

# Industrial Revolution 4.0 and Society 5.0 in the Transformation of Islamic Education: Digital Challenges, Opportunities, and Policy Strategies

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## Abstract

The Industrial Revolution 4.0 and the concept of Society 5.0 have had a significant impact on the world of education, including in Islamic education. This research aims to examine the application of digital technology at SMK Darul Lughah Wal Karomah, especially in integrating technology related to the Industrial Revolution 4.0 and Society 5.0 in Islamic religious learning. This study uses a qualitative case study method with data collection techniques through interviews and field observations. The results of the study show that the application of digital technology at SMK Darul Lughah Wal Karomah faces several challenges, such as the limitations of technological infrastructure and low digital literacy among students and teachers. Even so, digital technologies such as online learning, big data, and artificial intelligence have great potential to improve the quality of Islamic religious education, enrich learning resources, and create more flexible and adaptive learning. However, the use of this technology also presents challenges in terms of the sorting of valid and moderate information, especially through social media which is often unverified. This study suggests integrating digital literacy with the values of religious moderation in the Islamic education curriculum. A value-based pedagogical approach is needed to keep pace with technological developments with the formation of student characters who are moderate, inclusive, and adaptive to the changing times. Overall, this study provides policy recommendations to increase the digital literacy capacity of teachers and students, as well as create humanistic digital policies that can support the transformation of Islamic education that is more relevant to the digital era.

## Keywords

*Industrial Revolution 4.0, Society 5.0, Transformation of Education*

## 1. INTRODUCTION

Islamic education in Indonesia, especially in the context of faith-based educational institutions such as Islamic boarding schools and vocational schools, faces great challenges in integrating technological advances with religious values. The Industrial Revolution 4.0 marked by advances in digital technology, automation, artificial intelligence (AI), and the Internet of Things (IoT) requires the world of education to adapt quickly to remain relevant to the competency needs of the 21st century (Schwab, 2016). This change is also strongly felt by Islamic educational institutions that have been known to be strong in the classical scientific tradition, but are now required to transform towards digital-based learning that is adaptive, creative, and still based on Islamic spiritual values (Arrasyid et al., 2026; Putri et al., 2025; Suharto, 2019).

However, the acceleration of digitalization has an impact that is not only positive, but also presents various challenges in the implementation of technology in Islamic education. At SMK Darul Lughah Wal Karomah, for example, the integration of digital technology in the process of Islamic religious education still encounters obstacles related to limited infrastructure, the digital literacy skills of teachers and students, and the unpreparedness of a curriculum that is responsive to the dynamics of developing technology. Similar conditions are also found in various other Islamic educational institutions, such as the inadequacy of technology-based learning tools and the low integration between modern science and Islamic values (Arrasyid et al., 2026; Istiqomah Istiqomah, 2023). The reality on the ground shows that although digital technology has become widespread, there is still a huge gap between its potential use and the ability of Islamic educational institutions to manage it effectively and in value.

Along with the changing times, the concept of Society 5.0 emerged, a new paradigm introduced by Japan that emphasizes the use of technology that is not only sophisticated, but also humanist and inclusive. Society 5.0 places humans at the center of all technological developments, so that the resulting innovations are expected to be able to overcome social and economic problems and ensure the use of technology for the common good. In the context of Islamic education, the implementation of Society 5.0 requires educational institutions to not only integrate advanced technology in the curriculum, but also to maintain religious values and be in harmony with moderate Islamic teachings (Jawad et al., 2024; Raymond et al., 2025; Trisnawati et al., 2025). Thus, Islamic education in the digital era requires a more humanistic approach, which combines technology, ethics, and pedagogy to produce a digitally intelligent generation while still based on moderate and tolerant religious values (Jawad et al., 2024; Trisnawati et al., 2025).

The ideal state that should be achieved is an Islamic education that is able to integrate technology effectively without sacrificing deep religious values. This requires changes not only in the technical aspect, but also in the development of the student's character.

Islamic education must be able to balance technology-based learning and the formation of a moderate, inclusive, and adaptive religious character. The big challenge faced by Islamic educational institutions is how to combine technical competence with moral and spiritual intelligence, so that graduates not only master digital skills, but also have the resilience of values and religious integrity (Putri et al., 2025). As an institution based on religious values, SMK Darul Lughah Wal Karomah needs to create an education system that prepares students with digital skills as well as a balanced and moderate understanding of religion, so as to be able to avoid them from narrow and extreme religious understanding.

