



## A Bibliometric Study On The Integration Of Islamic Pedagogy And Artificial Intelligence: Toward A Sustainable Educational Future

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### ABSTRACT

This study aims to map the global scientific landscape regarding the integration of Islamic pedagogy and artificial intelligence (AI) in the context of sustainable education. The research uses a bibliometric approach based on data from the Scopus database and follows a systematic procedure using the PRISMA protocol. Data were analyzed using VOSviewer and Biblioshiny to visualize collaboration networks, keyword trends, and thematic development.

The findings show that research on the integration of AI and Islamic education is still relatively new, with a noticeable increase in publications over the last five years, especially after 2023. Most global studies focus on technical and pedagogical aspects, while discussions on Islamic values, spirituality, and ethics remain limited. This study highlights the conceptual gaps and emphasizes the importance of incorporating value-based perspectives in the development of educational technologies.

The study concludes that stronger collaboration between technology developers, Islamic education practitioners, and policymakers is needed to build ethical, inclusive, and contextually relevant smart education environments.

### ARTICLE INFO

#### **Article History:**

*Submitted/Received 12 April 2025*

*First Revised 26 Mei 2026*

*Accepted 15 June 2026*

*First Available online 29 June 2026*

*Publication Date 29 June 2026*

#### **Keyword:**

*Islamic pedagogy, artificial intelligence, bibliometrics, continuing education .*

## 1. INTRODUCTION

The development of artificial intelligence (AI) over the past decade has brought about a major transformation in global education. Technologies such as machine learning , natural language processing , adaptive learning systems , and intelligent tutoring systems are increasingly being adopted by educational institutions to improve learning effectiveness, personalize materials, and improve classroom management efficiency. The application of AI-based adaptive learning has been proven to dynamically adapt learning content to students' needs and abilities, thereby increasing motivation and learning outcomes (Gligorea, 2023). Furthermore, the development of AI-based educational analytics has made significant contributions to the learning evaluation process and more accurate academic decision-making (Silva et al., 2024).

On the other hand, discourse on Islamic education—including the concepts of *tarbiyah* , *ta'dīb* , and *ta'līm* —is experiencing revitalization as Islamic educational principles adapt to 21st-century needs. The integration of AI into Islamic education is viewed not only as a technological innovation but also as part of an epistemological transformation aimed at maintaining a balance between intellectual, spiritual, and moral intelligence. Recent studies confirm that the application of AI can strengthen ethical values, justice, and sustainability in the Islamic education system if guided by the principles of *maqāṣid al-sharī'ah* and Islamic scholarly etiquette (Salim & Aditya, 2025). In this context, future Islamic education is expected to integrate digital innovation with spirituality, in order to shape a globally competitive generation without losing its Islamic roots (Djazilan, 2024).

The integration of Islamic pedagogy and artificial intelligence (AI) has become a strategic issue in the modern educational landscape because they represent two complementary approaches: the tradition of values-based education and classical wisdom on the one hand, and technological innovation based on automation and data on the other. Islamic pedagogy fundamentally emphasizes the process of humanization through the formation of character, manners, and the spiritual dimension of students as the core of meaningful educational transformation. This approach is rooted in the concepts of *tarbiyah* (education) , *ta'dīb* (education) , and *ta'līm* (learning) , which foster ethical awareness and moral responsibility as part of the scientific process.

Meanwhile, AI in education offers computational capabilities to enhance personalized learning, enhance evaluation effectiveness, and enhance lifelong learning through intelligent data analysis and adaptive systems. Technologies such as intelligent tutoring systems and machine learning can optimize the learning process by tailoring materials to individual needs (Ahmad, 2025) . The integration of these two approaches opens up space for a more contextual and contemporary model of Islamic education.

Several studies have shown that the application of AI in Islamic education not only improves pedagogical efficiency but also has the potential to strengthen spiritual and ethical values in the teaching and learning process (Salim & Aditya, 2025). Furthermore, the transformation of Islamic education in the era of artificial intelligence demands a balanced approach between technology and human values, so that AI becomes not merely a tool but also a means to realize justice, wisdom, and sustainability in education (Rosmaini, 2025) . Thus, the collaboration between Islamic pedagogy and AI is an important foundation for the birth of a future educational model that is not only technologically intelligent but also ethically, socially, and spiritually sustainable.

Although the topic of integrating Islamic pedagogy and artificial intelligence (AI) is attracting increasing academic attention, the scientific literature on it remains scattered across disciplines. Studies on this topic have emerged in various fields such as education,

computer science, philosophy, sharia, and the social sciences, but few have connected them within a coherent conceptual framework. Existing research generally stands alone with diverse thematic focuses and methodologies, without a collective effort to comprehensively map the knowledge landscape, publication trends, or the direction of scientific development.

Several bibliometric studies indicate that the literature on AI in education is still dominated by technological and pedagogical approaches, with minimal attention to aspects of values, ethics, and spirituality. For example, a bibliometric analysis by (Kavitha et al., 2024) revealed that research on AI in global higher education focuses on learning efficiency and adaptive technology, but rarely highlights the integration of humanitarian values and religious ethics. Conversely, a bibliometric study of the modernization of Islamic education by (Asari, 2024) found that research in this field tends to be fragmented, with weak collaboration among researchers and a lack of interdisciplinary approaches to addressing the challenges of modern technology.

The lack of systematic studies on the relationship between AI and Islamic pedagogy has limited in-depth understanding of how the discourse on "Islamic pedagogy and AI" has developed globally, what theoretical concepts are most widely used, and the extent to which issues of ethics, *maqāsid al-sharī'ah* (obligatory goals of Islamic law), and sustainability are addressed in existing research. Therefore, a comprehensive bibliometric effort is needed that not only maps the scientific landscape but also highlights the conceptual gaps and normative values inherent in the integration of AI and Islamic education in the digital age.

Amid the growing need for adaptive, values-based, and relevant educational models to address future technological challenges, bibliometric studies play a crucial role in providing a comprehensive overview of the intellectual structure, research evolution, and development direction of the discourse on integrating Islamic pedagogy with artificial intelligence (AI). A bibliometric approach enables researchers to map networks of scholarly collaboration, identify dominant topics, and uncover underexplored research gaps in the global literature.

Recent research has shown that bibliometrics serves not only as a quantitative tool for calculating publications or relationships between authors, but also as an analytical instrument capable of highlighting research gaps, innovation opportunities, and future research directions in the field of sustainable AI-based education (Sahar et al., 2025). In the Islamic context, this approach is becoming increasingly important as Islamic education strives to adapt to digital transformation while maintaining the dimensions of values, spirituality, and academic ethics (Elihami, 2025).

