INTEGRATION OF DIGITAL TECHNOLOGY IN LEARNING IN THE INDUSTRIAL ERA 4.0: STUDY FROM THE LEARNING PERSPECTIVE OF ISLAMIC EDUCATION

Salafudin
UIN KH Abdurrahman Wahid Pekalongan
Email: salafudin@iainpekalongan.ac.id

Abstract

This research intends to describe the role and underlying concepts of digital technology integration in learning in the 4.0 Industrial Age. The topic of integration is seen through the lens of Islamic Education Learning. The conclusion is that the fundamental premise of integrating digital technology in Islamic Education Learning is that technology does not lead to a lack of conceptual understanding or replace the role of student intuition in the learning process. In contrast, the technology attempts to enhance pupils' conceptual comprehension and strengthen their intuitive learning capacities. It is known that there are three didactic functions of digital technology in Islamic Education Learning, namely: Technology for doing Islamic Education, namely technology that functions as an alternative tool for learning media to carry out Islamic Education activities; Technology for practicing skills, namely technology that functions as a learning environment to hone skills in Islamic education; Technology for developing conceptual understanding, namely digital technology that functions as a learning environment to develop students' conceptual understanding of certain Islamic Education concepts. This third didactic function is most expected from integrating digital technology into Islamic Education Learning.

Keywords: *Learning Technology, Principles of Technology Integration, The Role of Technology.*

A. INTRODUCTION

Industrial Period 4.0 is a concept used to describe an era in which the physical, biological, and digital dimensions are indistinguishable due to a technological convergence. Using digital help, two individuals can share information immediately without being in the same area or at the same time, both physically and biologically. The beginning of the 4.0 industrial era is signaled by the digitization of information and the widespread implementation of artificial intelligence in many facets of human life, including education (Lee et al., 2018).

Learning is a multifaceted process that incorporates a person's body and mind throughout their entire lives. Because of the interplay between a person and his environment, learning occurs. Therefore, learning can occur at any time and in any location. One sign that someone is said to have experienced a learning process is a change in behavior, which includes changes in the level of knowledge, skills, and attitudes (Oliveira et al., 2021).

In the current era of Industry 4.0, the expansion of digital technology has brought about changes and affected numerous facets of human existence, including education. According to Hoyles and Lagrange, digital technology is the most influential factor in the global education system today (Sima et al., 2020). This is owing to the effectiveness, efficiency, and appeal of technology-based digital learning. If fake concrete items dominated their use as a visualization tool for abstract notions in the 1980s, digital technology-based visualization is now extensively employed as a more effective, efficient, interactive, and visually appealing alternative (Dwivedi et al., 2022). NCTM asserts that the integration of technology in learning has at least three positive effects on Islamic Education Learning: technology can improve Islamic

Education's learning outcomes, technology can increase teaching effectiveness, and technology can influence what and how Islamic education should be studied and taught (Evendi et al., 2022).

In line with NCTM, various studies show that students can learn richer and deeper when technology is used ‘effectively’ in Islamic Education Learning. Although various studies show the positive impact of integrating digital technology in Islamic Education Learning, many educators, researchers and other education practitioners still doubt this (Septiani et al., 2022). For example, our initial study found that teachers still harbor concerns regarding implementing technology in Islamic Education Learning. They still assume that digital technology in Islamic Education Learning will have a bad impact on Islamic Education Learning. For example, when students are unaccompanied in using technology and reading sources of Islamic education, they are less precise or irrelevant (Masuwai et al., 2021). In addition, the use of digital technology is feared to be misused by students, resulting in students not learning what they should learn. For example, when students work with digital technology-based learning tools, they are more preoccupied with experimenting with features of these learning tools, not discovering Islamic education learning concepts with the aid of these tools (Al-Furaih & Al-Awidi, 2021).

However, they realize that technology in learning is unavoidable, and there is a belief in themselves that technology can have a positive impact if done properly. This is the source of their questions, namely how technology can be integrated into learning so that it has a positive impact, what principles need to be considered when implementing it, what factors influence it, what is the role of teachers and students, and so on. Therefore, this paper aims to theoretically reveal the principles and considerations in applying digital technology in Islamic Education Learning.

B. LITERATURE REVIEW

1. Islamic Education

At least two unique meanings can be found in the Islamic education vocabulary. First, an introduction to Islam, and then a more in-depth study of Islam. First, Islam is seen as a subject to be studied in school, but in the second sense, it is seen as a perspective to be studied in Islamic schools (Ayyad, 2022).

In Islamic education, an-Nashir & Darwis describe it as a process of guiding human development in terms of physical and intellectual development as well as language, behavior, religion, and social life toward goodness and perfection. Asy-Syaibani describes Islamic education as an attempt to influence one's behavior in both the personal and public spheres, as well as with regard to the natural environment (Khaidir & Suud, 2020).

