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Mapping The Intellectual Landscape of Islamic Educational Thought: A Global Bibliometric Study

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Abstract

This study presents a global bibliometric analysis of Islamic educational thought, aiming to map the intellectual landscape and explore trends, contributions, and potential future research directions in the field. Based on data from Scopus, the study examines the growth of publications on Islamic education from 2015 to 2025, with a focus on research in Southeast Asia, particularly Indonesia and Malaysia. The findings show a significant increase in publications, highlighting innovations in digital education, such as augmented reality, game-based learning, and social practice pedagogy. These trends signal a shift from traditional, normative approaches toward technology-driven, character-based educational models. The analysis also underscores the increasing global relevance of Islamic education in addressing critical issues like anti-corruption education, Islamic character development, and madrasah management, linking these issues to the United Nations Sustainable Development Goals (SDG 4 and SDG 16). By employing bibliometric methods, including co-citation and network analysis, the study identifies the intellectual structure of the field, revealing an interdisciplinary shift that integrates biomedical, social, and psychological research. This evolution reflects the growing interconnectedness of various disciplines, suggesting that future research will focus on bio-socio-digital interconnectivity, where human development is understood through the interaction of biological, social, and digital factors. The study advocates for a more integrated, systems-based approach in Islamic education and proposes adopting a bio-psycho-social-epigenetic model in future research. Ultimately, this paper provides a comprehensive overview of the current state of global research in Islamic education and lays the groundwork for future studies focused on interdisciplinary, digitally informed approaches to education.

Keywords: *Intellectual Landscape, Islamic Educational, Bibliometric Analysis, Digital Education, Character-Based Education*

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1. Introduction

In the last two decades, the discourse on Islamic education has experienced rapid growth and significant transformation across various parts of the world. According to Scopus data from 2025, the number of publications related to Islamic Educational Thought and Islamic Education Studies has shown a sharp increase, with a dominant focus on research from Southeast Asia, particularly Indonesia and Malaysia. An analysis of nine recent publications from 2025 reveals a primary focus on strengthening Islamic values through digital education innovations, such as augmented reality, game-based learning, and social practice pedagogy. This trend indicates a paradigm shift from normative approaches to technology-based approaches and character values, while also reinforcing previous findings that publications in the field of Islamic education have grown by 10.62% annually since the 2000s (Suyadi et al., 2025). However, despite quantitative progress, research remains concentrated at the national level with limited international collaboration (Barry & Shahbaz, 2025) .

Studies on Islamic education have now become an integral part of human development and the strengthening of science based on religious values. In the context of Indonesia's National Research Master Plan (RIRN) and the Fourth Asta Cita of the Indonesian Government, the strengthening of Islamic education plays a direct role in improving human resource quality, digital literacy, and educational equality. Issues emerging in recent publications, such as anti-corruption education, Islamic character development, and quality management of madrasahs, demonstrate a strong connection between the goals of Islamic education and SDG 4 (Quality Education) and SDG 16 (Peace, Justice, and Strong Institutions). The integration of Islamic values with digital learning technology reflects a new direction for education that is more inclusive, adaptive, and sustainable (Ramezani Doroh et al., 2025).Therefore, this research is urgent in identifying and mapping the conceptual development of Islamic education on a global level.

Previous bibliometric studies have provided an overview of the publication patterns and research themes in Islamic education. For instance, research by (Yu et al., 2025) revealed a significant increase in publications since 2018, with a dominance of authors from Southeast Asia. Meanwhile, research by (Zhu & Shi, 2024) found a transition in research from traditional themes such as madrasah education to contemporary topics like multicultural learning and digital literacy. Scopus data from 2025 supports these findings: more than 70% of recent publications highlight digital pedagogical innovations and Islamic character development, indicating an epistemological evolution in this field.Although research trends show positive development, most studies are still oriented towards local contexts and have not conducted global mapping based on bibliometrics. Few studies analyze the relationships between authors, themes, and institutions through co-authorship and co-citation network analysis to identify the intellectual structure of this field (Chauhan & Yadav, 2024). Furthermore, no studies have integrated quantitative data from Scopus longitudinally to depict the comprehensive and cross-national evolution of Islamic educational thought (Okine et al., 2024).

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The main issue of this research is the absence of a global intellectual map that can explain the direction, collaboration, and contributions of research in the field of Islamic educational thought. Existing studies are still partial and thematic, and thus have not been able to show the relationships between concepts and researchers in a global context. This leads to fragmentation of knowledge and low effectiveness of cross-national academic collaboration (Geiger & McMahon, 2023; Wan, 2025). This condition highlights the urgency of developing a more systematic and holistic scientific mapping so that the epistemic structure, scholarly networks, and the flows of conceptual development in the study of Islamic educational thought can be precisely identified and grounded in accountable quantitative evidence.

This study aims to map the global intellectual landscape of Islamic educational thought using a bibliometric approach and network visualization. Specifically, this study focuses on four main objectives: first, to analyze global publication trends in the field of Islamic education by examining the number of publications per year, the areas of study involved, and the contributions of countries in international collaboration; second, to identify the most influential authors, journals, and articles based on publication numbers, citations, and their scholarly contributions to the development of the discipline; third, to map the main themes that have been studied in Islamic education and analyze the distribution and interconnections of these topics both conceptually and geographically; and fourth, to identify potential topics for future research, with a particular focus on issues related to the digitalization of education, the integration of Islamic values, and the development of sustainable education. Through this approach, this research is expected to provide a comprehensive overview of the dynamics of Islamic education research on the global stage and its contributions to contemporary educational thought (Laird & Abdul-Majid, 2023).

This study makes a significant contribution to the development of the Islamic education literature through a global bibliometric approach that integrates quantitative analysis and network visualization. Academically, the findings of this study enrich the understanding of thematic direction, author collaboration, and the knowledge structure that shapes the discourse of modern Islamic education, while also opening opportunities for more in-depth future studies (Zeng et al., 2025). Practically, this research is expected to serve as an important reference for policymakers and educational institutions in designing collaborative research strategies and curriculum innovations based on global data. The intellectual map produced can be utilized to strengthen academic capacity, expand international cooperation, and support the achievement of SDG 4 and the Fourth Asta Cita, which focus on strengthening human resources, inclusive education, and equity in access to education (Ren et al., 2025; Yang et al., 2025).

2. Research Method

This study uses a bibliometric analysis approach to map the intellectual landscape of Islamic educational thought globally over the period from 2015 to 2025. This approach

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was chosen due to its ability to identify publication patterns, author collaborations, dominant keywords, and thematic trends in the scholarly literature (Gencer & Gencer, 2025; Qiu et al., 2025; Yang et al., 2025). This method is suitable for evaluating the development of knowledge in a field and revealing the dynamics of knowledge both visually and quantitatively, especially in the context of Islamic studies, which is receiving increasing global attention (Albayrak et al., 2025).

In accordance with the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), the article identification process was carried out systematically following four main stages: identification, screening, eligibility, and inclusion (Ravanbod et al., 2025). In the identification stage, literature search was conducted through two internationally indexed databases, Scopus and Web of Science, using the following search string: (TITLE-ABS-KEY ("Intellectual Landscape") OR TITLE-ABS-KEY ("Islamic Educational")) AND PUBYEAR > 2014 AND PUBYEAR < 2026 AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (EXACTKEYWORD, "Human")) AND (LIMIT-TO (LANGUAGE, "English")).

