

Data Driven Pedagogy: Integrating Problem Based Learning in Islamic Higher Education

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ABSTRACT

This study explores the challenges faced by Islamic higher education in adapting pedagogical approaches to the digital era, while maintaining Islamic epistemological and spiritual values. In response to these challenges, the study develops a conceptual model of Integrative Data-Driven Islamic Pedagogy (IDDIP) that integrates Problem-Based Learning (PBL) and Big Data in Islamic education at universities. The main objective of the research is to formulate a model that contributes to transforming Islamic pedagogy by incorporating digital data into the learning process without losing its spiritual foundation. A qualitative approach with Grounded Theory design was employed to gather data through in-depth interviews, participatory observation, and digital document analysis. Data analysis was conducted in three stages: open coding, axial coding, and selective coding. The results reveal four key dimensions: data-based reflection, Islamic ethical literacy, pedagogical transformation, and epistemological balance. These dimensions are integrated into three theoretical frameworks: digital pedagogical transformation, an ethical-spiritual framework, and knowledge creation and innovation. The study's findings have implications for the development of digital Islamic education models that are reflective, critical, and ethical, providing a roadmap for Islamic higher education institutions to design learning strategies that combine technology, values, and spirituality in the digital age.

Keywords: Big Data, Digital Epistemology, Digital Transformation, Islamic Education

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INTRODUCTION

Islamic higher education currently faces fundamental challenges amid the tide of digital disruption and the emergence of Big Data (Fillinger et al., 2019). Developments in information technology have drastically changed the patterns of access, distribution, and interpretation of religious knowledge (Tamphu et al., 2024). Various digital platforms have now become new spaces for the dissemination of Islamic discourse, ranging from digital interpretations and interactive hadiths to religious discourse on social media (Caidi et al., 2025; Reed, 2021; Sajjadi, 2025). This condition presents a great opportunity for students to

broaden their horizons, but also poses serious challenges regarding the validity, authenticity, and authority of knowledge sources. In this context, Islamic education in higher education institutions no longer plays a role as merely a conveyor of knowledge, but also as a guardian of epistemological integrity in the face of the complexity of abundant digital data (Bin Muhammad Yusoff, 2023; Nasir & Rijal, 2021).

Digital transformation has also changed the way students interact with Islamic sources. Whereas previously the learning process was textual and conventional, students are now exposed to cross-authority information that demands critical, reflective, and analytical thinking skills (Aljanazrah et al., 2022). Therefore, Islamic higher education needs to transform from merely transmitting knowledge to a transformative learning process that fosters data-based epistemological, ethical, and spiritual awareness (Arcos-Alonso et al., 2024).

One potential pedagogical approach to address these challenges is Problem-Based Learning (PBL) (Pabbajah et al., 2021; Smith et al., 2022). This model places students as active subjects in learning through solving real problems that are relevant to the social and academic context. Various studies show that PBL can improve students' critical thinking skills by up to 37.5% compared to conventional methods (Manuaba et al., 2022). Based on studies, (Foo et al., 2021; Su et al., 2025) also confirm that PBL strengthens reflective and analytical skills through collaboration based on the socio-religious context. Furthermore, (Hendawi & Qadhi, 2024) found that the integration of PBL with digital learning resources broadens students' Islamic literacy on contemporary issues such as media ethics, digital sharia economics, and online religious discourse (Imam et al., 2025).

However, the implementation of PBL in Islamic higher education is still often limited to cognitive and textual aspects. Many previous studies only highlighted the effectiveness of PBL in improving the understanding of religious texts, such as tafsir, hadith, or fiqh, without extending it to the epistemological and digital dimensions (Amirudin et al., 2025; Darmawan et al., 2024; Jazil et al., 2025). In fact, the era of Big Data presents opportunities to enrich the learning context through social-religious data analysis, digital literature exploration, and mapping of Islamic scientific trends in the online realm (Fajar et al., 2025). The integration of PBL and Big Data can open up new spaces for students to study Islam empirically, critically, and contextually while remaining grounded in Islamic values (Chang et al., 2024; Qodir et al., 2023).

