

Integrating Islamic Values In Science Education: A Critical Pedagogy Insight Through Systematic Literature Network Analysis

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Abstract

Integration of Islamic values in natural science education is essential. It forms learning not only focuses on cognitive or pure science aspects but also develops students' morals, ethics, and spirituality. In the context of science education, Islamic values can help students understand that science is not only aimed at exploring the physical world but also invites them to think about the ethical and spiritual implications of the resulting technology and innovation. The study aims to analyze the integration of Islamic principles in science education to provide students with a holistic and ethical approach to learning science. The methods used Systematic Literature Network Analysis (SLNA) to identify trends, connections, and gaps in the literature on Islamic values in science education. Fifty-four articles ($N = 54$) recorded in Scopus databases from 2014 to 2024 were analyzed using Vos Viewer and Biblioshiny software. The findings indicate that Islamic values in science education are integrated through critical pedagogical processes that connect scientific concepts with Islamic ethics and real-life contexts via discussion, inquiry, and communication, as shown by the systematic literature network analysis. Recommendations are offered to educators and policymakers to develop curricula that integrate Islamic values into science education. Further research can expand this field and its practical applications in Islamic-based schools and higher education.

Keywords:Critical Pedagogy; Islamic Values; Science Education; Systematic Literature Network Analysis.

INTRODUCTION

The intersection of science education and Islamic values has garnered increasing attention in recent years (Saky et al., 2024), particularly as educators and policymakers seek to create curricula that are not only academically rigorous but also ethically grounded. In a globalized world where diverse cultural and religious perspectives coexist, integrating values into educational frameworks becomes paramount. Among various value systems, Islamic values present a unique paradigm that can enrich the pedagogical landscape of science education (Oktar, 2021). The integration of these values can foster a holistic educational experience that transcends mere knowledge acquisition, promoting ethical reasoning, social responsibility, and critical thinking among students.

Building on this foundation, critical pedagogy provides a relevant theoretical lens that logically extends the discussion from value integration to pedagogical practice in science education. Critical pedagogy, which emphasizes the role of education in fostering social justice (Jeyaraj, 2020) and empowering marginalized voices (Gibson, 2020), serves as an essential theoretical framework for examining the integration of Islamic values in science education. This pedagogical approach encourages educators to reflect on their teaching practices, challenge oppressive structures, and cultivate a learning environment that respects diverse perspectives (Sigdel & Sharma, 2021). In science education, this approach enables students not only to understand scientific concepts but also to critically examine their ethical, social, and cultural implications. This perspective is particularly relevant in preparing students to respond to complex societal and global issues through reflective and value-based scientific engagement.

The importance of this integrative approach is further reinforced by the complexity of contemporary global challenges that require both scientific understanding and ethical awareness. Issues such as climate change, public health crises, and technological advancements require not only scientific knowledge but also ethical considerations that resonate with diverse cultural and religious contexts. Islamic teachings, which emphasize stewardship of the earth (Gulzar et al., 2021), the interconnectedness of all living beings (Mansir, 2021), and the pursuit of knowledge for the betterment of humanity (Younis et al., 2021), can provide valuable insights into these pressing issues. Moreover, the integration of Islamic values in science education can enhance students' engagement (Firdaus et al., 2023) and motivation (Solichin & Muhlis, 2020) by connecting scientific concepts to their cultural and religious identities. This connection can foster a sense of belonging and relevance, encouraging students to see science not as an isolated discipline but as a vital component of their holistic development. By situating scientific inquiry within a broader ethical framework, educators can inspire students to become not only competent scientists but also conscientious global citizens.

Despite the potential benefits of integrating Islamic values in science education, there exists a significant gap in the literature regarding the practical implementation of this integration. Many educators may lack the resources, training, or support necessary to effectively incorporate these values into their teaching practices (Mansour, 2011) (Taşkın, 2014). Furthermore, there may be resistance to such integration from various stakeholders, including educational institutions, policymakers, and parents, who may hold differing views on the role of religion in education. Thus, a critical examination of these barriers, along with the identification of best practices and successful case studies, is essential for advancing this important discourse.

