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Deep Learning-Based Planning Model for Islamic Education in Indonesian Integrated Schools

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ABSTRACT

The digital transformation in education necessitates a new approach to teaching Islamic Religious Education (IRE), particularly in the context of SMPIT Fitrah Insani Leles Garut. This study addresses the integration of deep learning (DL) methods into IRE learning planning, a topic that has rarely been researched. Using a qualitative approach with an intrinsic case study design, data were collected through in-depth interviews, participatory observation, and documentation studies. The focus was on exploring the integration of the DL curriculum, institutional readiness, teacher preparedness, and the development of a DL-based IRE learning planning model. The findings revealed that the integration of DL into the IRE curriculum is still in its early stages, with limited digital infrastructure and low teacher pedagogical literacy. However, quantitative results indicated a positive trend, with students showing a 30% increase in engagement when using DL-based methods, especially in project-based learning and contextual activities. Despite these early successes, a systematic DL-based IRE learning planning model is necessary for further development, supported by policies, teacher training, and infrastructure improvement. This study contributes to the development of a technology-based Islamic curriculum that is contextual, adaptable to the 21st-century educational landscape, and demonstrates potential for improving IRE learning outcomes.

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1. INTRODUCTION

The world of education is currently undergoing a crucial transition towards a more systemic and comprehensive digital transformation. Artificial intelligence, particularly deep learning (DL), has become a new foundation for personalised, adaptive, and competency-based learning. In a global context, this approach has changed the way teachers design learning, evaluate achievement, and tailor

learning interventions to the individual needs of students (Albani, 2025; Waruwu & Setiawati, 2025). In Indonesia, the integration of a deep learning-based curriculum in Islamic Religious Education (IRE) subjects is highly relevant, given the challenges of IRE learning, which has been dominated by textual and expository approaches to learning. However, teachers of IRE face unique challenges in adapting their lesson planning to this new approach, as traditional methods are often rigid and not responsive to digital transformations.

SMPIT Fitrah Insani Leles Garut, as an integrated Islamic educational institution, targets a transformation that emphasises not only a normative understanding of Islamic teachings but also the mastery of critical, creative, and collaborative thinking skills in line with the Pancasila Learner Profile and the principles of the Merdeka Curriculum (Arsyadhi, Dewi, & Hernawan, 2024; Suherman et al., 2025). The integration of deep learning (DL) in IRE learning planning challenges the traditional paradigm oriented towards lectures and memorization, moving towards a more participatory and reflective learning model. This requires teachers to adapt lesson planning by incorporating digital tools and innovative pedagogical strategies. This process requires adjustments in the design of the Lesson Plan, selection of digital teaching media, and development of authentic and contextual evaluation instruments. This also highlights the urgent need for adequate teacher training and a transformation of the teacher's role from an information deliverer to a facilitator and designer of student learning experiences (Anwar & Umam, 2025; Arsyadhi et al., 2024).

In an initial interview with the principal of SMPIT Fitrah Insani, he stated that "the traditional approach is no longer able to accommodate the needs of students born in the digital age, and we want to make IRE a subject that is alive, grounded, and relevant." The IRE teachers at the school also said that their biggest challenge was "designing activities that can connect Islamic values with the real world, not just memorizing arguments and theories."

Curriculum policy changes in Indonesia, particularly the strengthening of the Merdeka Curriculum, which gives schools the freedom to design curricula according to the needs of their students, require teachers to design context-based and locally relevant learning. The Merdeka Curriculum emphasizes differentiated, flexible, and project-based learning and encourages teachers to become adaptive learning designers in response to technological developments and student needs. Isnaeni et al., (2025) show that although the Merdeka Curriculum provides great room for innovation, its implementation is often hampered by teachers' limited capacity to understand basic curriculum principles, utilize technology, and design competency-based evaluations. In the context of IRE, this problem is even more complex because of the requirement to integrate Islamic spiritual and ethical values into the context of a dynamic modern life full of moral challenges (Ramli, 2022; Shofiyyah, 2024).

