



Analysis of Biology Teachers Problem in Integrating Islam with Biology Learning at Madrasah Aliyah

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Abstract

The integration of Islamic values into biology learning is an important aspect of science education in Madrasah Aliyah (MA), where teachers play a key role in linking scientific concepts with Islamic teachings. However, several previous studies have reported that biology teachers in MA still face various challenges in integrating Islamic values with biology learning. Therefore, this study aims to conduct a systematic literature review to identify and analyze the problems faced by teachers in integrating Islam and biology learning. This study employed the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) method. A comprehensive literature search was conducted using the Google Scholar and DOAJ databases, focusing on publications from 2017 to 2025. The keywords used were (“Biology Teacher” OR “Science Teacher”) AND (“Challenge” OR “Problem”) AND (“Integration of Islam and Science” OR “Integration of Islam and Biology”) AND (“Madrasah” OR “Islamic School”) AND (“Islamic Value”) AND (“Biology Learning” OR “Biology Education”). From the initial identification of 153 articles, 20 articles met the predetermined inclusion criteria and were analyzed in depth using content analysis. The findings reveal that teachers generally encounter three main challenges: epistemological, pedagogical, and structural. Epistemological challenges relate to teachers’ understanding of the relationship between Islamic teachings and scientific concepts. Pedagogical challenges include difficulties in designing integrative learning strategies and developing appropriate teaching materials. Structural challenges involve limited training opportunities, inadequate learning resources, and curriculum constraints. This study contributes to the development of a conceptual framework for understanding the challenges faced by teachers in integrating Islam and science in biology education. It also provides recommendations for madrasahs to enhance professional teacher training, develop integrative curricula, and provide adequate teaching materials to support integrated learning.

Keywords: biology education; islam biology integration; islamic values; PRISMA; teacher challenges

INTRODUCTION

Science education, particularly biology in Madrasah Aliyah (MA), has distinctive characteristics that require mastery of scientific concepts as well as the integration of Islamic values into the learning process. This integration aims to preserve the religious identity of madrasah institutions while developing scientific knowledge, especially in biology, through a systematic pedagogical approach (Mariana, 2018; Tahir, 2021). The integration of science and Islam in biology is an interdisciplinary approach that positions both as complementary elements. Biology, which studies life, is aligned with Islamic teachings that encourage observation and reflection on natural phenomena. Thus, this integration can enhance conceptual understanding while fostering meaningful learning experiences across scientific, spiritual, and ethical dimensions (Hafiz & Salminawati, 2022; Harahap & Yusuf, 2025).

The integration of Islam and science is often perceived as two opposing paradigms. This dichotomy emerges from the assumption that religion and science originate from fundamentally different epistemological foundations. Religion is generally regarded as deriving from divine revelation, whereas science is considered a relative and empirical system of knowledge. In this regard, religion is grounded in faith, while science is based on inquiry, doubt, and systematic investigation. Efforts to address this perceived contradiction emphasize the importance of integrating Islamic values into science education, particularly within biology learning (Muchtar & Sunhaji, 2022; Amalia & Ardi, 2024). Biology, as a scientific discipline, examines various aspects of living organisms, including humans, animals, plants, microorganisms, and their interactions within ecosystems. In the context of biology education, numerous concepts can be contextualized through an Islamic perspective, enabling a more holistic and meaningful understanding of scientific content.

Topics such as the origin of living organisms, ecological balance, and ethical considerations in biotechnology provide opportunities to integrate Islamic values into the learning process. Through the study of biology, learners can observe natural phenomena as signs of God's greatness, thereby enhancing conceptual understanding while strengthening faith and devotion (Aina & Mawaddah, 2023; Ardi *et al.*, 2024). The integration of Islam and biology also provides a perspective that biological concepts can be reflected in the Qur'an. Although the cited verses do not explicitly describe scientific concepts in detail, they are often interpreted as being consistent with or supportive of scientific findings. In this sense, the Qur'an is positioned as a source of guidance that can enrich the interpretation and contextual understanding of biological concepts (Mualimin, 2020; Yaqin, 2020).

The integration of biology and Islamic values constitutes an important pedagogical responsibility for teachers, particularly within Islamic educational institutions. Biology teachers are expected to incorporate Islamic values into instructional practices to reduce the dichotomy between religious teachings and scientific knowledge. Various biological topics, including growth and development, reproduction, and human origins, provide opportunities for contextualization within Islamic perspectives. In MA, teachers generally acknowledge the importance of integrating Islamic values into biology education, as such an approach can enhance the relevance and comprehensiveness of scientific learning. Through this integration, biological concepts are often connected to interpretations derived from the Qur'an, which is regarded as a source of guidance for understanding natural phenomena explored in biology (Ahmad *et al.*, 2019; Bakar *et al.*, 2023; Tilotama *et al.*, 2025). Nevertheless, existing studies indicate that the implementation of science Islam integration in biology education continues to encounter pedagogical, epistemological, and institutional challenges, suggesting that it has not yet been fully realized in classroom practice.

