Vokatek : Jurnal Pengabdian Masyarakat
E-ISSN: 2986-0105 P-ISSN : 2985-8402
Vol. 4, No. 2, Agustus 2026
https://journal.diginus.id/VOKATEK/index

From Dichotomy to Integration: Epistemological Transformation of Science and Religion in Science Learning from the Perspective of Philosophy of Science at MTS N 3 Kediri

Abas Shofwan[1*], Ngainun Na'im[2]
[1,2] UIN Sayyid Ali Rahmatullah, Tulungagung, Indonesia

Corresponding e-mail : abasshofwan26@gmail.com

ARTICLE INFO

Keywords:

Epistemological transformation;
Integration of science and religion;
Islamic education;
Natural Science learning.

Article History

Received: May 5, 2026
Revised : June 2, 2026
Accepted : July 10, 2026

ABSTRACT

The persistent dichotomy between scientific knowledge and religious understanding remains a major challenge in Islamic education, particularly in Natural Science learning, where integration is often limited to symbolic references rather than meaningful epistemological reconstruction. This study aimed to examine the process of epistemological transformation through the integration of science and religion in Natural Science learning at MTsN 3 Kediri and to develop a conceptual model that explains this transformation. A qualitative case study design was employed using classroom observations, semi structured interviews with the principal, Natural Science teachers, Islamic Religious Education teachers, and students, as well as document analysis. Data were analyzed through thematic analysis following the stages of data reduction, coding, categorization, interpretation, and verification using source and method triangulation to ensure credibility. The findings indicate that epistemological transformation occurs through three interrelated dimensions, namely conceptual integration, methodological integration, and practical integration. The integration process shifts the educational paradigm from a dichotomous perspective toward a complementary and dialogical relationship between science and religion, supported by visionary leadership, teacher competence, institutional commitment, and a pesantren based educational environment. Based on these findings, this study proposes an epistemological transformation model that integrates scientific inquiry with Islamic values within a holistic learning framework. The study contributes to the discourse on science and religion integration by providing empirical evidence that epistemological transformation can be operationalized through classroom practice, institutional culture, and educational leadership. The proposed model offers practical guidance for developing integrative science education in Islamic schools while extending the theoretical perspective on the integration of scientific and religious knowledge.

To cite this article : Abas Sofwan & Ngainun Na'im. (2026). From Dichotomy to Integration: Epistemological Transformation of Science and Religion in Science Learning from the Perspective of Philosophy of Science at MTS N 3 Kediri**.** Information Technology Education Journal, 4(2), 17-30. Doi. 10. 61255/vokatekjpm.v4i2.1547

INTRODUCTION

The integration of science and religion has become one of the central issues in contemporary Islamic education, particularly as educational systems are increasingly expected to develop learners who possess scientific competence alongside ethical awareness and spiritual integrity. Advances in science and technology have encouraged Islamic educational institutions to reconsider the traditional separation between scientific knowledge and religious teachings by promoting a more holistic conception of knowledge. Within this perspective, science and religion are not viewed as competing domains but as complementary sources of understanding that collectively contribute to human well being and intellectual development. From the perspective of the philosophy of science, knowledge is expected to emerge through a balanced interaction between empirical inquiry, rational reflection, and transcendental values, enabling a more comprehensive interpretation of reality (Bolis,

Dumas, and Schilbach n.d.; Verdicchio and Perin 2022). Consequently, the integration of science and religion has evolved beyond curriculum reform into a broader epistemological discourse concerning the nature, sources, and purposes of knowledge in Islamic education.

Despite the growing acceptance of integrative educational paradigms, many Islamic schools continue to experience a persistent dichotomy between scientific and religious knowledge. Science subjects are generally taught through empirical and experimental approaches, whereas religious education primarily emphasizes normative doctrines and spiritual values with limited conceptual interaction between the two domains. This separation often leads students to perceive natural phenomena either solely through scientific reasoning or exclusively through religious interpretation, resulting in fragmented knowledge construction. Recent studies indicate that the integration of science and religion frequently remains symbolic, with Qur'anic verses being inserted into science lessons without facilitating meaningful epistemological reflection (Barrett 2023; Hadiyanto, Putri, and Fazli 2025; Schnabel et al. 2022). Such conditions suggest that the principal challenge is no longer recognizing the importance of integration but rather implementing it in ways that genuinely reshape teaching and learning practices.

This issue becomes increasingly significant considering that Islamic education is expected to produce graduates who are academically capable while simultaneously demonstrating strong moral character and spiritual responsibility. Madrasahs occupy a distinctive position because they combine general education with Islamic instruction within a unified institutional framework. In particular, pesantren based madrasahs provide an educational environment where scientific inquiry and religious values can potentially interact more naturally through everyday academic and social practices. Nevertheless, the existence of a religious environment alone does not automatically guarantee meaningful integration unless it is supported by an appropriate epistemological orientation among educators and institutional leaders. Therefore, examining how epistemological transformation occurs within science learning represents an important step toward understanding the practical realization of integrated education in Islamic schools.

From the perspective of the philosophy of science, integrating science and religion involves more than simply combining two bodies of knowledge. Instead, it represents a reconstruction of educational paradigms encompassing ontological, epistemological, and axiological dimensions simultaneously. Such an approach acknowledges empirical observation, logical reasoning, and divine revelation as interconnected sources of knowledge that collectively contribute to a deeper understanding of reality. Rather than limiting science to material explanations or restricting religion to normative teachings, this perspective encourages a dialogical relationship in which both disciplines enrich one another. Consequently, philosophy of science provides an appropriate analytical framework for investigating how educational practices can transform from dualistic thinking toward a more comprehensive and meaningful conception of knowledge.

