

## **Revitalizing Muslim society through the integration of Islamic and scientific education: a comparative study of the educational thought of Ahmad Dahlan and Wahid Hasyim**

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**Abstract:** This study addresses the persistent dichotomy between religious knowledge and science in Islamic education, which has contributed to intellectual stagnation among Muslims from the colonial period to the contemporary era. The objective of this study is to analyze the concept of Islam-science integration in the thoughts of KH. Ahmad Dahlan and KH. Wahid Hasyim and to examine its relevance in modern Islamic education. This research employs a qualitative-descriptive approach using a library research method, with content analysis applied to primary and secondary sources related to both figures. The findings reveal that KH. Ahmad Dahlan developed an integrative model through modern schooling by combining religious and scientific curricula, while KH. Wahid Hasyim implemented integration within pesantren by incorporating general sciences without eliminating classical traditions. The originality of this study lies in its comparative analysis positioning both figures as representatives of modernist and traditionalist educational paradigms that produce complementary integration models. However, this study is limited to secondary data without empirical field validation. The implication suggests that Islam-science integration should be developed into a contextual and praxis-based educational model that is adaptive to technological advancements while maintaining strong ethical and spiritual foundations.

**Keywords:** Islam-science integration, Islamic education, reform, Ahmad Dahlan, Wahid Hasyim.

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### **Introduction**

The discourse on the integration of Islam and science has gained increasing attention in contemporary Islamic education, particularly in response to the challenges of globalization and the rapid development of science and technology. The concept of integration seeks to overcome the long-standing dichotomy between religious knowledge and scientific knowledge by reconstructing a unified epistemological framework rooted in Islamic principles. Scholars such as M. Amin Abdullah have emphasized the integration-interconnection paradigm as a strategic approach to bridging fragmented disciplines and promoting a holistic understanding of knowledge. This paradigm highlights that scientific advancement should not be separated from ethical and spiritual values, thereby reinforcing the relevance of integration in modern education systems (Masyitoh, 2020; Baihaqi et al., 2026; Tambak & Sukenti, 2026).

In the Indonesian context, the discourse on Islamic education reform has been historically shaped by two dominant paradigms: modernist and traditionalist (Idris, 2013). The modernist paradigm emphasizes rationality, institutional reform, and the adoption of formal education systems, while the traditionalist paradigm prioritizes the preservation of classical Islamic scholarship within pesantren traditions. Previous studies tend to analyze these paradigms separately or even position them as dichotomous and conflicting approaches. As a result, the

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relationship between modernist and traditionalist perspectives is often framed in terms of opposition rather than integration. Despite the growing body of literature on Islam-science integration and Islamic educational reform, there remains a significant gap in understanding how these paradigms can be conceptually integrated within a unified framework (Wathoni, 2018; Chapakiya et al., 2025; Tambak & Sukenti, 2025). Most existing studies focus either on theoretical models of integration or on institutional practices, without adequately exploring the synthesis of modernist and traditionalist approaches at the conceptual level. Furthermore, limited attention has been given to the comparative analysis of influential Islamic educational figures whose ideas reflect both paradigms.

The contemporary discourse on Islamic education has increasingly emphasized the necessity of overcoming the longstanding dichotomy between religious knowledge (*‘ulūm al-dīn*) and modern scientific disciplines to foster an intellectually vibrant and socially transformative Muslim society. Recent scholarship argues that integrated Islamic and scientific education constitutes a strategic paradigm for cultivating holistic human capital capable of responding to globalization, technological disruption, and ethical challenges while maintaining a strong Islamic worldview (Azra, 2022; Sahin, 2023; Abdullah, 2024; Abdullah et al., 2025; Tambak & Sukenti, 2024). Within this discourse, the educational philosophy of Ahmad Dahlan has regained scholarly attention because of its progressive synthesis of Qur’anic values, scientific inquiry, and modern pedagogy, positioning education as the principal instrument for Muslim social renewal rather than merely religious transmission (Suwarsih et al., 2024; Sunan & Abu Bakar, 2025; Azizah et al., 2025). Nevertheless, the majority of recent studies have concentrated on institutional implementation, curriculum integration, or educational modernization, while giving limited attention to how integrated Islamic and scientific education contributes to the broader project of Muslim revival as envisioned by pioneering Muslim reformers.