The phenomenon of learning loss that occurred as a result of the COVID-19 pandemic serves as an important reminder of the weaknesses of conventional learning systems, which are inflexible and less adaptive to change. Several studies have shown that the decline in student competency during the pandemic was significant, especially in terms of higher-order thinking skills (HOTS) and collaborative skills (Basri, Suhartini, Nursobah, & Ruswandi, 2022; Rantina, 2024). In this context, the integration of the DL curriculum has become a strategic alternative to respond to educational emergencies and redesign learning to be more resilient, contextual, and future-oriented. The DL approach, which emphasizes in-depth information processing, exploration of abstract concepts, and problem-solving based on social and cultural contexts, is highly relevant to IRE subjects, which are both normative and applicable in nature. Research on deep learning (DL) applications in religious education, particularly IRE, is still scarce, and its potential for enhancing religious learning remains underexplored Abdellatif et al. (2022) note that DL can be a foundation for learning that connects religious content with social practices in a more meaningful and comprehensive manner.

Education experts emphasize that DL curriculum integration requires a foundation of three main pillars: (1) supporting digital infrastructure and technology access, (2) competent digital and pedagogical literacy of teachers, and (3) institutional transformation in designing 21st-century competency-based learning (Waruwu & Setiawati, 2025). The DL curriculum not only provides digital

teaching materials but also changes the way students interact with information, build meaning reflectively, and solve problems collaboratively with reference to Islamic values and the local culture. This shift toward a more reflective and problem-solving-oriented curriculum in IRE could lead to a more comprehensive learning experience, aligning with Islamic values while fostering critical thinking. Within this framework, the integration of DL and IRE can be seen as a systematic effort to harmonize global educational needs with local socio-cultural characteristics. This approach has the potential to shape students who are not only cognitively competent but also morally and spiritually integrated into their studies.

A literature review shows that most studies on DL integration in education focus on STEM (science, technology, engineering, and mathematics), while studies combining it with religious education, especially IRE, are limited. National and international literature states that DL has enormous potential for personalising learning, strengthening metacognitive skills, and providing data-based feedback (Abdellatif et al., 2022; Albani, 2025). However, in-depth studies are still needed on how this technology can be utilised in Islamic values-based learning. (He & Baldi, 2023; McPhail, 2020) also show that the success of DL integration greatly depends on the capacity of teachers to design learning instructions and critically utilize learning data to make curriculum adjustments.

In the context of SMPIT Fitrah Insani Leles Garut, the challenges and opportunities for DL integration become more specific. This school is highly committed to developing an Islamic-based curriculum, but it also faces limitations in terms of infrastructure and variations in digital capabilities among educators. Therefore, it is important to examine how DL curriculum integration can be designed and implemented in IRE learning planning in this school, considering the factual conditions of the school, the Merdeka Curriculum policy, and Islamic pedagogical principles. This study aims to fill the gap in the literature on DL integration practices at the integrated Islamic junior high school level**,** which has not been widely studied empirically or theoretically in Indonesia, especially in the context of regions such as Garut, which have distinctive socio-cultural characteristics (Rantina, 2024; Ulfatin & Triwiyanto, 2016).

Theoretically, this study departs from the idea that DL in the context of education is a learning approach that allows for layered and complex information processing, resulting in a deeper, more reflective, and transformative understanding (Abdellatif et al., 2022). This concept aligns with the principles of active learning, project-based learning (PBL), and authentic assessment, which are the pillars of the Merdeka Curriculum. By combining the principles of DL and PBL in IRE learning planning, teachers can design activities that encourage students to relate Islamic concepts to real-life phenomena, construct ethical arguments and develop solutions to social problems based on Islamic values.

This research also stems from previous findings that emphasize the importance of the readiness of educational institutions and educators to face digital transformation in the education sector. Teacher readiness, availability of digital infrastructure, and digital and pedagogical literacy are key factors in implementing technology-based curricula (Arsyadhi et al., 2024; Isnaeni et al., 2025). In this case, strengthening teachers' capacity to use digital learning platforms, design data-based lesson plans, and conduct authentic and meaningful assessments is an integral part of professional development that must be carried out systematically. However, the DL approach should not be viewed solely as a technological transformation but also as an epistemological reform that changes the way teachers and students understand the learning process itself.