A substantial body of literature has examined science and religion integration from various perspectives within Islamic education. Previous studies have explored integration models in Islamic higher education (Stein et al. 2024; Verdicchio and Perin 2022; Vuong and Nguyen 2025), philosophical relationships between science and religion (Coşkun et al. 2023), integration within Islamic educational thought (Diana, Azani, and M 2024; Qadri, Hussin, and Dar 2024), and collaborative approaches to the Islamization of science (Elsawahly and Ali 2025; Supena 2022). Other scholars have investigated the integration of science and Islam in biology education (Amin et al. 2022; Rachmatullah, Park, and Ha 2022), implementation models in madrasahs and pesantren (Hidayati et al. 2025; Laila et al. 2025), institutional policies supporting integration (Chen, Li, and Chen 2025; Fouka 2024), teachers' epistemological understanding of science and religion integration (Chan and Erduran 2023; Hudson et al. 2022), and the relevance of Seyyed Hossein Nasr's ideas for Islamic education (Hussain 2023; Khofifah 2023). Additional contributions addressing Bayani, Burhani, and Irfani epistemologies (Rizki and Rijal 2026; Syaifuddin et al. 2026), conceptual integration between Islamic education and science (Imamah 2025; Mahmudi, Sumarni, and Faiz

2022), complementary perspectives on science and religion (Damper 2022; Salim et al. 2024), and contemporary Islamic educational values (Barry et al. 2025; Rahman 2025) have further enriched this academic discourse. Collectively, these studies confirm the increasing scholarly interest in overcoming the historical separation between scientific and religious knowledge.

Although previous research has significantly expanded theoretical discussions regarding science and religion integration, several important limitations remain. First, most studies have concentrated on conceptual frameworks, curriculum development, or institutional policies rather than investigating how epistemological transformation actually occurs during classroom instruction. Second, empirical evidence explaining how teachers simultaneously integrate conceptual, methodological, and practical dimensions of science and religion remains relatively scarce, particularly within pesantren based madrasahs. Third, existing research has largely emphasized the inclusion of Islamic values in science education without examining how such integration fundamentally reconstructs students' understanding of knowledge itself. Consequently, the existing literature provides limited explanations regarding the educational processes through which science and religion become epistemologically interconnected in everyday learning practices. These limitations indicate the need for further empirical investigations capable of capturing the complexity of science and religion integration beyond normative or conceptual discussions.

Based on this review, several research gaps can be identified. Previous investigations have predominantly approached science and religion integration from pedagogical, curricular, or policy perspectives, while relatively little attention has been devoted to epistemological transformation as the core mechanism underlying integrative learning. Furthermore, studies rarely employ the philosophy of science as a comprehensive analytical framework incorporating ontological, epistemological, and axiological dimensions simultaneously to explain the interaction between scientific and religious knowledge in classroom practice. Existing empirical studies also provide limited evidence regarding how integrative learning evolves through conceptual integration, reflective dialogical pedagogy, and value internalization within pesantren based educational settings. Accordingly, there remains a need to develop an empirically grounded model that explains how science and religion can be integrated through a process of epistemological transformation capable of reconstructing educational paradigms rather than merely combining instructional content.

This study addresses these gaps by analyzing the epistemological transformation of science and religion integration in Natural Science (IPA) learning at MTsN 3 Kediri from the perspective of the philosophy of science. Specifically, the research aims to identify patterns of integration implemented during science instruction, analyze the epistemological transformations emerging throughout the learning process, and formulate an integrative model that reflects the characteristics of pesantren based madrasah education. Theoretically, this study contributes to strengthening the integration interconnection paradigm by providing empirical evidence that science and religion function as complementary rather than dichotomous sources of knowledge within Islamic education. Practically, the findings are expected to offer educators, school leaders, and policymakers a comprehensive framework for designing science learning that integrates scientific reasoning, religious values, and spiritual development in a balanced manner. Ultimately, the proposed model is expected to support the development of a more holistic, contextually relevant, and philosophically grounded approach to science education within contemporary Islamic educational institutions.

METHOD

This study employed a qualitative case study design to explore the epistemological transformation of science and religion integration in Natural Science (IPA) learning within the context of an Islamic junior secondary school. A qualitative approach was considered appropriate because the study sought to understand participants' experiences, interpretations, and educational practices rather than to measure relationships among variables quantitatively. The case study design enabled an in depth investigation of a bounded educational setting where the interaction between

scientific knowledge and Islamic values could be examined comprehensively. This design also facilitated an exploration of how epistemological transformation emerged through classroom practices, institutional culture, and educational leadership within a pesantren based madrasah. The study adopted an interpretive paradigm in which reality was understood as socially constructed through interactions among teachers, students, and the broader educational environment.

The research was conducted at MTsN 3 Kediri, East Java, Indonesia, a public Islamic junior secondary school located within a pesantren environment that actively promotes the integration of science and Islamic values in teaching and learning. The school was selected purposively because it represents an educational institution that has consistently implemented integrative learning practices supported by institutional policies, religious culture, and qualified teaching staff. Data collection was carried out over a four month period from January to April 2026, allowing sufficient time for repeated observations, interviews, document analysis, and verification of findings. Conducting the research over several months enabled the researchers to capture routine classroom activities as well as institutional practices that reflected the implementation of science and religion integration.

The participants were selected using purposive sampling, which is widely employed in qualitative inquiry to identify information rich cases relevant to the research objectives. Selection criteria included direct involvement in science learning and sufficient experience with the implementation of integrative educational practices. The participants consisted of one principal, three Natural Science teachers, two Islamic Religious Education teachers, and twelve students representing different grade levels and academic achievement categories, resulting in a total of eighteen participants. Students were selected based on recommendations from teachers to ensure variation in learning experiences and classroom participation. Individuals who had less than one year of teaching experience or who were not directly involved in science instruction were excluded from the study to ensure that all participants possessed sufficient contextual knowledge.