Previous research related to the application of technology in Islamic education shows that there is great potential for the use of digital technology to improve the quality of Islamic religious education. Online-based learning, the use of Learning Management System (LMS) platforms, and the use of artificial intelligence (AI) have been proven to expand access, enrich learning resources, and accommodate diverse learning styles in Islamic education environments (Nugraha et al., 2023; Putri et al., 2025; Rahman et al., 2025; Teknowijoyo & Marpelina, 2022). On the other hand, some studies affirm that the main challenge is not only in the provision of technology, but also in the quality of religious information that students access. Without adequate supervision, information spread on the internet, especially related to religion, is often unverified and can exacerbate narrow, intolerant, or even extreme religious understandings (Hasanuddin et al., 2025)

In this context, a value-based pedagogical approach is very important. The value-based pedagogical approach emphasizes that technology should be positioned as an instrument to strengthen students' character through the moderate integration of moral and religious values in the learning process. Afandi and Jannah (2024) emphasized that in Islamic religious education, technology should be used to deepen the internalization of values, build morals, and foster spiritual awareness that is in line with the Islamic principle of *rahmatan lil 'alamin*, not just as a tool for material delivery. This approach is in line with findings that show that the integration of values, institutional culture, and teacher role models is a determining factor for the success of digital transformation that remains oriented towards strengthening religious character (Maftuhah, 2026; Hayes et al., 2025).

In supporting the development of digital spirituality, digital literacy also becomes an essential competency that must be strengthened among students. From the perspective of digital spirituality, technology in Islamic religious education is not only related to the use of digital devices or platforms, but also concerns how technology can strengthen students' spirituality and foster a moderate religious character in the digital space. Meli Afriani (n.d.) explained that digital spirituality requires awareness to make the digital space a medium of *dhikr*, reflection, and strengthening inclusive religious identity, not as a space that triggers polarization and hatred. In line with that, several studies in Islamic boarding schools show that the use of digital-ethical ecosystems—such as the digitization of books, online classes, and moderate *da'wah* content—can strengthen students' critical literacy, evaluative ability, and ideological resilience to digital radicalism (Baidowi & Habib,

2026).

In addition, digital literacy is one of the crucial factors in facing the various challenges above. Gilster in his theory of digital literacy states that the ability to access, evaluate, and use information critically in the digital world is a mandatory competency of every individual (Gilster, 1997). At SMK Darul Lughah Wal Karomah, students need to be equipped with digital literacy education that not only teaches technical skills in the use of devices, but also the ability to filter and evaluate religious content that they encounter in the digital world. Nahdhiyanto and Zataadini's research shows that low digital literacy among students causes many of them to receive religious information without prior verification, thereby increasing the risk of spreading invalid religious content and undermining moderate religious understanding (Nahdhiyanto & Zataadini, 2023). Along with the low digital literacy among students, several studies show that digital literacy plays a very important role in the formation of moderate religious understanding. Improving digital literacy helps students sort out authentic information and avoid content that is detrimental to their religious understanding, in line with the findings that religious digital literacy has a positive impact on students' religious moderation attitudes (Agusta, 2024; Subekti & Waslah, 2024).

A number of recent studies also confirm that religious digital literacy and the targeted use of digital platforms contribute to strengthening religious moderation among students. Digital learning platforms and social media that are managed in an educative manner can provide authentic, contextual, and moderate Islamic content, while training students to have healthy and critical dialogue with differences of views (Agusta, 2024; Patahilah & Rauf, 2025; Puspita et al., 2025). In other words, strengthening digital literacy that is integrated with religious value education is one of the strategic keys to prevent the spread of extreme religious beliefs, especially among the younger generation who are very familiar with gadgets and social media.

On the other hand, digital education policies also have an important role in directing the use of technology in Islamic educational institutions to remain in line with strengthening religious moderation. Various studies recommend that digital education policies not only focus on infrastructure development, but also on value development, curriculum development that is sensitive to moderation issues, and capacity building for teachers as role models for digital literacy and religious moderation (Arrasyid et al., 2026; Trisnawati et al., 2025). In the context of Islamic vocational schools such as SMK Darul Lughah Wal Karomah, this is even more urgent considering that graduates are not only directed to become skilled workers in the world of work, but also agents of moderation in a society that is full of digital information flows.