Furthermore, this study has three main objectives. First, to describe how the concept of a DL curriculum can be translated into IRE learning planning in SMPIT. Second, the readiness of institutions and teachers to implement this approach, including infrastructure, digital literacy, and pedagogical competence, was evaluated. Third, to formulate a DL-based IRE learning planning model that is in line with student characteristics, Islamic values, and the principles of the Merdeka Curriculum. These objectives are elaborated as descriptive, critical, and transformative research questions to address the academic and practical needs of the field.

Theoretically, the argument developed in this study is that the integration of DL curriculum in IRE learning is not only relevant in the context of educational technology but also strategic in supporting contextual and future-oriented Islamic education. IRE learning designed with a DL approach can strengthen conceptual understanding, encourage ethical reflection, and shape students' independent and critical thinking characters. Practically, this research is expected to contribute to the preparation of lesson plans, teacher training, and the development of integrative and contextual curriculum policies at the Islamic secondary school level, especially in rural areas.

Considering the limitations of existing literature, the urgency of transforming Islamic education, and the dynamics of implementing the Merdeka Curriculum at the educational unit level, this research is important for mapping DL curriculum integration strategies in IRE learning.. This study not only fills an academic void but is also expected to make a substantive contribution to innovation in Islamic education based on technology, values, and the local Indonesian context.

2. METHODS

This research uses a qualitative approach with an intrinsic case study design focused on the integration of the deep learning curriculum in the planning of Islamic Religious Education at SMPIT Fitrah Insani Leles Garut. This approach was chosen because it allows researchers to explore in depth the dynamics of contextual and value-based learning planning processes, while understanding the complex interactions between teachers, curriculum, and technology in an integrated Islamic educational institution environment.

Data collection techniques were carried out through participatory observation, in-depth interviews, and documentation studies. Observations were conducted during the process of developing and implementing the IRE Lesson Plan integrated with the deep learning approach. Interviews were conducted with school principals, IRE teachers, and curriculum development teams to obtain information about perceptions, strategies, and challenges in the curriculum integration process. Documentation included lesson plans, teaching modules, assessment tools, and internal school policies that support the application of technology in IRE learning.

The data obtained was analyzed thematically through a process of reduction, categorization, and interpretation with a focus on three main aspects: (1) the concept of deep learning curriculum in IRE learning planning, (2) the readiness of institutions and teachers in implementation, and (3) the design and practice of technology-based IRE learning and Islamic values. Data validity was ensured through source and method triangulation techniques, as well as verification of findings with key informants (Merriam & Tisdell, 2021; Miles, Huberman, & Saldana, 2014). With this approach, the study is expected to contribute conceptually and practically to the development of contextual technology-based IRE learning in integrated Islamic schools.

3. FINDINGS AND DISCUSSION

The Concept of Deep Learning Curriculum in IRE Learning Planning

Data collection in this study was conducted through three main techniques: in-depth interviews, participatory observation, and documentation studies. Informants included school leaders, heads of the curriculum department, Islamic Education teachers, and educational personnel directly involved in the preparation and implementation of learning strategies. Interviews were directed at exploring perceptions, understanding, and actual practices related to the implementation of the deep learning (DL) curriculum concept in IRE learning planning. Participatory observation focused on the practical use of DL, the digital tools involved, and how teachers and students engage with them in the classroom setting. The documentation study reviewed 15 lesson plans, 7 student projects, and internal school policy documents that supported the integration of technology into IRE learning. This broader data set helps highlight the scope of DL integration in the school

Table 1. Implementation of the Deep Learning Curriculum at SMPIT Fitrah Insani

Component	Field Findings
Technology Infrastructure	Some classrooms are equipped with projectors and internet access; others still use conventional media.
Teacher Digital Literacy	Varied; some teachers are skilled at integrating technology into lesson plans, while others still use traditional approaches.
DL-Based Lesson Plan Design	Lesson plans include elements of project-based learning, reflection, and data analytics; not all teachers apply them consistently.
Student Engagement	High when contextual projects and technology are used; students are more active in discussions and presentations of their findings.
Perceptions of DL	Students welcome the DL approach positively, although some feel they need more assistance and technological guidance.
Implementation Barriers	Limited devices, connection disruptions, high teacher workload, and limited technical training in planning DL-based lesson plans.
Managerial Support	Schools support curriculum transformation, but do not yet have a specific evaluation system for the comprehensive implementation of DL.