The first sense of Islamic education has been generally understood, it must be acknowledged. A teacher's ability to effectively teach students about Islamic education is largely based on the materials, curriculum, and teaching methods he or she employs. Assume that the primary meaning of Islamic education is being conveyed. In this case, Islamic ideals are being passed down from one generation to the next without the need to encourage innovative and forward-thinking thinking among pupils (Uyuni & Adnan, 2020).

Let's imagine that the second concept is applied to the understanding of Islamic education. As a result, it will not see Islam as only a collection of ideas taught in schools, but rather as a way of life embodied in Islam. Islam is not a subject that must be taught to students, but rather it is the essence of education; consequently, it means that Islam entails having education-related beliefs (Sahin, 2018).

It is the endeavor of pious Muslim adults to actively direct and supervise the development of students' basic capacities through Islamic teachings in order to maximize their growth and development potential. Theoretically, education has the notion of "feeding" students' souls in order to provide them with spiritual happiness. However, education is

frequently viewed as "developing" fundamental human capacities (Sugiarto et al., 2022). For a more Islamic upbringing, you'll need to go through the Islamic educational system, which consists of schools and a curriculum. The essence of a person's dynamic potential lies in their faith or belief, their knowledge, their morals (morality), and their experience. These are the four fundamental potentials that Islamic education aims to cultivate (Ilyasin, 2020).

2. Islamic Education Goals

Students in Islamic education are expected to grow in their faith, understanding and appreciation of Islam in order to become Muslim human beings who believe and fear Allah SWT, as well as possessing a noble character in their personal, national and state-level life (Tabroni & Bumi, 2022).

From these objectives, several dimensions that will be improved and targeted by Islamic education learning activities can be drawn, namely:

a. Aspects of students' confidence in Islam's teachings
b. Dimensions of thinking or reasoning (intellectual) in addition to student knowledge of Islam's teachings.
c. Students' sense of gratitude or inner satisfaction following the implementation of Islamic teachings (Maemunah et al., 2021)
d. Islamic teachings and values that pupils believe, understand, and live or absorb can inspire and motivate them to move, practice, and wait for them in their own lives as human beings who believe in Allah SWT and actualize and realize it in the life of society, nation, and state.

It follows that Athiyah al-Abrasyi revealed five key goals for Islamic education, in line with the concept provided above. Get your morals in order first. Islamic education, according to him, is a means to cultivate a noble character. According to the Prophet's primary objective, which was to improve human character, this is in line with this Second, the supply of life on earth and in the hereafter. Islamic education is not solely concerned with the religious side, nor is it solely concerned with the mundane. Islamic education accords equal significance to both (Parinduri et al., 2020).

Third, foster a scientific mindset and fulfill your curiosity. In order to help students succeed in their chosen professions and lead virtuous lives, we must prepare them from a professional, technical, and business perspective. Fifth, preparation for the pursuit of sustenance and the maintenance of advantages. According to Islamic education, moral formation and knowledge of the world are not mutually exclusive goals. The curriculum emphasizes the development of specific skills that students may put to good use in the real world (Amirudin, 2019).

3. Industrial Revolution 4.0

Two (2) terms comprise the industrial revolution: revolution and industry. The Big Indonesian Language Dictionary (KBBI) defines revolution as a quick change, whereas industry is the implementation of the manufacturing process. Therefore, when the two terms are combined, it refers to a rapid change in the production process. This quick transformation is intended not just to increase the quantity of things produced (quantity) but also to enhance the quality of output (grade) (Malik, 2019).

In the middle of the 19th century, Friedrich Engels and Louis Auguste Blanqui coined the term "Industrial Revolution." This industrial revolution is also occurring intermittently. This last decade represents the beginning of the fourth phase of 4.0. The transition from one phase to the next provides a distinction in terms of its utility (Sholeh, 2021). The first phase (1.0) centers on the invention of machines that emphasize the mechanization of production. The second phase (2.0) has reached the point of mass production, which includes quality

control and standardization. Using computerized integration, the third phase (3.0) advances to the mass uniformity stage. The fourth phase (4.0) has introduced the internet's digitization and automation to manufacturing integration (Denmar et al., 2021).

The disruptive innovation phenomena has emerged as a result of industrial revolution 4.0. This phenomena has had an effect on all aspects of life. Starting with industry, economy, education, politics, and so forth. This phenomena has also altered the lifestyle and mentality of the global population. Due to the convenience of information technology, disruptive innovation might be regarded as the replacement of established industry players by new market entrants (Nagy et al., 2018).