In line with that, several studies highlight the need for a humanistic policy strategy in utilizing technology in Islamic educational institutions. (Putri et al., 2025) suggested that in the face of the Industrial Revolution 4.0, schools need to formulate strategies to increase competitiveness through the use of educational technology, while integrating

religious values to produce students who are competent and have strong character. (Nugraha et al., 2023) show that the integration of technology in Islamic education not only improves technical competence, but also allows for more customized Islamic religious learning according to the needs of each student. These findings indicate that digital policies that are designed in a humanistic manner, which combines aspects of technology, values, and ethics, are very relevant to be implemented at SMK Darul Lughah Wal Karomah as part of the transformation towards an adaptive, inclusive, and moderate Islamic education ecosystem.

Departing from the various descriptions above, this research aims to fill the study gap at the practical level in Islamic vocational education units, especially at SMK Darul Lughah Wal Karomah. This research seeks to provide a deeper understanding of policy strategies and pedagogical approaches that can be adopted to integrate technology in Islamic religious learning effectively and moderately. More specifically, this study seeks to answer the following questions: (1) What are the challenges faced by teachers and students in integrating digital technology into Islamic value-based learning at SMK Darul Lughah Wal Karomah? (2) What are the opportunities that arise from the application of the Society 5.0 concept to create a more humanistic, inclusive, and adaptive Islamic education at SMK Darul Lughah Wal Karomah? (3) What kind of humanistic digital policy strategy can be applied by SMK Darul Lughah Wal Karomah to utilize technology without sacrificing moderate religious values?

The purpose of this research is to identify the challenges faced by teachers and students in the use of digital technology for Islamic religious learning, explore opportunities arising from the implementation of Society 5.0 to create a more humanistic and inclusive Islamic education, and formulate a humanistic digital policy strategy that can be applied at SMK Darul Lughah Wal Karomah so that the technology used remains in line with moderate Islamic values. In addition, this research aims to provide practical recommendations for Islamic educational institutions in integrating technology in a balanced manner between technology, values, and ethics in the learning process. The novelty of this study lies in its focus on the integration of digital literacy, Society 5.0 principles, and religious moderation within the context of Islamic vocational education, particularly at SMK Darul Lughah Wal Karomah, which has rarely been discussed comprehensively in previous studies. This study also offers a humanistic digital policy perspective that emphasizes the balance between technological competence and the strengthening of moderate Islamic character in the learning process. Through this research, it is hoped that a technology-based model of Islamic education can be found that not only improves students' digital competence, but also strengthens moderate religious character, thereby producing a generation that is ready to face global challenges without losing their Islamic identity.

## 2. METHOD

This research employs a qualitative approach with a case study design to gain an in-depth understanding of the implementation of technology in Islamic education at SMK Darul Lughah Wal Karomah, particularly within the context of the Industrial Revolution 4.0 and Society 5.0. A qualitative approach was selected because this study focuses on social, cultural, and pedagogical phenomena that require contextual and interpretative analysis rather than statistical measurement. The case study design was specifically chosen to explore the unique characteristics, experiences, and practices of SMK Darul Lughah Wal Karomah as an Islamic vocational school integrating digital technology with Islamic religious values in its learning process.

This study emphasizes the specific institutional context of the school, including its technological adaptation strategies, the integration of digital literacy into Islamic religious learning, teacher and student experiences in using digital platforms, and school policies aimed at maintaining moderate Islamic values amid rapid digital transformation. By focusing on the real conditions and practices within the institution, this research seeks to reveal the distinctive challenges and opportunities encountered by SMK Darul Lughah Wal Karomah in balancing technological innovation with value-based Islamic education. In addition, the study aims to identify and analyze the policies implemented by the school to support the integration of technology into the Islamic religious education curriculum in a humanistic and moderate manner.

Data collection in this study was carried out by in-depth interviews and participatory observations. In-depth interviews are conducted by involving principals, teachers, and students as key informants. Principals and teachers provide insights into the policies and strategies implemented in schools related to the use of technology in religious learning, as well as the challenges and opportunities they face in integrating technology into the classroom. Meanwhile, interviews with students provide an overview of their experiences in using technology in the religious learning process and how they assess its effectiveness. Participatory observation is carried out to see firsthand how technology is used in daily learning in the classroom. Researchers participate in learning activities to observe the interaction between teachers and students, as well as the use of digital devices in accessing and disseminating learning materials. The data collected from these two techniques were then analyzed thematically to identify patterns, categories, and relationships between variables relevant to the research topic.