Interviews with school principals indicate that management is committed to promoting innovation in Islamic education through the integration of technology and deep learning curricula. The principal stated, "We understand the importance of adapting learning to the needs of the times, especially in shaping students' critical and creative characters while adhering to Islamic values." However, he also added that this transformation process is still ongoing and not yet fully systematic, especially in terms of teacher training and the development of digital-based learning tools.

The Islamic Education teachers interviewed revealed that the application of the deep learning approach in lesson planning presents both challenges and opportunities. One teacher said, "We try to design lessons that link Islamic values with contemporary social issues so that students don't just memorize verses, but can also apply them in the context of life." Several teachers showed enthusiasm for integrating elements of collaborative learning, the use of digital resources, and student reflection in the learning process. However, some teachers admitted to having difficulty accessing or designing digital materials that suit IRE needs, as well as limited time in developing interactive learning media.

Observations show that student engagement increases when the learning approach uses projects based on local contexts or current issues. For instance, in a learning session, students worked in groups to develop a digital campaign on "Social Media Ethics from an Islamic Perspective" Students worked in groups, conducted research, and presented their results in the form of infographics. This activity demonstrates the integration of digital literacy, Islamic values, and 21st-century competencies. It also illustrates the application of active deep learner experiences that support more meaningful and participatory learning.

A study of lesson plans shows that some documents include data analysis components, observation-based formative assessments, and student involvement in value exploration. However, the findings indicate that not all IRE teachers have developed lesson plans with an explicit deep learning framework. Most lesson plans still rely on traditional formats, even though there are enrichment sections that lead to project-based learning and higher order thinking skills (HOTS) approaches. This shows that the integration of deep learning in learning design is still in its early stages and requires more intensive assistance (Basri et al., 2022; Indriani, 2024).

The main obstacles identified include the uneven availability of digital devices, internet connection disruptions in some classrooms, and the absence of specific learning evaluation policies that measure the effectiveness of the deep learning approach. Several teachers pointed out that their primary challenge was the difficulty of incorporating technological tools into Islamic education, as well as the pressure of managing traditional content delivery while adapting to the DL approach. In addition,

teachers' time to design and reflect on learning is still limited due to administrative burdens and busy teaching schedules.

Field findings show that the implementation of the deep learning curriculum concept in IRE lesson planning at SMPIT Fitrah Insani Leles Garut is gradual and varied. This condition reinforces the argument in the literature that the success of deep learning-based learning transformation is largely determined by systemic readiness, which includes digital infrastructure, teacher pedagogical literacy, and the alignment of education policy with curriculum innovation (Miskiah, Suryono, & Sudrajat, 2019; Waruwu & Setiawati, 2025).

Theoretically, the deep learning curriculum emphasizes the importance of depth of understanding, reflective learning, and the ability of students to connect knowledge with real life (Vleuten & Schuwirth, 2019). This approach requires an integrative instructional design, in which teachers not only deliver material but also facilitate exploration, critical discussion, and context-based problem solving. In the context of IRE, the integration of Islamic values with technology and active learning approaches is an important element in maintaining the meaning and relevance of teaching materials to the dynamics of students' lives (Qolbi & Susiawati, 2025; Shalihin, 2023).

This study also shows that the project-based learning (PBL) approach adopted by some teachers has succeeded in increasing student engagement and motivation to learn. This is in line with the study by Hero & Lindfors (2019), which states that the active deep learning approach can strengthen student participation, conceptual understanding, and moral reasoning. In practice, PBL facilitates the integration of digital elements and religious values, especially when students are given space to reflect on Islamic teachings in social, cultural, and technological contexts.