The integration of Islamic values into biology learning continues to face various challenges in educational practice. Teachers encounter multiple barriers when attempting to connect Islamic values with scientific concepts in the classroom. These challenges include limited understanding of Islamic perspectives relevant to biological topics, the persistent separation of religious and scientific knowledge within educational systems, and inadequate structural support, such as limited reference materials and insufficient professional development opportunities related to science Islam integration (Robiah *et al.*, 2023; Taufiqurrahman *et al.*, 2025). Furthermore, the incorporation of Qur'anic verses and hadith into biology instruction at the secondary school level is constrained by several factors, including the dichotomy of knowledge embedded in the curriculum, teachers' limited competence in interpreting Islamic sources relevant to biological concepts, limited learning resources, curriculum and time constraints, and inadequate institutional support (Nursalim *et al.*, 2022; Siregar *et al.*, 2025).

These barriers hinder teachers from integrating Islamic values into biology learning in an optimal and meaningful manner. Consequently, biology teachers often experience difficulties in presenting biological concepts from an Islamic perspective, and the relationship between biology and Islam frequently remains superficial without deeper exploration of the relevance of Islamic values to the concepts being taught (Bakar *et al.*, 2023; Humairoh & Mustafidin, 2025). Research on the integration of Islam and science in education has been widely conducted however, most previous studies have primarily focused on the development of teaching materials, integrative learning models, and the implementation of Islamic values in science education. Only a limited number of studies have specifically examined the challenges faced by

biology teachers in integrating Islamic values with biological concepts at the MA level. Studies that systematically classify these challenges into comprehensive analytical dimensions also remain scarce. This study addresses this gap by systematically analyzing the challenges encountered by biology teachers in integrating Islamic values into biology learning.

The novelty of this study lies in its attempt to identify and categorize teachers' problems into several key dimensions, namely epistemological, pedagogical, and structural problems, resulting in a conceptual framework that contributes theoretically to the development of biology learning integrated with Islamic values in MA. Based on the background described above, the integration of Islamic values into biology learning at MA remains a complex issue that requires systematic investigation. Through a Systematic Literature Review (SLR) approach, this study systematically examines and synthesizes prior research to develop a deeper understanding of the problems encountered by teachers when integrating Islamic values with biology instruction. Therefore, this study aims to analyze the various problems faced by biology teachers in integrating Islamic values into biology learning at MA.

METHOD

The main focus of this study is to analyze the problems faced by biology teachers in integrating Islam into biology learning at MA. The guideline used in conducting the Systematic Literature Review (SLR) to search for and analyze the literature is the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method (Ramayanti *et al.*, 2023; Asriadi, 2025). The PRISMA framework was selected because it provides a systematic, transparent, and replicable procedure for identifying, screening, and synthesizing relevant literature. Furthermore, the use of PRISMA helps minimize selection bias and ensures that the review process is conducted rigorously according to established methodological standards. According to Liberati *et al.* (2009), the PRISMA method consists of four stages: identification, screening, eligibility, and inclusion.

The identification stage involved searching articles in the Google Scholar and DOAJ databases using the keywords (“Biology Teacher” OR “Science Teacher”) AND (“Challenge” OR “Problem”) AND (“Integration of Islam and Science” OR “Integration of Islam and Biology”) AND (“Madrasah” OR “Islamic School”) AND (“Islamic Value”) AND (“Biology Learning” OR “Biology Education”), resulting in 153 articles. The screening stage was conducted by reviewing article titles, abstracts, and keywords to determine their relevance to the research topic and ensure alignment with the study objectives. Subsequently, the articles were evaluated based on the inclusion and exclusion criteria presented in Table 1. As a result, 88 articles met the established criteria and were selected for further analysis, while 65 articles were excluded.

Table 1. Inclusion and exclusion criteria

No.	Inclusion Criteria	Exclusion Criteria
1.	Articles discussing the integration of Islam and science or biology in education	Articles not related to integration of Islam and science or biology education
2.	The subjects in the research were biology teacher or science teachers	The subject in the research were not biology teacher or science teacher
3.	Article were published within the range of 2017-2025	Article were published before 2017
4.	Article were accessible in the full text	Article were not accessible in the full text
5.	Articles written in English or Indonesian	Articles written in other languages

The eligibility stage involved a full text review of the screened articles to assess their relevance and suitability for the research objectives. Based on this evaluation, 20 articles were identified as eligible and selected as the primary data sources for this study. The inclusion stage involved synthesizing and analyzing these articles to generate research findings and draw conclusions regarding the challenges faced by biology teachers in integrating Islam into biology learning at MA. The synthesis process focused on identifying

recurring themes, patterns, and challenges reported across the selected studies. This approach enabled a comprehensive understanding of the factors influencing the implementation of Islam biology integration in educational practice. The findings were subsequently categorized into several analytical dimensions to facilitate a more systematic interpretation of the identified challenges. The overall article selection process is presented in Figure 1.