The problem is that, to date, the application of data-based PBL in Islamic studies is still very limited. Most lecturers still rely on traditional learning models that are oriented towards memorisation and lectures, while students do not yet have strong digital literacy skills to process and analyse religious data (Ajmal & Hafeez, 2021; Shambour & Abu-Hashem, 2022). As a result, the potential of Big Data as a source of learning and reflection on Islamic values has not been optimally utilised. In fact, amid the rapid flow of digital information, the ability to critically sort data and weigh it against Islamic ethics is an essential competency for students in the 21st century (Killam & Camargo-Plazas, 2022).

Previous studies have shown a dualistic tendency in approaches to PBL and Big Data in Islamic education. PBL studies have largely focused on methodological

aspects, while Big Data studies have emphasised technological and managerial aspects such as learning analytics or student performance prediction (Bellaj et al., 2024; Zotou et al., 2020). The two are rarely brought together in a single, comprehensive conceptual framework. As a result, no learning model systematically bridges digital technology and Islamic epistemological values (Namoun & Alshanqiti, 2020; Wang et al., 2023). This gap highlights the urgent need to develop new approaches that can integrate pedagogical, spiritual, and digital dimensions.

يَا أَيُّهَا الَّذِينَ آمَنُوا إِذَا قِيلَ لَكُمْ تَفَسَّحُوا فِي الْمَجَالِسِ فَافْسَحُوا يَفْسَحِ اللَّهُ لَكُمْ وَإِذَا قِيلَ انشُرُوا فَانْشُرُوا اللَّهُ الَّذِي آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ

Meaning: "O ye who believe! When ye are told to make room in assemblies, make room; Allah will make room for you. When ye are told to rise, rise; Allah will raise those of you who believe and those who have been given knowledge to high ranks. Allah is fully aware of what you do." (Qur'an al-Mujadilah 58:11)

The verse above emphasises that knowledge holds a very noble position in Islam. Allah elevates the status of those who are faithful and knowledgeable, indicating that knowledge not only improves the quality of individuals but also grants them a higher status in the eyes of Allah. In the context of Islamic higher education in the digital age, this verse reminds us that knowledgeable people, especially those who integrate knowledge with technology and data, will have a greater ability to understand and overcome the challenges of the times. The application of methods such as Problem-Based Learning (PBL) and the use of Big Data in learning helps to improve critical and reflective understanding, which ultimately enhances the quality of knowledge acquired and has a positive impact in both worldly and spiritual contexts. Thus, the integration of religious knowledge and technology will further elevate the status of students and Islamic education itself.

Furthermore, the hadith below explains that intention in seeking knowledge is very important. The Prophet reminded us that those who seek knowledge should not be solely focused on worldly matters, because if the purpose of seeking knowledge is only to obtain worldly gains, then Allah will forbid them from entering Paradise on the Day of Judgement.

لَا يَطْلُبُ هَذَا الْعِلْمَ أَحَدٌ لَا يُرِيدُ بِهِ إِلَّا الدُّنْيَا إِلَّا حَرَّمَ اللَّهُ عَلَيْهِ عَرْفَ الْجَنَّةِ يَوْمَ الْقِيَامَةِ

Meaning: "No one seeks this knowledge and desires nothing but the world, except that Allah will forbid the fragrance of Paradise for him on the Day of Judgement." (Narrated by Darimi, no. 259, and Ibn Majah, no. 248)

This hadith shows the importance of having sincere and pure intentions in seeking knowledge, which should be done for the sake of Allah's pleasure and not merely for personal or worldly interests. In the context of Islamic higher education

and the use of technology, this reminds us that the main purpose of learning and integrating knowledge with data-based learning methods should be to increase religious understanding and benefit the ummah, not just for prestige or worldly gain.