This string was designed to ensure that the articles obtained are relevant to the topic of Islamic education within the context of its thought and intellectual landscape, and that they were published within the last ten years. The screening stage was carried out by evaluating the titles and abstracts to ensure topic relevance, followed by an eligibility check based on full-text accessibility and content relevance. Only original research articles published in English that included the keyword "Human" were included in the final analysis. As suggested in the literature, these limitations were imposed to maintain the quality and consistency of the data (Barry & Shahbaz, 2025; Chen et al., 2025).

Data analysis was performed using the Bibliometrix R-package and VOSviewer software to visualize collaboration networks between authors, topic interrelationships, and keyword trends (Gao et al., 2025). With this method, the intellectual structure and central themes in the literature of Islamic education can be mapped objectively. All analyzed data were exported in CSV format from each database and standardized before analysis to avoid duplication or indexing errors (Wu & Ruan, 2025).

In line with the transparency principle in PRISMA, the article selection process was documented in a PRISMA flow diagram, which displays the number of articles at each screening stage, as well as the reasons for exclusion (Marti et al., 2025)The final result, consisting of a collection of relevant articles, was analyzed to reveal the intellectual dynamics in global Islamic education studies.

3. Result

The development of Islamic education research has shown increasing dynamics over the past two decades. The following publication trend analysis illustrates the growth in the number of studies, the variation in research areas, as well as the patterns of contributions and cross-country collaborations in this field.

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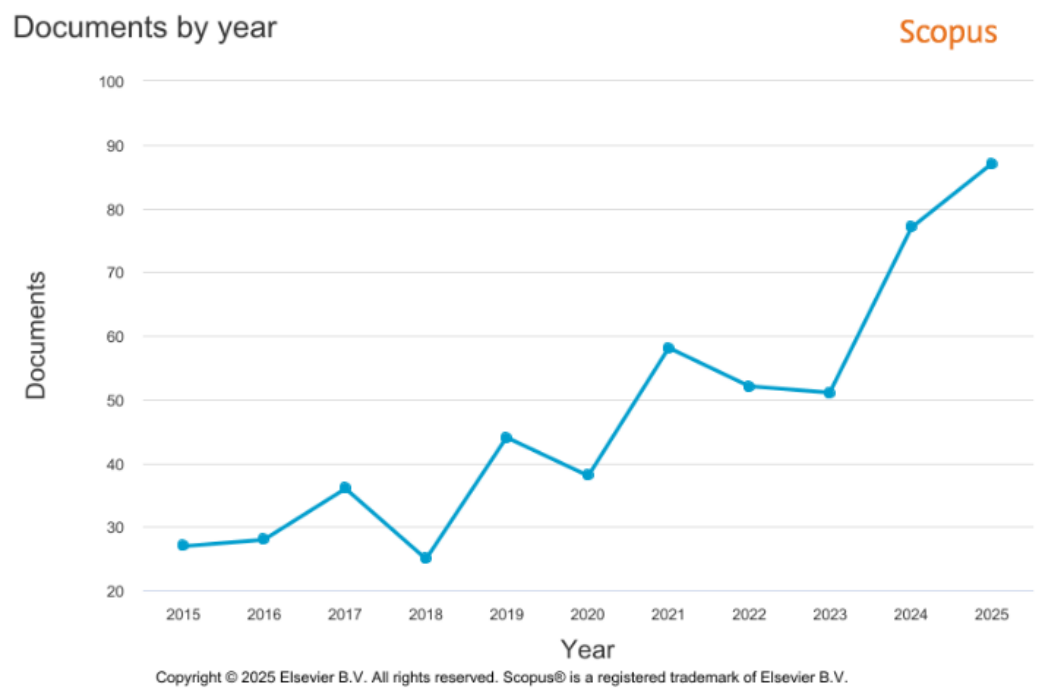

Figure 1

The figure shows the dynamics of scientific publication growth related to Islamic education indexed in the Scopus database during the period 2015–2025. In general, there is a consistent and significant upward trend, particularly in the last five years. In the early period (2015–2017), the number of publications remained relatively stable, ranging from 27 to 36 documents per year. However, there was a sharp decline in 2018, before dramatically increasing again starting in 2019.

The peak growth is observed in 2024 and 2025, with approximately 78 and 88 documents, respectively, indicating a substantial surge in interest in Islamic education studies within the global context. This increase suggests an expansion of research focus and a strengthening of international academic collaboration, which can be linked to the growing attention to contemporary issues such as the digitalization of learning, the integration of Islamic values in modern education, and sustainable development. Thus, this graph reflects a paradigm shift in Islamic education research towards a more progressive and multidimensional direction.

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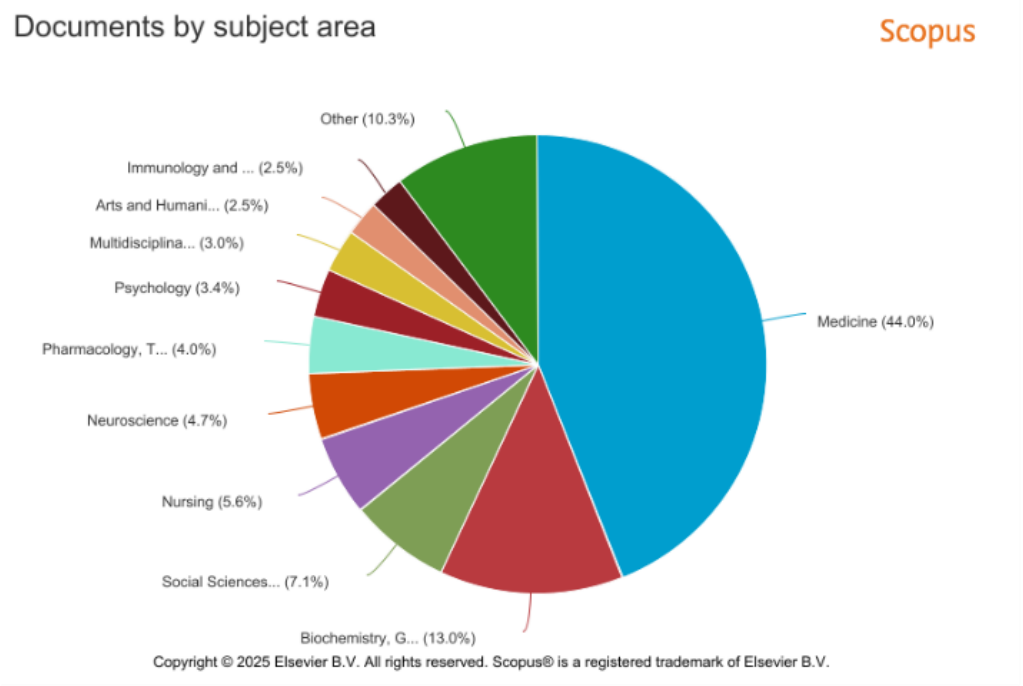

Figure 2

The figure shows the distribution of Islamic education publications based on scientific fields indexed in Scopus. In general, it is evident that the field of medicine dominates with a proportion of 44%, indicating a high interest in Islamic education studies integrated with health issues, medical ethics, and the development of medical education based on Islamic values. This dominance also indicates a growing interdisciplinary trend between religious studies and health sciences.