Although previous studies have discussed the integration of Islamic values in science education (Ardi et al., 2024) (Taşkın, 2014) (Wahyuni, 2020) and the use of critical pedagogy in educational practice (Jeyaraj, 2020) (Sigdel & Sharma, 2021), these studies are often fragmented, with limited attention to how both perspectives intersect within a single analytical framework. Most existing research tends to focus either on the conceptual integration of Islamic values in science learning or on pedagogical approaches in general, without systematically examining their interrelationship through a critical pedagogical lens. Furthermore, there is still limited synthesis of how these studies have developed over time, how they are thematically structured, and how they are intellectually connected within the broader literature. This indicates a need for a more comprehensive approach that can map the development, structure, and gaps of research in this field in an integrated manner. The novelty of this study is embedded in this integrative approach, as it combines Islamic values, science education, and critical pedagogy to address the fragmented understanding of value-based science learning by revealing their interconnected roles within the existing literature.

Thus, this study aims to explore the integration of Islamic values in science education through the lens of critical pedagogy by employing a systematic literature network analysis (SLNA) to map existing knowledge and identify areas for further research. By integrating systematic literature review and bibliometric network analysis, SLNA enables a comprehensive and transparent synthesis of research on this topic, allowing the identification of research development patterns, key themes, trends, and gaps within the literature (Donthu

et al., 2021) (Paul & Barari, 2021) (Wakid et al., 2024). This structured mapping provides a foundation for understanding how Islamic values are conceptualized and implemented in science education within critical pedagogical perspectives.

The Research Questions (RQ) include:

- RQ1: How is the development of research on the integration of Islamic values in science education from 2014–2024?
- RQ2: How is the network analysis of research on the integration of Islamic values in science education?
- RQ3: What are the thematic themes of research on the integration of Islamic values in science education that can be developed?

In this study, science education represents the domain of scientific knowledge construction and literacy development (Osborne, 2023) (Osborne et al., 2025), while Islamic values function as an ethical and cultural framework that guides meaning-making and decision-making in learning processes (Demir, 2025). Critical pedagogy, in turn, operates as the pedagogical lens that connects both domains by emphasizing dialogue, reflection, and critical engagement with real-life issues (Darder et al., 2023). Through this integrative lens, the teaching and learning of science are not limited to conceptual understanding but extend to ethical reasoning and social awareness grounded in Islamic principles. This triangulated relationship provides the analytical foundation for examining how Islamic values are integrated into science education and how such integration is operationalized within critical pedagogical practices, as investigated through the systematic literature network analysis in this study.

RESEARCH METHODS

This research employs a Systematic Literature Network Analysis (SLNA) methodology (Wakid et al., 2024), which integrates systematic literature review techniques with bibliometric analysis (see Figure 1). The systematic literature review component is utilized to explore the existing body of knowledge surrounding the intersection of Islamic values and science education. This review aims to identify key themes, trends, and gaps within the literature, providing a comprehensive understanding of how Islamic values are represented and integrated into science education. For bibliometric analysis, we focus on quantifying and visualizing the relationships among the identified literature. This includes analyzing publication trends, citation networks, and co-authorship patterns, which provide insights into the academic discourse surrounding the topic. The data for this study is sourced from the Scopus database, one of the largest and most reputable research databases, covering publications from 2014 to 2024. The keywords employed for the literature search include ‘Islamic values’ and ‘science education,’ ensuring a focused inquiry into relevant articles.

