and skill (KI 4).

The core competencies for PAI are also presented in detail in the same regulation. Detailed contents of the PAI and ethics curriculum in relation to those four competencies based on Permendikbud No. 24/ 2016 are attached in the APPENDICES.

2.8 Conclusion

The chapter has reviewed studies related to the research subject, which is using interactive multimedia device in Islamic education learning. There have been many studies on the use of interactive multimedia in education. There have also been numerous studies related to the use of interactive multimedia for the instruction and learning of PAI, although they are fundamentally different from this research. Nonetheless, the reviewed studies can be used as comparison and as supporting or contradicting evidence. This study also differs from the literature in terms of research location, subject matter, and even the findings.

This study is based on three foundational theories, namely Mayer's cognitive theory of multimedia learning (Mayer, 2021) and the technology acceptance models of TAM and UTAUT (Fred and Davis, 1989; Venkatesh *et al.*, 2003). These theories are widely used as the basis for research on the use of interactive multimedia in learning.