This study aims to explore in depth the empirical experiences of lecturers and students in the application of data-based Problem-Based Learning in contemporary Islamic studies in higher education. Through exploration, this study seeks to discover patterns of interaction and pedagogical values that emerge from the learning process that integrates the PBL approach with the use of Big Data. From the results of analysis and field findings, this study aims to formulate a conceptual model called the Integrative Data-Driven Islamic Pedagogy (IDDIP) Model. This model is expected to contribute theoretically to the development of Islamic education science that is contextual to the challenges of the digital era, while offering practical guidance for Islamic higher education institutions in designing learning strategies that harmoniously combine technology, values, and spirituality.

Theoretically, this research offers a new contribution in the form of integrating the PBL approach and the use of Big Data within the framework of Islamic epistemology. The IDDIP model emphasises the importance of data awareness, digital ethics (digital adab), and Islamic reflection as a whole in the learning process. Meanwhile, in practical terms, this research provides innovations in Islamic education curricula that are technology-based, collaborative, and contextual. Thus, Islamic higher education can become a space for shaping a generation that is not only digitally literate but also has a strong moral and spiritual compass in facing an increasingly open and complex world of knowledge.

METHOD

This study employs a qualitative paradigm that aims to understand the integration of Problem-Based Learning (PBL) and Big Data in Islamic education within the digital age. The Grounded Theory approach was chosen as it allows for the development of a substantive theory based directly on empirical data, rather than pre-existing assumptions (Holt et al., 2022). This methodology facilitates an in-depth exploration of how PBL can be integrated with Big Data in Islamic learning, offering new theoretical insights grounded in participants' experiences and perspectives. By focusing on real-world applications of Big Data in education, this approach ensures that findings are not just theoretical but contextually relevant and grounded in the digital realities of contemporary Islamic education (Xiong et al., 2023).

The research was conducted at the Faculty of Tarbiyah and Teacher Training at the State Islamic Institute (IAIN) Parepare, a setting known for its dynamic use of digital technologies in Islamic education. The participants were three lecturers and four students from the Islamic Education Study Programme (PAI). These participants were chosen through theoretical sampling, based on their active involvement in the application of PBL and the use of digital media for learning purposes.

Table 1. Data Collection Process

Data Collection Technique	Description
In-depth Interviews	Conducted in a semi-structured manner to explore participants' experiences, perceptions, and reflections regarding the implementation of Big Data-based PBL.
Participatory Observation	Conducted in classroom learning activities and digital environments to understand the interaction between lecturers and students in the use of digital data.
Digital Document Analysis	Involves a review of teaching materials, student assignments, and online data-based learning artifacts to gain insights into the learning process.
Theoretical Memos	Reflective notes made by the researcher during the research process to develop relationships between concepts during data analysis.

Ethical considerations were central to this study. Before participation, all participants received full information regarding the study's purpose, procedures, and their rights, with clear assurances of voluntary participation. Informed consent was obtained from all participants, and before the data was collected, it was stored anonymously to protect privacy. The study adhered to strict ethical guidelines to ensure that participant identities were protected, and no personal information was published without explicit consent (Badampudi et al., 2022).

In the Open Coding stage, basic concepts are identified from various data sources such as interviews, observations, and documents. This initial step helps in breaking down the data into discrete categories. The Axial Coding stage involves grouping and connecting these categories to identify patterns and cause-and-effect relationships within the data, providing a deeper understanding of the phenomena being studied. Finally, in Selective Coding, the researcher integrates the concepts and identifies core categories that form the substantive theory, specifically the Integrative Data-Driven Islamic Pedagogy (IDDIP) Model, which is the central focus of the research. Throughout these stages, the data analysis is conducted simultaneously with the data collection, allowing for the continuous development and refinement of the theory in alignment with the principles of Grounded Theory. This step-by-step process ensures that the findings are both grounded in empirical data and conceptually coherent (Cullen & Brennan, 2021).