Furthermore, scientific mapping studies have shown increasing interest in the themes of Islamic character education and AI-driven learning, although literature combining the two remains limited and scattered across various scientific fields (Kistoro et al., 2023). Other bibliometric studies confirm that thematic mapping and publication trends can help build a stronger theoretical foundation for AI-based Islamic education, as well as encourage the creation of a socially, morally, and technologically sustainable future for education (Hasan, 2024); (Ramli, 2025). Thus, bibliometric studies are not only scientific analytical tools but also epistemological bridges for integrating digital innovation and Islamic values in shaping future educational paradigms.

Therefore, this study aims to map the global scientific landscape regarding the integration of Islamic pedagogy and AI through a bibliometric approach, thereby contributing to the development of an Islamic education framework that is adaptive, inclusive, and appropriate to the demands of the digital era. The findings of this study are expected to serve as a foundation for researchers, educators, policymakers, and

technology developers in formulating future educational strategies that are sustainable in terms of values, sociality, and technology.

## 2. METHOD

### Data Collection and Search Strategy

This research is a bibliometric study that examines the literature related to the integration of Islamic pedagogy and artificial intelligence in the context of continuing education. Data was collected from Scopus on specific dates to ensure consistency of results and avoid being affected by database updates. Search keywords are composed using advanced search techniques with combinations of terms such as:

TS = ("Islamic Pedagogy" OR "Islamic Education") AND ("Artificial Intelligence" OR "AI") AND ("Education")

The publication time range searched was from 2000 to 2025. All documents were exported in *plain text* and *BibTeX* formats for further analysis ( Durak, G., at al . (2024) .

### Inclusion and Exclusion Criteria

Criteria inclusion and exclusion according to Durak, G., et al . (2024) :

1. Inclusion criteria:
  - a. Scientific journal articles (not proceedings, editorials, or book reviews).
  - b. Written in English.
  - c. Discusses the relationship between Islamic pedagogy and artificial intelligence in the context of education.
2. Exclusion criteria:
  - a. Thematically irrelevant articles.
  - b. Articles are duplicate or do not have complete metadata.

### Bibliometric Data Analysis

The analysis was performed using two main software:

1. VOSviewer is used for:
  - a. Analyze and visualize collaborative networks between authors, institutions, and countries.
  - b. Keyword co-occurrence mapping to identify dominant research topics and future trends.
  - c. *Co-citation* analysis and bibliographic coupling.
2. Biblioshiny (a visual interface of the *Bibliometrix* package in R) is used to:
  - a. Descriptive statistical analysis (number of publications per year, most productive authors, leading journals).
  - b. Visualization of conceptual maps and thematic evolution.

Data visualization was conducted to identify intellectual structures, research evolution, and future research directions on the topic of integrating Islamic pedagogy and artificial intelligence. ( Aria, M., & Cuccurullo, C. 2017) .

### Selection Procedure: PRISMA Approach

The article selection process was conducted based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. The stages include ( Page, MJ, at a. 2021) :

1. Identification: Filter all results based on keywords.
  2. Filtering: Remove duplicates and irrelevant articles based on title and abstract.
  3. Eligibility: Review the full text of articles that pass the initial stage.
  4. Inclusion: Determining the final articles to be analyzed bibliometrically.
- PRISMA flowchart is used to depict the number of articles at each

stage of the selection process. as following :

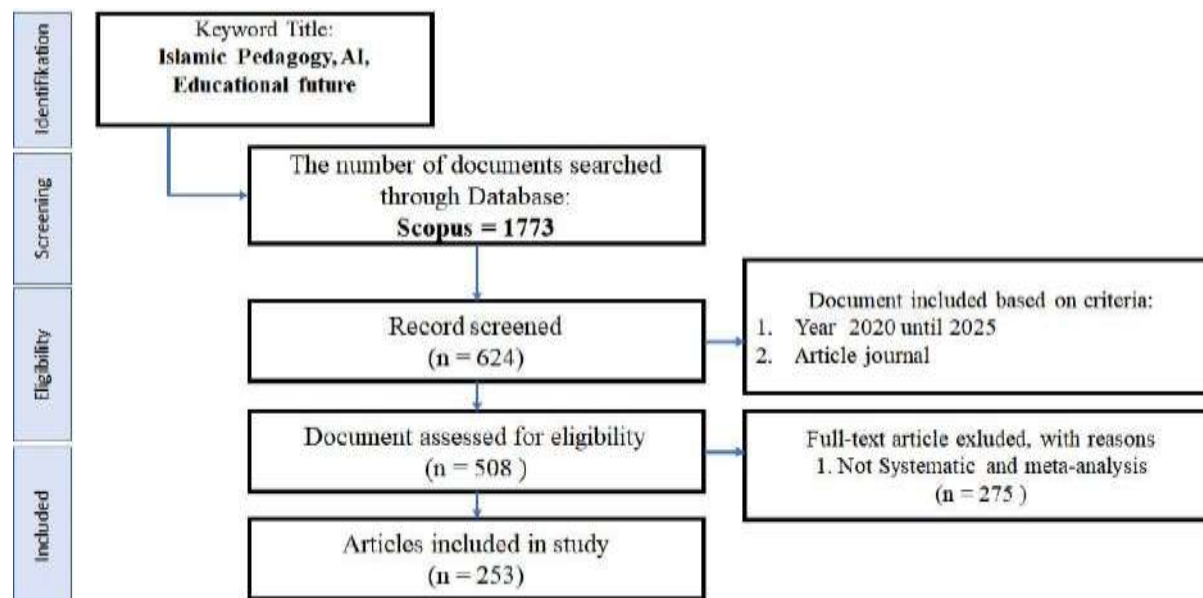


Figure 1. Prism  
Method Source : ( Page,  
M. J., at a. 2021) :

The PRISMA diagram illustrates the article selection process used in research on *Islamic Pedagogy, Artificial Intelligence, and the Educational Future*. The process begins at the Identification stage, when researchers conduct an initial search using keywords in the Scopus database and obtain 1,773 documents. Next, at the Screening stage, a filtering process is carried out based on two main criteria: publication year range 2020 to 2025 and document type (journal article). After the initial screening, the number of documents meeting the initial criteria shrank to 624 articles.

In the Eligibility stage, researchers further reviewed the 508 articles that passed the initial selection to ensure their relevance to the research focus. The evaluation was based on topic suitability, article quality, and suitability to the study objectives, resulting in a more specific eligibility assessment. From this evaluation, 275 articles were excluded because they were non-systematic or did not meet the meta-analysis criteria, thus not meeting the study objectives.