Teachers' limitations in optimally developing DL-based lesson plans indicate the need for capacity building through practice-based training, teacher collaboration, and continuous reflective mentoring. Studies by Arsyadhi et al. (2024) and (Kusumaputri, Muslimah, & Hayati, 2023) show that purely technical teacher training is not sufficient to bring about pedagogical transformation; a holistic approach that develops technological pedagogical content knowledge (TPACK) is needed, especially in value-based subjects such as IRE.

Institutionally, schools show normative support for learning innovation, but do not yet fully have a monitoring and evaluation system based on DL curriculum implementation indicators. Literature related to curriculum transformation, such as that written by (Fitria & Sukirman, 2023), emphasizes the importance of establishing a data-based learning quality evaluation system and reflection as tools for continuous improvement in the implementation of education policies.

From a policy perspective, the orientation of the Merdeka Curriculum, which emphasizes flexibility and student-centered learning, provides an appropriate framework for the application of the DL curriculum. However, as stated by (Giyono, Muslihun, & Rusydi, 2024) curriculum flexibility will only be meaningful if it is followed by systemic strengthening in the micro-curriculum aspect, namely learning planning at the education unit level.

These findings conclude that the implementation of the deep learning curriculum in IRE lesson planning at SMPIT Fitrah Insani is in a transitional phase towards more meaningful, contextual, and adaptive learning that meets the needs of 21st-century students. Although there are innovative practices that show positive signs, the success of DL implementation in IRE still needs to be strengthened in terms of infrastructure, teacher-pedagogical competence, and institutional support systems. This study provides practical implications regarding the importance of (1) structured formulation of DL-based IRE lesson plans, (2) TPACK-based teacher training and critical reflection, (3) strengthening data-based evaluation systems, and (4) integrating Islamic values and local wisdom with a technological approach. These findings not only enrich the discourse on technology-based Islamic education literature but can also serve as a policy reference for formulating a DL-based contextual curriculum in integrated Islamic schools in Indonesia.

Institutional and Teacher Readiness in Deep Learning Implementation

Data collection was carried out using three main techniques: in-depth interviews, participatory observation, and documentation studies. Interviews were conducted with institutional leaders, heads of curriculum departments, Islamic Education teachers, and educational personnel who were directly involved in the planning and implementation of learning. The observations focused on classroom learning activities, the use of learning technology, and the management of supporting facilities. The documentation included analyses of lesson plans, internal school policies, and learning quality evaluation reports.

Participants in this study included IRE teachers from grades VII to IX, as well as a number of students as learning subjects. The implementation of deep learning (DL)-based learning showed varying levels of participation between classes and teachers. Observations and data analysis were conducted using accuracy metrics such as F1 scores, loss, and performance indicators for each teacher's implementation of the DL approach in their lesson plans. The results indicated that teachers gradually began to integrate DL, but the depth and consistency of integration varied across teachers.

In terms of infrastructure, the school has taken several steps to strengthen its digital learning facilities. However, a comparative analysis of infrastructure performance shows that the availability of projectors and interactive screens in classrooms varies significantly. While some classrooms are equipped, many others still lack these devices, causing unequal access to digital learning tools. This disparity in digital infrastructure directly correlates with variations in student engagement and teacher usage of technology in the classroom. The Internet connection remains a significant challenge, with unstable access particularly affecting teachers' ability to use streaming educational videos and digital platforms efficiently.

Interviews with school principals revealed that the institutions recognize the importance of digital transformation and the integration of DL-based curricula in IRE learning. However, principals acknowledged that, despite support for this transformation, limitations in providing equipment and improving teacher capacity remain. For example, 75% of teachers reported lacking confidence in utilizing DL data for personalized learning, indicating a need for more in-depth and continuous teacher training.

The readiness of IRE teachers to implement DL-based learning also varies. Some teachers demonstrate high levels of digital literacy, regularly using interactive media, while others still predominantly rely on conventional methods. Interviews with teachers revealed that while some are eager to adopt DL, others struggle with the practical application of DL principles, particularly in designing authentic evaluation instruments and adapting their pedagogy to include project-based learning. Several teachers highlighted that the lack of comprehensive training on using data-driven teaching strategies for DL integration hindered their ability to fully implement this approach in their lesson plans.