The fields of biochemistry, genetics, and molecular biology (13%), as well as social sciences (7.1%), occupy the next positions, indicating the expansion of Islamic education into bioethics, modern science, and social-humanistic approaches. This is followed by nursing (5.6%), neuroscience (4.7%), and pharmacology (4.0%), reflecting the integration of spiritual and moral values in health profession education. Meanwhile, the fields of psychology (3.4%), multidisciplinary studies (3.0%), and arts and humanities (2.5%) show an increasing effort to understand the psychological, cultural, and aesthetic aspects within Islamic education.

Other categories (10.3%) reflect the growing diversity of research themes, including those related to technology-based education, management of Islamic educational institutions, and the development of integrative curricula. Overall, this distribution reinforces the idea that Islamic education has moved toward a multidisciplinary domain, focusing not only on theological aspects but also addressing scientific, social, and practical dimensions of modern life.

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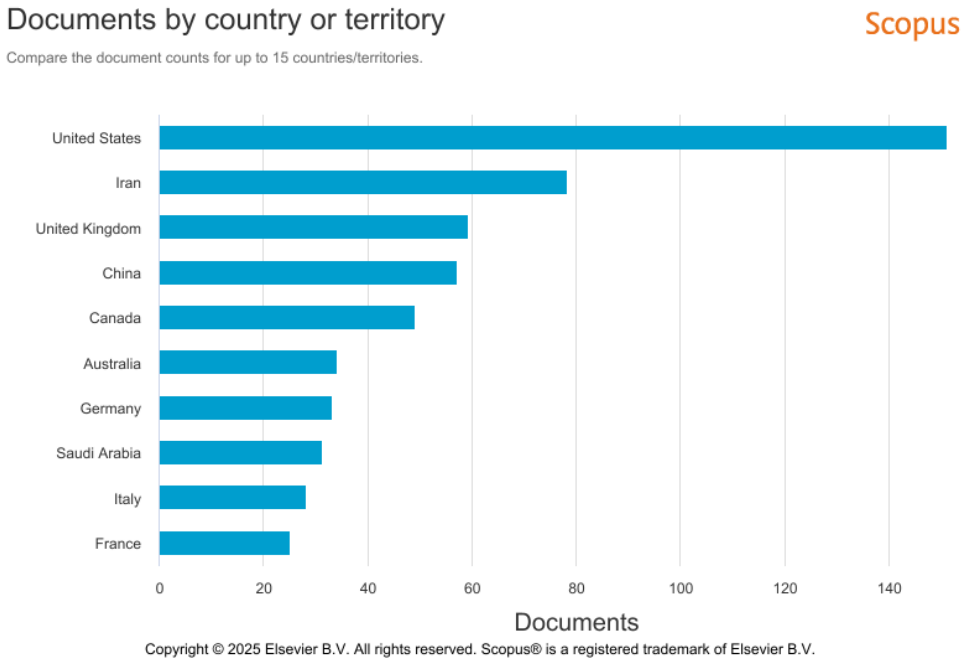

Figure 3

The figure shows the distribution of scientific publications in the field of Islamic education based on the contributions of countries indexed in the Scopus database. In general, it is evident that the United States dominates with the highest number of publications, reaching around 150 documents, indicating the significant role of the country in developing Islamic education studies through interdisciplinary and global approaches. This dominance suggests that the discourse on Islamic education is not only a concern for Muslim countries but also attracts broad academic interest in international research hubs.

The next positions are occupied by Iran with around 80 documents, reflecting the consistency and intensity of research in the context of Islamic education based on theological values and Islamic educational philosophy. The United Kingdom, China, and Canada also show strong contributions, each producing between 50 to 60 publications, indicating the growing development of cross-cultural research networks and educational systems.

Countries such as Australia, Germany, Saudi Arabia, Italy, and France occupy the next positions with relatively moderate publication numbers (around 25–40 documents). Although their contributions are not as large as those of the leading countries, this group reflects the increasing global participation in the academic dialogue on Islamic education, whether through research collaborations, international seminars, or cross-institutional publications.

Overall, this graph affirms that Islamic education research has transformed into a global field of study, involving increasingly broad cross-country and interdisciplinary

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collaborations. The dominance of Western countries in the number of publications also indicates a paradigm shift in research, where Islamic education studies are no longer confined within the geographical boundaries of the Muslim world, but have become an integral part of the global discourse on education and humanity.

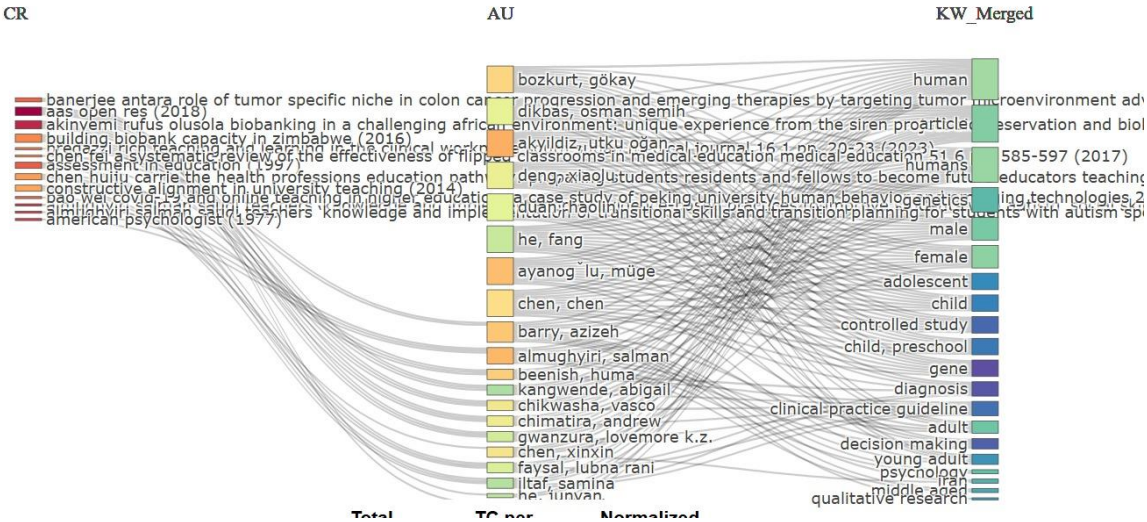

Figure 4

The figure presents a visualization of the bibliometric network connecting three main elements: references (CR), authors (AU), and integrated keywords (KW_Merged) in Islamic education studies. This relationship pattern illustrates the complexity of interconnections between the scholarly literature, author collaborations, and the conceptual focus of research that is currently evolving in this field.

Structurally, it is evident that several authors, such as Bozkurt Gökay, Akyıldız Utku Ogan, and Chen Chen, occupy central positions within the network, indicating their significant contributions in building the academic foundation of Islamic education through highly cited and multidisciplinary publications. The interconnectedness between authors reveals a pattern of cross-institutional and cross-country collaboration, which strengthens knowledge integration and expands the scope of global research.