The final stage, Included, shows the final number of articles used in the bibliometric analysis. After the entire selection process, 253 articles met all criteria and were ultimately included in the study. Overall, this PRISMA diagram demonstrates a transparent, systematic, and structured selection process for selecting truly relevant and high-quality literature for analysis in the study.

### 3. RESULT AND DISCUSSION

The results of this bibliometric study provide a comprehensive overview of the dynamics of developments and global research trends examining the integration of Islamic pedagogy and artificial intelligence (AI) in the context of sustainable education. Through visualization and analysis using VOSviewer and Biblioshiny, various patterns of scientific collaboration, institutional concentration, keyword dominance, and research lifecycle predictions are identified, indicating accelerated academic attention to this topic, particularly after 2023.

1.

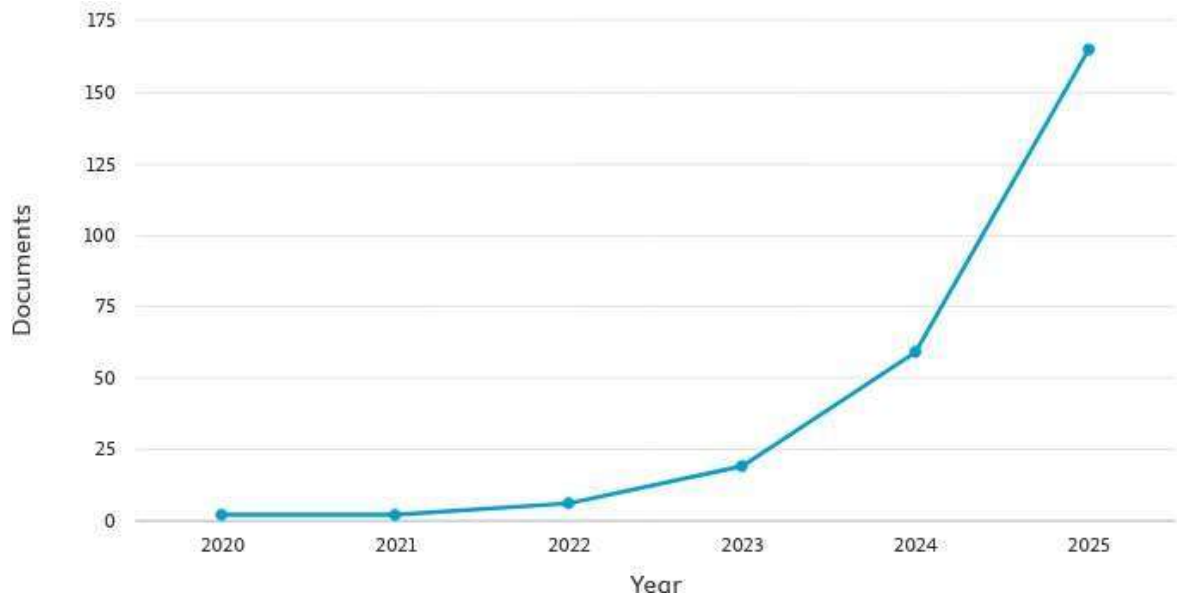


Figure 2. Document by Year Source : Scops analysis results

The graph shows the development of the number of publications related to the topics of *Islamic Pedagogy*, *AI*, and *the Educational Future* from 2020 to 2025, based on Scopus data. At the beginning of the period, from 2020 to 2022, the number of publications was very low and relatively stagnant, ranging from zero to five documents each. Starting in 2023, a more pronounced increase was seen, with the number of publications rising to around twenty documents. A more significant development occurred in 2024, when publications jumped to over fifty documents, indicating increased academic interest in this theme. This trend peaked in 2025 with over one hundred and sixty publications, illustrating a very strong acceleration of research examining the role of AI and digital transformation in Islamic pedagogy and the future of education.

## 2. Author Network

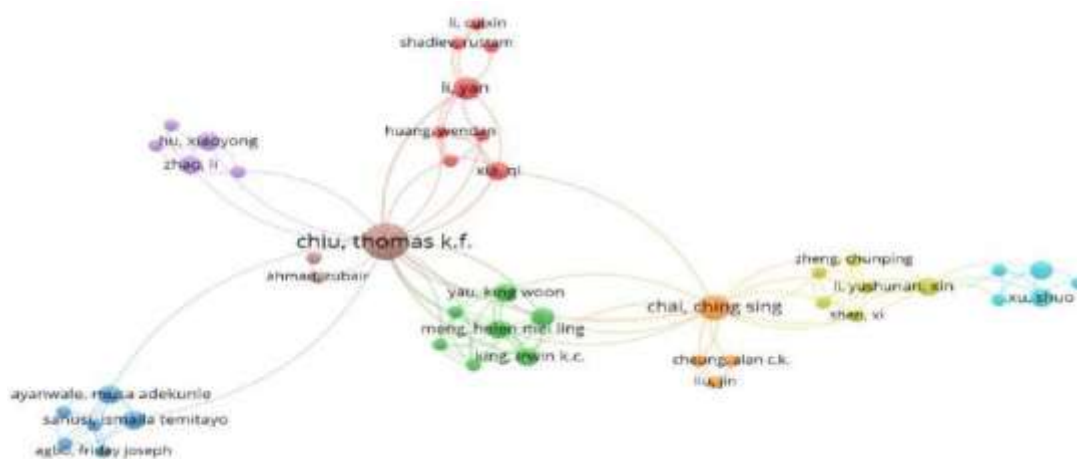


Figure 3. Author

### Network Source : Processed data with Vosviewer

The VOSviewer visualization depicts the collaborative network of authors in the fields of Islamic pedagogy, AI, and the future of education. Larger nodes indicate more influential authors, and Chiu, Thomas K.F. appears to be the center of the network with the most extensive collaborations. He is connected to several other clusters of authors, such as Li Yan, Huang Wendan, and Xia Qi, indicating a strong international network. On the other hand, Chai, Ching Sing also forms a large cluster that remains connected to the core network, indicating his role as a key researcher in the field. Other clusters of authors, such as Xu Shuo, Hu Xiaoyong, and Ayanwale Musa Adekunle, are more peripheral, indicating more limited contributions or a more specialized research focus. Overall, the map shows a collaborative structure centered on a few key figures, with supporting networks expanding research directions in educational technology and Islamic pedagogy.