Data were collected using multiple qualitative instruments to enhance the richness and credibility of the findings. Semi structured interview guides were developed to explore participants' perceptions regarding the integration of science and religion, instructional strategies, philosophical understanding of knowledge, and institutional support for integrative education. Participant observation sheets were employed during classroom activities to document teaching practices, teacher student interactions, reflective discussions, and the incorporation of Islamic values into science instruction. In addition, document analysis was conducted on lesson plans, teaching modules, school policies, curriculum documents, and learning materials to identify evidence of conceptual and practical integration. The interview protocol and observation indicators were developed based on the philosophical dimensions of ontology, epistemology, and axiology, as well as previous studies on science and religion integration in Islamic education.

To ensure the trustworthiness of the research instruments, several validation procedures were implemented before fieldwork commenced. The interview guide, observation protocol, and document analysis checklist underwent expert validation involving three specialists in Islamic education, science education, and qualitative research methodology. Feedback obtained from the experts was used to improve the clarity, relevance, and comprehensiveness of each instrument. A pilot interview involving two teachers from another Islamic junior secondary school was subsequently conducted to evaluate the effectiveness of the interview questions and to refine probing techniques. During data collection, methodological rigor was strengthened through source triangulation, method triangulation, member checking, prolonged engagement, and peer debriefing. These procedures enhanced the credibility, dependability, confirmability, and transferability of the research findings.

The data collection process followed several sequential stages. The first stage involved obtaining institutional permission, preparing research instruments, and coordinating the research schedule with school administrators. During the second stage, classroom observations were conducted to

identify instructional practices associated with science and religion integration. This was followed by in depth interviews with the principal, teachers, and students to gain deeper insights into their experiences and interpretations. Simultaneously, institutional documents and instructional materials were collected and analyzed to complement observational and interview data. Throughout the data collection process, field notes, reflective memos, and digital audio recordings were systematically organized to facilitate subsequent analysis and interpretation.

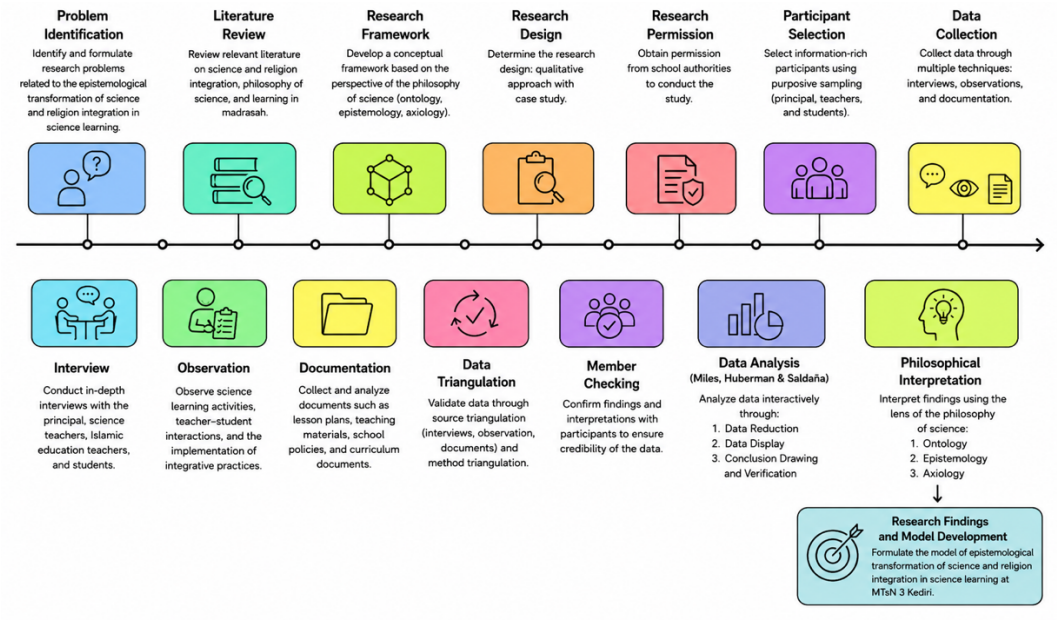

Figure 1. Research Procedure

The collected data were analyzed using thematic analysis following the procedures proposed by Miles, Huberman, and Saldaña (2023). Audio recordings from interviews were transcribed verbatim and integrated with observation notes and documentary evidence. Data analysis began with data reduction, during which irrelevant information was eliminated while meaningful segments were retained. Subsequently, open coding was conducted to identify initial concepts emerging from the data, followed by axial coding to establish relationships among categories and selective coding to develop overarching themes that represented the epistemological transformation of science and religion integration. These themes were then interpreted using the philosophical perspectives of ontology, epistemology, and axiology to explain how scientific and religious knowledge interacted within classroom practices. Throughout the analytical process, constant comparison was employed to identify similarities and differences across multiple data sources, thereby enhancing the credibility of interpretations.

This study adhered to internationally recognized principles of research ethics throughout all stages of the investigation. Prior to data collection, approval was obtained from the school administration, and all participants voluntarily agreed to participate after receiving clear information regarding the objectives, procedures, and potential benefits of the study. Written informed consent was obtained from teachers and school administrators, while parental consent was secured for student participants. Participants' identities were anonymized using pseudonyms to ensure confidentiality, and all research data were securely stored and used exclusively for academic purposes. The researchers also maintained objectivity by minimizing personal bias during data collection, analysis, and interpretation while respecting participants' perspectives and institutional values.

RESULTS AND DISCUSSION

Context of Science and Religion Integration at MTsN 3 Kediri

The findings indicate that MTsN 3 Kediri has developed a learning environment in which science education is implemented within an integrated Islamic educational framework. The integration of science and religion was consistently observed in curriculum planning, classroom instruction, and the broader culture of the madrasah. Rather than treating scientific knowledge and religious teachings as separate domains, teachers incorporated Islamic values into science learning activities to encourage students to understand natural phenomena from both scientific and religious perspectives. Classroom observations demonstrated that science lessons regularly connected scientific concepts with relevant Qur'anic verses and Hadith while maintaining the scientific integrity of the subject matter. Documentation, including lesson plans and instructional materials, further confirmed that this integrative approach had become part of the school's academic policy and instructional practice.