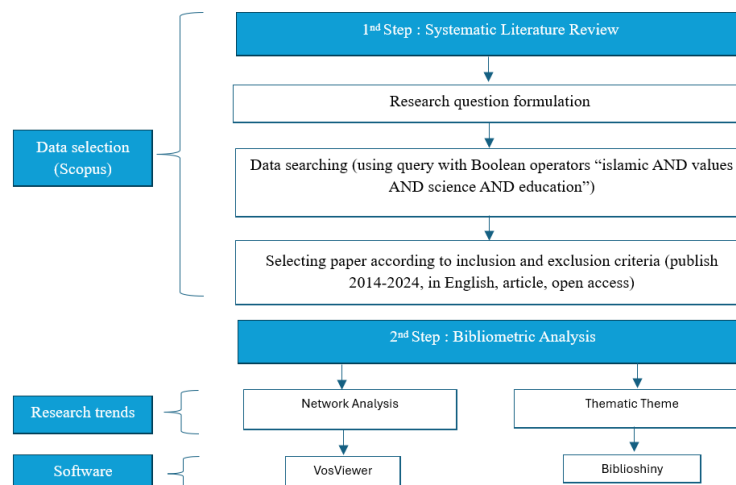


Figure 1: Design of SLNA procedure

Initially, a total of 174 articles were retrieved from Scopus. These articles were then screened according to the established inclusion criteria, resulting in fifty-five articles with one duplicate article reduced to a final dataset of fifty-four articles suitable for analysis. The inclusion criteria were established to ensure that only the most relevant and high-quality studies were considered, thus enhancing the reliability of our findings. To facilitate the bibliometric analysis, we utilized two software tools: VosViewer and Biblioshiny (Moral-Muñoz et al., 2020). VosViewer is employed to work with the RIS database format, allowing for the visualization of bibliometric networks, while Biblioshiny operates with the BibTeX format, providing additional analytical capabilities. The analysis process is illustrated in Figure 1, which outlines the steps taken to extract and analyze the data from Scopus. Through this comprehensive methodological approach, the study aims to contribute to the understanding of the relationship between Islamic values and science education, highlighting significant patterns and implications for future research and practice.

RESULT AND DISCUSSION

RQ1 about the development of research on the integration of Islamic values in science education can be explored based on year of publication (see Figure 2), and countries scientific production (see Figure 3). The analysis of fifty-four articles published in Scopus-indexed international journals reveals a significant trend in the integration of Islamic values into science education from 2014 to 2024. Figure 2 illustrates the publication action view, with the x-axis representing the years and the y-axis indicating the cumulative total of articles. The data indicates a steady increase in research output over the specified period, highlighting a growing interest in the intersection of Islamic values and scientific pedagogy. This finding is related to previous studies which explain that there is integration of Islam with sustainable development, especially science lesson (Saky et al., 2024). In 2014, the initial year of data collection, there was a modest number of publications, reflecting the nascent stage of this research field. However, subsequent years demonstrated a marked increase in the volume of scholarly work, peaking in 2022. This upward trajectory suggests that educators and researchers are increasingly recognizing the importance of integrating cultural and religious values into science education, thereby enriching the learning experience and fostering a more inclusive educational environment. The findings underscore the necessity for further exploration of methodologies that effectively incorporate Islamic principles into science curricula, as well as the impact of such integration on student engagement and comprehension in scientific concepts.

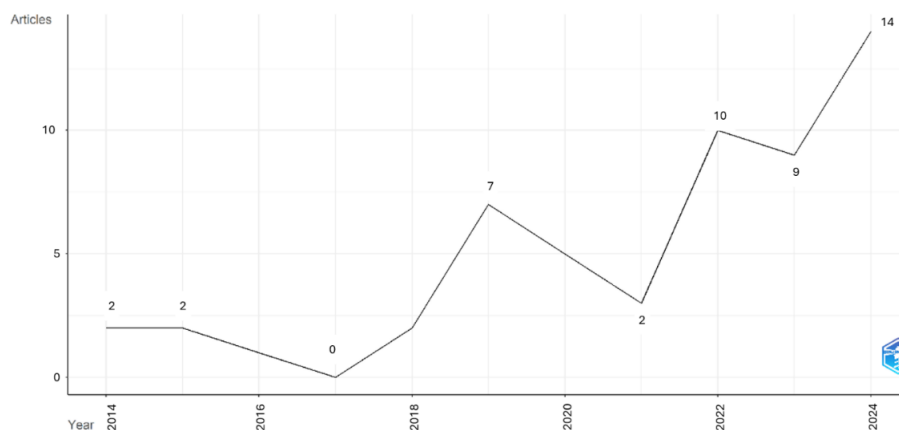


Figure 2: Annual Scientific Production on Integration Islamic Values in Science Education from Biblioshiny's output