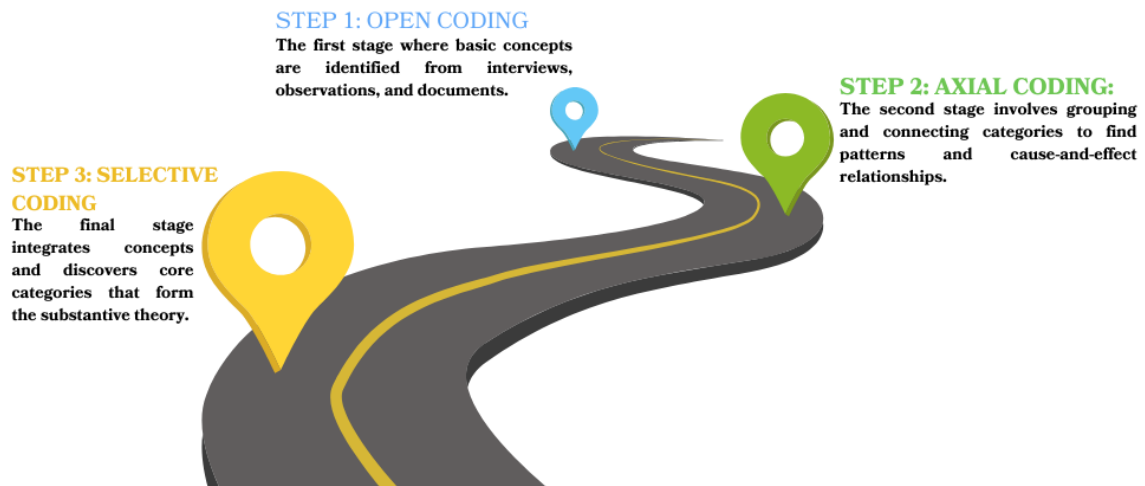


Figure 1. Steps In Developing Grounded Theory

While this study offers valuable insights into the integration of PBL and Big Data in Islamic education, it is not without its limitations. One challenge encountered was the limited availability of data on the practical application of Big Data in Islamic education, particularly in regions outside the study's geographic scope. Additionally, the digital literacy of lecturers was varied, which may have influenced the extent to which Big Data was effectively incorporated into teaching practices. Resistance to changing traditional pedagogical methods also emerged as a significant barrier.

RESULTS AND DISCUSSION

RESULT

The results of this study began with a qualitative data analysis process conducted simultaneously with data collection, in accordance with the basic principles of Grounded Theory, which emphasises the integration of empirical exploration and theory formation. The analysis began with the open coding stage, which is the process of breaking down the data line by line to label the main concepts and group them into initial categories. The purpose of this stage is to ensure that the theory developed is truly rooted in empirical data, rather than based on pre-existing theoretical assumptions. Once the initial categories were formed, the researchers proceeded to the axial coding stage to identify relationships between categories, such as cause-and-effect patterns, contextual conditions, and the strategies used by lecturers and students in applying digital pedagogy practices in Islamic education settings.

Open Coding

The analysis process began with the open coding stage, which was the first step in analyzing the interview transcripts. At this stage, each line of text was analyzed in detail to identify the main concepts that described the participants' experiences and views on the application of Problem-Based Learning (PBL) integrated with Big Data.

Through line-by-line conceptualization, 92 initial codes and 18 sub-dimensions were identified, which were then grouped into broader conceptual

dimensions. The following is an example of the open coding process that was carried out:

Table 2. Open coding

Original Data	Concepts	Emerging Dimensions
"Our lecturers begin the lesson by presenting real issues from Islamic social media, such as hate speech or disinformation."	Learning begins with real-world Islamic digital issues	Contextualization of Islamic learning
"We analysed data from Google Trends and Twitter to understand public perceptions of moderate Islam."	Using digital data sources for Islamic analysis	Data-driven inquiry
"Lecturers always remind us that every data analysis must be based on the intention of worship and the value of trustworthiness."	Spiritual guidance in data interpretation	Ethical-spiritual dimension
"Big Data helps me understand contemporary Islamic issues more objectively."	Big Data as an analytical tool for contemporary Islamic discourse	Empirical epistemology
"The difficulty lies in sorting out valid data and maintaining objectivity within the framework of Islamic values."	Challenges of balancing objectivity and spirituality	Methodological tension
"The ideal learning model for me is an Islamic digital laboratory that combines data and values."	Vision of integrative digital-Islamic learning	Pedagogical innovation