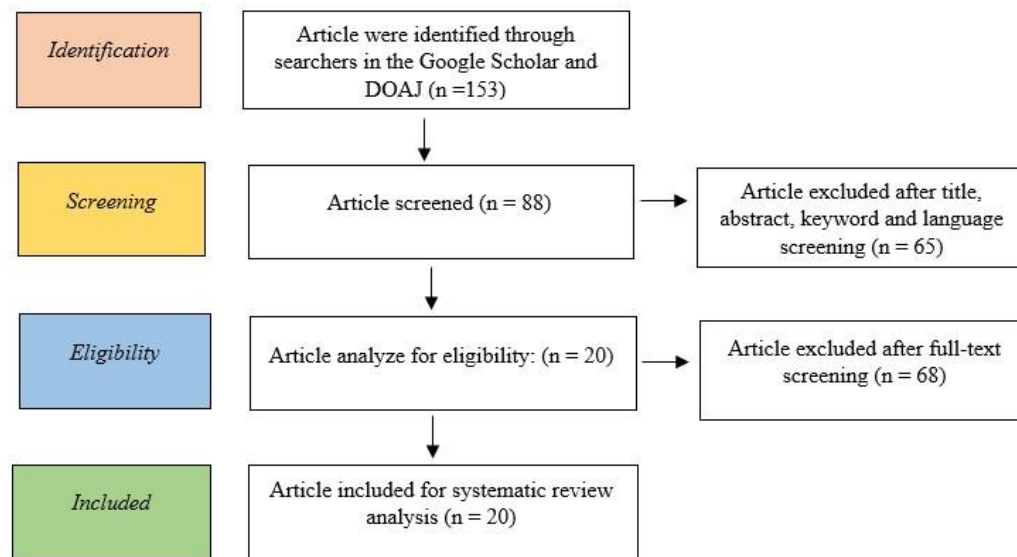


Figure 1. PRISMA flowchart

Data obtained from the selected articles were analyzed using a thematic analysis approach supported by a conceptual coding framework to identify and classify the challenges faced by teachers in integrating Islamic values into biology learning. The analysis began with a comprehensive review of each article to identify findings related to teachers' experiences and challenges in implementing Islam biology integration. Relevant information was then extracted and organized in a data analysis table. Subsequently, the findings were coded according to a conceptual framework that categorized the identified challenges into three dimensions: epistemological, pedagogical, and structural. The coded data were then synthesized to identify recurring themes and patterns across the studies. This process enabled a systematic interpretation of the challenges and facilitated the development of a comprehensive understanding of factors influencing the integration of Islamic values into biology learning in MA.

Articles that met the established criteria were exported in RIS format and analyzed using VOSviewer software. VOSviewer was employed to construct, visualize, and analyze bibliometric networks based on the selected articles. This analysis generated three types of visualizations: network, overlay, and density visualizations (Prasetyo *et al.*, 2025). Through these visualizations, VOSviewer facilitates the mapping of relationships among keywords, authors, journals, and countries, enabling the identification of research trends, thematic clusters, and potential research gaps. Furthermore, bibliometric analysis provides insights into emerging research areas and the interconnections among topics, thereby supporting a broader understanding of the current state of research and informing future studies related to the integration of Islamic values into biology learning.

RESULT AND DISCUSSION

The study employed a SLR to examine publication trends related to the integration of Islamic values into biology learning, with a particular focus on research addressing the challenges faced by biology teachers in MA. A total of 20 articles that met the established inclusion criteria were analyzed, covering

publications from 2017 to 2025. The results show that the number of publications fluctuated considerably across the observed period, indicating that research interest in this area has developed inconsistently. This pattern suggests that the integration of Islamic values into biology learning remains an emerging field of study that has not yet received sustained scholarly attention. The limited and fluctuating number of publications also indicates the need for further research to strengthen the evidence base and deepen understanding of the challenges encountered by biology teachers in implementing Islam biology integration. The distribution of publications by year is presented in Figure 2.

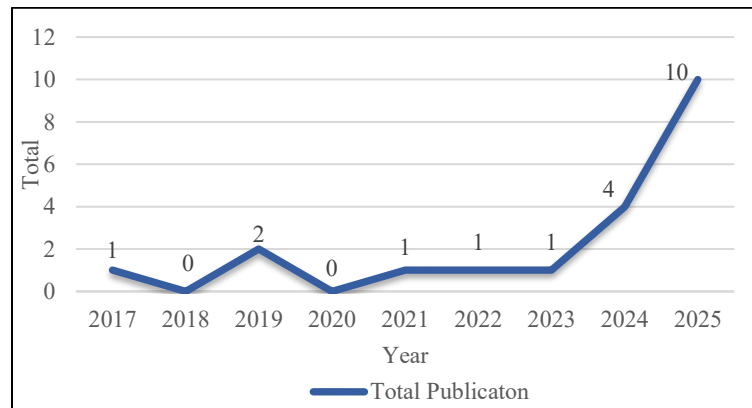


Figure 2. Research and publication trends in the last decade

The distribution of publications from 2017 to 2025 shows considerable variation in the number of studies related to the integration of Islamic values into biology learning, as presented in Figure 2. Research output was relatively limited during the 2017–2023 period, with only one or two publications identified in most years and no eligible studies found in 2018 and 2020. A notable increase in publication activity emerged in 2024, followed by a substantial rise in 2025. This trend suggests growing scholarly interest in the challenges faced by biology teachers in integrating Islamic values into biology learning at MA. The increasing number of publications in recent years may also reflect a greater recognition of the importance of Islam science integration within contemporary educational discourse. Despite this positive trend, the overall number of studies remains relatively limited, indicating the need for further research to strengthen the evidence base and explore effective strategies for implementing Islam biology integration.