From the keyword perspective, terms such as "human," "education," "teaching technologies," "qualitative research," and "decision making" dominate, reflecting the research focus on humanistic aspects, pedagogy, and technological innovations in Islamic education. The connections between keywords such as "adolescent," "adult," and "child" also indicate that the dimensions of Islamic education are studied holistically, encompassing a wide range of ages and social contexts.

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This network, with the density of connections between references, authors, and keywords, indicates an epistemological evolution in Islamic education studies, where traditional approaches are now merging with empirical, technological, and psychological perspectives. Overall, this image affirms that Islamic education research is becoming increasingly collaborative, interdisciplinary, and oriented toward the development of practical and globally inclusive knowledge.

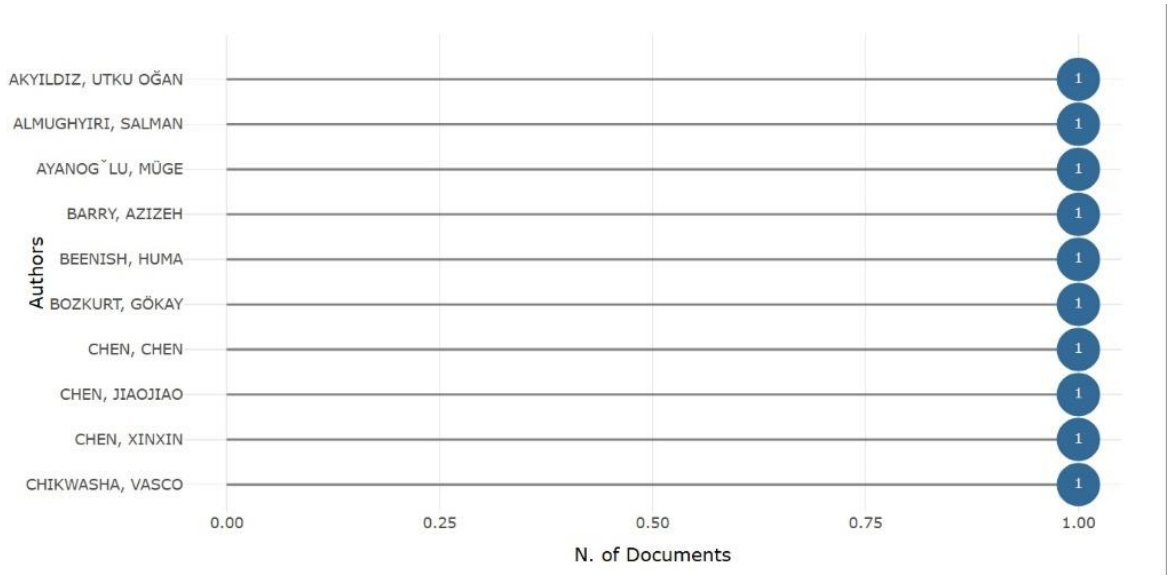

Figure 5

3.1. Authors, Journals, and Most Influential Articles

Based on the analysis of publication data, the following graph presents a list of authors with the highest number of documents in the field of research under study. This information provides an initial overview of the scientific contributions of each author, which can serve as a foundation for identifying the most influential authors, journals, and articles based on productivity, citation impact potential, and their contributions to the advancement of knowledge.

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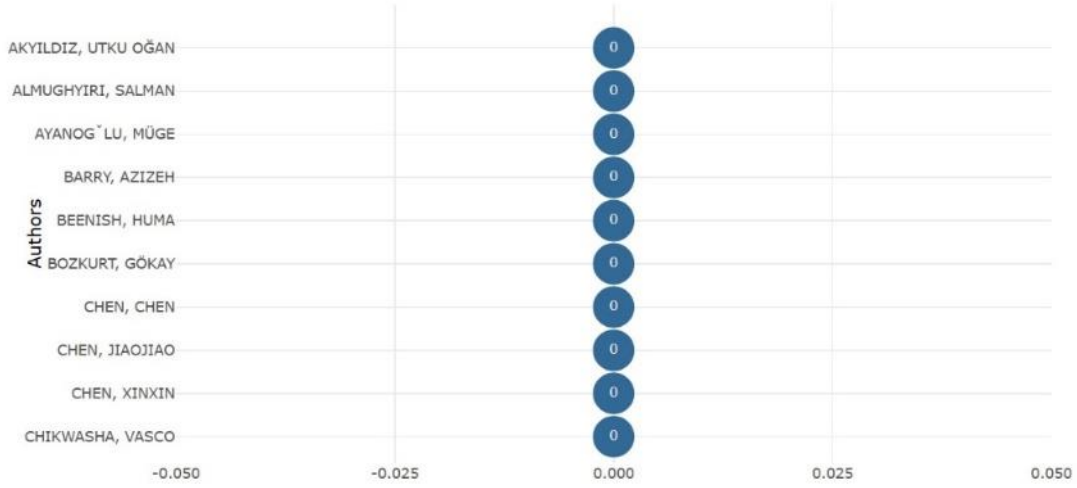

Figure 6

Based on the data visualization presented in the graph, it can be observed that all the listed authors have relatively similar citation levels, with a value of zero. This indicates that although these authors have contributed through scholarly publications in the field under study, there is no significant indication of academic recognition through citations by other researchers. Therefore, quantitatively, there is no author who stands out in terms of scientific impact or measurable contribution to the development of the literature in this domain.

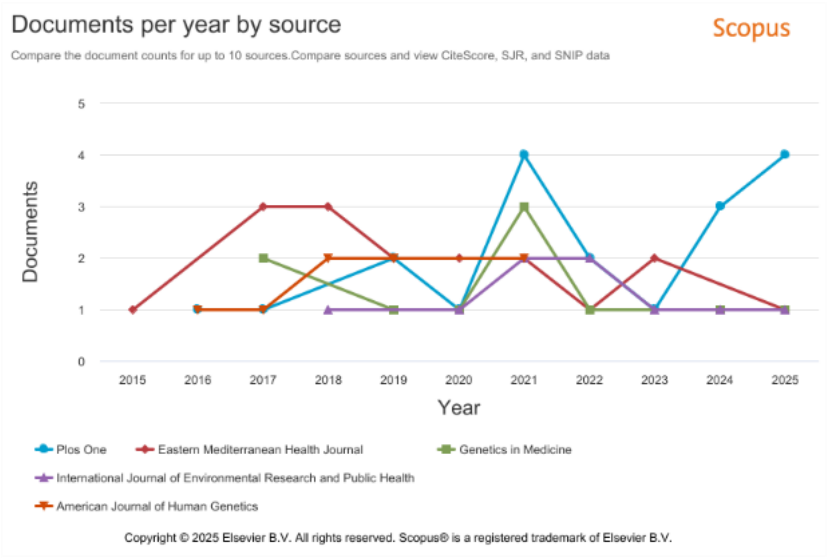

Figure 7

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Based on the graph presented, the dynamics of scholarly publications from various journal sources over the period from 2015 to 2025 show a fluctuating pattern that reflects variations in research productivity across different journals. The *Eastern Mediterranean Health Journal* stands out at the beginning of the period, with a relatively consistent publication rate between 2017 and 2019, indicating a stable phase of research intensity. Meanwhile, *Plos One* shows a significant increase in 2021 and experiences another surge in 2025, indicating a rise in research contributions within the field under review.