C. METHOD

This research was carried out using a qualitative approach and literature study. This research was carried out using various data from previous studies and studies that still have relevance to the theme of this research. After the research data has been successfully collected, then the data will then be processed so that the researcher can find the conclusions from this research.

D. RESULT AND DISCUSSION

1. The Role of Technology in Islamic Education Learning

The Association for Education and Communication Technology (AECT) defines media as all forms that are configured to distribute information. According to the Education Association, media are objects that are manipulated, viewed, heard, read, or discussed, as well as tools that are utilized appropriately in learning activities. The study of Islamic education learning examines the structure of abstract ideas. Therefore, when a person studies, he is studying Islamic education concepts. These notions are compiled in a compilation of interconnected ideas and ideals. This connection then constitutes the system known as the term. It is believed that the subject of Islamic education is the reason why pupils have difficulties understanding it. In this instance, digital technology is a viable choice for assisting students in discovering and expanding their conceptions of abstract Islamic education. The forerunner of the use of technology in communication, including communication in learning.

This is expressed in Surah An-Naml (27) Verses 29-30, which is about the story of Prophet Sulaiman and the queen of Balkis, in Tafsir Jalalain, it is stated that; “Go and bring this Surah of mine, then drop it to them) to Queen Balkis and her people (then turn away) and go (from them) not too far from them (then pay attention to what they are talking about.” i.e., what answer or reaction they will do. Then the bird Hud-Hud brought the letter and went to Queen Balkis, who was in the midst of his army at that time. Then the Hud-hud bird dropped Solomon’s letter into his lap. When queen Balqis read the surah, her body trembled and limp with fear, then she thought about the letter’s contents.

The relationship with the learning process is also a form of communication in education. The use of Hud-Hud bird media by Prophet Sulaiman in delivering a letter to Queen Balqis was an implementation of technology at that time because using the bird could make the communication process more effective and efficient. Even in the meeting, both of them were facilitated with facilities and infrastructure that used advanced technology to create a comfortable and conducive atmosphere. Thus, learning should be able to use media that can facilitate communication in the process, and use facilities that can make students comfortable, so that learning can optimally achieve its goals.

In general, the object of study of Islamic education can be categorized into two parts: the object of direct study (direct object) and the object of indirect study (indirect object). The direct object is conceptual knowledge about Islamic education itself, where this knowledge consists of concepts, operations, relations, principles, and facts in the field. At the same time,

the indirect object of Islamic education (indirect object) is the skills obtained from learning activities such as problem-solving, direct language, critical thinking, logic, creativity, and so on.

In accordance with the direct and indirect goals of Islamic education, Goos categorizes Islamic education into two categories: knowing and doing. Islamic Education as a sort of knowledge is associated with knowing. In the meantime, doing pertains to Islamic education activities. In this case, Goos views knowing as important as doing in Islamic Education Learning. This is because the understanding of Islamic education is not a fixed understanding of a person but is formed and developed through a construction process through life experiences and learning experiences (Budiman et al., 2021).

Regarding technology integration in Islamic Education Learning, Goos, Galbraith, Renshaw, and Geiger provide a metaphor for 4 teacher and student conceptions of technology in Islamic Education Learning, namely technology as master, servant, an extension of self, and partner. Students and teachers will view technology as a master if they consider it limited to knowledge of Islamic Education. Technology will be seen as a servant if they consider that Islamic education is not limited to activities on paper, namely, making technology an alternative to paper and pencil-based learning activities. Suppose technology is an inseparable part of the activity itself. In that case, i.e., technology is part of knowledge, even though it is learned, then they will view technology as an extension of self which is part of the learning content.

However, suppose teachers and students perceive Islamic education as constructive knowledge. In that case, they will view technology as a learning tool (partner) to find new perspectives from an idea, find relationships between ideas, use these relationships in solving problems with various approaches, and develop students' conceptual understanding of ideas. In this case, technology acts as a partner for students and teachers. In line with this, Pope emphasized that using technology in learning should provide opportunities for students to understand and master concepts and principles through exploring and investigating feedback, patterns, changes, and relationships with the help of technology.

Based on the description above, it can be concluded that the views of teachers and students about Islamic education will affect the way they apply technology in learning. In this case, their understanding of philosophy, namely the ontology, epistemology, and axiology aspects of Islamic education, plays a central role in determining the technology integration model they will apply in Islamic Education Learning.

Because philosophically Islamic education is a knowledge system that is built and understood constructively by the human mind through a series of life experience processes, not a ready-made concept knowledge system, then the role of technology as a partner or learning aid is the most appropriate thing when technology is integrated into learning.

In this case, technology integration should not cause students' conceptual understanding of Islamic learning to be worse or replace the role of students' intuition in learning. On the other hand, technology integration aims to enhance students' conceptual comprehension and aid in the development of students' intuitive talents in Islamic education.