Source: (*Elaborasi Researcher*, 2025)

From this stage, several dominant dimensions emerged that formed the basis for the development of substantive theory in this study. The first dimension is Data-Based Reflection, which demonstrates the ability of lecturers and students to utilize digital data in the form of scientific articles, online media, and contemporary Islamic trends as a basis for the learning process and religious analysis. This dimension marks a paradigm shift from passive to active learning, which requires students to think critically, interpret social realities, and connect empirical data with Islamic values.

The second dimension is Islamic Ethical Literacy, which emphasizes that every data analysis process must be based on Islamic moral values, such as trust, tabayyun (clarification), and scientific honesty. These values serve as an ethical compass in managing big data, ensuring that every digital interpretation remains within the corridor of scientific decency and Islamic spirituality.

Axial Coding

The second stage in the analysis process is axial coding, which is a step to regroup data that has been broken down in the previous open coding stage. According to Strauss and Corbin, this process is called 'axial' because it focuses on one main category and connects various categories and subcategories based on their nature and dimensions (Alhassan et al., 2023). The purpose of this stage is to

systematically build relationships between categories to produce a more complete and accurate explanation of the phenomenon being studied.

In this study, axial coding explains how lecturers and students at IAIN Parepare integrate PBL with Big Data in the context of contemporary Islamic learning. Through repeated analysis, the researcher identified the cause-and-effect relationships between conditions, actions, interactions, and consequences that arose during data-based learning practices.

Table 3. Axial Coding Results

Main Dimension	Related Categories	Brief Description
Digital Pedagogical Transformation	Problem-based learning, Reflective collaboration, Social-religious data analysis	Depicts the shift from traditional text-based learning to a more contextual, problem-based, and data-driven approach.
Ethical-Spiritual Framework	<i>Amanah</i> (trustworthiness), <i>Tabayyun</i> (clarification), <i>Ikhlas</i> (sincerity), Role of the lecturer as a digital mentor	Emphasizes the importance of Islamic ethical values like trustworthiness, verification, and sincerity in data analysis, alongside the role of the lecturer as a moral guide.
Knowledge Creation and Innovation	Digital Ijtihad Learning, Data-driven innovation in teaching, Creation of Islamic knowledge through data	Focuses on the creation of new knowledge by students, based on digital data, while integrating Islamic values into the learning process.

The dimension of Digital Pedagogical Transformation represents a significant shift in the way learning is carried out. Traditional text-based teaching methods in Islamic education have evolved into a more active, problem-based learning model, enhanced by Big Data. This approach allows students to engage with contemporary social and religious issues using real-world data, promoting collaborative and reflective learning. It provides students with the opportunity to apply their knowledge to real-world problems and think critically about societal issues in the context of Islamic teachings.

Ethical-Spiritual Framework underscores the importance of integrating Islamic ethical values into the data analysis process. As digital data becomes more accessible, principles like *amanah* (trustworthiness), *tabayyun* (clarification), and *ikhlas* (sincerity) are crucial for ensuring the integrity of the learning process. The role of lecturers as digital mentors is central to guiding students in applying these ethical principles, ensuring that the use of technology and data aligns with Islamic moral standards.

The third dimension, Knowledge Creation and Innovation, focuses on empowering students to move beyond merely consuming information to actively creating new knowledge based on Big Data. In the Digital Ijtihad Learning model, students are encouraged to generate innovative solutions to contemporary social and religious challenges. This dimension highlights the importance of critical thinking, creativity, and problem-solving within an Islamic framework, allowing students to develop solutions that are both intellectually rigorous and socially relevant (Elysa, 2025).