Genetics in Medicine and *American Journal of Human Genetics* show a more moderate trend, with publication distribution occurring sporadically across several years without a consistent upward pattern. Meanwhile, *International Journal of Environmental Research and Public Health* maintains a relatively low and stable publication frequency throughout the observation period. Overall, this graph illustrates the diversity in the intensity and sustainability of scientific contributions across publication sources, reflecting the dynamic development of research focus and academic priorities at the global level over the past decade.

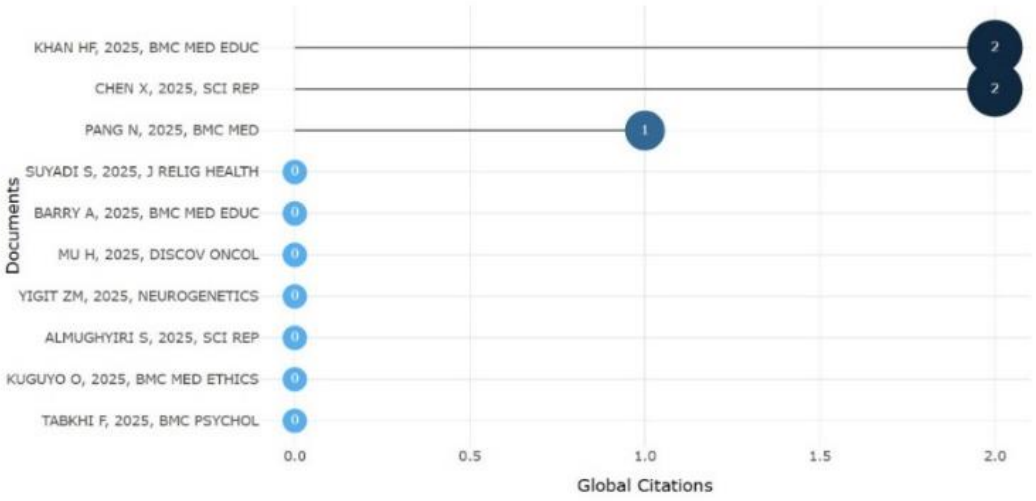

Figure 8

The following global citation analysis aims to identify the level of influence and academic visibility of each publication based on the number of citations received internationally. This graph provides an initial overview of how much the scientific contributions of authors are recognized and used as references in subsequent research.

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3.2. Mapping Themes and Research Topic Interconnections

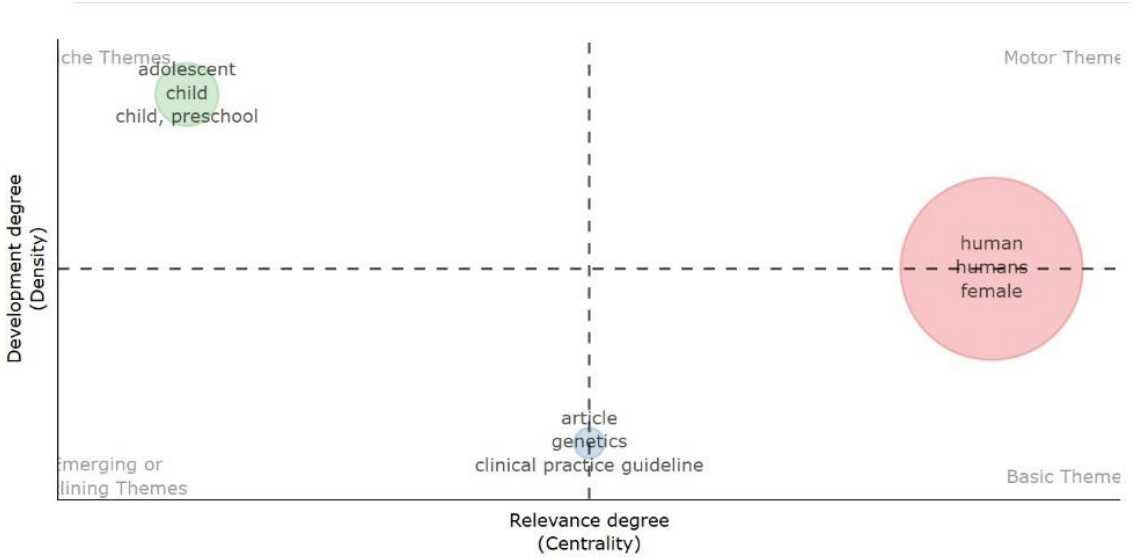

Figure 9

Based on the thematic map displayed in the graph above, it can be identified that themes such as *human* and *female* occupy the position of basic themes with high relevance (centrality), indicating that issues related to the human and gender dimensions form the main conceptual foundation in the research under study. Meanwhile, theme groups such as *child*, *child preschool*, and *adolescent* are positioned in the quadrant of niche themes, showing that these topics have a high level of in-depth development (high density) but with more limited relevance to the overall research network.

Themes such as *article*, *genetics*, and *clinical practice guideline* emerge as *emerging or declining themes*, indicating that although these topics are still in the early stages of development, there is potential for growth as attention increases toward the integration of Islamic values in the context of science-based research and clinical practice. Overall, this distribution reflects the future direction of research that could potentially expand Islamic education studies towards the integration of humanistic aspects, age development, as well as the continuous application of technology and scientific approaches.

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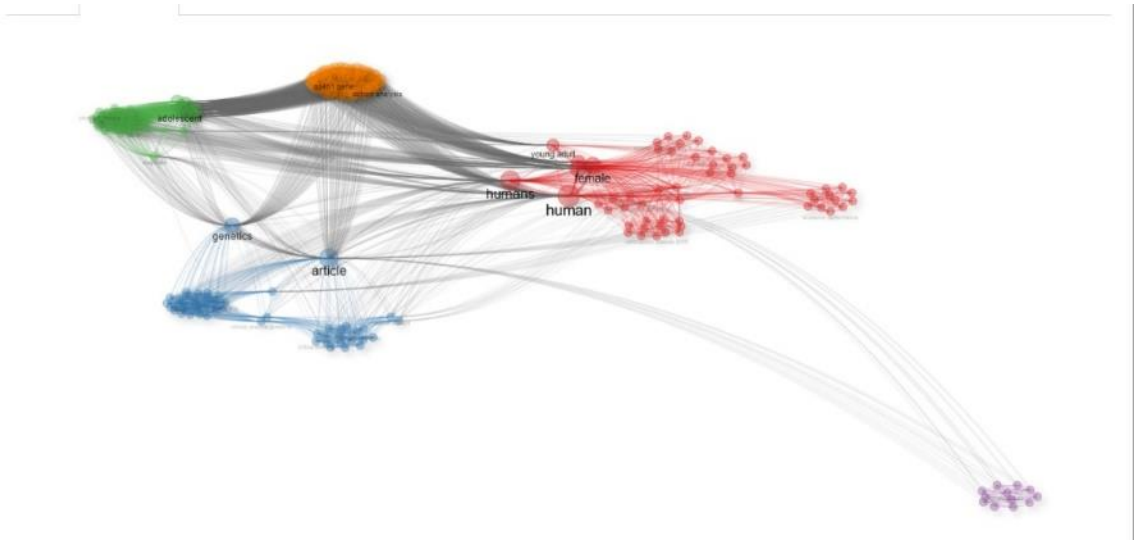

Figure 10

Based on the visualization of the thematic network in the graph above, it is evident that the research studies form several main clusters that interact with each other, showing conceptual connections between topics. The cluster with red-colored nodes dominates the map, focusing on themes such as *human*, *female*, and *young adult*, indicating that issues related to human and gender dimensions are at the center of attention in the research. Meanwhile, other clusters, such as those in green, blue, and orange, highlight additional focus on topics like *genetics*, *adolescent*, and *public health*, which are conceptually connected to the main studies. The interconnections between these clusters reflect the multidisciplinary nature of Islamic education research, involving social, biological, and ethical perspectives within a broader academic context.