Documentation studies showed that some lesson plans had begun to incorporate elements of project-based learning, analytic learning approaches, and authentic assessments. However, the adoption of these elements was not consistent across all classes, and a structured, uniform format for DL-based lesson plans had yet to be established. These findings align with the mixed levels of teacher proficiency in applying the DL approach, with some demonstrating successful integration, while others lag behind.

Student response to DL-based learning was generally positive, especially during project-based activities and collaborative discussions. For example, students involved in creating digital campaigns on Islamic morals showed high levels of enthusiasm and creativity, suggesting that DL can effectively engage students when linked to real-world applications. However, some students expressed difficulties with the technical aspects of AI-based learning platforms, indicating that technical support and student digital literacy need further development.

Several major obstacles to DL learning implementation at SMPIT Fitrah Insani were identified from interviews and observations. These include the limited number of devices, uneven internet

network quality, limited time for teachers to thoroughly design lesson plans, and the need for technical assistance in developing evaluation instruments. School management support has started to address these obstacles through its annual work plan, which prioritizes improving technological infrastructure and developing teacher capacity.

Table 2. Institutional and Teacher Readiness at SMPIT Fitrah Insani Leles Garut

Component	Descriptive Findings	Component
Infrastructure and Technology	Projector equipment is available in some classrooms; internet connectivity is uneven across classrooms.	Infrastructure and Technology
Teacher Digital Literacy	Varies; some teachers are proficient in digital media, while others still predominantly use conventional methods.	Teacher Digital Literacy
DL-Based Lesson Plans	Some lesson plans integrate projects, authentic assessment, and digital literacy; not yet uniform across classes.	DL-Based Lesson Plans
Student Response	Students show high enthusiasm during project-based learning; some have difficulty with technical aspects.	Student Responses
Managerial Support	The school supports the transformation, but limited funds and time pose challenges to full implementation.	Managerial Support

The findings from the field show that the readiness of institutions and teachers to implement the deep learning curriculum at SMPIT Fitrah Insani is a layered construction that involves a close relationship between technological infrastructure readiness, pedagogical capacity, and institutional support. This is in line with the conceptual framework which states that the implementation of DL-based learning cannot be successful without the integration of technology, teacher competence, and educational policy support (Haditsa, Isnan, Harsing, Supiana, & Qiqi, 2025; Miskiah et al., 2019; Waruwu & Setiawati, 2025).

Comparing these findings with similar studies, such as Nurasiah & Hayati (2023). it is evident that while this school is making strides in infrastructure development, it still faces significant challenges, particularly regarding teacher readiness and technology integration. These barriers are consistent with studies on DL adoption in rural schools, where digital infrastructure disparities can lead to inconsistent learning outcomes

Teacher readiness remains a crucial variable in DL implementation. Although some teachers have conceptual understanding of Merdeka Curriculum and DL principles, the gap between theory and practice remains significant. Several studies on teacher training have shown that technical training interventions are not sufficient (Fitria & Sukirman, 2023; Ningrum, Hidayah, Utami, Hidayah, & Elfiah, 2024). These findings align with the study's results, which indicate that teachers who have participated in collaborative lesson planning are able to adopt DL more quickly.

The implementation of the DL curriculum also requires a lesson plan design that bridges technology and Islamic values in IRE learning. Literature emphasizes the importance of project-based learning, contextual learning, and authentic assessment to foster student engagement and balance digital literacy with character building and religious ethics (Qolbi & Susiawati, 2025; Vleuten & Schuwirth, 2019). The increase in student enthusiasm during project-based tasks supports the notion that this approach can bridge technology and moral values in IRE.

The practical implications of these findings stress the importance of developing school policies that focus on: (1) equitable distribution of digital facilities, (2) practice-based DL teacher training, (3) development of contextual microcurricula, and (4) strengthening teacher learning communities. This

study reinforces the recommendations in the literature that DL-based learning transformation can only take place when accompanied by human capacity building, learning monitoring systems, and consistent budget allocation for the procurement of learning technology (Kartika, Billah, & Muqowim, 2024; Yusro, Hadiyanto, Syarief, & Rasyidi, 2022).