Recent investigations into Islamic educational reform have also revisited the intellectual legacies of Indonesian Muslim reformers, particularly Ahmad Dahlan, in addressing contemporary educational challenges. These studies consistently demonstrate that Ahmad Dahlan advocated a transformative educational model that harmonized religious commitment, scientific literacy, critical thinking, and civic responsibility, thereby rejecting the epistemological separation between revealed and empirical knowledge (Achmad, 2021; Amir & Rossidy, 2025; Khasanah et al., 2025; Tambak et al., 2023). In contrast, scholarly attention to the educational thought of Wahid Hasyim remains comparatively limited despite his significant contribution to integrating pesantren traditions with modern schooling, national education, multilingual competence, and scientific learning (Firdaus et al., 2025; Arlinda & Maragustam, 2026; Pascasarjana et al., 2024). Consequently, the existing literature has yet to provide a comprehensive comparative framework explaining how the complementary educational philosophies of Ahmad Dahlan and Wahid Hasyim collectively articulate an integrated Islamic-scientific paradigm for the revitalization of Muslim civilization.

Against this scholarly background, the present study addresses an important gap by comparatively examining the educational philosophies of Ahmad Dahlan and Wahid Hasyim through the analytical lens of Muslim revival grounded in integrated Islamic and scientific education. Unlike previous studies that primarily focus on educational modernization, curriculum reform, or institutional transformation, this research reconstructs the philosophical foundations through which both reformers envisioned educational integration as a catalyst for intellectual renewal, moral regeneration, and civilizational advancement within Muslim societies (Prayoga et al., 2025; Mokmin et al., 2025; Khikmatun & Khobir, 2025; Saputra et al., 2026). Therefore, this study contributes a novel conceptual framework that bridges Islamic educational philosophy, knowledge integration, and Muslim revival, extending current scholarship beyond pedagogical implementation toward a comprehensive theory of educational transformation rooted in the intellectual legacies of Ahmad Dahlan and Wahid Hasyim.

To address this gap, this study employs a conceptual analysis approach to examine and reconstruct the integration of Islam and science in the thoughts of KH. Ahmad Dahlan and KH. Wahid Hasyim. By comparing their epistemological foundations, curricular models, and institutional strategies, this study aims to develop a comprehensive conceptual model that bridges modernist and traditionalist paradigms. The novelty of this research lies in its effort to move

beyond dichotomous perspectives by proposing a complementary integration model that synthesizes the strengths of both paradigms. This study not only contributes to the theoretical development of Islam-science integration but also offers a contextual framework for reforming Islamic education in Indonesia. Therefore, this research focuses on answering about how can the integration of Islam and science be conceptually reconstructed through the complementary perspectives of modernist and traditionalist Islamic educational thought.

## **Literature review**

### **Concept of Islam-science integration**

The concept of Islam-science integration refers to an epistemological effort to unify religious knowledge and scientific knowledge within a coherent and holistic framework. In Islamic intellectual tradition, knowledge is not divided into secular and religious domains, but rather understood as originating from a single divine source (Rahmani dkk., 2026). Revelation (wahyu) serves as the ultimate guidance that provides ethical direction and metaphysical meaning, while reason and empirical observation function as tools for exploring the natural and social world. This integrative perspective is rooted in the principle of tawhid, which emphasizes the unity of all existence and knowledge. Scholars such as M. Amin Abdullah have developed the integration-interconnection paradigm to address the fragmentation of knowledge in modern education (Khoirunnisa & Asrori, 2026). This paradigm encourages dialogue between disciplines and promotes a holistic understanding of knowledge that integrates scientific inquiry with spiritual values. As a result, Islam-science integration is not merely about combining subjects but about reconstructing a worldview that aligns scientific advancement with ethical and religious principles (Firnanda et al., 2026).

From an evaluative perspective, Islam-science integration can be categorized into several models, including the Islamization of knowledge, integration-interconnection, and scientific-religious synthesis. The Islamization model focuses on reconstructing modern sciences based on Islamic values, while the integration-interconnection model emphasizes interdisciplinary dialogue and mutual enrichment between fields of knowledge (Syihabuddin dkk., 2024). Meanwhile, the synthesis model seeks to create new frameworks that combine religious and scientific perspectives into a unified system. Each model involves different methodological approaches, such as curriculum redesign, interdisciplinary teaching, and epistemological reconstruction. For example, integration can be implemented through thematic learning that combines Qur'anic values with scientific concepts or through institutional reforms that align religious and general education (Nur Intan dkk., 2025). However, challenges remain in terms of teacher competence, curriculum alignment, and institutional readiness. Therefore, effective integration requires not only conceptual clarity but also practical strategies that can be adapted to diverse educational contexts. Islamic educational reform in Indonesia has been historically shaped by two dominant paradigms, namely the modernist and traditionalist approaches. The modernist paradigm emphasizes rationality, progress, and the adoption of modern educational systems, including formal schooling, standardized curricula, and the inclusion of scientific disciplines. This paradigm emerged as a response to colonial influence and the need to modernize Muslim society in order to compete globally. On the other hand, the traditionalist paradigm prioritizes the preservation of classical Islamic scholarship, particularly within pesantren institutions, where education is centered on kitab kuning and traditional teaching methods such as sorogan and bandongan. Both paradigms reflect different orientations in understanding the role of education in society. While the modernist approach seeks transformation and innovation, the traditionalist approach emphasizes continuity and cultural preservation. Together, they represent the dynamic nature of Islamic education in responding to changing social and historical contexts.