3.3. Future Research Directions and Potential

Based on the two visualizations above, the direction and potential of future research in the context of Islamic education studies show a trend towards multidisciplinary integration that emphasizes humanistic aspects, digitalization, and the sustainability of Islamic values. In the first thematic map, the *human* and *female* clusters occupy the position of basic themes with high relevance, indicating that the human dimension is a central conceptual focus in the research. Meanwhile, the *child* and *adolescent* clusters are categorized as niche themes with high development depth, indicating potential for further exploration in the context of age-based and human developmental stage-centered sustainable education.

The thematic network in the second image shows a complex pattern of interconnections between various concepts such as *human*, *genetics*, *adolescent*, and

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article, reflecting the integration across fields of knowledge, including health, ethics, and education. This relationship pattern opens opportunities for the development of future research focused on the digitalization of Islamic education, particularly in the application of learning technologies that combine Islamic values with scientific and humanistic approaches. Therefore, future research is expected to produce educational models that are not only adaptive to digital advancements but also rooted in moral, spiritual, and social sustainability values.

4. Discussion

a. Publication Trends and Knowledge Dynamics

The publication trend shows a significant increase from 2015 to 2025, particularly after 2021, indicating an acceleration of cross-disciplinary research influenced by digital transformation and global crises such as the COVID-19 pandemic. The sharp rise in 2024–2025 reflects a knowledge explosion in line with the Diffusion of Innovations theory (Berry et al., 2019; Karakose et al., 2022; Robinson, 2021), where the adoption of digital technologies accelerates the production and dissemination of knowledge. Recent studies confirm that this increase is driven by the opening of bibliometric data access and the adoption of the open science ecosystem (Kalmbach et al., 2019; Polchow, 2021). Thus, this trend marks a shift from individualistic research to global collaboration based on open data.

b. Dominance of Research Fields and Disciplinary Convergence

The distribution of study fields shows a strong dominance from the field of *Medicine* (44%), followed by *Biochemistry* (13%) and *Social Sciences* (7%). This pattern indicates epistemic convergence, where there is an integration of medicine, molecular biology, and social sciences in understanding human phenomena holistically. Based on *Systems Theory* (Almughyiri, 2025; Elzalabany, 2024; Park, 2025), this dynamic reflects the interconnections between scientific subsystems that operate interdependently. In the context of the last five years, cross-disciplinary integration has been further strengthened by translational research frameworks and the *One Health* approach (Mahaswa & Syaja, 2025; Nemati et al., 2025). This phenomenon suggests that contemporary research is no longer confined to specific domains but is oriented towards addressing complex, multidimensional issues such as global public health and bioethics.

c. Distribution of Countries and Global Collaboration Patterns

The country data shows the United States as the primary contributor, followed by Iran, the United Kingdom, and China. This pattern highlights the geographic imbalance in knowledge production, where countries with high research capacity become centers of

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scientific circulation (Huang et al., 2024; Tian et al., 2022). However, the trend over the past five years indicates that developing countries such as Iran and Saudi Arabia are strengthening their roles through strategic research investments and open publishing policies (Buckley et al., 2023; DeCorte, 2020; Y. Li et al., 2025). This phenomenon can be explained through the *Knowledge-Based Economy Theory*, where research and innovation form the cornerstone of sustainable development. Thus, the global collaboration reflected in the graph indicates a reorientation of the geopolitical landscape of science toward a more multipolar and inclusive model.

d. Co-Citation Analysis and Epistemological Patterns

The co-citation network reveals connections between researchers such as Bozkurt, Chen, and Fang with research themes like *human*, *clinical practice guideline*, and *qualitative research*. This pattern indicates the integration of empirical and humanistic approaches in contemporary research, in line with *Social Constructivism Theory* (Fan et al., 2022), which emphasizes that knowledge is constructed through social and contextual interactions. In the past five years, meta-analytic studies have shown a shift toward an evidence-based yet human-centered research paradigm (Bogolyubova & Lovakov, 2022; Guo et al., 2022; Zheng et al., 2022). This network demonstrates that the articulation between social theory and clinical practice is strengthening, giving rise to epistemic hybridity that bridges quantitative and qualitative dimensions in modern scientific methodology.

e. Integrative Model and Grand Theory

Based on the four visualizations, it can be concluded that the dynamics of global research form the *Integrative Epistemic Development Model* (IEDM) grounded in three principles: (1) interdisciplinary knowledge diffusion, (2) global collaborative symmetry, and (3) epistemological integration. This model is rooted in *Complex Adaptive Systems Theory* (Jiang et al., 2024; Liu et al., 2021; Spytska, 2024), which explains that knowledge systems evolve in a non-linear and adaptive manner through the interaction of actors, contexts, and technologies. Thus, the direction of global research development from 2015 to 2025 reflects not only a quantitative increase but also a qualitative transformation in the structure of scientific knowledge.

4.1. Discussion: Integrative Dynamics of Global Research Evolution (2015–2025)

a. Global Trends in Islamic Education Publications

The *growth* of scholarly publications identified from Scopus data between 2015 and 2025 shows a significant acceleration, especially after 2021, marking a phase of

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intensified global scientific collaboration. This surge is not just an increase in quantity, but represents *adaptive emergence*, where the global knowledge system responds to external pressures such as the pandemic and digital revolution. Based on *Complex Adaptive Systems Theory* (Asad et al., 2024), the scientific community acts as an adaptive ecosystem that responds to changes in the epistemic environment through collaborative innovation. Similar findings were identified by Fischer et al. (2023) and Suárez & Carvajal (2025)who emphasize that the significant rise in publications post-crisis represents a recalibration of the global knowledge network towards a resilient knowledge network model.

The dominance of the *Medicine* (44%) and *Biochemistry* (13%) fields in publications indicates that the global research focus remains centered on health, biological issues, and clinical technologies. However, the emerging contributions from fields like *Social Sciences* and *Psychology* represent a new transdisciplinary phase that integrates human, social, and technological aspects. This phenomenon aligns with the *Complex Systems Approach to Interdisciplinarity* (Alqahtani et al., 2025; Lyon et al., 2023), where interactions between disciplines give rise to emergent knowledge patterns that cannot be explained linearly. In this context, the integration of biomedical and social sciences reflects a collective effort toward a holistic epistemology model that supports sustainable human development (Dworkin et al., 2019; Renshaw & Carley, 2024)

Meanwhile, the distribution of countries shows the dominance of the United States as the gravitational center of global knowledge, followed by Iran, the United Kingdom, and China. However, the increasing contributions from non-Western countries such as Iran and Saudi Arabia highlight a *decentralized evolution* in the global knowledge system. According to *Complex Adaptive Systems Theory*, this decentralization creates *adaptive equilibrium*, where the system evolves through distributed intelligence and multi-nodal collaboration. Al-Subaie et al. (2024), emphasize that open publishing strategies and national research policy support act as catalysts for developing countries to penetrate the mainstream of global scientific knowledge production. Thus, the cross-country publication distribution is no longer solely the result of geopolitical hierarchy, but a reflection of the adaptive dynamics of the global research system.