The analysis of scientific production on the integration of Islamic values in science education reveals a significant disparity among countries. Indonesia leads with a remarkable total of 80 articles, indicating a robust engagement in this field. Iran follows with 18 articles, while Malaysia contributes 16 articles. Turkey and Pakistan present smaller outputs, with 7 and 6 articles, respectively. Additionally, India, Jordan, the UK, and the USA each have produced two articles. Integration of science learning and Islamic values has been implemented in Islamic-based schools in Indonesia (Purwati et al., 2018), (?), (Wahyuni, 2020). Figure 3

illustrates the distribution of scientific production across these countries, highlighting Indonesia's dominance and the relatively modest contributions from other nations.

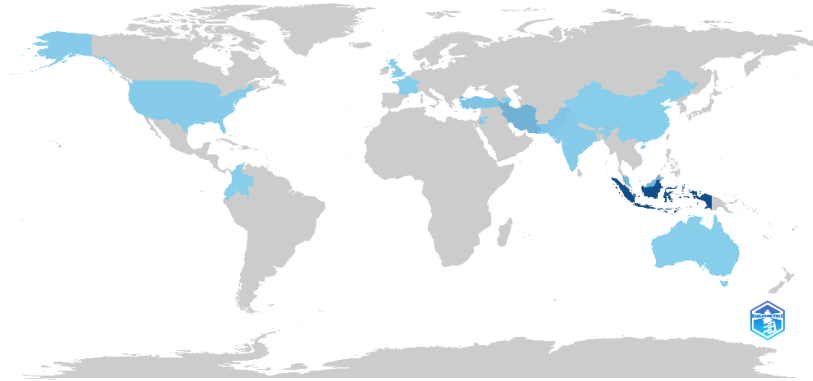


Figure 3: Country Scientific Production on Integration Islamic Values in Science Education Biblioshiny's output

RQ 2 regarding network analysis related to this topic can be answered by using VosViewer software analysis based on co-occurrence keywords (see Figure 4). Network analysis based on keywords produces four clusters. It revealed four distinct clusters that encapsulate the themes prevalent in the literature concerning medical education and cultural competency. Cluster 1 (10 items) are attitude, behavior, cultural competency, information processing, interview, iran, medical education, medicine, middle aged, qualitative research. It comprises ten items, including "attitude," "behavior," and "cultural competency," indicating a significant focus on the interpersonal dimensions of medical education, particularly in qualitative research contexts within Iran. Cluster 2 (8 items) are adult, awareness, cross-sectional study, female, knowledge, male, medical student, questionnaire. It includes eight items such as "adult," "awareness," and "medical student," highlighting the demographic aspects of studies, particularly those employing cross-sectional methodologies and questionnaires to gauge knowledge and awareness among different genders. Cluster 3 (8 items) are curriculum, education, higher education, integration, islamic education, learning loss, pandemic, religious education. It features eight items, including "curriculum," "higher education," and "pandemic," suggesting an emphasis on the structural and educational frameworks, particularly in relation to learning disruptions caused by the COVID-19 pandemic. Lastly, cluster 4 (7 items) are content analysis, human experiment, islam, islamic values, religion, science, scientific literacy. It consists of seven items, such as "content analysis," "islam," and "scientific literacy," reflecting a critical examination of the integration of religious values within scientific education. These clusters collectively illustrate the multifaceted nature of research in medical education and cultural competency, underscoring the interplay between educational practices, demographic factors, and socio-cultural influences