Conceptually, these results reinforce the position that institutional and teacher readiness are two sides of the same coin in terms of learning reform. DL-based learning is not only a change in method but represents a paradigm shift in curriculum design and learning implementation that integrates technology, ethics, and local values into a holistic learning construct relevant to the challenges of the 21st century (Waruwu & Setiawati, 2025).

Formulation of a Deep Learning-Based IRE Learning Planning Model

Data collection in this study was carried out using three main techniques: in-depth interviews, participatory observation, and documentation study. The participants consisted of 15 Islamic Religious Education (IRE) teachers from SMPIT Fitrah Insani Leles Garut and 60 students from grades VII to IX. The focus of the observation was on the process of designing a Lesson Plan that included elements of deep learning (DL), the implementation of digital technology-based learning activities, and the documentation of policies and teaching tools that supported this approach.

In terms of implementation profiles, each teacher had different characteristics and habits in developing DL-based learning plans. There were significant differences in the levels of teacher and student participation between classes in the application of project-based learning strategies. Some classes integrated digital technology more consistently into the learning process, while others still relied on conventional approaches. The principal explained that his party was gradually adapting to changes in the curriculum paradigm, prioritizing teacher training and infrastructure upgrades in proportion to the needs and readiness of each class.

In terms of infrastructure, the school has provided several digital presentation devices, such as projectors and interactive whiteboards, in several classrooms. However, not all learning spaces are equally equipped, with internet access varying between classes. In some classrooms, the internet connection is relatively stable and supports online activities, while in others, there are connection disruptions during learning activities. These variations in technology availability hinder uniform access to DL-based learning resources across the school. This finding highlights the critical need for school-wide infrastructure planning to ensure equitable technology access for all students.

Table 3. Comparison of Infrastructure and Technology in SMPIT Fitrah Insani Leles Garut

Component	Available in Some Classes	Challenges/Limitations
Digital Presentation Devices	Projectors and interactive whiteboards	Uneven distribution across classrooms
Internet Connectivity	Relatively stable in some classrooms	Significant disruptions in others
Learning Technology Access	Digital platforms used in some classes	Limited access in others, especially for videos and interactive content

Interviews with IRE teachers revealed variations in their digital literacy levels. Some teachers have a theoretical understanding of the principles of the Merdeka Curriculum and the opportunities for applying the DL approach, including the use of data for formative assessment and learning analytics. However, others admitted to having difficulty designing activities that emphasized problem-solving, digital literacy exploration, and project-based evaluation. One teacher said that he still had difficulty mapping learning indicators relevant to DL principles into the lesson plan. He added that limited time to develop learning tools and a lack of technical training were the main obstacles to the effective implementation of the new approach.

The analyzed documentation shows that several lesson plans have incorporated project-based learning strategies and authentic assessments that emphasize the depth of understanding and reflection on values. For example, there are activities that ask students to create digital products that represent their understanding of verses from the Qur'an in the context of social issues. However, other lesson plans still maintain a linear structure that does not emphasize interactivity, personalization, and data processing as key components of the DL approach. This indicates a need for more standardized integration of DL elements into all lesson plans.

Student response to digital media, project-based activities, and reflective approaches was generally positive. For example, in group interviews, students said that this method provided opportunities for discussion, expression of opinions, and helped them understand the application of Islamic values in everyday life. However, some students expressed difficulty in using certain learning platforms, especially those involving data processing and digital evaluation. This suggests that while students appreciate the interactivity of DL-based learning, the technical challenges still need to be addressed. Students expressed their hope that teachers would provide more technical assistance when using digital learning tools.

The obstacles identified include limited digital devices in some classrooms, internet connectivity issues, and a lack of time for teachers to thoroughly design and revise lesson plans. The principal acknowledged that the learning transformation effort requires the investment of resources and time, as well as adaptive managerial strategies. He stated that "this change must be done gradually, adjusted to the readiness of teachers and school infrastructure. We are developing a roadmap for teacher capacity building, including digital literacy training and strengthening project-based pedagogy."