Interview data showed that the integration of science and religion was supported by a shared commitment among school leaders and teachers. The principal emphasized the importance of creating an educational environment that develops students' scientific competence alongside their spiritual awareness. Science teachers explained that scientific explanations were frequently accompanied by reflective discussions that encouraged students to appreciate natural phenomena as manifestations of Allah's creation. Islamic Education teachers also collaborated with science teachers to ensure that religious values were incorporated appropriately into classroom learning. These findings demonstrate that science and religion integration has become an institutional characteristic of MTsN 3 Kediri rather than an individual teaching initiative.

The observed learning environment also reflected the influence of the pesantren-based culture surrounding the madrasah. Religious activities, academic programs, and daily school routines mutually reinforced the integration of scientific inquiry and Islamic values. Students actively participated in classroom discussions that encouraged both analytical reasoning and moral reflection. Consequently, science learning was implemented within a context that promoted intellectual, spiritual, and character development simultaneously. This educational context provides the foundation for understanding the epistemological transformation described in the following sections.

Conceptual, Methodological, and Practical Integration of Science and Religion

The findings reveal that the integration of science and religion in Natural Science learning at MTsN 3 Kediri is reflected in several interconnected dimensions that collectively demonstrate the epistemological transformation occurring within the learning process. These dimensions are summarized in Table 1, which presents the empirical evidence and the corresponding meanings of epistemological transformation identified during the study.

Table 1. Findings on the Integration of Science and Religion in Natural Science Learning at MTsN 3 Kediri

No.	Research Focus	Empirical Indicators	Meaning of Epistemological Transformation
1	Conceptual Integration	Teachers connect Natural Science content with relevant Qur'anic verses and Hadith.	A shift occurs from a dichotomous paradigm toward an integrative paradigm of science and religion.
2	Interpretation of Natural Phenomena	Natural phenomena are understood as *ayat kauniyah* that reflect the greatness of Allah SWT.	Science is understood not only as empirical knowledge but also as possessing a spiritual dimension.

3	Methodological Integration	Learning is conducted through a reflective and dialogical approach that connects scientific and spiritual dimensions.	Scientific rationality is integrated with religious values throughout the learning process.
4	Reflection on Islamic Values	Students are encouraged to discuss both the scientific meaning and the religious wisdom underlying natural phenomena.	Learning promotes both critical thinking and spiritual awareness.
5	Internalization of Values	Islamic values are integrated into classroom activities and students' daily lives within the madrasah.	Integration is implemented holistically across the cognitive, affective, and psychomotor domains.
6	Pesantren Based Madrasah Culture	The pesantren environment reinforces the practice of religious values within educational activities.	The integration of science and religion is implemented naturally and sustainably.
7	Visionary Leadership	The madrasah principal promotes institutional policies and an academic culture that support integration.	Leadership serves as a catalyst for transforming the educational paradigm.
8	Teacher Competence	Teachers possess adequate disciplinary knowledge and demonstrate openness toward integrating science and religion.	Teachers' epistemological competence becomes a key determinant of successful integration.
9	Institutional Environmental Support	The pesantren based madrasah provides strong cultural and spiritual support for integrative education.	An educational ecosystem is established to support the comprehensive integration of science and religion.

Table 1 presents the empirical findings regarding the integration of science and religion in science learning at MTsN 3 Kediri. The findings reveal that the integration process occurred through conceptual, methodological, and practical dimensions, indicating that integration extended beyond curriculum content into instructional practice and school culture.

At the conceptual level, teachers consistently connected science topics with relevant Qur'anic verses and Hadith. Scientific concepts were introduced alongside Islamic teachings to encourage students to understand natural phenomena as both empirical realities and signs of Allah's creation (ayat kauniyah). Classroom observations showed that these connections were incorporated during explanations of scientific topics rather than presented as separate religious messages. Documentation analysis further demonstrated that lesson plans included learning objectives integrating scientific understanding with Islamic values.

Methodological integration was identified through the use of reflective and dialogical learning approaches. Instead of relying solely on teacher-centred instruction, teachers encouraged classroom discussions that enabled students to relate scientific reasoning to ethical and spiritual values. Students were invited to examine scientific evidence while reflecting on the broader meaning of natural phenomena from an Islamic perspective. Observation data indicated that this dialogical approach promoted active participation and critical reflection throughout the learning process.

Practical integration was reflected in the internalization of Islamic values during classroom activities and daily school life. Islamic principles were embedded not only in classroom discussions but also in students' behaviour, school culture, and educational activities within the pesantren environment. The findings further indicated that visionary leadership, teacher competence, and institutional support strengthened the implementation of science and religion integration across learning activities. Overall, the evidence demonstrates that integration at MTsN 3 Kediri encompasses conceptual understanding, instructional methodology, and educational practice as interconnected dimensions.

Epistemological Transformation in Science Learning

The empirical findings further indicate that the implementation of science and religion integration has contributed to significant changes in the educational paradigm adopted within science learning. Table 2 summarizes the epistemological transformation observed across several educational dimensions by comparing conditions before and after the implementation of the integrative approach.

Table 2. Epistemological Transformation of Science and Religion Integration at MTsN 3 Kediri

No.	Dimension of Transformation	Before Integration	After Integration
1	Scientific Paradigm	Science and religion were viewed as separate domains.	Science and religion are understood as complementary sources of knowledge.
2	Learning Orientation	Focused on mastering scientific concepts.	Focused on mastering scientific concepts while fostering spiritual values.
3	Meaning of Science	Science was perceived as empirical and rational.	Science is understood as empirical, rational, and spiritual.
4	Learning Strategy	One way knowledge transmission.	Dialogical, reflective, and integrative learning.
5	Learning Environment	Focused primarily on academic activities.	Integrates religious and academic cultures within the learning environment.
6	Educational Objectives	Acquisition of scientific knowledge.	Development of scientific knowledge, character, and spirituality.