It also indicates that the integration of Islam and science is increasingly being recognized as an important field of study that requires further investigation, especially in understanding the various epistemological, pedagogical, and structural challenges faced by teachers in the learning process (Sahara & Ardi, 2025; Zarifah & Ardi, 2025). A systematic synthesis of the existing literature is therefore essential to provide a comprehensive overview of these challenges and identify areas requiring further development. To identify the various challenges faced by biology teachers in integrating Islamic values into biology learning, this study conducted an in depth analysis of 20 selected articles using a SLR approach. The analysis was conducted using a conceptual coding framework designed to categorize previous research findings into relevant thematic groups.

Epistemological problems refer to teachers limited conceptual understanding of the relationship between biological concepts and Islamic values. Pedagogical problems relate to teachers' difficulties in implementing effective instructional strategies that integrate these two aspects in classroom learning. Meanwhile, structural problems are associated with supporting factors within the educational system, such as limited learning resources, curriculum constraints, and the lack of professional training for teachers (Munir *et al.*, 2023; Widyasari, 2025). This classification provides a more comprehensive understanding of the challenges faced by teachers in integrating Islam with biology learning in MA. Based on the synthesis of 20 literature studies, the most dominant problem faced by teachers in integrating Islam and science in biology learning relates to epistemological aspects, particularly teachers' competencies and educational backgrounds.

Most studies found that differences in teachers' educational backgrounds influence their ability to carry out such integration, and many teachers still have limited understanding or skills in connecting biological concepts with Islamic values. In addition, structural problems are also frequently reported. The synthesis of the data indicates that facilities and biology teaching materials that integrate Islamic values are still very limited. In contrast, pedagogical issues, such as the lack of standardized learning models for Islam biology integration or learning practices that remain overly focused on cognitive aspects, are mentioned in only a few studies and with lower frequency. Therefore, this synthesis highlights that teachers' competence and educational background constitute the primary challenge, followed by limitations in learning resources and facilities, in the implementation of science Islam integration in MA.

Research by Handoko *et al.*, (2024) and Sodik (2019) indicates that teachers' educational backgrounds can influence their understanding and competence in delivering learning materials. Teachers' educational backgrounds also affect their mastery of learning materials that integrate Islam and biology. Several studies suggest that many biology teachers are graduates of public universities, where scientific knowledge and religious perspectives are often taught separately. This condition may contribute to challenges in integrating biological concepts with Islamic values in classroom learning, although some teachers have begun to combine both perspectives in their teaching practices. However, such integration is often limited to the insertion of Qur'anic verses and is not explored in depth. In addition, teachers' limited knowledge of integration may reduce their confidence in delivering materials related to Islamic perspectives.

Insufficient knowledge of Islamic values makes it difficult for teachers to effectively integrate Islam and science, as they lack adequate understanding to connect the two domains (Amri *et al.*, 2017; Darsyah, 2023). As a result, the integration process tends to be partial. The connection between biology and Islamic studies is often limited to the insertion of Qur'anic verses without deeper understanding of the relevance of Islamic values to the biological concepts being taught. Consequently, students may find it difficult to see the relationship between religious knowledge and science, leading to a fragmented understanding of the two (Inami, 2020; Khasanah, 2020). Teaching materials and learning resources that integrate biology and religious education in MA are still limited, many teaching materials used do not directly include the relationship between the two, although philosophically, many topics in biology can be linked to religious teachings (Kholid & Supriyadi, 2021; Pohan *et al.*, 2024).

The biology books used still tend to be oriented towards a conventional scientific approach, with textbooks emphasizing the scientific aspects of science without connecting them to deeper Islamic values. A lack of resources and infrastructure, especially in the availability of religious texts on scientific topics, which complicates learning management and hinders the deepening of knowledge integration (Harahap *et al.*, 2025; Khofilla *et al.*, 2025; Sri *et al.*, 2026). As a result, teachers who want to integrate integrated learning must independently seek additional learning resources to be able to adapt teaching materials that are integrated with Islamic values. The limited teaching materials also affect the quality of learning, including students' lack of active involvement in learning, their lack of ability to understand the learning material, and their reduced interest in seeking information related to the material (Lestari *et al.*, 2024; Hadad *et al.*, 2025).

The limited availability of training for teachers in the fields of science and religion represents one of the major challenges in implementing the integration model. Training programs specifically designed for biology teachers to integrate Islamic values into biology learning are still relatively limited, resulting in teachers' understanding of integrated learning not yet developing optimal (Merakati *et al.*, 2025; Mumtazah *et al.*, 2025). Although many teachers try to incorporate religious values in biology lessons, they feel less confident or not prepared enough to teach material that connects science and religion. This indicates the need for more further training for teachers to improve their understanding and skills in teaching both simultaneously (Rtg & Anhar, 2024; Humairoh & Mustafidin, 2025). Lack of training can cause teachers' pedagogical competencies not to develop, making it difficult to design integrated learning methods, strategies and models (Fadilla & Ardi, 2025; Yanti & Ardi, 2025).