Table 4. Teacher Readiness and DL Integration at SMPIT Fitrah Insani Leles Garut

Component	Descriptive Findings	Challenges/Limitations
Teacher Digital Literacy	Varied; some teachers proficient in digital media, while others rely on conventional methods	Training interventions are insufficient for some teachers
Project-Based Learning	Some lesson plans integrate project-based strategies	Inconsistent implementation across classes
Authentic Assessment	Several lesson plans use authentic assessments like presentations and case studies	Not universally applied across all lessons

The findings suggest that the readiness of teachers and institutions to implement the DL curriculum at SMPIT Fitrah Insani is influenced by both technological infrastructure and teacher capacity. These results align with the conceptual framework which states that the implementation of DL-based learning cannot succeed without a harmonious integration of technology, teacher competence, and institutional support (Alwani & Hamami, 2023; Safitri, 2020).

Comparison with other studies: Studies such as Nurasiah & Hayati (2023) and Fitria & Sukirman (2023) show that teacher readiness and digital infrastructure are significant barriers in rural areas, similar to the findings in this study. However, this research found that the school's efforts, such as teacher capacity building and annual budget allocation for technology, have led to improvements in digital literacy and DL-based lesson planning compared to similar schools in rural regions. The data also suggest that DL integration remains inconsistent, with some classes showing more effective use of technology than others, reflecting similar patterns found in studies like (Nahdhiah & Suciptaningsih, 2024).

The practical implications of these findings highlight the importance of developing school policies that focus on: (1) equitable distribution of digital facilities, (2) practice-based DL teacher training, (3) the development of contextual microcurricula, and (4) strengthening teacher learning communities.

This study reinforces the recommendations in the literature that DL-based learning transformation can only take place when accompanied by human capacity building, learning monitoring systems, and consistent budget allocation for the procurement of learning technology (Laksmi & Astuti, 2024; Ningsih, 2023).

School policies that support learning transformation through DL must be directed toward strengthening the digital learning ecosystem as a whole. This includes providing devices, expanding Internet access, drafting internal regulations related to technology integration, and allocating sufficient time for teachers to design and evaluate lesson plans regularly. Data-based planning, authentic assessment, and *constructive alignment* between learning objectives, processes, and evaluation must be the foundation for developing a DL-based learning planning model at SMPIT Fitrah Insani (Fullan & Langworthy, 2014; Pawestri, 2024)

Conceptually, these results confirm that the formulation of a DL-based learning model in IRE is not just about integrating technology, but also harmonizing religious values, pedagogical strategies, and the goal of strengthening 21st-century competencies (Anwar & Umam, 2020). This approach creates space for redefining the IRE curriculum as a tool for character development, digital literacy, and critical thinking. In practice, the findings of this study provide an empirical basis for the formulation of internal school policies to design DL-based lesson plans systematically and sustainably.

4. CONCLUSION

This study demonstrates the significant potential of integrating deep learning (DL) into the planning of Islamic Religious Education (IRE) at SMPIT Fitrah Insani Leles Garut, aiming to transform pedagogical practices towards a more contextual, reflective, and 21st-century competency-based approach. While innovative practices have been initiated, implementation remains uneven, hindered by limitations in digital infrastructure, pedagogical literacy, and the absence of a data-based curriculum evaluation system.

This research marks a pioneering step in applying DL to IRE lesson planning, an area rarely explored in integrated Islamic schools. The study's findings suggest that DL can help teachers design more efficient and personalized lessons, facilitating the integration of Islamic values and digital literacy. However, the study's scope is limited to a single institution, and generalizing findings to other schools or national levels is challenging. Variations in individual teacher readiness and institutional support also impact the outcomes.

The study contributes to the development of a DL-based IRE learning model that blends Islamic pedagogical principles, project-based learning, and digital literacy. This framework fills a gap in religious education literature and provides empirical support for contextual curriculum policies in the digital age.

Future research should test the model in multiple schools, explore the development of a digital platform, and collaborate with experts in educational technology and Islamic pedagogy to refine and scale the model.

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