Table 2 summarizes the epistemological transformation identified during science learning at MTsN 3 Kediri. The findings indicate a gradual transition from a dichotomous understanding of science and religion toward an integrative paradigm encompassing scientific concepts, instructional orientation, learning strategies, and educational objectives.

The transformation was evident in changes to the educational paradigm adopted by teachers. Science and religion were no longer presented as independent domains but were treated as complementary sources of knowledge within classroom instruction. This shift was reflected in lesson implementation, where scientific explanations were consistently accompanied by ethical and spiritual reflection without reducing scientific accuracy. The findings also showed that the meaning of science expanded beyond empirical investigation to include moral and spiritual awareness in understanding natural phenomena.

Changes were likewise observed in learning strategies and educational objectives. Teacher-centred knowledge transmission gradually shifted toward dialogical and reflective learning, enabling students to participate actively in constructing knowledge. Educational goals were no longer limited to conceptual mastery but also emphasized character formation and spiritual development.

Classroom observations further indicated that religious culture within the madrasah supported these pedagogical changes by creating learning experiences integrating academic achievement with religious values.

Supporting Factors of Epistemological Transformation

The successful implementation of epistemological transformation was influenced by several institutional and pedagogical factors identified during data collection. As presented in Table 3, these supporting factors collectively created an educational environment that facilitated the sustainable integration of science and religion in classroom practice.

Table 3. Supporting Factors for the Integration of Science and Religion at MTsN 3 Kediri

No	Supporting Factors	Forms of Support
1	Visionary Leadership of the Madrasah Principal	Willingness to develop integrative instructional approaches
2	Teacher Competence	Reinforcement of religious culture in students' daily lives
3	Teacher Openness	Internalization of Islamic values through routine learning activities
4	Pesantren Environment	Synergy among the curriculum, teachers, and the educational environment
5	Madrasah Culture	Willingness to develop integrative instructional approaches
6	Institutional Support	Reinforcement of religious culture in students' daily lives

The findings identified several institutional factors that supported the successful implementation of epistemological transformation at MTsN 3 Kediri. These factors include visionary leadership, teacher competence, teacher openness toward interdisciplinary learning, the pesantren environment, madrasah culture, and institutional support. Together, these elements created an educational ecosystem that facilitated the integration of science and religion within classroom instruction.

Visionary leadership emerged as an important supporting factor. School policies consistently encouraged the integration of Islamic values into science education while promoting collaboration among teachers from different academic backgrounds. Documentation analysis also demonstrated that institutional policies and curriculum planning reflected the school's commitment to implementing integrative science education.

Teacher competence and openness further contributed to successful implementation. Teachers demonstrated the ability to relate scientific concepts to Islamic teachings using contextual examples relevant to classroom learning. They also showed willingness to adopt dialogical instructional approaches that encouraged students to integrate scientific reasoning with religious reflection. Observation data indicated that collaboration between science teachers and Islamic Education teachers strengthened the quality of instructional implementation.

The pesantren-based environment and the broader culture of the madrasah reinforced the sustainability of science and religion integration. Daily religious activities, institutional traditions, and academic practices consistently supported the internalization of Islamic values throughout the educational process. Consequently, epistemological transformation was facilitated not only by classroom instruction but also by the institutional culture in which learning occurred.

Proposed Model of Epistemological Transformation

The integration process identified throughout the study culminated in the development of a conceptual model illustrating the epistemological transformation of science and religion in Natural

Science learning. Figure 2 presents the proposed model, highlighting the relationships among the major components and supporting factors identified from the empirical findings.

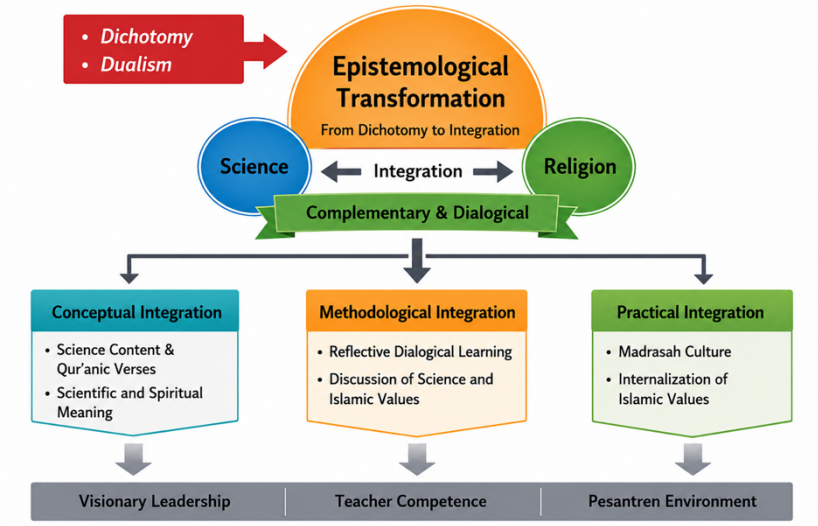

Figure 2. Epistemological Transformation Model of Sciences and Rekigion at MTS N 3 Kediri

Figure 2 illustrates the proposed model of epistemological transformation developed from the findings of this study. The model depicts a transition from a dichotomous perspective separating science and religion toward an integrative paradigm in which both domains function as complementary sources of knowledge. This transformation begins with the removal of conceptual separation between scientific knowledge and Islamic teachings and continues through interconnected conceptual, methodological, and practical integration.