### 3. Network Organization



Figure 4. Network  
Organization Source :  
Processed data with Vs Viewer

The image from VOSviewer shows the affiliated network of institutions involved in research related to Islamic pedagogy, artificial intelligence, and the future of education. Larger nodes, such as *the department of curriculum and instruction*, indicate institutions with the most dominant publication contributions within the network. These institutions appear to be centers of collaboration, as they are frequently connected by lines to other institutions. Surrounding them are clusters, such as *the faculty of education* and *department of education*, which indicate close research focuses and frequent academic collaborations.

On the other hand, *Beijing Normal University* has formed its own cluster that remains connected to the network hub, indicating its significant role as an active institution in educational technology and AI research. Meanwhile, the blue cluster representing *the School of Computing, ITA*, appears to be more peripheral, indicating that while it contributes, its research focus may be more technical and less integrated with the education cluster.

Overall, this visualization shows that research on this topic is dominated by educational institutions and curriculum-related faculties, with support from computing and technology institutions that form cross-disciplinary collaborative networks. The network structure indicates that AI integration in education is being developed primarily by mainstream educational institutions with the support of technology institutions as technical partners.

#### 4. State Network

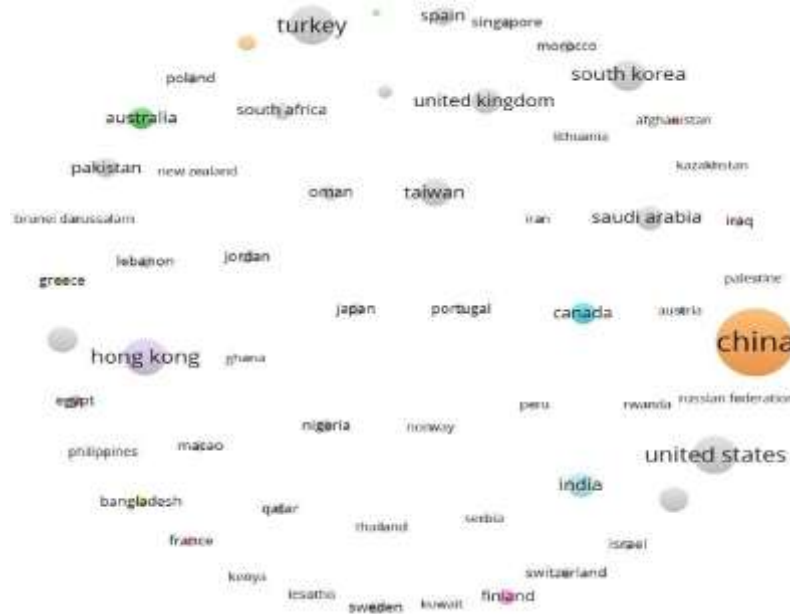


Figure 5. State Network  
Source : Processed data with Vos Viewer

The VOSviewer visualization depicts the distribution of countries contributing to publications related to Islamic pedagogy, artificial intelligence, and the future of education. Node size indicates the extent of each country's contribution, with countries with larger nodes—such as China, the United States, and India—being the main contributors to research production in these fields. China appears to be the hub with the largest node size, indicating a high level of publication dominance and active engagement in educational technology and AI studies.

Other countries such as Hong Kong, Turkey, the United Kingdom, South Korea, and Saudi Arabia also appear to have significant roles, albeit with more moderate contributions. Meanwhile, many other countries, such as Qatar, Finland, Greece, Egypt, and Pakistan, appear with smaller nodes, indicating that their contributions are present but not as significant as those of the major countries. The wide distribution of nodes without a single, tightly clustered cluster indicates that research in this field is global and encompasses diverse geographic contexts, although it remains dominated by countries with high research capacity.

Overall, this map shows that research on Islamic pedagogy and modern technology is developing through a wide range of international contributions, with strong research centers in East Asia, North America, and South Asia. This reflects the strong global interest in AI-based educational development and the need to adapt pedagogical values and approaches in various countries to the digital age.

## 5. Tree Field Plot Network

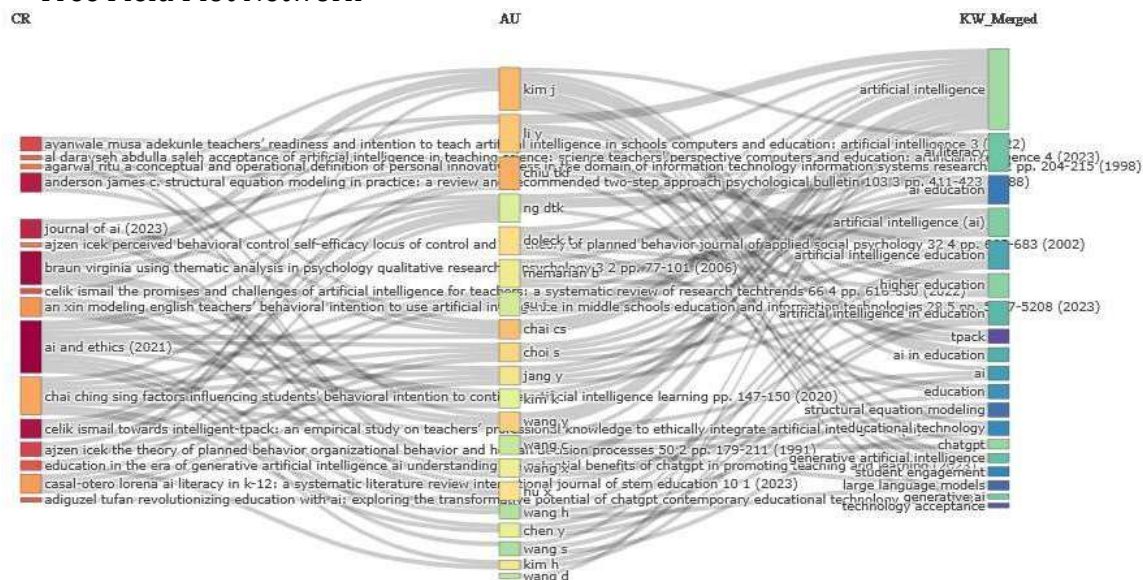


Figure 6. Tree Field Plot  
 Source : Data analyzed with Biblioshiny

*Three-Field Plot* visualization displays the relationships between three main elements in the literature: CR (cited references), AU (authors), and KW\_Merged (keywords). This relationship pattern illustrates how authors, the references they use, and research keywords interrelate in shaping the direction and focus of research related to AI in education, instructional technology, and modern pedagogy.

In the middle column, authors such as *Kim J.*, *Li Y.*, *Ng D.D.K.*, and *Chai et al.* appear to be the most dominant figures because they connect many references and keywords. This indicates that they are the most influential authors in the literature on *artificial intelligence in education*, *technology acceptance*, and *teacher behavioral intention*. Meanwhile, the left column (CR) shows classic references such as *Ajzen (1991; 2002)* which are very frequently used, indicating that the theory of planned behavior, perceived behavioral control, and other psychological factors are the main theoretical foundations in research on the acceptance of AI and educational technology.