This has resulted in many teachers still using conventional approaches in biology learning without fully relating it to profound Islamic values, so that the biology taught does not include Islamic values in its teaching, so that the application of this integrated learning is not optimal (Robiah *et al.*, 2023; Sholehah, 2025). Another challenge faced by teachers in integrating Islam and science in biology learning is related to the curriculum structure, which has not yet provided explicit operational guidance on how Islamic values can be integrated with scientific concepts (Sutiana & Nugraha, 2025; Hidayat *et al.*, 2025). In addition, the persistence of a dichotomy between religious knowledge and scientific knowledge within the education system leads some teachers to perceive these two fields as separate disciplines, making it difficult to connect biological concepts with Islamic perspectives both conceptually and pedagogically (Rahman & Akbar, 2021; Sukari *et al.*, 2025). This condition indicates the need for the development of a more integrative curriculum and the provision of clear instructional guidelines to support teachers in implementing Islam science integration more systematically in biology learning at MA.

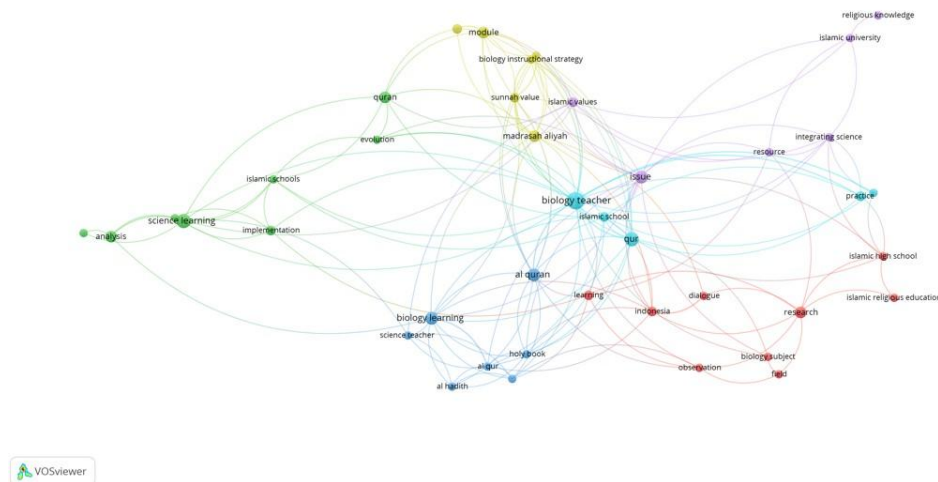


Figure 3. Network visualization

The network visualization presented in Figure 3 illustrates the conceptual structure of research on the integration of Islamic values into biology learning. The visualization reveals several interconnected clusters representing major themes within the literature. Among these, biology teacher appears as one of the most prominent keywords and is strongly connected to terms such as biology learning, Qur'an, Islamic values, MA, and integrating science. These connections indicate that biology teachers occupy a central role in implementing Islam biology integration, as they are responsible for linking biological concepts with Islamic values and perspectives in classroom practice. The prominence of teacher related keywords demonstrates that teachers are considered the primary actors in translating the concept of integration into meaningful learning experiences. It also suggests that the effectiveness of Islam biology integration largely depends on teachers' competencies and readiness to implement integrative approaches in the classroom (Sholehah, 2025; Siregar & Rahadian, 2025).

The strong relationships among teacher related, religious, and educational keywords suggest that Islam biology integration is a multidimensional issue involving not only content knowledge but also pedagogical and institutional aspects. This finding supports previous studies emphasizing that successful integration depends on teachers' understanding of both biological concepts and Islamic teachings, as well as their ability to translate these into meaningful learning experiences (Mualimin, 2020; Tahir, 2021). Furthermore, the network highlights the close interconnection between biology education and Islamic values, indicating that the challenges faced by teachers extend beyond instructional practices and encompass broader epistemological and structural dimensions. The presence of multiple interconnected themes also reflects the complexity of integrating religious values with scientific concepts in educational

settings. Therefore, efforts to strengthen Islam biology integration should address not only teachers' knowledge and pedagogical skills but also the institutional support necessary for effective implementation.