### **Islamic educational reform: modernist and traditionalist paradigms**

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From an evaluative standpoint, the modernist and traditionalist paradigms can be analyzed based on their strengths, limitations, and implementation strategies (Sari, 2022; Tambak et al., 2024). The modernist paradigm offers advantages in terms of efficiency, scalability, and alignment with global educational standards, making it suitable for formal institutional settings. However, it may risk neglecting the depth of classical Islamic scholarship. Conversely, the traditionalist paradigm ensures the preservation of intellectual heritage and spiritual depth but may face challenges in adapting to modern scientific developments. In practice, many educational institutions have adopted hybrid approaches that combine elements of both paradigms (United Nations, 2013). For example, pesantren-based schools may incorporate formal curricula while maintaining traditional learning methods. This indicates that Islamic educational reform is not limited to a single model but involves a continuous process of adaptation and synthesis. The challenge lies in balancing innovation with tradition to create an education system that is both relevant and rooted in Islamic values.

### **Conceptual analysis in Islamic educational studies**

Conceptual analysis is a qualitative research approach that focuses on examining, clarifying, and reconstructing key concepts within a particular field of study (Zach & Bulgarian Academy of Sciences, 2019; Namora et al., 2025). Unlike descriptive research, which primarily presents information, conceptual analysis seeks to uncover the underlying meanings, relationships, and theoretical structures of concepts. In the context of Islamic educational studies, this approach is particularly useful for analyzing the thoughts of influential scholars and understanding their contributions to educational theory and practice. Conceptual analysis allows researchers to move beyond historical narration and engage in deeper theoretical interpretation. It involves identifying key concepts, exploring their definitions, and examining how they relate to broader theoretical frameworks. This method is especially relevant for studies that aim to develop new models or frameworks, such as the integration of Islam and science, as it provides a systematic way to analyze and synthesize existing ideas.

From an evaluative perspective, conceptual analysis involves several systematic stages, including concept identification, categorization, comparison, and synthesis. These stages enable researchers to organize complex ideas into coherent frameworks and generate new theoretical insights. For example, in analyzing the thoughts of Islamic educational figures, researchers may compare their epistemological views, curricular models, and institutional strategies to identify patterns and differences. This process allows for the development of integrative models that reflect the strengths of different perspectives. However, the effectiveness of conceptual analysis depends on the quality of sources and the rigor of the analytical process. It requires careful selection of relevant literature, critical evaluation of concepts, and logical synthesis of findings. When conducted rigorously, conceptual analysis can make significant contributions to the development of Islamic educational theory, particularly in addressing contemporary challenges such as knowledge integration and educational reform.

### **Method**

This study employed a qualitative research approach using concept analysis as its principal methodological framework to explore and reconstruct the integration of Islam and science in the educational philosophies of KH. Ahmad Dahlan and KH. Wahid Hasyim. Concept analysis is particularly appropriate for investigating abstract philosophical constructs because it enables researchers to systematically examine the meanings, attributes, relationships, and contextual development of concepts embedded in historical and intellectual texts rather than measuring

empirical variables (Walker & Avant, 2019; Rodgers, 2000; Jabareen, 2009). Unlike conventional historical or descriptive studies, concept analysis facilitates the reconstruction of conceptual relationships and the generation of new theoretical models through rigorous comparative interpretation of textual evidence (Jabareen, 2009; Furner, 2004; Schwartz-Barcott & Kim, 2000). The study adopted a comparative conceptual design, positioning the educational philosophies of KH. Ahmad Dahlan and KH. Wahid Hasyim as two complementary intellectual traditions addressing the integration of Islamic and scientific knowledge. The unit of analysis was not the individuals themselves but the educational concepts articulated throughout their intellectual works, educational reforms, institutional practices, and documented scholarly interpretations. Consequently, the analysis focused on identifying conceptual convergence, divergence, and theoretical complementarity across both educational paradigms rather than constructing biographical narratives.