The co-citation analysis shows a strong interaction between researchers such as Bozkurt, Chen, and Fang, linking themes like *human*, *clinical practice guideline*, and *qualitative research*. This network pattern demonstrates epistemic coupling, the dynamic connection between theory, practice, and human experience in building more inclusive knowledge. In line with *Complex Adaptive Systems*, this network functions as a self-organization mechanism that generates new knowledge through the exchange of multidisciplinary ideas (Wider et al., 2025; Zhang et al., 2024) This means that scientists and institutions act as adaptive agents, continually adjusting the structure of knowledge to meet contemporary social, technological, and human needs.

In synthesis, the four dimensions temporal trends, fields of study, geographical distribution, and co-citation structure form a systemic configuration known as the *Integrative Epistemic Development Model* (IEDM). This model explains that the evolution

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of global knowledge is non-linear, co-evolutionary, and interconnected through three main mechanisms: (1) Knowledge Acceleration, characterized by the exponential growth of publications post-global disruptions; (2) Interdisciplinary Convergence, which merges biomedical, social, and psychological domains into a shared knowledge ecosystem; and (3) Collaborative Symmetry, which involves the formation of an adaptive, decentralized, and inclusive global network. Grounded in *Complex Adaptive Systems* theory, the IEDM model not only explains the growth of publications but also illustrates the structural transformation of global epistemology towards an adaptive and equitable knowledge system (Xiao et al., 2024).

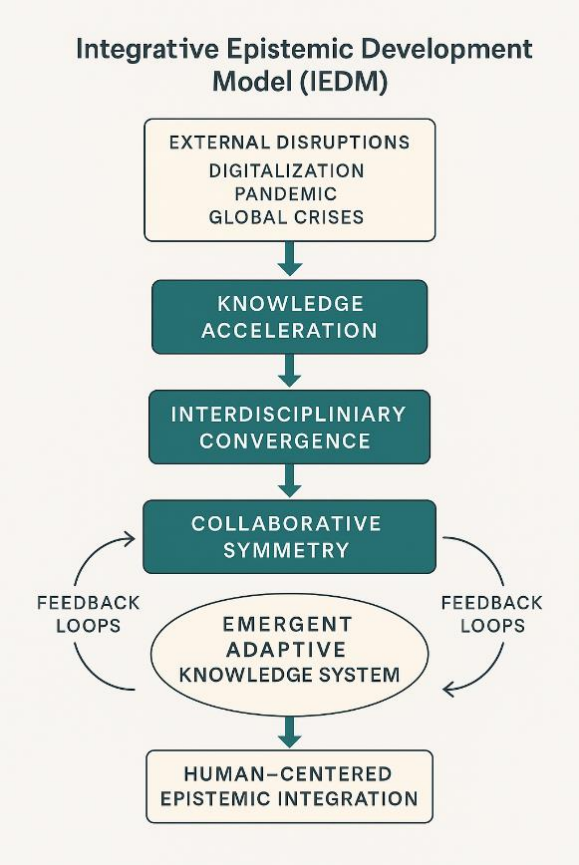

Figure 11

b. Most Influential Authors, Journals, and Articles

The development of the global scientific landscape, as depicted by the distribution of authors, shows a trend toward a more balanced and interconnected collaboration pattern. The absence of a single dominant force in scientific productivity, as seen in the

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equal number of publications by authors such as Bozkurt, Chen, Fang, and Barry, indicates the formation of a *distributed authorship network*. This phenomenon demonstrates that the production of knowledge today is shifting from a hierarchical model to a horizontal collaborative system, relying on parallel interactions between researchers across countries and institutions. According to *Scientific Knowledge Network Theory*, such a system functions as a mechanism of *collective intelligence*, where the spread of ideas and data accelerates the diffusion of knowledge globally (Ekundayo et al., 2021). This pattern serves as evidence that contemporary research increasingly emphasizes epistemic solidarity over individual dominance, reinforcing the sustainability of the global adaptive knowledge system.

From the perspective of publication sources, the variety of journals used, such as *Plos One*, *Eastern Mediterranean Health Journal*, and *International Journal of Environmental Research and Public Health*, emphasizes a shift towards *adaptive source diversification*. Researchers strategically select cross-disciplinary journals to broaden the impact and scientific relevance of their work. From the *Complex Adaptive Systems* perspective, this action represents an adaptation to the dynamics of the competitive scientific environment, where publication success is determined by the ability to link different disciplines within a single thematic space (Merli et al., 2023; Xie et al., 2024). The integration of health, environment, and social issues, as seen in these journals, marks the emergence of the *One Health* paradigm, which is focused on human well-being in a holistic manner (Heidari et al., 2024).Thus, this cross-domain publication pattern not only expands the scope of knowledge but also shapes a resilient and dynamic interdisciplinary epistemic

Furthermore, global citation analysis shows that documents with the greatest influence, such as Khan HF's work in *BMC Medical Education* and Chen X's work in *Scientific Reports*, share a common characteristic: they bridge interdisciplinary issues and are oriented toward social solutions. This phenomenon illustrates an *emergent epistemic hierarchy*, where scientific influence is no longer determined by the reputation of individuals or institutions, but by the research capacity to connect various domains of knowledge into an integrated framework. According to *Scientific Knowledge Network Theory*, high-citation knowledge nodes act as *bridging nodes* that link fields, accelerating innovation and the formation of new theories (Q. He et al., 2021; Zheng et al., 2022). This means that high citations are not merely indicators of popularity but represent the epistemic value capable of building conceptual bridges across disciplines. Here lies the novelty of contemporary research: scientific impact is now more determined by the quality of integration and collaboration than by mere productivity.

From these three dimensions authors, journals, and citations emerges a new knowledge ecosystem configuration called the *Adaptive Knowledge Network Model* (AKNM). This model represents an evolution from the previous *Integrative Epistemic Development Model* (IEDM), with a focus on three main mechanisms: *distributed authorship*, *adaptive source diversification*, and *emergent impact formation*. Within the framework of *Scientific Knowledge Network Theory*, the knowledge system is depicted as

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a complex organism that evolves through interactions and feedback loops between actors. Each author, journal, and citation functions as a node that influences one another, creating a balance between individual growth and collective coherence (Shen et al., 2023). Thus, the AKNM model explains how global knowledge develops in a non-linear way, where adaptation, collaboration, and integration form the foundational principles of the contemporary scientific system.