The model demonstrates that conceptual integration is achieved by connecting science learning with relevant Qur'anic verses and Hadith, enabling students to understand scientific phenomena within both empirical and spiritual contexts. Methodological integration is realized through reflective and dialogical instructional approaches that combine scientific reasoning with religious reflection. Practical integration is manifested in the internalization of Islamic values through classroom activities, school culture, and students' daily behaviour within the pesantren environment.

The findings also indicate that the successful implementation of this model depends on several interconnected supporting factors, including visionary leadership, teacher competence, and a conducive pesantren-based educational environment. These factors collectively facilitate the transition toward an integrated educational paradigm that combines scientific inquiry, Islamic values, and character development within science learning.

Discussion

The most significant finding of this study is the emergence of an epistemological transformation from a dichotomous understanding of science and religion toward an integrative paradigm in science learning at MTsN 3 Kediri. This transformation should not be interpreted merely as the inclusion of religious content in science lessons, but rather as a fundamental reconstruction of how knowledge is conceptualized, acquired, and applied within the educational process. From the perspective of the philosophy of science, this finding reflects a shift from viewing scientific and religious knowledge as independent epistemic systems toward recognizing them as complementary sources of truth that address different yet interconnected dimensions of reality. Such a transformation supports Abdullah's integration interconnection paradigm, which argues that scientific and religious disciplines should interact through continuous dialogue rather than remain separated by disciplinary boundaries (Aulia et al. 2025; Rahmani, Najmi, and Dewi 2026; Riwanda 2023). The present findings, however, extend Abdullah's framework by demonstrating that epistemological integration is not

confined to curriculum discourse or institutional philosophy but can also be translated into everyday classroom practices through pedagogical interaction, reflective learning, and school culture. In this respect, the study contributes empirical evidence showing that epistemological transformation is a dynamic educational process rather than merely a theoretical proposition. Consequently, the integration observed at MTsN 3 Kediri represents an operational model of knowledge construction in which scientific inquiry and religious understanding mutually reinforce one another instead of competing for epistemic authority.

This interpretation is further strengthened when viewed alongside recent studies on science and religion integration. Previous research has consistently emphasized the importance of overcoming the historical separation between scientific and religious knowledge in Islamic education (Assalihee et al. 2024; Mukhlis et al. 2026; Qorib and Afandi 2024; Zaluchu, Widodo, and Kriswanto 2025). Similarly, studies by Atika, Salminawati, and Dahlan (2025) and Solihah (2025) reported that integration often remains symbolic, with Qur'anic verses added to science instruction without substantially influencing epistemological perspectives or pedagogical practices. Unlike those studies, the findings of the present research indicate that integration at MTsN 3 Kediri extends beyond symbolic incorporation because it influences learning orientation, instructional interaction, and the educational objectives pursued by teachers and students. This difference appears to be closely associated with the institutional characteristics of the madrasah, particularly its pesantren based educational environment, collaborative academic culture, and leadership commitment to integrating scientific reasoning with Islamic values. Rather than presenting religion as an external justification for scientific concepts, the learning process encourages students to construct meaning through dialogue between empirical evidence and religious reflection. Therefore, this study fills an important gap in previous literature by demonstrating that epistemological transformation becomes sustainable when supported simultaneously by philosophical orientation, pedagogical practice, and institutional culture. These findings broaden current discussions on science and religion integration by illustrating that meaningful educational integration requires changes not only in curriculum content but also in the epistemic assumptions that guide teaching and learning.

CONCLUSIONS

This study demonstrates that the integration of science and religion in Natural Science learning at MTsN 3 Kediri represents a substantive epistemological transformation rather than a symbolic incorporation of Islamic values into scientific instruction. The findings reveal that this transformation is reflected in three interconnected dimensions, namely conceptual, methodological, and practical integration, which collectively reconstruct the relationship between scientific knowledge and religious understanding from a dichotomous paradigm toward a complementary and dialogical framework. The transformation is further strengthened by institutional factors, including visionary leadership, teacher competence, teacher openness, a pesantren based educational environment, and a supportive madrasah culture, all of which contribute to the sustainability of integrative learning practices.

From a theoretical perspective, this study enriches the discourse on science and religion integration by providing empirical evidence that epistemological transformation is not limited to curriculum design or philosophical discourse but can be realized through classroom interaction, institutional culture, and educational leadership. The proposed model extends the integration interconnection paradigm by demonstrating how conceptual, methodological, and practical dimensions interact to establish a holistic learning environment that simultaneously promotes scientific literacy, spiritual awareness, and character development. Consequently, the study contributes to the philosophy of science by illustrating that empirical inquiry and religious values can function as complementary epistemic foundations within contemporary Islamic education.

Practically, the findings provide a reference for madrasahs, educators, curriculum developers, and educational policymakers seeking to implement integrative science learning in Islamic

educational institutions. The proposed model may serve as a framework for designing learning experiences that balance scientific reasoning with ethical and spiritual values without compromising scientific rigor or religious authenticity. Nevertheless, this study is limited to a single qualitative case study conducted in one pesantren based madrasah, which may limit the transferability of the findings to different educational contexts. Future studies are therefore encouraged to examine the proposed model across diverse Islamic educational institutions using comparative, mixed methods, or longitudinal approaches to further validate and refine the epistemological transformation framework.

AKNOWLEDGMENT

The authors would like to express their sincere gratitude to MTsN 3 Kediri for granting permission to conduct this research and for providing valuable support throughout the data collection process. Special appreciation is extended to the school principal, teachers, students, and all participants who generously shared their time, experiences, and insights, making this study possible. Their openness and cooperation significantly contributed to the successful completion of this research. The authors also acknowledge the constructive contributions of colleagues and academic peers whose valuable suggestions helped improve the quality of this manuscript. Finally, the authors are grateful to all individuals and institutions who directly or indirectly supported this study. Their encouragement and assistance have been invaluable in the completion of this research.