Data were derived from purposively selected primary and secondary documentary sources based on their relevance, authenticity, credibility, and conceptual richness (Bowen, 2009; Scott, 1990). The primary corpus consisted of authoritative writings, speeches, educational documents, organizational records, policy documents, correspondence, and officially published collections of Ahmad Dahlan's and Wahid Hasyim's educational thought. These primary materials were complemented by historical documents published by Muhammadiyah, Nahdlatul Ulama, the Ministry of Religious Affairs, and national archival collections. Secondary sources comprised peer-reviewed journal articles indexed in Scopus and Web of Science, scholarly books, doctoral dissertations, edited volumes, and authoritative studies examining Islamic educational philosophy, Islam-science integration, curriculum reform, pesantren modernization, and Indonesian Islamic intellectual history. Only publications demonstrating clear scholarly rigor and direct relevance to the research objectives were included in the analysis.

Data collection employed systematic document analysis, which allows researchers to generate empirical evidence from written materials through careful examination, interpretation, and categorization (Bowen, 2009). The documentary review was conducted in several iterative stages. Initially, all relevant documents were identified through academic databases, university libraries, archival repositories, and institutional publications. Subsequently, documents were screened according to predefined inclusion criteria emphasizing authenticity, historical significance, conceptual relevance, and academic credibility. Following document selection, the texts were read repeatedly to extract conceptual units associated with the integration of Islam and science. Particular analytical attention was devoted to concepts concerning epistemological foundations, the relationship between revelation and reason, educational objectives, curriculum integration, pedagogical orientation, institutional reform, scientific literacy, moral education, and civilizational development.

Data analysis followed an iterative concept analysis procedure adapted from Rodgers' evolutionary concept analysis and Jabareen's conceptual framework methodology (Rodgers, 2000; Jabareen, 2009). The analytical process consisted of five interconnected stages. First, concept identification involved recognizing recurring philosophical ideas and educational principles related to Islam-science integration across the documentary corpus. Second, open conceptual coding generated preliminary conceptual labels representing the essential meanings expressed in each document. Third, categorization and thematic abstraction grouped conceptually related codes into broader analytical dimensions, including epistemological integration, curriculum integration, pedagogical integration, institutional transformation, and civilizational orientation. Fourth, comparative conceptual analysis systematically examined similarities, differences, continuities, and distinctive characteristics between Ahmad Dahlan's transformative-modernist framework and Wahid Hasyim's adaptive-traditionalist framework. Finally, conceptual synthesis reconstructed a higher-order theoretical model describing the complementary integration of Islam and science as a multidimensional educational paradigm capable of addressing contemporary challenges in Islamic education.

To enhance the trustworthiness of the findings, several qualitative validation strategies were implemented. Credibility was strengthened through prolonged engagement with historical documents, continuous comparison across multiple documentary sources, and theoretical triangulation between primary texts and contemporary scholarly interpretations (Lincoln & Guba,



1985; Bowen, 2009). Dependability was ensured by maintaining a transparent analytical audit trail documenting coding decisions, conceptual categorization, and framework development throughout the research process. Confirmability was achieved through reflexive interpretation and continuous verification of conceptual findings against original documentary evidence, thereby minimizing subjective bias. Transferability was facilitated by providing thick conceptual descriptions that enable future researchers to apply the proposed framework within broader contexts of Islamic educational studies (Lincoln & Guba, 1985).

## Results

### Epistemological foundation of the integration of Islam and science

The concept analysis reveals that the integration of Islam and science in the educational philosophies of KH. Ahmad Dahlan and KH. Wahid Hasyim is fundamentally constructed upon a unified epistemological framework that rejects the dichotomous separation between revealed (*naqli*) and rational (*aqli*) knowledge. Rather than conceptualizing religion and science as competing domains, both reformers regarded them as complementary dimensions of a single epistemological system grounded in the principle of *tawhid*. Comparative examination of primary documents and contemporary scholarly interpretations consistently demonstrates that revelation functions as the ethical and metaphysical foundation of knowledge, whereas scientific inquiry serves as the methodological instrument for understanding empirical reality. Consequently, the integration of Islam and science should be understood not merely as curriculum reform but as the reconstruction of the philosophical meaning of knowledge itself.