In the right column (KW\_Merged), keywords such as *artificial intelligence*, *higher education*, *AI in education*, *structural equation modeling*, and *technology acceptance* indicate the most frequently occurring research focuses. The numerous connecting lines between these keywords and the primary authors indicate that these topics are central to discussions in the current literature. Furthermore, the emergence of keywords such as *generative AI*, *large language models*, and *chatGPT* indicates recent developments that are gaining increasing attention in the educational context.

Overall, this graph shows that research in AI-based education is heavily influenced by classical theoretical frameworks (such as Ajzen's) and led by a few key authors who have produced influential work. This combination suggests that the field is moving away from earlier behavioral and technological theories toward leveraging generative AI and new learning models, reflecting the dynamics of cutting-edge research in the era of digital transformation in education.

## 6. Life Cycle of Scientific Production

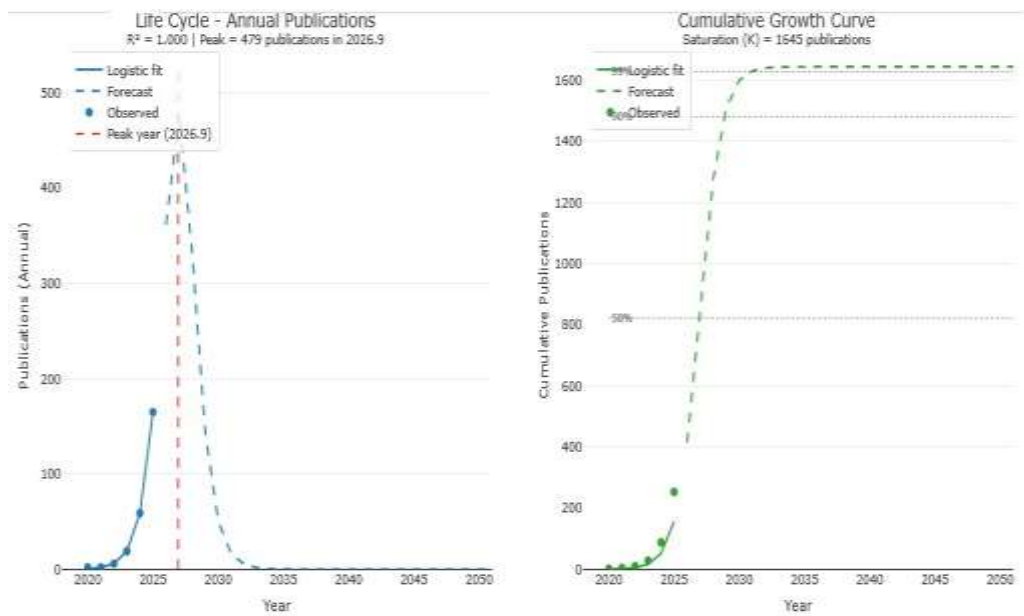


Figure 7. Life Cycle of Scientific Source : Processed data with Biblishiny

*Life Cycle of Scientific Production* figure shows the growth pattern and projection of scientific publications related to research topics, which are visualized through two graphs: annual publications and cumulative growth curve.

The graph on the left shows the annual publication lifecycle. *Observed data* shows that publications began to increase slowly in 2020, then experienced a significant spike in 2024 and continued to rise until reaching a peak in 2026.9 with an estimated 479 publications. The *logistic fit* and *forecast lines* show a pattern of rapid growth followed by a drastic decline after reaching a peak, indicating that research on this topic is predicted to have entered a saturation phase after 2027. This pattern illustrates the general cycle of new research fields: a slow initial phase, exponential growth, and then a decline after reaching conceptual maturity.

The graph on the right shows the cumulative growth curve. The logistic model predicts that total publications will reach saturation at approximately 1,645 publications. The sharp cumulative growth between 2024 and 2028 indicates that this period will be the most dynamic and productive in the literature's development. After this phase, the curve declines and flattens, indicating that new research is no longer developing as rapidly as before and the field is entering a stable or mature phase.

Overall, this visualization indicates that research in this field is currently in a phase of rapid growth, leading to peak scientific productivity. However, according to the logistic model, after 2027, the research phenomenon will slow down and reach saturation, indicating topic maturation and a decline in the frequency of new publications. These findings provide important insights into the dynamics of the field's development and predict future research directions.

## 7. Most Frequent Words

Table 1. Most Frequent Words

Words	Occurrences
artificial intelligence	94
chatgpt	37
higher education	32
artificial intelligence (ai)	20
generative ai	16
ai literacy	14
generative artificial intelligence	13
artificial intelligence in education	11
ai in education	9
artificial intelligence education	9

Previous 1 2 3 4 5 ... 86 Next

Source : Processed data with Biblioshiny

The table shows the ten most frequently occurring terms in the analyzed collection of articles, providing a clear picture of the primary focus of research in Islamic pedagogy, artificial intelligence, and the future of education. The term "*artificial intelligence*" topped the list with 94 occurrences, indicating that AI is central to the discussion in the reviewed literature. The term "*chatGPT*" appeared 37 times, indicating that the use and impact of generative language models is a rapidly evolving topic in academic discourse.

The term "*higher education*," which appears 32 times, shows that most research focuses on the context of higher education, whether in the form of AI implementation, lecturer and student readiness, or curriculum transformation. Other terms such as "*generative AI*" (16 times), "*AI literacy*" (14 times), and "*generative artificial intelligence*" (13 times) indicate that the literature is starting to move beyond general AI concepts to AI literacy skills and the use of generative AI in learning. The emergence of phrases such as "*artificial intelligence in education*," "*AI in education*," and "*artificial intelligence education*" confirms that the integration of artificial intelligence into the education system is a dominant theme that continues to receive widespread attention.

Overall, this table shows that the research focus is directed at understanding, applying, and impacting artificial intelligence—specifically generative AI and ChatGPT—in the context of modern education, with a strong emphasis on higher education and pedagogical transformation in the digital age.