Figure 4. Overlay visualization

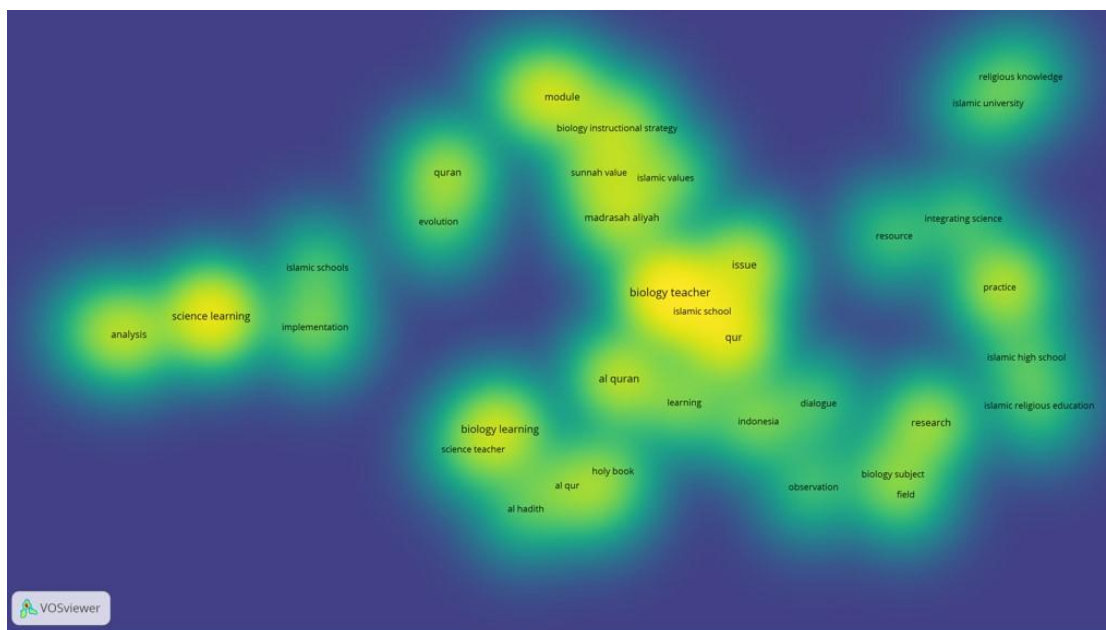


Figure 5. Density visualization

The density visualization presented in Figure 5 highlights the intensity and frequency of keywords appearing in research on the integration of Islamic values into biology learning. Keywords displayed in brighter colors indicate topics that have received greater attention from researchers, while darker colored areas represent less frequently studied themes. As shown in the figure, keywords such as biology teacher, Islamic school, Qur'an, Islamic values, and MA exhibit the highest density, indicating that these topics constitute the primary focus of existing studies. The prominence of these keywords suggests that current research largely concentrates on the role of teachers and the incorporation of Islamic values within biology education. This finding reflects the central position of educational institutions and teachers in the implementation of Islam biology integration (Bakar *et al.*, 2023; Sukari *et al.*, 2025).

In contrast, several keywords related to instructional implementation, learning strategies, and classroom practices appear with lower density, indicating that these areas have received comparatively less scholarly attention. This pattern suggests that existing studies tend to emphasize conceptual and contextual aspects of integration rather than practical approaches to its implementation. The uneven distribution of keyword density also reveals potential research gaps that warrant further investigation, particularly regarding effective pedagogical models, assessment methods, and learning resources that support Islam biology integration. Therefore, future research should focus not only on theoretical discussions but also on developing and evaluating practical strategies that can assist biology teachers in implementing meaningful and sustainable integration in MA.

CONCLUSION

This study examined the challenges faced by biology teachers in integrating Islamic values into biology learning at MA through a SLR. The findings revealed three interrelated dimensions of challenges: epistemological, pedagogical, and structural. These challenges indicate that effective Islam biology integration requires not only teachers' understanding of biological concepts and Islamic teachings but also appropriate instructional strategies and institutional support. This study contributes by providing a systematic synthesis of the challenges encountered in implementing Islam biology integration. At the national level, the findings can serve as a reference for curriculum development, teacher professional development programs, and educational policies aimed at strengthening the integration of religious values and scientific knowledge in Indonesian education.