Evidence from the concept analysis further demonstrates that Ahmad Dahlan's educational reform was directed toward eliminating the epistemological dualism that had long separated religious and general sciences within Muslim education. As concluded by Marlini, Fakhurrazi, and Shofiyah (2024), Ahmad Dahlan's educational renewal was achieved by "uniting traditional-based education systems and modern education systems, collaborating religious sciences and general sciences, and integrating Islamic religious education and general education which includes aspects of curriculum, methods and institutions." This quotation provides empirical support for the present finding that educational integration, in Ahmad Dahlan's perspective, represents a comprehensive epistemological reconstruction rather than the simple addition of scientific subjects to religious curricula.

The analysis also indicates that Ahmad Dahlan viewed scientific knowledge as an indispensable component of Muslim intellectual advancement. A recent qualitative study concludes that his educational philosophy emphasized "the integration of religion and science as the foundation of educational modernization", enabling Islamic schools to cultivate both religious commitment and scientific competence simultaneously. Accordingly, the present study interprets Ahmad Dahlan's educational philosophy as advocating an educational system capable of producing Muslims who are intellectually competent, spiritually grounded, and socially responsive.

Similarly, the concept analysis identifies Wahid Hasyim's educational thought as representing an adaptive model of knowledge integration that preserved the intellectual authority of the pesantren while embracing scientific and educational modernization. As stated by Maragustam (2016), Wahid Hasyim's educational reform was "oriented on ideal hereafter and mundane pragmatic," encouraging pesantren students "to think more openly and free yet carry on proper obedient to the teachers." This finding indicates that Wahid Hasyim regarded modernization not as the replacement of Islamic tradition but as the enrichment of its intellectual capacity through scientific learning, multilingual education, and educational innovation. Consequently, this concept analysis concludes that both scholars conceptualized epistemological integration as the philosophical basis for educational reform. Their educational philosophies consistently position revelation as the source of ethical direction and scientific inquiry as the means of exploring God's creation. Therefore, the integration of Islam and science emerges as a comprehensive worldview in which theology, rationality, morality, and empirical investigation operate within a coherent educational framework.

A deeper examination of the documentary corpus further reveals that both scholars conceptualized *tawhid* not merely as a theological doctrine but as the central epistemological

principle governing the organization, validation, and application of knowledge. Across their educational philosophies, *tawhid* functions as the integrating axis through which revelation, reason, experience, and ethical responsibility become inseparable components of the learning process. The analysis demonstrates that scientific inquiry is consistently interpreted as an act of understanding the signs (*āyāt*) of God manifested in the natural and social worlds, while religious knowledge provides the moral and spiritual framework that directs scientific exploration toward human welfare. Consequently, the integration of Islam and science extends beyond disciplinary synthesis to encompass an ontological and axiological unity in which all forms of knowledge ultimately contribute to the realization of Islamic civilization and the public good (*maslahah*).

Another conceptual finding emerging from the analysis concerns the reciprocal relationship between knowledge integration and character formation. The comparative examination indicates that neither Ahmad Dahlan nor Wahid Hasyim viewed educational integration solely as an intellectual enterprise aimed at expanding cognitive competence. Instead, both scholars consistently linked the acquisition of scientific knowledge with the cultivation of ethical integrity, spiritual maturity, and social responsibility. Their educational philosophies therefore position moral education as an intrinsic outcome of epistemological integration rather than as a separate component of the curriculum. This finding suggests that the integration of Islam and science operates simultaneously as a process of intellectual development and character formation, producing graduates who are expected to employ scientific knowledge responsibly within the ethical framework of Islamic teachings while contributing positively to society.

Finally, the cross-document synthesis identifies a broader conceptual implication that has not been explicitly articulated in previous studies. The educational philosophies of Ahmad Dahlan and Wahid Hasyim collectively demonstrate that the integration of Islam and science constitutes a dynamic process of continuous epistemological renewal rather than a fixed educational model. Their ideas reveal that educational integration remains responsive to changing historical, social, and scientific contexts without compromising the permanence of Islamic theological principles. Accordingly, this study reconstructs an interpretive conceptual framework in which epistemological integration serves as the foundational layer supporting curricular innovation, pedagogical transformation, institutional development, leadership practices, and societal engagement. This multidimensional framework represents the culminating conceptual finding of the present research, illustrating that sustainable Islamic educational reform can be achieved through the continuous interaction between revelation, scientific inquiry, educational innovation, and the enduring values of *tawhid*.

### Orientation of educational integration

A second conceptual category emerging from the analysis concerns the differing orientations through which both scholars operationalized the integration of Islam and science. Although sharing an identical epistemological foundation, they developed distinct reform strategies shaped by different institutional contexts and socio-historical realities.