## 8. Word's Frequency Over Time

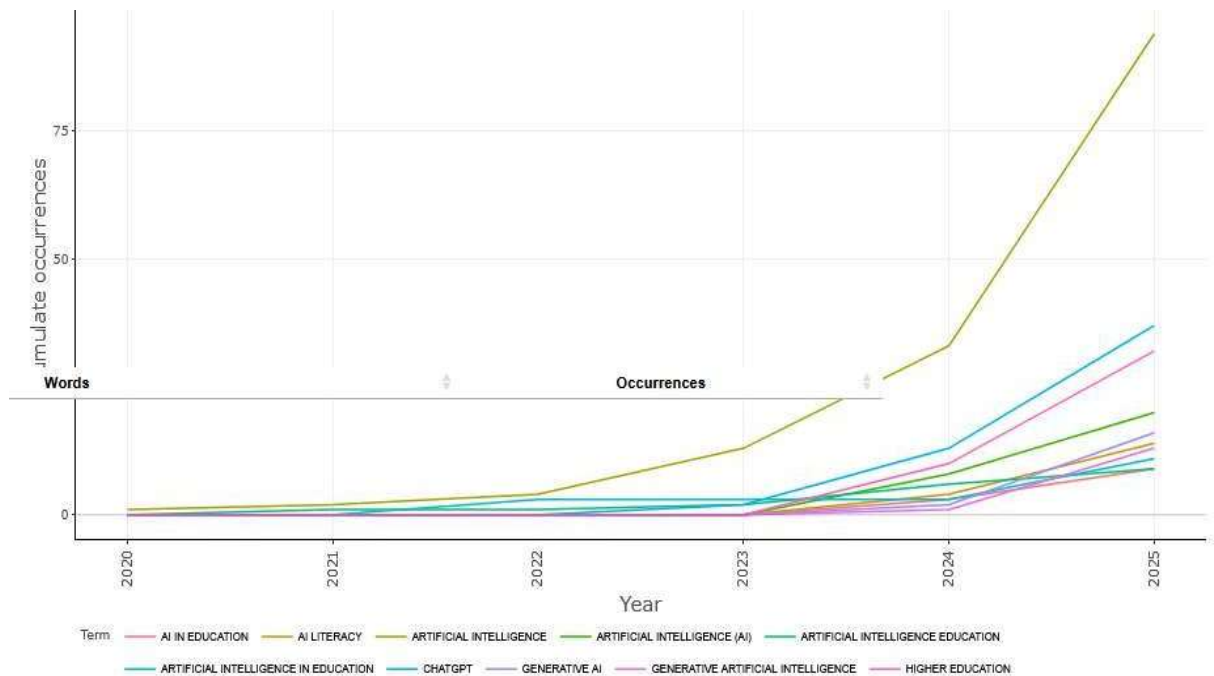


Figure 9 . Words' Frequent overtime Source : Processed data with Biblioshiny

The Words' Frequent Overtime graph shows the development of key keywords in publications related to AI and education from 2020 to 2025. All terms showed a relatively flat pattern at the beginning of the period (2020–2022), indicating that research on AI integration in education was still limited and had not yet received widespread attention. The increase that began to be seen in 2023 indicates the emergence of academic interest in topics such as *artificial intelligence* , *AI literacy* , and *higher education* .

A significant spike occurred in 2024 and intensified in 2025. The term "*artificial intelligence*" became the most dominant term, indicating that AI is a major focus of discussion in education. The terms "*chatGPT* " and "*generative AI* " also experienced a rapid increase after 2023, reflecting the direct impact of generative AI technology developments on educational research. Meanwhile, the terms "*AI in education* , " "*artificial intelligence in education* ," and "*AI literacy*" also showed a steady upward trend, indicating that the research focus is not only on AI technology itself but also on its application in the learning process and the AI literacy skills of students and educators.

Overall, this graph illustrates that over the past five years, research in education has increasingly shifted toward intensive exploration of generative AI, language models, AI applications in the classroom, and higher education transformation. The sharp increase in 2024–2025 indicates that these topics are becoming mainstream global research and are predicted to continue to develop as strategic themes in educational innovation in the future.

## 9. Most Relevant Affiliates

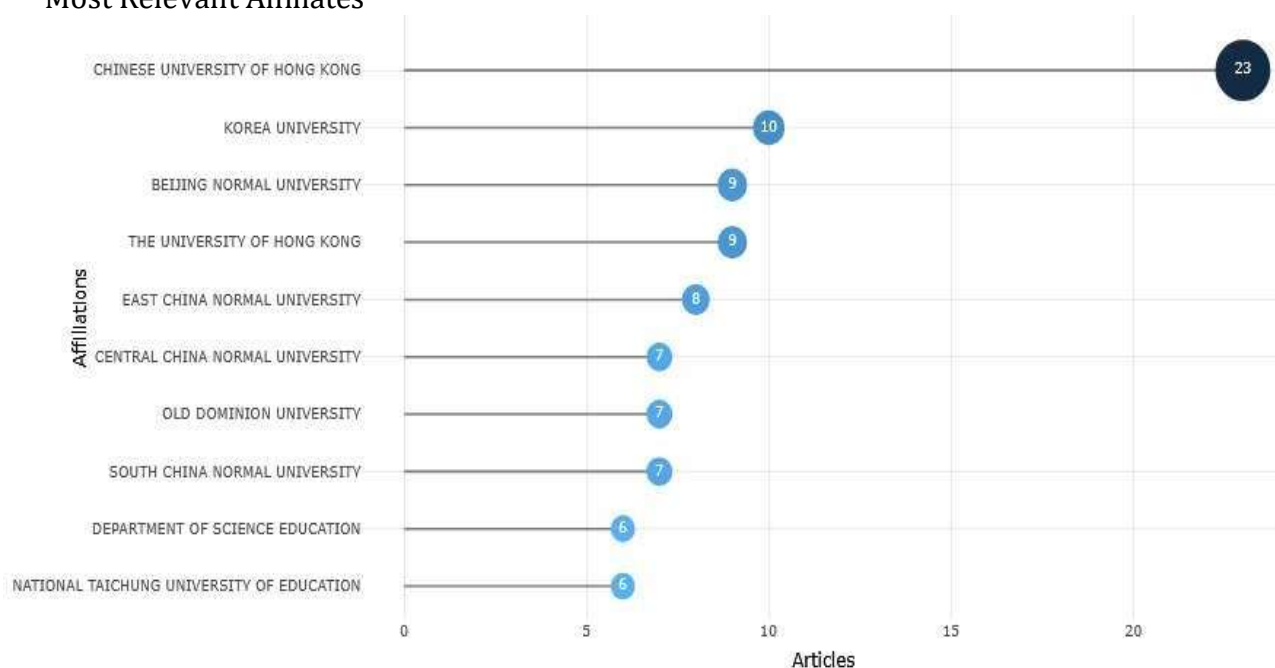


Figure 10. Most Relevant Affiliations Source : Processed data with Bibloshiny

*Most Relevant Affiliations* chart shows the institutions that contributed the most publications related to Islamic pedagogy, artificial intelligence, and the future of education. The Chinese University of Hong Kong tops the list with 23 articles, making it the most dominant research center in this field. The high number of publications from this institution indicates an active research group and a strong focus on educational technology and AI integration.