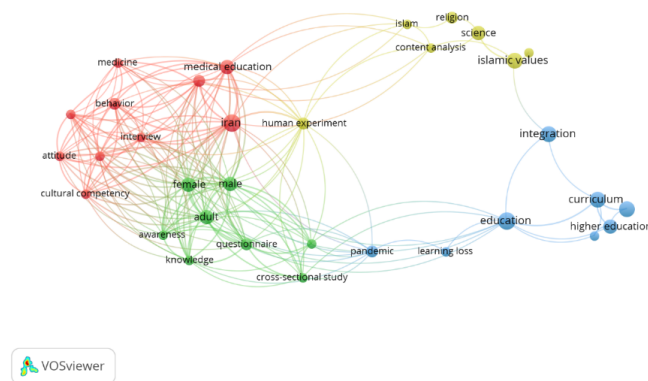


Figure 4: Co-Occurrence Network of Integrating Islamic Values in Science Educationt

RQ 3 about the thematic themes on the integration of Islamic values in science education that can be developed are obtained from Biblioshiny output. The thematic analysis of integrating Islamic values in science education reveals several key findings that highlight the potential for a holistic educational framework (see Figure 5). The primary motor themes identified include qualitative research, human experience, and the medical field, indicating a strong interconnection between Islamic principles and scientific inquiry, particularly in the context of medical education. Qualitative research underscores the importance of understanding human perspectives and experiences in the educational process. This approach facilitates a deeper exploration of how Islamic values can inform ethical considerations in scientific practice and medical ethics (Hennink et al., 2020). The integration of these values fosters a more compassionate and morally grounded approach to education, particularly for adult learners who may be navigating complex ethical dilemmas in their professional lives. Emerging themes such as cross-sectional studies in education suggest a growing interest in assessing the impact of Islamic values on student engagement and learning outcomes. This trend indicates a shift towards a more inclusive educational paradigm that recognizes the significance of cultural and religious contexts in shaping scientific understanding. Thus, the integration of Islamic values into science education presents a promising avenue for enriching the curriculum and enhancing the ethical dimensions of scientific inquiry, particularly in the medical field. Further research is guaranteed to explore these themes in greater depth and to develop practical frameworks for implementation.

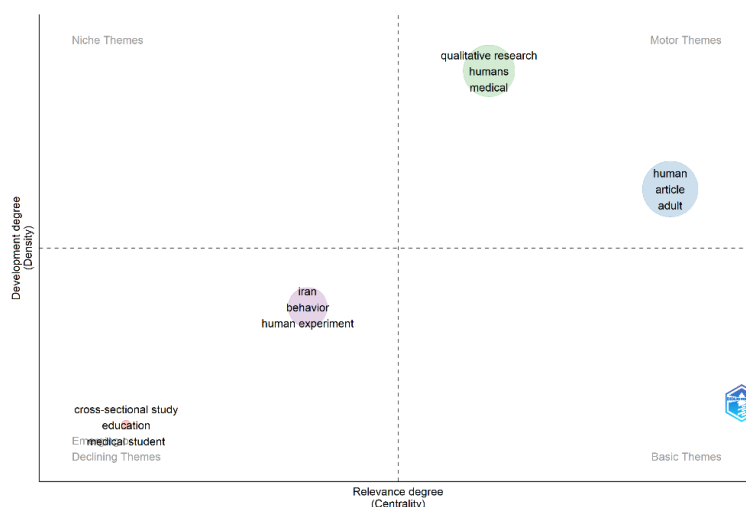


Figure 5: Thematic Themes of Integrating Islamic Values in Science Education

There are six Islamic values, including siddiq, amanah, tabligh, fathanah, qana'ah, and istiqamah (Haron et al., 2020); (Muhammad, 2023). These values are very useful and positive and have good intentions in Islam. These values can be integrated in science education (see Table 1).