The findings indicate that Ahmad Dahlan adopted what this study conceptualizes as a transformative-modernist orientation. His educational reform was characterized by the establishment of modern schools, curriculum standardization, teacher professionalization, organizational management, and the systematic incorporation of scientific disciplines into Islamic education. Rather than reforming traditional institutions gradually, Ahmad Dahlan reconstructed educational structures by introducing a new institutional model capable of responding to colonial modernity while maintaining Islamic values. Recent scholarship similarly concludes that Ahmad Dahlan integrated religious studies with mathematics, science, and languages through modern educational institutions to produce Muslims who were simultaneously faithful, knowledgeable, and socially responsible.

Conversely, Wahid Hasyim developed what this study identifies as an adaptive-traditionalist orientation. Instead of replacing the *pesantren* system, he strengthened its intellectual capacity through selective adaptation. Modern sciences, multilingual education, and administrative innovation were incorporated into the existing *pesantren* framework without weakening its traditional authority. The analysis therefore demonstrates that educational

modernization, according to Wahid Hasyim, should emerge organically from within the Islamic scholarly tradition rather than through institutional discontinuity.

The comparison between these two reform strategies reveals an important conceptual finding. Ahmad Dahlan pursued educational transformation through institutional reconstruction, whereas Wahid Hasyim achieved modernization through institutional adaptation. Although their methods differ substantially, both strategies pursue the same philosophical objective: eliminating epistemological dualism while preparing Muslims capable of responding constructively to social change. This finding extends previous studies by demonstrating that educational integration is not represented by a single reform model but encompasses multiple trajectories shaped by historical experience, institutional culture, and educational priorities.

A further conceptual pattern identified through the comparative analysis concerns the role of educational leadership in sustaining the integration of Islam and science. The documentary evidence indicates that both Ahmad Dahlan and Wahid Hasyim regarded educational leaders not merely as institutional administrators but as intellectual reformers responsible for translating epistemological principles into educational practice. However, they differed in their leadership orientation. Ahmad Dahlan emphasized transformational leadership through organizational innovation, institutional expansion, and systematic educational governance, enabling the rapid dissemination of integrated Islamic schools across diverse social settings. In contrast, Wahid Hasyim exercised dialogical and accommodative leadership by cultivating consensus among pesantren scholars, preserving religious authority while introducing educational innovations incrementally. This finding suggests that successful knowledge integration depends not only on conceptual coherence but also on leadership strategies capable of harmonizing educational vision with institutional culture and stakeholder acceptance.

Another significant finding emerging from the concept analysis relates to the educational objectives underpinning both models of integration. Despite their institutional differences, both scholars consistently conceptualized education as a process of holistic human formation rather than the transmission of fragmented disciplinary knowledge. Ahmad Dahlan envisioned graduates who combined Islamic piety with scientific competence and civic responsibility, while Wahid Hasyim emphasized the development of intellectually open, morally grounded, and socially adaptive Muslims who remained firmly rooted in the pesantren tradition. Comparative analysis reveals that these educational objectives converge toward the formation of individuals possessing intellectual excellence, ethical integrity, spiritual maturity, and social engagement. Consequently, the integration of Islam and science is interpreted not simply as curriculum innovation but as a comprehensive educational philosophy aimed at cultivating balanced human development (*insan kamil*) capable of responding to both religious obligations and contemporary societal challenges.

Finally, the cross-case conceptual synthesis generated a higher-order theoretical proposition that extends existing scholarship on Islamic educational reform. Rather than positioning Ahmad Dahlan's modernist orientation and Wahid Hasyim's adaptive-traditionalist orientation as competing paradigms, the analysis demonstrates that both constitute complementary dimensions within a broader integrative educational framework. Ahmad Dahlan contributes structural transformation, institutional modernization, and scientific rationality, whereas Wahid Hasyim contributes cultural continuity, contextual adaptation, and the preservation of Islamic scholarly traditions. Their conceptual convergence ultimately produces a multidimensional model of Islam–science integration operating simultaneously at epistemological, curricular, pedagogical, institutional, and societal levels. This synthesized model represents the principal theoretical outcome of the present study, providing an interpretive framework that explains how contemporary Islamic education can reconcile religious authenticity with scientific advancement while remaining responsive to changing educational, technological, and civilizational contexts.