## 3. RESULTS

### **Challenges in the Integration of Islamic Educational Technology**

One of the main challenges faced by schools is the limitation of adequate technological infrastructure. Uneven infrastructure between classrooms and lack of adequate

technological tools limit the effectiveness of technology integration in learning. For example, some teachers revealed that they still face difficulties in using advanced educational software due to a lack of adequate training and digital skills. This is evident from the statement of one of the teachers who said, "We do not have consistent access to advanced technological tools that can support digital-based learning. In fact, the internet network in some rooms is very slow."

Another challenge is related to low digital literacy among students. Although most students have digital devices, many of them have not mastered the basic skills of searching for and evaluating information critically. Some students reveal that they often have difficulty in verifying the truth of the information they find on the internet, especially those related to religious content. One student said, "Sometimes I just trust the content of a YouTube video without checking the source, because it looks convincing." This shows that there is a gap in students' digital literacy skills, which leads to a religious understanding that is not always moderate and balanced.

### **Opportunities Presented by the Industrial Revolution 4.0 and Society 5.0**

Despite the various challenges, this study also shows the great opportunities offered by the application of digital technology in Islamic education. Technology-based learning, such as the use of digital platforms for online learning, provides opportunities for students to access learning materials more flexibly and in a more efficient time. Additionally, technologies such as big data and artificial intelligence (AI) can be used for personalization of learning, allowing teaching to be tailored to each student's needs and abilities.

For example, the principal of SMK Darul Lughah Wal Karomah revealed that the school has started using online-based learning for certain subjects, "We use platforms like Google Classroom to facilitate distance learning. This allows students to access the material anytime and anywhere, as well as interact with teachers through discussion forums." This shows how the application of technology can facilitate the learning process even in the physical limitations of the classroom.

In addition, this research shows that Society 5.0 can provide a new perspective in Islamic education. Society 5.0 prioritizes a balance between technology and human well-being, emphasizing the importance of human values in every technology used. In the context of Islamic education, it opens up opportunities to integrate technology that is not only technically effective, but can also support the development of better character and morals of students. One of the teachers commented, "We try to integrate Islamic values in every use of technology. For example, in religious learning, we invite students to use the internet as a source of information that is authentic and relevant to the principles of moderation in Islam."

### **Humanistic Digital Policy Strategy**

In order to support humanistic digital transformation, this research also identifies a

number of policy strategies that can be applied at SMK Darul Lughah Wal Karomah. One of the main recommendations is to increase the capacity of teachers in digital literacy. Teachers need to be involved in regular training programs on the use of technology in learning and how to integrate religious values in every digital interaction. According to an interview with the principal, "It is important for us to provide training to teachers so that they can teach students using technology effectively, as well as ensure that the technology used still upholds moderate Islamic values."

In addition, a curriculum policy management strategy that is responsive to digital dynamics is also very important. The curriculum needs to be adapted to include digital learning that focuses on developing students' critical and analytical skills in accessing and assessing information. The implementation of this policy will involve collaboration between school managers, teachers, and other related parties, including the community and parents of students, in creating a learning ecosystem that supports religious moderation through technology.

#### **4. DISCUSSION**

##### **Thesis: Integration of Islamic Technology and Education in the Industrial Revolution 4.0 and Society 5.0**

This study reveals findings that show that the application of technology in Islamic education at SMK Darul Lughah Wal Karomah, especially related to the Industrial Revolution 4.0 and Society 5.0, has a significant impact on the learning process and religious understanding of students. In the context of Islamic education theory, the theory of educational technology and value-based education proposes that digital technology not only serves as a tool to accelerate the learning process, but can also play an important role in strengthening religious values and spirituality in education. This study reveals findings that show that the application of technology in Islamic education at SMK Darul Lughah Wal Karomah, especially related to the Industrial Revolution 4.0 and Society 5.0, has a significant impact on the learning process and religious understanding of students. In the context of Islamic education theory, the theory of educational technology and value-based education proposes that digital technology not only serves as a tool to accelerate the learning process, but can also play an important role in strengthening religious values and spirituality in education.

In particular, the digital learning theory put forward by Laurillard directs that technology-based learning is able to provide a space for students to learn in a more interactive, flexible, and personalized way (Laurillard, 2016). At SMK Darul Lughah Wal Karomah, the implementation of online learning platforms and the use of artificial intelligence (AI) shows the potential to improve the quality of Islamic religious learning that can be tailored to the individual needs of students. His research notes that the use of technology in Islamic education, as explained by Suhendi, can create a more adaptive and

inclusive education, as well as facilitate the teaching of religious values that are relevant to the challenges of the times (Suhendi, 2023).