Together, these three dimensions form the core of the Integrative Data-Driven Islamic Pedagogy (IDDIP) model, which highlights the importance of integrating technology, Islamic values, and knowledge creation within the educational system. The dimensions also illustrate how the integration of PBL and Big Data is reshaping Islamic education, making it more relevant and contextual to the digital age.

Theoretical Model

Based on the third-order categories determined through the axial coding process, this theoretical model is designed to explain how the integration of Problem-Based Learning (PBL) and Big Data forms a new paradigm in Islamic learning in higher education, particularly in the IAIN Parepare environment. The process of forming this theory follows the principles of Grounded Theory as proposed by Strauss and Corbin, namely by tracing the relationship between contextual conditions, actions/interactions, and the consequences resulting from data-based pedagogical practices.

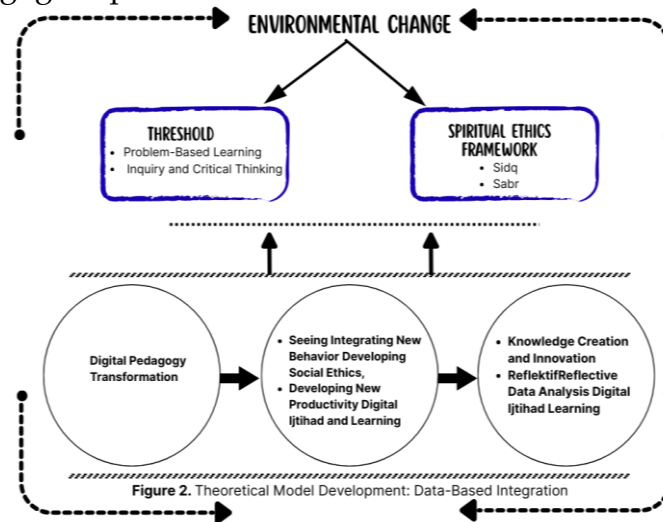


Figure 2. The Building of the Integrative Data-Driven Islamic Pedagogy (IDDIP) Model

This theoretical model describes the interrelationship between three main dimensions that form the conceptual framework of Integrative Data-Driven Islamic Pedagogy (IDDIP). The results of the study show that digital pedagogical transformation is the first dimension, which describes the shift in Islamic learning from a textual model to a more analytical and contextual model. Through PBL enriched with digital data sources, students learn to connect social phenomena with Islamic principles, making learning more reflective, participatory, and relevant to reality.

The second dimension is the ethical-spiritual framework, which serves as the moral core of the entire process of integrating technology into learning. Islamic values such as *amanah* (trust), *tabayyun* (clarification), *ikhlas* (sincerity), and *ta'dib* (good manners) serve as ethical guidelines in selecting, verifying, and interpreting digital information. With this framework, the integration of Big Data does not distance Islamic learning from its essence, but rather strengthens students' character to be more prudent and ethical in using technology.

The third dimension is the creation and innovation of knowledge, which marks the advanced stage of the reflective learning process, where students and

lecturers jointly develop a new model of thinking called Digital Ijtihad Learning. Through this model, digital data is not only an object of analysis but also a source of epistemological inspiration to produce Islamic ideas that are contextual and relevant to the challenges of the times.

Theoretical Model Validation

To validate the theoretical model of IDDIP, a comparative analysis was conducted across the informants. This validation aimed to assess the frequency of key concepts or core categories as they appeared in the participants' narratives, which helps ensure the model's relevance and authenticity. The following table provides an overview of the frequency with which specific categories emerged from the data collected across all informants:

Table 4. Across-Case Pattern Comparison

Core Categories	Subcategories	(D1)	(D2)	(D3)	(M1)	(M2)	(M3)	(M4)
Digital Pedagogical Transformation	Contextualized Islamic learning using real-world data	15	13	9	18	16	17	14
	Problem-Based inquiry and collaborative learning	12	11	8	19	15	18	13
	Data-driven reflection and critical reasoning	11	10	7	17	15	16	12
Ethical-Spiritual Framework	Application of <i>amanah</i> and <i>tabayyun</i> in digital interpretation	13	12	9	16	15	13	14
	Integration of spiritual reflection into data analysis	10	9	8	18	17	14	13
	Lecturer as <i>murabbi digital</i> (ethical and spiritual mentor)	9	8	8	11	9	10	10
Knowledge Creation and Innovation	Emergence of "Digital Ijtihad Learning" model	8	9	6	14	12	13	14
	Reflective and collaborative interpretation of data	10	8	8	15	13	14	12
	Production of new Islamic knowledge integrating data and values	9	8	7	13	14	15	11

The table illustrates the frequency of emerging themes and core categories from the Digital Pedagogical Transformation, Ethical-Spiritual Framework, and Knowledge Creation and Innovation dimensions. The numbers represent the

frequency with which certain themes or categories appeared across different informants, either from detailed interviews (D1, D2, D3) or multiple case studies (M1, M2, M3, M4). The data from this table strongly support the validity of the IDDIP model by showing consistent patterns across all participants. For example, the Digital Pedagogical Transformation category emerged frequently, particularly in the subcategory Contextualized Islamic learning using real-world data, with occurrences ranging from 15 to 19 across all informants. This highlights the significance of data-driven learning in the context of Islamic education, showing that integrating real-world data into learning is a central theme for participants.

The Ethical-Spiritual Framework also showed a strong presence, especially in the subcategory Application of *amanah* and *tabayyun* in digital interpretation, which appeared 13 to 16 times. This reflects the importance of ethical principles in the integration of digital pedagogy. Finally, the Knowledge Creation and Innovation category emphasizes the Digital Ijtihad Learning model, which was particularly important for helping students generate innovative solutions using Big Data (with occurrences ranging from 8 to 14 times). This suggests that students are not only consuming information but actively creating new knowledge based on data, illustrating the role of data and Islamic values in fostering innovation in education.

DISCUSSION

This study successfully developed the Integrative Data-Driven Islamic Pedagogy (IDDIP) model, which combines two important elements in contemporary Islamic education, namely Problem-Based Learning (PBL) and Big Data. This model consists of four main dimensions, namely Digital Pedagogical Transformation, Ethical-Spiritual Framework, Knowledge Creation and Innovation, and Digital Ijtihad Learning. The uniqueness of the IDDIP model lies in the synthesis of problem-based pedagogical principles with the use of Big Data, which contributes significantly to the development of technology-based Islamic education theory and Islamic values. This model offers a more comprehensive approach to Islamic education, which not only integrates digital technology but also maintains Islamic ethical and spiritual values in data analysis and knowledge creation.

As explained in the introduction, Surah Al-Mujadilah (58:11) emphasizes that those who possess knowledge are elevated in status by Allah. In the context of the IDDIP model, this verse reminds us that knowledge not only improves the quality of individuals but also gives them a higher position in the sight of Allah. In the world of digital Islamic education, the integration of Big Data and PBL provides opportunities for students to not only acquire knowledge, but also understand analytical methods for solving social and religious problems, which are in line with Islamic principles that prioritize knowledge as a means of improving the community.

This study is in line with previous studies, such as those conducted by (Anggraeni et al., 2023; Asyari et al., 2016; Razak et al., 2022), which show that Problem-Based Learning (PBL) can improve critical thinking and problem-solving skills among students. Our research confirms these findings and expands upon

them by integrating Big Data into Islamic education, which not only enables students to understand social phenomena but also to generate data-driven knowledge that can be applied in the real world. The use of Big Data in Islamic learning, as described in the IDDIP model, offers a more contextual approach, allowing students to apply critical thinking in solving social and religious problems based on data analysis.