Next in line was Korea University with 10 publications, followed by Beijing Normal University and The University of Hong Kong, each with 9 articles. These two institutions are known for their strong traditions in educational research, making their contributions consistent with their established academic reputations. Furthermore, East China Normal University, Central China Normal University, Old Dominion University, and South China Normal University each produced 7 to 8 articles, indicating that East Asia—especially China—is a major hub for research development in this field.

Other institutions, such as the Department of Science Education and the National Taichung University of Education, each with six publications, demonstrate the diverse contributions of institutions focused on education and technology. Overall, this graph confirms that global research in AI for education is heavily spearheaded by universities in Hong Kong, Korea, and mainland China, with a strong concentration at institutions with a strong tradition of advanced educational and technology research.

## 10. Co-Occurrence Network

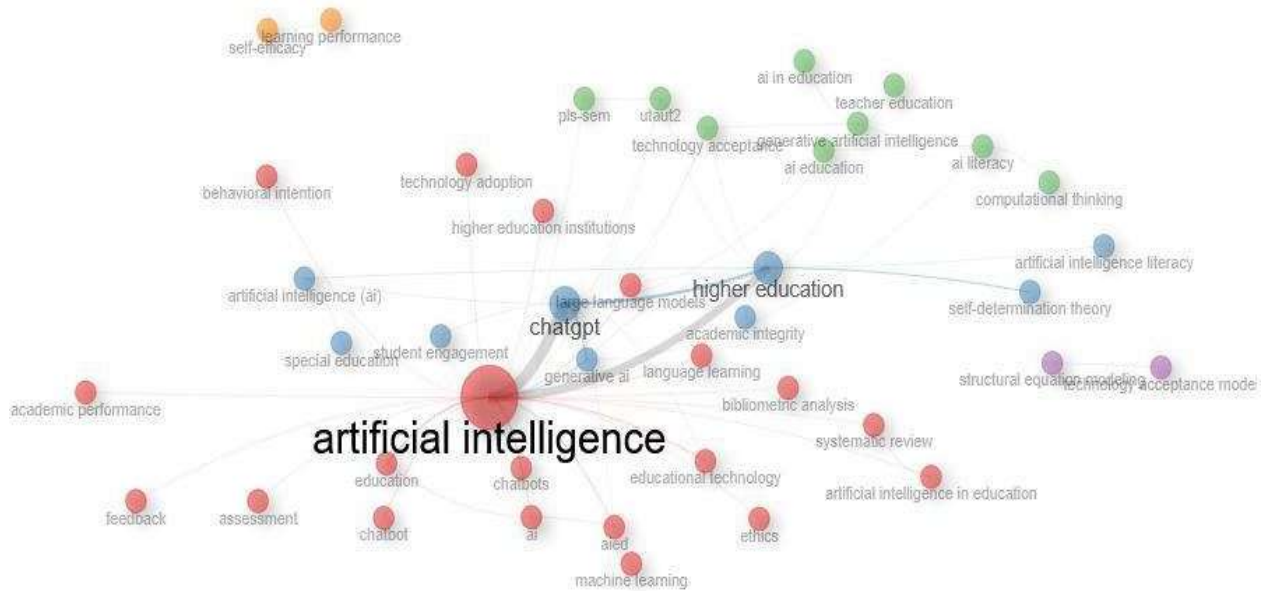


Figure 11. Co-Occurrence Network Source : Processed data with Biblioshiny

*Co-occurrence Network* image shows the interrelationships between keywords in publications discussing artificial intelligence and education, particularly in the context of higher education and the use of generative AI. The size of each node indicates the frequency of keyword occurrence, so the term *artificial intelligence* appears as the largest node and is central to the entire network. Its central position indicates that nearly all topics discussed in the literature are directly related to AI as a central concept.

The next major nodes are *chatgpt* and *higher education*, which are closely connected to AI and form a large thematic cluster. This indicates that research on AI in higher education, as well as the exploration of the use of language models like ChatGPT, is a major focus and is growing rapidly. Terms like *generative AI*, *large language models*, and *machine learning* form interconnected clusters, illustrating new trends in the integration of generative AI into learning, assessment, and academic interactions.

On the other hand, the green cluster contains keywords such as *AI in education*, *teacher education*, *AI literacy*, and *computational thinking*, indicating a research focus on teacher preparedness, AI literacy competencies, and pedagogical changes driven by new technologies. Meanwhile, the blue cluster shows the relationship between *higher education*, *student engagement*, and *academic integrity*, reflecting academic concerns about plagiarism, the ethical use of AI, and the quality of learning in the digital age.

The red cluster appears to be related to methodological approaches such as *structural equation modeling*, *technology acceptance models*, *behavioral intention*, and *assessment*. This indicates that many studies use quantitative approaches to measure AI acceptance, usage intentions, and its impact on academic performance.

Overall, this visualization shows that research on AI in education forms an ecosystem that is highly focused on artificial intelligence and ChatGPT as core topics, then branching out into technical, pedagogical, ethical, and methodological issues. This network structure reflects the rapid and widespread influence of generative AI in transforming the modern educational landscape, particularly at the higher education level.