However, although the use of technology opens up great opportunities, this study also shows that the application of technology in SMK Darul Lughah Wal Karomah cannot be separated from the challenges faced in terms of inadequate digital infrastructure, as well as the limitations of digital literacy among students and teachers. Therefore, the theory of digital literacy developed by Gilster is very relevant in this discussion (Gilster, 1997). Digital literacy is not only about technical skills in using digital devices, but rather the critical ability to evaluate and utilize information wisely.

Based on interviews and observations, most students admitted that they had difficulty distinguishing relevant and valid information on social media. This reflects that their digital literacy is still low, and they are often trapped in a narrow and uncritical understanding of religion. In this context, digital technology does not necessarily function as a neutral tool. This reminds us of the theory of critical pedagogy by Freire (1970), which states that technology must be integrated with critical values to prevent the formation of narrow and sectarian mindsets (Irsan, 2025).

### **Antithesis: The Challenges and Potential of Technological Misuse in Islamic Education**

One of the antitheses that emerged in this study was the potential for misuse of technology that could exacerbate the problem of radicalization among students. These findings underscore that while technology brings many benefits, it also carries potential abuses that must be controlled wisely. Free access to unfiltered digital content and students' lack of critical competence in evaluating information risks leading to the spread of extreme religious understanding.

According to Maslichah and Hilalludin, although technology can be an effective educational tool, without strict supervision and mentoring from teachers, invalid or extreme religious content can easily be spread on digital platforms (Maslichah & Hilalludin, 2026). For example, one of the students at SMK Darul Lughah Wal Karomah stated that he often found misleading religious content on YouTube and TikTok, but he did not know how to verify the truth. These findings suggest that there is a gap in students' ability to sort and choose the correct information, which worsens their understanding of moderate religious teachings.

Research by Malik and Labib also revealed that social media is often a channel for the spread of radicalization, especially among the younger generation who tend to be affected by information without verification (Malik & Labib, 2025). Therefore, the biggest challenge in the transformation of Islamic education in the digital era is to balance the positive use of technology and reduce the risk of misuse that can damage the quality of Islamic education. The integration of digital education with moderate Islamic values is a solution to overcome this antithesis.

## **Synthesis: Developing a Digital Pedagogy Model Based on the Value of Religious Moderation**

To achieve a balance between the positive potential of technology and the risk of its misuse, this study suggests a synthesis of thesis and antithesis approaches through the integration of value-based digital pedagogy. This pedagogical model not only relies on technology as a tool, but also prioritizes moderate, inclusive, and contextual religious values. In this regard, Islamic religious education should include more than just the transfer of religious knowledge, but also the development of students' character through a digital-wise-based approach.

The theory of value-based pedagogy put forward by Muqorrobin et al. is particularly relevant here, which emphasizes that education must incorporate moral and ethical values in technology-based learning (Muqorrobin et al., 2024). In this case, SMK Darul Lughah Wal Karomah has tried to implement the concept of Society 5.0, which emphasizes the integration of technology with humanistic values. This theory focuses not only on learning based on technical competence but also on character formation through moral and spiritual education.

At SMK Darul Lughah Wal Karomah, teachers act as facilitators who accompany students in navigating the digital world, helping them to choose content that is authentic and relevant to moderate Islamic values. One teacher said, "We teach students to verify the religious information they get from social media by matching it to what they learn in class." This approach reflects the integration between critical digital literacy and moderation-based religious education, which supports the formation of inclusive and tolerant attitudes among students.

The synthesis of this pedagogical model can be represented in a digital Islamic education curriculum that not only teaches basic digital skills but also integrates moderate Islamic values that encourage students to think critically and reflectively. According to Hamidalloh and Hamdani, this kind of curriculum will provide space for students to access information, analyze it carefully, and make wise decisions in response to differences in religious views (Hamidalloh & Hamdani, 2025).

## **5. CONCLUSION**

The integration of technology in Islamic education at SMK Darul Lughah Wal Karomah opens up great opportunities to create more flexible and innovative learning. However, this also requires more mature digital literacy learning among students and teachers. Although challenges such as limited infrastructure and digital literacy still exist, effective supervision and mentoring from teachers in selecting and evaluating digital content are the main keys to building moderate religious understanding.

Through a values-based pedagogical approach, which integrates technology and

Islamic values, SMK Darul Lughah Wal Karomah can create an adaptive, inclusive, and well-being-oriented learning ecosystem for students. It is not only about preparing students with technical skills but also about shaping their character to become a competent and moderate generation in the face of digital challenges in the era of the Industrial Revolution 4.0 and Society 5.0

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