However, this study contradicts the findings of other studies, such as those described by (Mandinach & Schildkamp, 2021; Panjaitan et al., 2023), which criticize the lack of data-based pedagogy in religious education. Their research shows that religious education is often hampered by the inability to effectively integrate technology into the learning process. The IDDIP model we developed responds to this criticism by combining Islamic values with Big Data in learning, providing an innovative solution to this challenge. Thus, this model not only creates a more reflective, critical, and contextual learning approach, but also introduces the concept of Digital Ijtihad

Learning, which combines classical ijthad methods with digital data analysis. This opens up space for innovation in creating data-driven solutions relevant to contemporary social and religious challenges. This research also expands on previous studies that still have limitations in terms of integrating technology and Islamic values in education (Dalimunthe et al., 2023; Sholehuddin et al., 2023; Tubagus et al., 2023). Most existing studies focus more on the use of technology in the context of general education and have not explored in depth how Islamic values can be applied in the use of technology in religious education (Nurhikmah, 2024). The IDDIP model bridges this gap by integrating Islamic ethical principles, such as *amanah* (trust), *tabayyun* (clarification), and *ikhlas* (sincerity), into every process of technology-based data analysis. This research brings a new concept to Islamic education, which not only promotes technological advancement but also ensures that technology is used within a moral and spiritual framework that is in line with Islamic principles.

One of the most innovative findings of this study is the concept of Digital Ijtihad Learning, which combines classical ijthad (independent reasoning in determining Islamic law) with modern digital data analysis. This concept is an epistemological breakthrough that has not been widely discussed in previous Islamic education literature. By using Big Data, students are not only encouraged to think critically, but also empowered to create data-driven solutions that are relevant to the challenges of the times, both in social and religious contexts.

The IDDIP model, which combines classical ijthad with Big Data, opens up space for innovation in creating technology-based Islamic education that is not only relevant to today's challenges but also remains rooted in Islamic spiritual and ethical values. This research also has important implications for the development of technology-based Islamic education, especially in today's digital era. By introducing Digital Ijtihad Learning, this research opens up a new space for the integration of science, technology, and Islamic values. This concept enables the creation of a more holistic education model, where technology is not only a tool but also an integral part of creating more relevant and applicable knowledge to solve social and religious problems in society. Thus, this research not only provides

solutions for Islamic education in the digital age but also introduces an innovative learning model that combines data-based education with Islamic values.

CONCLUSION

This study successfully achieved its objective of developing the Integrative Data-Driven Islamic Pedagogy (IDDIP) model, which describes the integration of Problem-Based Learning (PBL) and the use of Big Data in Islamic learning in higher education. The main findings of this study indicate that pedagogical transformation in the digital age requires a balance between scientific rationality and revelatory spirituality, which is reflected in the four core dimensions of the IDDIP model, namely Data-Based Reflection, Islamic Ethical Literacy, Pedagogical Transformation, and Epistemological Balance. Theoretically, this study enriches Islamic education by positioning digital data as an epistemological medium that builds critical and reflective thinking based on Islamic values. Practically, the IDDIP model guides lecturers and Islamic higher education institutions in designing contextual, participatory, and value-based learning that is in line with the rapid development of digital information flows.

The knowledge contribution generated from this research lies in the development of the IDDIP model, which introduces new concepts in Islamic education by combining classical ijihad methods with modern digital data analysis. This model not only relies on traditional approaches in Islamic education but also positions Big Data as a tool that helps create new knowledge that is more relevant and contextual. With Digital Ijtihad Learning, students are not only taught to consume knowledge but also empowered to create innovative data-based solutions that are relevant to current social and religious challenges. The successful integration of PBL and Big Data in this model shows that Islamic education in the digital age can combine technology and spiritual values without sacrificing its traditional roots.

Although this research makes an important contribution, there are several limitations, such as limited data on the application of Big Data in Islamic education and low digital literacy among lecturers. Resistance to changing traditional teaching methods is also a significant obstacle, in addition to the challenge of balancing digital technology with Islamic ethical principles. For further research, it is recommended to design digital literacy training programs for lecturers and conduct case studies at various Islamic universities to explore the application of the IDDIP model. Further research can also integrate artificial intelligence (AI) and learning analytics, as well as conduct longitudinal studies to assess the long-term impact of this model's application on student learning outcomes and the application of Islamic values in daily life.

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