AUTHOR CONTRIBUTION STATEMENT

AS: Conceptualization, methodology, investigation, data curation, formal analysis, visualization, writing original draft, and project administration. **AS** led the overall research process, conducted fieldwork, collected and analyzed qualitative data, developed the epistemological transformation model, and prepared the initial manuscript.

NN: Supervision, conceptualization, validation, formal analysis, writing review and editing, and resources. **NN** provided academic supervision throughout the research process, contributed to the refinement of the conceptual and theoretical framework, critically reviewed the data interpretation, revised the manuscript for important intellectual content, and approved the final version for publication.

AI DISCLOSURE STATEMENT

The authors acknowledge the use of artificial intelligence (AI)-assisted language support during the preparation of this manuscript. AI tools were utilized solely to improve language quality, grammar, readability, and the overall organization of the manuscript. All research ideas, study design, data collection, data analysis, interpretation of findings, and final scientific conclusions were developed exclusively by the authors. The authors carefully reviewed, revised, and verified all AI-assisted outputs and accept full responsibility for the accuracy, integrity, and originality of the content presented in this article.

REFRENCES

Amin, A. M., Ahmad, S. H., Zulkarnaim, & Adiansyah, R. (2022). RQANI: A learning model that integrates science concepts and Islamic values in biology learning. International Journal of Instruction, 15(3), 695–718.

Assalihee, M., Bakoh, N., Boonsuk, Y., & Songmuang, J. (2024). Transforming Islamic education through lesson study (LS): A classroom-based approach to professional development in Southern Thailand. Education Sciences, 14(9), Article 1029. https://doi.org/10.3390/educsci14091029

Atika, N., Salminawati, S., & Dahlan, Z. (2025). Integration of Islamic religious education, Al-Quran science and general school subjects at Adzkia Babalan Integrated Islamic Junior High School, Langkat Regency. QiST: Journal of Quran and Tafseer Studies, 4(1), 221–240. https://doi.org/10.23917/qist.v4i1.8905

Aulia, M. H., Abdussalam, A., Kosasih, A., Ridwan, A. D., Ali, M. M. F., Setiawan, A. G., & Faizin, M. N. (2025). Integrating science and technology in Islamic education through the tawhid paradigm. Mauriduna: Journal of Islamic Studies, 6(4), 759–788. https://doi.org/10.37274/mauriduna.v6i4.26

Barrett, N. F. (2023). Religious symbolism and the experience of life as meaningful: Addition, enhancement, or both? Religions, 14(1), Article 88. https://doi.org/10.3390/rel14010088

Barry, A., Valarthodi, M. I., Ali, M., Hermawan, R., & Azzacky, J. I. Y. (2025). Contemporary educational trends in Islamic education: An analytical review of pedagogical challenges and strategic opportunities. LECTURES: Journal of Islamic and Education Studies, 4(3), 375–385. https://doi.org/10.58355/lectures.v4i3.163

Bolis, D., Dumas, G., & Schilbach, L. (2023). Interpersonal attunement in social interactions: From collective psychophysiology to inter-personalized psychiatry and beyond. Philosophical Transactions of the Royal Society B: Biological Sciences, 378(1870), Article 20210365. https://doi.org/10.1098/rstb.2021.0365

Chan, J., & Erduran, S. (2023). The impact of collaboration between science and religious education teachers on their understanding and views of argumentation. Research in Science Education, 53(1), 121–137. https://doi.org/10.1007/s11165-022-10041-1

Chen, Y., Li, S., & Chen, R. (2025). Impact of industry and education integration on employment quality in higher vocational colleges: Moderating role of faculty qualifications and curriculum development capacity. Education Sciences, 15(10), Article 1316. https://doi.org/10.3390/educsci15101316

Coşkun, C. (2023). Religion-science relationship in Western thought: A historical review. Eskiyeni, 51, 941–959.

Damper, R. (2022). Science and religion in conflict, Part 1: Preliminaries. Foundations of Science. https://doi.org/10.1007/s10699-022-09870-0

Diana, A., Azani, M. Z., & M. (2024). The concept and context of Islamic education learning in the digital era: Relevance and integrative studies. Profetika: Jurnal Studi Islam, 25(1), 33–44. https://doi.org/10.23917/profetika.v25i01.4239

Elsawahly, M. M. R., & Ali, F. (2025). Operationalizing faith and science: A policy & curriculum toolkit for Islamic schools. Nwerash International Journal of Islamic Thought, 1(2), 39–60.

Fouka, V. (2024). State policy and immigrant integration. Annual Review of Political Science, 27, 25–46. https://doi.org/10.1146/annurev-polisci-051921-102651

Hadiyanto, A., Putri, K. Y. S., & Fazli, L. (2025). Religious moderation in Instagram: An Islamic interpretation perspective. Heliyon, 11(4). https://doi.org/10.1016/j.heliyon.2025.e42816

Hidayati, A., Jalaludin, Najikh, M., & Alikhan, M. S. (2025). Curriculum management implementation strategies in improving the quality of madrasah education. Indonesian Journal of Education and Social Studies, 4(3), 310–323. https://doi.org/10.33650/ijess.v4i2.12733

Hudson, B., Stolare, M., Olin-Scheller, C., & Gericke, N. (2022). International perspectives on knowledge and quality. (Lengkapi nama penerbit).

Hussain, K. (2023). Islam and the contemporary world: Interview with Professor Seyyed Hossein Nasr. Islam and Christian–Muslim Relations, 34(4), 365–380. https://doi.org/10.1080/09596410.2023.2292935

Imamah, Y. H. (2025). Integration of science and religious values in learning Islamic religious education. Journal Corner of Education, Linguistics, and Literature, 5(1), 25–35. https://doi.org/10.54012/jcell.v5i1.510

Khofifah, B. (2023). The relevance of Seyyed Hossein Nasr's perspective spirituality to the world of Islamic education. Proceeding of International Conference on Education, Society and Humanity, 1(1), 1165–1173.