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REFERENCES

- Ahmad, M., Minarmo, B., & Suyono, S. (2019). Kunci tadabbur dan integrasi Al-Qur'an dalam pembelajaran biologi. *Bioeduca: Journal of Biology Education*, 2(2), 101–114.
- Aina, Z. N., & Mawaddah, N. (2023). Peran ilmu biologi dalam Islam menurut perspektif Al-Qur'an. *Jurnal Religion: Jurnal Agama, Sosial, dan Budaya*, 1(6), 367–379.
- Amalia, F. R., & Ardi. (2024). Implementasi integrasi materi pembelajaran biologi dengan nilai-nilai religius Islam di kelas XI madrasah aliyah negeri se-Kota Bukittinggi. *Jurnal Pendidikan Tambusai*, 8, 10849–10861.
- Ardi, Lufri, Amran, A., Kosasih, A., & Hervi, F. (2024). The effect of Islam and science integration implementing on science learning in Indonesia: A meta-analysis. *International Journal of Evaluation and Research in Education*, 13(4), 2594–2602.
- Asriadi, M. (2025). *Synthesis research: Pendekatan, metode, dan aplikasi*. CV. Ruang Tentor.
- Bakar, A., Nazir, M., Deceu, R., & Purnama, B. (2023). Membumikan konsep integrasi pendidikan Islam dengan sains di lembaga pendidikan islam. *Jurnal Adzkiya*, VII(I), 82–92.
- Darsyah, S. (2023). Problematika dan solusi integrasi pendidikan agama Islam dengan sains di madrasah. *Jurnal Keagamaan dan Pendidikan*, 19(2), 209–219.
- Dielfi, M., & Helmi, A. M. (2018). Madrasah sebagai lembaga pendidikan di Indonesia. *Al-Muaddib : Jurnal Ilmu-Ilmu Sosial & Keislaman*, 3(1), 1907–1919.
- Fadilla, S., & Ardi, A. (2025). Analisis problematika guru dalam mengintegrasikan pembelajaran biologi dan Islam di MAN se-Kota Padang. *Islamic Natural Science Education Journal*, 4(2), 285–291.
- Hadad, N., Istikhori, H., Sirojudin, M. J., Kusban, H., & Supandi, H. (2025). Problem kurangnya bahan ajar/literatur pendidikan bagi peserta didik. *Journal of Islamic Religious Education*, 1(3), 132–137.
- Hafiz, M., & Salminawati, S. (2022). Implikasi integrasi ilmu sains dan agama pada perkembangan akhlak peserta didik. *Journal of Social Research*, 1(7), 694–707.
- Handoko, A., Febtiana, D., Hidayah, N., Haka, N. B., Mazalena, M., & Darmayanti, H. (2024). An analysis of the integration of islamic values in science learning at state Islamic junior high school. *Biosfer: Jurnal Tadris Biologi*, 15(2), 193.
- Harahap, A. H., & Kadar, M. Y. (2025). Integrasi sains dan Islam dalam pembelajaran biologi. *Indonesian Journal of Elementary Education (IJETE)*, 1(2), 250–254.
- Harahap, F. D. S., Arbi, A., & Yusrianto, E. (2025). Integrasi sains dan Islam dalam pendidikan Islam: Model, tantangan, dan implementasi di madrasah dan pesantren. *Kutubkhanah: Jurnal Penelitian Sosial Keagamaan*, 25(1), 1–12.
- Hidayat, S., Mubin, N., & Kamal, F. (2025). Pola integrasi sains dan Islam dalam pembelajaran biologi: Kajian Kompetisi Sains Madrasah (KSM) mata pelajaran biologi terintegrasi di MAN 1 Wonosobo. *Journal of New Trends in Sciences*, 3(1), 01–13.
- Humairoh, A. S., & Mustafidin, A. (2025). Integrasi ilmu agama dan sains dalam pendidikan Islam Kontemporer. *Naafi: Jurnal Ilmiah Mahasiswa*, 1(4), 528–538.
- Inami, M. (2020). *Pendidikan Islam 5.0 integrasi spritualitas dan teknologi di era disrupsi*. Zahir Publishing.
- Khasanah, N. (2020). *Terampil dalam pembelajaran terintegrasi Islam melalui model DBUS*. Alinea Media Dipantara.
- Khofilla, T., Widiyaningrum, P., Indriyanti, D. R., & Irsadi, A. (2025). Development of a teaching module containing islamic values on the material of the human reproductive system to strengthen students'

- critical thinking abilities in madrasah aliyah. *Jurnal Pendidikan IPA Indonesia*, 14(3), 562–569.
- Kholid, I., & Supriyadi, S. (2021). Harmonisasi sains dan agama: Pengembangan modul biologi berbasis interkoneksi sains dan nilai-nilai agama. *BIOEDUKASI (Jurnal Pendidikan Biologi)*, 12(1), 57.
- Lestari, F. D., Anggela, P. A., Putra, A. D., & Sari, uci P. (2024). Analisis dampak ketersediaan buku siswa terhadap kualitas pembelajaran siswa kelas 4 MIN 1 Bengkulu Selatan. *Jurnal Pendidikan Sosial dan Humaniora*, 3(2), 1811–1823.
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gotzsche, P. C., Ioannidis, J. P. A., Clarke, M., Devereaux, P. J., Kleijnen, J., & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate healthcare interventions: Explanation and elaboration. *BMJ*, 339(1).
- Merakati, I., Lieung, K. W., Hanipah, S., Yati, Y., Rahayu, W., & Arif, A. (2025). *Praktik pendidikan inklusif di sekolah Indonesia*. PT. Penerbit Qriset Indonesia.
- Mualimin, M. (2020). Pengembangan nilai islami peserta didik melalui integrasi Alquran dan Hadis dalam pembelajaran biologi. *Humanika*, 20(2), 129–146.
- Muchtar, A., & Sunhaji, S. (2022). Efforts to erode dichotomies using integrative learning models in Islamic religious education. *Fondatia*, 6(4), 1162–1172.
- Munir, M., Rasim, R., Ranggana, A., Husaeni, D. F., Permatasari, E., Gunarso, G., Septiani, H., Sari, L., Azizah, A. N., Nurmalasari, P. S., Ayusyaningtiyas, R., Ningsih, S. W., Aprianto, V., Alivia, Z. P., & Khoirunnisa, A. N. (2023). *Kajian pedagogik: Pendidikan ilmu kontemporer*. Indonesia Emas Group.
- Nuha Mumtazah, M., Zahrotul Ulya, D., Rohmah, N., & Ibrahim, R. (2025). Hakekat tujuan pendidikan Islam dalam perspektif integrasi sains dan pendidikan modern. *NAWASENA Journal of Mathematics, Science, and Technology Education*, 1(01), 12–13.
- Nurhadi, A. M., Rasyidin, A., & Imran, A. (2017). Integrasi nilai-nilai keislaman dalam pembelajaran biologi di SMA Islam Al Ulum Terpadu Medan. *Edu Riligia*, 1(4), 487–501.
- Nursalim, E., Hasan, H., Tinggi, S., Islam, A., Kutai, S., Tinggi, S., & Quran, I. (2022). Implementation of the integration of science and Islam in Islamic education: Strategies for building a non-dichotomy paradigm. *At-Taqaddum*, 17(2), 70–87.
- Pohan, A., Wadud, A. A., & Harahap, R. S. (2024). Integrasi agama dan sains pada mata pelajaran biologi di MAN 3 Tapanuli Tengah. *Al-Muhajirin: Jurnal Pendidikan*, 1(1), 1–8.
- Prasetyo, O., Ruwaida, U., Aurora, Z. F., Oktaviana, R., & Fajeriadi, H. (2025). Teachers' strategies to foster students' creative thinking skills in biology learning: A systematic literature review. *Journal Of Biology Education and Research (JBER)*, 6(2), 176–188.
- Rahman, D., & Akbar, A. R. (2021). Problematika yang dihadapi lembaga pendidikan Islam sebagai tantangan dalam meningkatkan mutu pendidikan. *Nazzama: Journal of Management Education*, 1(1), 76.
- Ramayanti, R., Rachmawati, N. ., Azhar, Z., & Azman, N. H. . (2023). *Langkah demi langkah systematic literature review dan meta-analysis* (A. Lastiati, Ed.). PT Rajagrafindo Persada.
- Robiah, S., Elfis, E., Hamzah, H., & Triyeni, A. (2023). Workshop on integrating biology instructional strategies with Al-Quran and As-Sunnah value for prospective biology teachers. *Journal of Community Service and Empowerment*, 4(3), 436–441.
- Rtg, M. K., & Anhar, A. (2024). Integration of religion and science in biology at SMA 4 Padangsidempuan. *Ontologi: Jurnal Pembelajaran Ilmiah Kependidikan*, 02(03), 1–9.
- Sahara, S., & Ardi, A. (2025). Problematika guru dalam mengintegrasikan pembelajaran biologi dengan Islam di madrasah aliyah negeri: Literatur review. *Islamic Natural Science Education Journal*, 4(2), 299–307.
- Sholehah, N. R. (2025). Islamic education based on integration of science. *Halaqa: Journal of Islamic Education*, 1(2), 227–244.
- Siregar, A. Y., & Rahadian, A. (2025). Integrasi nilai-nilai Al-Qur'an dan hadis dalam pembelajaran biologi di sekolah menengah atas: Pendekatan interdisipliner sains dan agama. *Jurnal Penelitian Ilmu Pendidikan Indonesia*, 4(2), 710–728.
- Sodiq, M. (2019). Problematika integrasi kompetensi spiritual dalam pembelajaran IPA (studi pembelajaran