The integration of science and religion highlights the intricate relationship between these two domains (see Figure 6) ((Nurdyansyah & Arifin, 2018)). This intersection suggests that scientific inquiry and religious belief can coexist and inform one another, rather than being inherently contradictory. Such a perspective encourages a dialogue that respects empirical evidence while acknowledging spiritual dimensions. Furthermore, this synthesis can enhance our understanding of complex issues, fostering a more holistic approach to knowledge. Future research should explore specific frameworks that facilitate this integration, promoting collaborative discourse that bridges the gap between scientific and religious communities.

The reviewed literature indicates that critical pedagogy can serve as a bridge between science education and Islamic values. (Amin et al., 2022) integrated Islamic values into science learning materials by connecting biological concepts with Qur'anic teachings and ethical discussions. For example, in a lesson on healthy food and nutrition, students were not only asked to understand the functions of nutrients, balanced diets, and the health impacts of unhealthy eating habits, but also to practice the Islamic value of tabligh through communicating scientific information to their peers, families, and communities. Students analyzed nutritional content in packaged foods, evaluated food advertisements, and developed educational campaigns promoting healthy eating habits based on scientific evidence and Islamic principles of consuming halal and tayyib food. From a science education perspective, students developed scientific literacy through investigating nutritional issues, interpreting food labels, and evaluating evidence related to healthy lifestyles. From an

Table 1: Islamic Values Integrated in Science Learning

Islamic Values	Definition	Islamic values in science learning	Author (Year)
Tabliq	Delivering or communicating	Deliver and communicate a subject matter, availability facilities and technology, using historical heritage or cases, instructional model and textbooks or modules	((Amin et al., 2022); (Asiyah et al., 2024); (Darvishi et al., 2019); (Harsanto et al., 2024); (Hasanov et al., 2021); (Machouche et al., 2019); (Mulyana & Maylawati, 2024); (Muslim et al., 2015); (Okutan, 2020); (Pamungkas et al., 2023); (Rosyidin & Arifin, 2021); (Rusydiah et al., 2019); (Sapdi et al., 2024); (Zabidi et al., 2021); (Zuhri et al., 2023))
Istiqamah	Consistency or steadfastness in carrying out orders	Internalizing through science materials, school-scape with science terms; evaluation process; sustainability	((Fahyuni et al., 2020); (Haraty & Hu, 2018); (Kawangit et al., 2019); (Khaghanizadeh et al., 2019); (Muhammad et al., 2024); (Navabi et al., 2016); (Rahman et al., 2020); (Rohmah et al., 2024); (Rohmatulloh et al., 2023); (Setiowati et al., 2023); (Zarkasyi, 2020))
Fathanah	Intelligence or wisdom	As alternative educational methods, teaching materials, using Quranic emotional intelligence, using spatial analysis, learning outcomes, scientific literacy, science concept understanding	((Ardi et al., 2024); (Chande, 2023); (Latipah et al., 2023); (Mansur et al., 2023); (Maqbool et al., 2022); (Musa & Yusoff, 2019); (Suhartono et al., 2019); (Umar & Sukarno, 2022); (Wulan et al., 2021); (Zainuri et al., 2022); (Zekkoub et al., 2024))
Amanah	Trust or responsibility	Integrated curriculum with general science, inclusive schools, management to good services	((Fatmawati et al., 2024); (Fazilat et al., 2022); (Hamami & Nuryana, 2022); (Nurdin et al., 2024); (Suprihatiningrum et al., 2022); (Tabatabai & Simforoosh, 2023))
Siddiq	Honest or true in words and deeds	Value-based recruitment and selection; ethics	((Hendek et al., 2022); (Vasalou, 2022); (Wahab, 2024))
Qana'ah	Satisfaction or sufficiency with what is owned	Cooperative reconstruction strategy	((Suwarsono et al., 2024))
Supplementary	Religious moderation (tawassuth), socio-cultural values	Tolerance for cultural differences in the classroom; leading to a community of global learners, sympathy based on the cultural premise	((Al-Momani, 2014); (Mousavi Bazaz et al., 2015); (Mukhibat et al., 2024); (Sahin, 2018); (Sidik et al., 2024); (Suyatno et al., 2022))