## 11. Corresponding Author's Countries

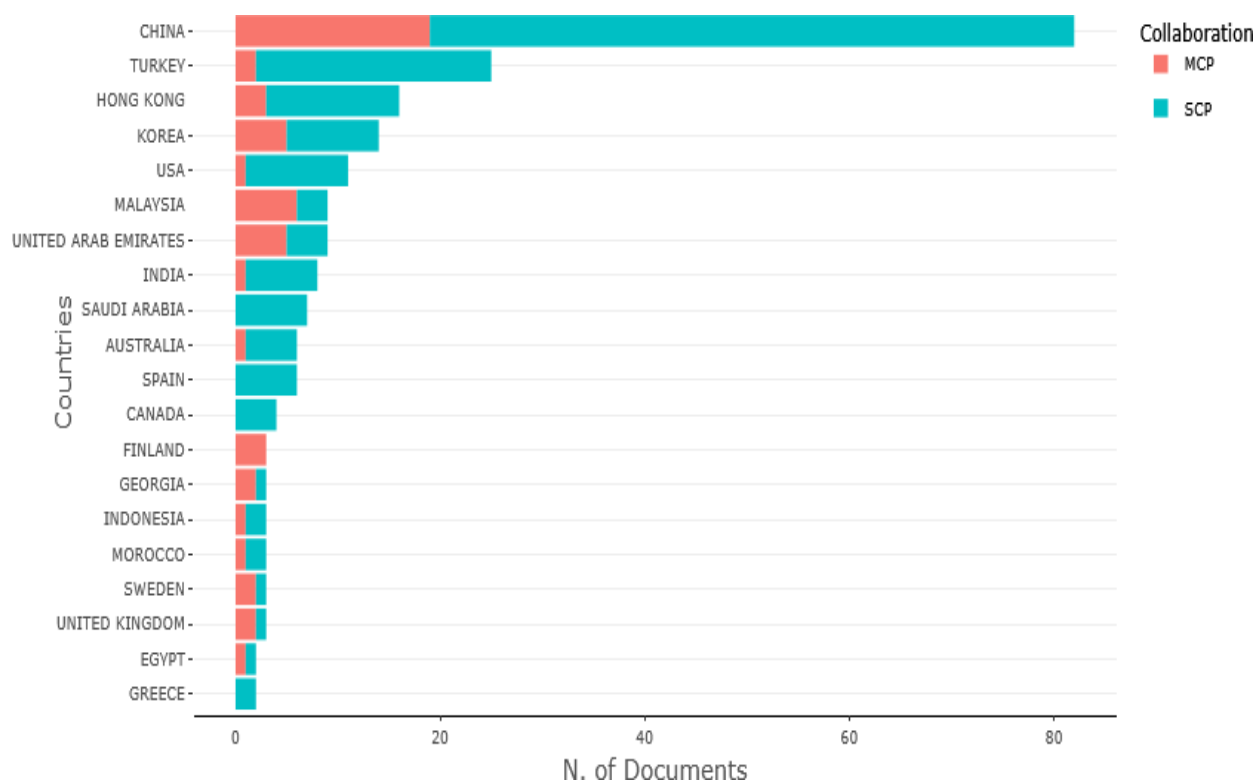


Figure 12. Corresponding Authors Countries Source : Processed data with biblioshiny

The graph shows the contribution of countries to scientific publications related to AI and education, distinguishing between Single Country Publications (SCP) and Multiple Country Publications (MCP). China dominates with the highest number of publications, demonstrating its significant research capacity and consistency in producing research both independently and collaboratively. The color scheme shows that the majority of articles from China are **SCP**, indicating that research in the country is conducted primarily domestically without extensive international collaboration.

Turkey ranks second with a significant contribution and a higher proportion of MCPs than several other countries, indicating a more globally collaborative research orientation. Hong Kong, Korea, and the United States follow with significant publications, and all three show a balance between SCPs and MCPs, reflecting strong international research networks and active engagement in cross-border research.

Countries such as Malaysia, the United Arab Emirates, India, and Saudi Arabia also show consistent contributions, although the majority of their publications originate from SCP. This suggests that AI research in education is growing in Asia and the Middle East, but global collaboration still has room for expansion. Countries with smaller contributions, such as Canada, Finland, Georgia, Indonesia, and Morocco, demonstrate that research in this area is global, but with varying publication intensity.

Overall, this graph shows that research on AI-based education is led by countries

with significant research capacity, such as China, Turkey, and the United States. While some countries demonstrate strong international collaboration, others still rely on domestic research. These findings indicate opportunities for increased cross-border collaboration to broaden perspectives and strengthen global contributions in the field of AI-based education.

## DISCUSSION

The discussion of bibliometric results indicates that the integration of Islamic pedagogy and artificial intelligence (AI) remains a developing field of study and has not been comprehensively mapped in the global literature. This finding aligns with a systematic study conducted by Greiff et al. (2024) in *Sensors*, which reviewed the application of AI in education from various technological and pedagogical approaches. The study emphasized that the adoption of AI has accelerated the personalization of learning and the efficiency of the instructional process, but faces significant challenges in teacher readiness and the disparity of digital infrastructure. However, unlike the context of this study, Greiff et al. did not focus on aspects of religious or cultural values, particularly within an Islamic framework, which in this study are the central variables that differentiate pedagogical orientations and the direction of technology utilization.

Furthermore, a study by Tzafilkou et al. (2025) in *the Journal of Digital Educational Technology* maps the potential of generative AI to support sustainable higher education, including through resource efficiency, reduced ecological footprint, and digital inclusion. The study suggests that the application of AI can strengthen the sustainable development goals (SDGs), particularly in the realm of education (SDG 4). In relation to the findings of this study, the dimensions of sustainability raised are not only limited to environmental and technological aspects, but also include the sustainability of values, morals, and communities within an Islamic epistemological framework. This approach prioritizes the principle of balance between technological sophistication and Islamic scientific principles based on *adab*, *sanad*, and the transformational function of teachers as *murabbi*, not merely learning facilitators.

Furthermore, the digital literacy gap and resistance to modern technology are also distinctive findings in this study. While similar challenges are mentioned in global literature, such as in Greiff et al. (2024), resistance in the context of Islamic education is strongly correlated with concerns about value distortion and decontextualization of teachings. Therefore, the integration of AI in Islamic education requires a policy framework and technology design that is adaptive to Islamic values, including the need to develop Islamic datasets, value-based recommendation systems, and strengthen AI literacy among Islamic educators.

Thus, this study both strengthens and broadens the scope of the global discourse on the application of AI in education, adding normative, cultural, and spiritual perspectives that have been underrepresented in international studies. The implications of these findings demonstrate the importance of collaboration between technologists, Islamic educators, and policymakers in designing an AI ecosystem that is not only technologically intelligent but also ethical, transformative, and contextual.

## 4. CONCLUSION

Based on the results of the bibliometric analysis, it can be concluded that the integration of Islamic pedagogy and artificial intelligence (AI) is a developing field with uneven scientific contributions globally. This study highlights that the application of AI in Islamic education has great potential to support personalized learning and efficiency of

instructional processes, but also faces unique ethical, normative, and technological challenges, such as the importance of value alignment, teacher readiness, and the availability of Islamic-based data. Comparison with international literature shows that while there are similarities in the opportunities and barriers to AI implementation in the

education sector, this study adds an additional dimension in the form of the need for an approach rooted in Islamic values in designing AI-based solutions. Therefore, cross-disciplinary synergy between technology and values-based pedagogy is needed to realize a sustainable, adaptive, and transformative future for Islamic education.

## 5. AUTHOR STATEMENT

The author declares that there is no conflict of interest regarding the publication of this article. The author confirms that the manuscript is free from plagiarism.

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