Laila, S. N. F., Mufarokah, A., Anwar, H. S., & Mudhofar, A. (2025). Curriculum changes in Indonesia: Implementation and its challenges in religious institutions. Journal of Educational Research and Practice, 3(1), 16–31. https://doi.org/10.70376/jerp.v3i1.266

Mahmudi, Sumarni, S., & Faiz, F. (2022). Integration of science and religion: Implications for Islamic education. QALAMUNA: Jurnal Pendidikan, Sosial, dan Agama, 14(1), 303–316. https://doi.org/10.37680/qalamuna.v14i1.4102

Mukhlis, Sabda, S., Yaqin, H., & Hamdan. (2026). Reorientation of Islamic religious education in the global era in facing the challenges of globalization, multiculturalism, and radicalism. Al Ghazali: Jurnal Pendidikan dan Pemikiran Islam, 6(1), 170–200. https://doi.org/10.69900/ag.v6i1.517

Qadri, S. S., Hussin, N. S., & Dar, M. M. (2024). Countering extremism through Islamic education: Curriculum and pedagogical approaches. Journal on Islamic Studies, 1(1), 74–89. https://doi.org/10.35335/r182s939

Qorib, M., & Afandi, A. (2024). Implementing prophetic values in the Islamic life guidelines for Muhammadiyah citizens: A qualitative analysis for transforming science and technology. MIQOT: Jurnal Ilmu-Ilmu Keislaman, 48(1), 1–24. https://doi.org/10.30821/miqot.v48i1.1129

Rachmatullah, A., Park, S., & Ha, M. (2022). Crossing borders between science and religion: Muslim Indonesian biology teachers' perceptions of teaching the theory of evolution. Cultural Studies of Science Education, 17(2), 589–624. https://doi.org/10.1007/s11422-021-10066-4

Rahman, G. (2025). Transforming Islamic education through value-based leadership: A narrative review. Sinergi International Journal of Islamic Studies, 3(2), 83–95. https://doi.org/10.61194/ijis.v3i2.712

Rahmani, D. A., Najmi, V. N., & Dewi, E. (2026). Reconstructing Islamic epistemology: A philosophical analysis of Amin Abdullah's integrative–interconnected paradigm. Jurnal Pendidikan Agama Islam Al-Thariqah, 11(1), 169–182. https://doi.org/10.25299/althariqah.2026.vol11(1).27798

Riwanda, A. (2023). Comparative typology of science and religion integration of Syed Muhammad Naquib Al-Attas and Amin Abdullah and its implications for Islamic education. Journal of Islamic Civilization, 5(1), 91–111.

Rizki, A., & Rijal, S. (2026). Epistemological foundations of Islamic education: Bayani, Burhani, and Irfani. Al-Mudarris (Jurnal Ilmiah Pendidikan Islam), 9(1), 1–14. https://doi.org/10.23971/mdr.v9i1.11002

Salim, N. A., Zaibi, M., Brantasari, M., Ikhsan, M., & Aslindah, A. (2024). Islamic boarding school leadership innovation: From traditional to modernization of education. Munaddhomah: Jurnal Manajemen Pendidikan Islam, 5(4), 447–460. https://doi.org/10.31538/munaddhomah.v5i4.1392

Schnabel, L., Abdelhadi, E., Zaslavsky, K. A., Ho, J. S., & Torres-Beltran, A. (2022). Gender, sexuality, and religion: A critical integrative review and agenda for future research. Journal for the Scientific Study of Religion, 61(2), 271–292. https://doi.org/10.1111/jssr.12781

Solihah, I., Aljauhany, I. H., Akmaluddin, K., Mustafidin, A., Alrumayh, S., Rochmawan, A. E., & Azid, A. (2025). Integrating Al-Qur'an, Hadith, and science in Islamic education: Tracing scientific insights. Jurnal Ilmu Pendidikan dan Sains Islam Interdisipliner, 123–131. https://doi.org/10.59944/jipsi.v4i3.453

Stein, D. J., Nielsen, K., Hartford, A., Gagné-Julien, A.-M., Glackin, S., Friston, K., Maj, M., Zachar, P., & Aftab, A. (2024). Philosophy of psychiatry: Theoretical advances and clinical implications. World Psychiatry, 23(2), 215–232. https://doi.org/10.1002/wps.21194

Supena, I. (2022). Integration of Islamic sciences and secular sciences through spiritualization and humanization approaches. Hikmatuna: Journal for Integrative Islamic Studies, 8(1), 1–15. https://doi.org/10.28918/hikmatuna.v8i1.4657

Syaifuddin, M., Muhlisin, Untung, S., Zuhri, A., Khikmah, N., Thoyibah, & Prayogi, A. (2026). Synthesis of Islamic epistemology "Bayani, Burhani, and Irfani" as a foundation for the development of contemporary scientific integration. Al Qodiri: Jurnal Pendidikan, Sosial dan Keagamaan, 24(2), 211–225. https://doi.org/10.53515/alqodiri.v24i2.65

Verdicchio, M., & Perin, A. (2022). When doctors and AI interact: On human responsibility for artificial risks. Philosophy & Technology, 35(1), Article 11. https://doi.org/10.1007/s13347-022-00506-6

Vuong, Q.-H., & Nguyen, M.-H. (2025). On nature quotient. Pacific Conservation Biology, 31(5), Article PC25028. https://doi.org/10.1071/PC25028

Zaluchu, S. E., Widodo, P., & Kriswanto, A. (2025). Conceptual reconstruction of religious moderation in the Indonesian context based on previous research: Bibliometric analysis. Social Sciences & Humanities Open, 11, Article 101552. https://doi.org/10.1016/j.ssaho.2025.101552