Islamic values perspective, the value of tabligh encouraged students to disseminate accurate and beneficial knowledge regarding nutrition and health. From a critical pedagogical perspective, this integration process is characterized by discussion, evidence-based inquiry, contextual analysis of real-life food practices, and communicative actions that position students as agents of change who critically respond to social influences on dietary behavior. This example demonstrates that the integration of Islamic values in science education is not merely an addition of religious content but a transformative educational approach that combines scientific

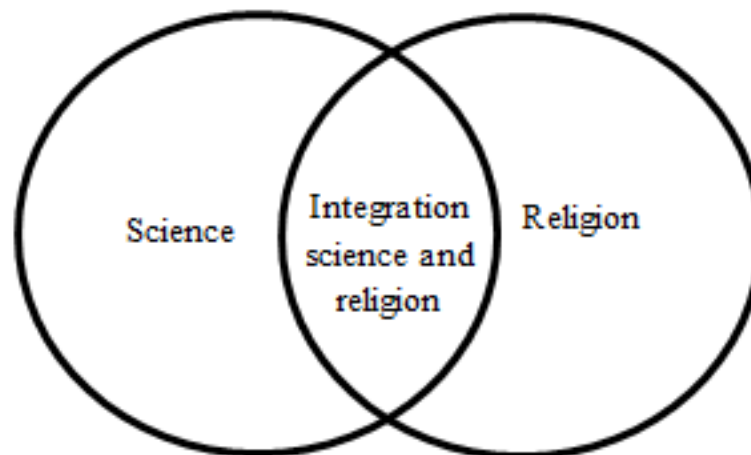


Figure 6: Integration of Science and Religion ((Nurdyansyah & Arifin, 2018))

understanding, ethical responsibility, and social engagement.

This study highlights the important role of critical pedagogy in fostering inclusive educational environments (Nurdin et al., 2024) (Suprihatiningrum et al., 2022). By emphasizing learner-centered pedagogy, which shifts instruction from teacher-directed delivery to active student engagement and knowledge construction through collaboration and participation (Msonde, 2023) (Zhang & Tan, 2025), the study reflects key principles of critical pedagogy that value diverse perspectives and experiential learning. Findings suggest that when educators incorporate critical pedagogical approaches, they not only empower students to critically engage with their learning but also challenge systemic inequities inherent in traditional educational frameworks. This alignment underscores the need for pedagogical practices that prioritize dialogue, reflection, and social justice, thereby enhancing instructional efficacy and student outcomes in contemporary educational settings. Furthermore, integrating Islamic values into science education exemplifies how critical pedagogy can be adapted to enrich various educational contexts and foster more holistic learning experiences. Recommendations are offered to educators and policymakers to develop curricula that integrate Islamic values into science education.

CONCLUSION

This study has provided a comprehensive exploration of the integration of Islamic values in science education through a systematic literature review and bibliometric analysis of fifty-four articles sourced from the Scopus database. The findings reveal a significant focus on medical education and cultural competency, highlighting the critical intersection of religious values and scientific inquiry. By employing advanced bibliometric techniques, we successfully mapped the annual scientific production, country-specific contributions, co-occurrence networks, and thematic themes, thereby illuminating the landscape of research in this domain. This study contributes to the growing body of literature advocating for an interdisciplinary approach that harmonizes faith and reason, ultimately enriching the educational experience and promoting a more inclusive understanding of science within the context of Islamic values, namely *tabliq*, *istiqamah*, *siddiq*, *amanah*, *qana'ah*, and *tawasuth*. Further research can expand this field and its practical applications in Islamic-based schools and higher education. Most importantly, incorporating Islamic values into science education can enrich this interdisciplinary approach, promoting ethical reasoning and a sense of responsibility towards the application of knowledge.

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