2. Principles of Technology Integration in Islamic Education Learning

The effectiveness of technology in learning cannot be doubted. Various studies show that students can learn richer, deeper, and more meaningful when technology is used 'effectively' in Islamic Education Learning. However, using technology 'effectively' in learning is challenging for teachers and researchers who design Islamic Education Learning activities. The 'appropriate' application of technology in Islamic Education Learning involves the application of the principle of technology integration in Islamic Education Learning. In this regard, NTCM asserts that "technology should not be used as a replacement for basic

understandings and intuitions; rather, it can and should be used to foster those understandings and intuitions." This implies that technology should not be utilized as a substitute for students' conceptual knowledge and intuition in learning, but rather that technology should be used to enhance students' conceptual understanding and intuitive talents in Islamic education. This is the fundamental premise of employing digital technology in Islamic Education Learning, meaning avoiding the use of technology that hinders conceptual understanding and student intuition.

Related to this, Drijvers, Boon, and Van Reeuwijk suggested three didactic functions of technology in Islamic Education Learning, namely:

a. Technology for doing, namely digital technology that functions as an alternative to paper and pencil media for carrying out learning activities.
b. Technology for practicing skills, namely digital technology, functions as a learning environment to hone skills in Islamic Education learning.
c. Technology for developing conceptual understanding, namely digital technology that functions as a learning environment to develop a conceptual understanding of Islamic Education.

Of the three functions, if you use a constructivist perspective, then technology for developing conceptual understanding is the most expected expectation from integrating technology in Islamic Education Learning. This is because Islamic education is seen as a knowledge system built through knowledge construction and understanding gained from life experience, including learning experiences.

This view of technology for developing conceptual understanding aligns with the NCTM above that technology should be used to build or construct students' understanding and intuition. The construction process consists of three stages of thinking, namely conjecturing (guessing), justifying (testing the truth of allegations), and generalizing (using conjectures that have been tested for truth in a wider context).

Thus, the application of digital technology in Islamic education learning is ideal when the technology applied provides space and opportunity for students to conjecture, test the truth of the assumption (justifying), and use the assumption in the context of broader Islamic education (generalizing) to develop the conceptual understanding and intuition of students' Islamic education.

This view is in line with the view of technology as a student partner in learning in the Goos, Galbraith, Renshaw & Geiger metaphor, namely, technology acts as a tool for students in the process of finding and developing students' conceptual understanding of the idea of Islamic education (Wulan et al., 2021).

3. Determinants of the Success of Technology Integration in Islamic Education Learning

By paying attention to the basic principles of using technology in learning as described above, Drijvers suggests three factors that need to be considered related to the development and integration of digital technology in Islamic Education Learning, namely: technology design factors, the teacher's role in the application of the technology, and factors in the educational context in which the technology is applied.

Included in the technology design factors are related to the following questions: Is the technology design easy to use by users? Is technology design effectively used to achieve the objectives? Is the technology design content and construction valid based on the relevant learning theory?

Meanwhile, the teacher's role is related to the magnitude of the teacher's role in the success of technology integration in learning. In this case, there needs to be clarity on the teacher's role in integrating technology in Islamic Education Learning, namely clarity on what

teachers should do and how to do it. Thus, the success of technology integration in learning concerns teachers' level of ability or professionalism in orchestrating technology integration-based Islamic Education Learning activities. In this case, teacher professionalism training activities need to be in applying technology in learning.

The educational context factor concerns the situation where the learning technology is used, namely whether the technology can motivate students' interest in learning, whether the education system, such as educational evaluation, is in line with the technology-based learning paradigm, and so on.

E. CONCLUSION

Based on the preceding description, it can be inferred that the fundamental principle governing the use of digital technology in Islamic education is that technology should not replace conceptual understanding and intuition. On the other hand, technology has a role in enhancing students' conceptual knowledge of Islamic education and strengthening their intuitive skills in Islamic education.

There are three didactic functions of technology in Islamic Education Learning, namely: Technology for doing, namely digital technology that functions as an alternative to paper and pencil media to carry out Islamic Education activities; Technology for practicing skills, namely digital technology that functions as a learning environment to hone certain Islamic Education skills; and Technology for developing conceptual understanding, namely digital technology that functions as a learning environment to develop a conceptual understanding of Islamic Education.

The three didactic functions, technology for developing conceptual understanding is the most expected expectation from integrating technology into Islamic Education Learning. This is because Islamic education is seen as a knowledge system built through knowledge construction and understanding gained from life experience, including learning experiences. Three factors need to be considered related to the development and integration of digital technology in Islamic Education Learning: technology design factors, teacher role factors in the application of the technology, and educational context factors in which the technology is applied.

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