## Discussion

The findings of this study provide strong evidence that the integration of Islam and science is fundamentally an epistemological project rather than merely a pedagogical or institutional reform (Asman et al., 2021; Rahmani et al., 2026; Saputra et al., 2026; Muallimin et al., 2026). The shared emphasis on *tawhid* as the foundation of knowledge reflects a holistic worldview in which



all branches of knowledge are interconnected within a unified ontological and epistemological framework (Suharto, 2021; Rahmani et al., 2026; Khasanah et al., 2026; Muhajir et al., 2025). This perspective aligns closely with the integration-interconnection paradigm proposed by M. Amin Abdullah, which emphasizes the necessity of overcoming disciplinary fragmentation in Islamic education (Rahmani et al., 2026; Khasanah et al., 2026; Waston). In this regard, the ideas of KH. Ahmad Dahlan and KH. Wahid Hasyim can be understood not merely as historical responses to educational challenges but as enduring theoretical foundations for contemporary discourse on the integration of knowledge in Islamic education (Asman et al., 2021; Amir & Rossidy, 2026; Arlinda & Maragustam, 2026).

The differentiation in integration orientation between the two figures further illustrates how educational reform is profoundly shaped by socio-historical contexts (Zain et al., 2026; Asman et al., 2021; Arlinda & Maragustam, 2026). Dahlan's transformative-modernist approach reflects a strategic response to colonial domination and the marginalization of Islamic education by promoting formal schooling, scientific literacy, and educational modernization (Asman et al., 2021; Amir & Rossidy, 2026; Ahmad Dahlan Educational Methodology, 2025). By introducing formal schooling systems, standardized curricula, and modern scientific subjects, he sought to reposition Islamic education within a progressive and competitive educational framework (Amir & Rossidy, 2026; Asman et al., 2021; Saputra et al., 2026). In contrast, Wahid Hasyim's adaptive-traditionalist orientation demonstrates a culturally responsive reform strategy that preserves the intellectual heritage of the *pesantren* while gradually incorporating scientific knowledge, foreign languages, and modern educational management (Arlinda & Maragustam, 2026; Zain et al., 2026; Rahmani et al., 2026). Consequently, these findings indicate that Islamic educational reform is inherently pluralistic and evolves through multiple pathways that respond to different historical, cultural, and institutional realities (Baihaqi et al., 2026; Zain et al., 2026; Saputra et al., 2026; Rahmani et al., 2026).

From a curricular perspective, the distinction between formal-integrative and hybrid curriculum models demonstrates that knowledge integration is contextually flexible rather than universally standardized (Saputra et al., 2026; Zain et al., 2026; Rahmani et al., 2026). Dahlan's institutional model offers administrative coherence, systematic curriculum organization, and scalability that facilitate implementation across formal educational institutions (Asman et al., 2021; Amir & Rossidy, 2026; Saputra et al., 2026). Conversely, Wahid Hasyim's hybrid curriculum model maintains continuity with classical Islamic scholarship while encouraging gradual adaptation to scientific and technological developments (Arlinda & Maragustam, 2026; Zain et al., 2026; Saputra et al., 2026). These findings therefore challenge the dominant assumption that curriculum integration requires a single standardized model and instead support a pluralistic, adaptive, and context-sensitive framework for Islamic curriculum development (Rahmani et al., 2026; Saputra et al., 2026; Suharto, 2021).

A key contribution of this study lies in identifying a complementary relationship between modernist and traditionalist paradigms rather than viewing them as mutually exclusive educational orientations (Rasyid et al., 2026; Zain et al., 2026; Asman et al., 2021). This finding suggests that educational transformation within Islamic societies can be achieved through the constructive interaction of reformist innovation and the preservation of authentic Islamic intellectual traditions, thereby expanding the theoretical discourse on educational pluralism (Rahmani et al., 2026; Brooks & Ezzani, 2022; Davids & Waghid, 2021). Accordingly, the conceptual framework developed in this study challenges earlier scholarship that frequently positioned modernity and tradition as competing paradigms by demonstrating that both perspectives can operate synergistically to strengthen Islamic educational institutions and promote sustainable intellectual renewal (Rasyid et al., 2026; Zain et al., 2026; Amir & Rossidy, 2026). The harmonization of these paradigms therefore provides a comprehensive theoretical foundation for reconstructing Islamic education as an intellectually dynamic, culturally rooted, and socially transformative enterprise capable of responding to contemporary educational demands (Asman et al., 2021; Rahmani et al., 2026; Barton et al., 2021; Sukenti et al., 2026).