- IPA madrasah aliyah di lingkungan pondok pesantren Jombang Jawa Timur). *Jurnal Penamas*, 32(2), 281–292.
- Sri, E., Titin, T., Faturrahman, M. A., Virda, D. A., & Wahyuningsih, D. (2026). Assessing prospective biology teachers' knowledge and perceptions regarding basic teaching skills through revised Blooms taxonomy. *JPBI (Jurnal Pendidikan Biologi Indonesia)*, 12(1), 151–166.
- Sukari, S., Sudarto, S., & Haryati, S. (2025). Problematika pendidikan Islam masa kini. *IHSANIKA: Jurnal Pendidikan Agama Islam*, 3(3), 69–79.
- Sutiana, D., & Nugraha, M. S. (2025). Integration of Islamic values and science in islamic primary schools: A philosophy of science approach. *Journal of Elementary Education Research and Practice*, 1(1), 21–34.
- Tahir, M. T. (2021). Religious integration in science learning in madrasah. *Jurnal AL-Muta'Aliyah*, 6, 19–36.
- Taufiqurrahman, Kurahman, O. T., & Rusmana, D. (2025). Tantangan pendidik dalam pengintegrasikan nilai-nilai pendidikan islam di sekolah negeri pada era globalisasi. *Jurnal IHSAN Jurnal Pendidikan Islam*, 3(1), 179–189.
- Tilotama, A. R., Arif, M., & Salkeri, F. K. (2025). Tafsīr 'ilmī is an approach in interpreting the verses of the Qur'an related. *TAFSĪR 'ILMĪ IN MADRASAH IBTIDAIYAH: FOSTERING A SPIRITUALLY AND SCIENTIFICALLY*, 7(2), 155–176.
- Widyasari, W. (2025). *Dilema guru: Antara kompetensi & tuntutan kurikulum* (H. Soba, Ed.). Indonesia Emas Group.
- Yanti, I., & Ardi, A. (2025). Analisis problematika guru dalam mengintegrasikan Islam pada pembelajaran biologi di madrasah aliyah negeri Kabupaten Sijunjung dan Kota Sawahlunto. *Alsys*, 6(1), 145–164.
- Yaqin, M. A. (2020). Integrasi ayat-ayat Al-Quran dalam pembelajaran sains. *SPEKTRA: Jurnal Pendidikan Sains*, 06(1), 78–85.
- Zarifah, N. D. N., & Ardi, A. (2025). Analisis problematika guru dalam mengintegrasikan Islam pada pembelajaran biologi di MAN kabupaten Tanah Datar. *Al-Alam: Islamic Natural Science Education Journal*, 4(2), 279–284.