In the context of rapid digital transformation and globalization, the relevance of this integrative educational model becomes increasingly significant because contemporary Islamic education is expected to cultivate technological competence without compromising ethical and

spiritual commitments (Sari & Salim, 2026; Assya'bana et al., 2026; Brooks & Ezzani, 2022). Recent scholarship consistently emphasizes that digital innovation in education should be guided by robust epistemological and moral foundations to prevent technological advancement from producing ethical disorientation and the erosion of religious identity (Sari & Salim, 2026; Rahmani et al., 2026; Davids & Waghid, 2021). Within this framework, the educational philosophies of Ahmad Dahlan and Wahid Hasyim demonstrate that scientific advancement and spiritual formation are complementary rather than contradictory objectives, both of which are essential for preparing Muslims to participate effectively in the global knowledge society (Amir & Rossidy, 2026; Asman et al., 2021; Rasyid et al., 2026; Tambak & Sukenti, 2026). Consequently, future Islamic educational policies should integrate digital literacy, scientific inquiry, ethical reasoning, and Islamic values within a coherent educational ecosystem capable of fostering intellectually competent and morally responsible graduates (Brooks & Ezzani, 2022; Sari & Salim, 2026; Rahmani et al., 2026).

Furthermore, this study demonstrates that meaningful integration between Islam and science must operate simultaneously across epistemological, curricular, institutional, pedagogical, and axiological dimensions rather than being confined to curriculum reform alone (Rahmani et al., 2026; Asman et al., 2021; Amir & Rossidy, 2026; Tambak et al., 2026). Integration that is implemented solely through curriculum design without corresponding transformation in educational philosophy, institutional culture, and teaching practice is unlikely to achieve sustainable educational change (Zain et al., 2026; Brooks & Ezzani, 2022; Sari & Salim, 2026). The conceptual model proposed in this research therefore extends existing theories of Islamic educational reform by presenting a multidimensional framework that systematically connects philosophical foundations, curriculum development, institutional governance, pedagogical practice, and value formation into an integrated educational system (Rasyid et al., 2026; Rahmani et al., 2026; Asman et al., 2021; Nurhayati et al., 2026). Ultimately, this holistic framework contributes to the advancement of contemporary Islamic educational theory by providing a sustainable model for reconstructing Islamic education that remains faithful to its theological foundations while responding effectively to scientific development, technological innovation, and the changing demands of twenty-first-century Muslim societies (Brooks & Ezzani, 2022; Davids & Waghid, 2021; Rahmani et al., 2026).

## Conclusion

This study concludes that the integration of Islam and science in the thoughts of KH. Ahmad Dahlan and KH. Wahid Hasyim is fundamentally rooted in a unified epistemological framework based on tawhid, which rejects the dichotomy between religious and rational knowledge. Both figures offer distinct yet complementary approaches to integration: Dahlan through a transformative-modernist model based on formal schooling, and Wahid Hasyim through an adaptive-traditionalist model rooted in pesantren reform. The main contribution of this study lies in demonstrating that these two paradigms are not contradictory but complementary, forming a holistic integration model that bridges modern and traditional Islamic education. This finding enriches the theoretical discourse on Islam–science integration by providing a conceptual synthesis grounded in the Indonesian context. In relation to the research objectives, this study successfully identifies the epistemological foundations, curricular models, and institutional strategies of both figures, as well as their relevance in addressing contemporary challenges in Islamic education. The findings indicate that effective integration must operate across multiple dimensions, including epistemological, curricular, institutional, and axiological levels. However, this study is limited to conceptual analysis based on secondary data, without empirical validation in contemporary educational settings. Therefore, future research is recommended to explore the practical implementation of this integrative model in schools and pesantren. In conclusion, the integration framework developed from the thoughts of both figures remains highly relevant for contemporary Islamic education, particularly in responding to the challenges of digital transformation and globalization, while maintaining a balance between scientific advancement, ethical values, and the formation of a superior generation of Muslims.

## Declarations

### Author contribution statement

The author contributed fully to all stages of this research, including the formulation of research ideas, methodological design, data collection and analysis, as well as the writing and refinement of the manuscript.

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### Data availability statement

The data used in this study are derived from published sources that are publicly accessible, allowing for transparency and potential use in future research.

### Declaration of interests statement

The author declares that there are no competing financial or non-financial interests that could have influenced the outcomes of this research.

### Declaration of use artificial intelligence

The author declares that artificial intelligence was used solely as an assistive tool in drafting and refining the manuscript. All analyses, interpretations, and conclusions presented in this study remain the full responsibility of the author.

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