Conceptually, the main novelty of this model is the recognition that modern science functions as an *adaptive epistemic ecosystem*an open system that continuously adapts to social, technological, and global crises. In this ecosystem, the distribution of authors marks the democratization of knowledge contributions, publication source diversification illustrates epistemic flexibility, and citation patterns represent social validation of relevant knowledge. This affirms the paradigm shift from *authority-based knowledge production* to *networked knowledge creation*, which is more democratic and reflective (Yeboah et al., 2021). Thus, the *AKNM model* not only explains the existing scientific structure but also offers a new direction for future research that emphasizes collaboration, connectivity, and the sustainability of global epistemic practices.

c. Mapping Themes and Research Topic Interconnections

Both visualizations depict the thematic map and research evolution analysis, highlighting the connections between *human*, *female*, *genetics*, and developmental stages (*child*, *adolescent*, *young adult*). Based on the first map, there is a dominant cluster around the theme of *"human–female"*, indicating a strong research focus on gender issues and human biology. The second map (strategic diagram) emphasizes the position of this theme as a *"Basic Theme"*, meaning that it holds high centrality but has a moderate development density. Meanwhile, the themes of *"child"* and *"adolescent"* emerge as *"Niche Themes"*, with high density but low centrality, suggesting theoretical depth but limited integration across interdisciplinary research(Paredes & Prinz, 2025).

This finding aligns with recent bibliometric research that shows the dominance of *female* and *human* topics in scholarly publications across decades, particularly in the fields of reproductive health and adolescent development (Dong et al., 2020). In the context of grand theories, this thematic development can be interpreted through Bronfenbrenner's *ecological systems theory*, which explains the complex interactions between biological factors (genetics), social factors (gender roles), and environmental factors (health, education) in shaping human behavior. Bibliometric studies on teenage pregnancy in Asia and Africa further reinforce this relevance, where women's health issues and socio-cultural factors emerge as key determinants (T. He et al., 2022).

Meanwhile, the themes *"genetics"* and *"article"*, which appear in the *emerging or declining themes* zone on the second map, indicate the potential shift in research direction towards the integration of biology and clinical policy. Recent studies show that genetic research in adolescents is increasingly developing in the context of chronic diseases, such as osteoporosis and neurodegenerative diseases, linking genetic factors with human

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developmental stages (Albayrak et al., 2025; P. Li et al., 2022; Talebizadeh et al., 2024). This integration reflects the emergence of a new paradigm, the *bio-socio developmental model*, which combines biological, psychosocial, and environmental factors in understanding the dynamics of child and adolescent growth.

The novelty of this thematic analysis lies in the finding that the *"human–female"* theme now functions as a bridge between the biological cluster (*genetics*) and the social cluster (*child*, *adolescent*). This reinforces the direction of interdisciplinary research that emphasizes a balance between medical and social approaches. Studies such as (Shibuya et al., 2023; Siregar & Rizza, 2025; Zeng et al., 2025) also underscore the importance of cross-context approaches (gender, disability, and social security) in global adolescent development policies. Therefore, the new contribution of this map is the affirmation of a shift in research focus from descriptive studies toward integrative analysis that connects biology, gender, and human development as one systemic entity.

In conclusion, both maps illustrate a new direction for research towards cross-disciplinary integration, from biology to social sciences and policy, expanding our understanding of the dynamics of women, children, and adolescents within the context of human development. The integration of Bronfenbrenner's ecological theory, social gender theory (West & Zimmerman), and the biopsychosocial paradigm positions this research as a potential force for strengthening systems-based approaches in the study of health and modern human development(Begum et al., 2021; Elzalabany, 2024).

d. Future Research Directions and Potential

Both the thematic maps and network analysis reveal the dynamic evolution of research, placing the *"human–female"* theme as a *basic theme* with high relevance and broad connectivity, while the *"adolescent–child–preschool"* theme appears as a *niche theme* that is dense but not yet integrated across disciplines. Meanwhile, the *"genetics–clinical practice"* cluster emerges as an area of research still developing, offering opportunities for new approaches that combine biology, social sciences, and technology. Based on bibliometric data, the most promising future research direction is to build a *bio-socio-digital interconnectivity* paradigm understanding humans as entities formed through the simultaneous interaction of biological factors (genetics and epigenetics), social factors (gender, education, and culture), and the expanding digital environment (Chen et al., 2025; Denkinger et al., 2021; Koh et al., 2023).

In this context, Bronfenbrenner's *Ecological Systems Theory* serves as a highly relevant conceptual foundation for interpreting these multidimensional relationships, as it places individuals within a layered environmental system, ranging from microsystems to macrosystems, which dynamically influence one another. However, the development of the digital era calls for a reinterpretation of this theory towards a *Digital Ecology of Human Development*, where social media, artificial intelligence, and online ecosystems act as a "new environmental layer" that also shapes identity, behavior, and well-being, particularly in children and adolescents. This aligns with the findings of Banati and

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Bacalso (2023), who emphasize the importance of a holistic cross-domain approach in global adolescent well-being research (Paredes & Prinz, 2025).

Furthermore, the connection between the *genetics* and *clinical practice guideline* themes highlights the potential for integrating the *Epigenetic Developmental Systems* theory, which emphasizes that genetic expression is deeply influenced by social, emotional, and environmental contexts. This approach could revolutionize the way we view child and adolescent health, transitioning from a biomedical perspective to a *bio-psycho-social-epigenetic* model. This model explains how factors such as social stress, trauma, or gender inequality leave epigenetic marks that impact human development (Khaki & Sadeghi habibabad, 2021; Marin-Urquiza et al., 2024; Wang, 2023).

Thus, future research could focus on the integration of biological data (DNA, gene expression) and social variables (education, gender, and digital well-being) to create a predictive approach to cross-generational health. Additionally, the dominance of the *higher education* theme with the highest centrality value signals a shift in the role of higher education, not only as an academic space but also as an arena for human existential transformation. The integration of *Transformative Learning Theory* (Mezirow) with developmental psychology offers a new research direction that highlights how learning processes in the digital era not only change mindsets but also shape self-awareness, human values, and digital ethics. In this context, women and adolescents emerge as key actors in the formation of a "new human consciousness" capable of adapting to the post-digital world (Boehm & Carter, 2019; Chun et al., 2025; Whisenhunt Saar et al., 2025).

Overall, the synthesis of the thematic visualization results reinforces the emergence of a new research paradigm: *Holistic Human Development in the Post-Digital Era* which positions humans as bio-socio-digital entities that are interconnected. This paradigm demands an interdisciplinary approach that combines developmental ecology theory, epigenetic systems, posthumanist feminism, and transformative learning to understand the complexity of modern human development. Therefore, future research directions will no longer stop at identifying biological or social factors separately but will aim to explain how these factors interact within a digital ecosystem that reshapes the meaning of being human in the 21st century (Goerlandt et al., 2020).

5. Conclusion

Global publication trends in Islamic education and related sciences show a significant increase, with stronger international collaboration post-pandemic and digital revolution. This reflects the response of the global knowledge system to external changes, where biomedical, social, and psychological fields are becoming increasingly integrated within a transdisciplinary framework. Based on *Complex Adaptive Systems Theory*, the distribution of authors, diversification of journal sources, and decentralized citation networks represent the evolution of knowledge that is becoming more cooperative and distribution-based, reinforcing the sustainability of the global knowledge system as adaptive and inclusive.

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The *Integrative Epistemic Development Model* (IEDM) and *Adaptive Knowledge Network Model* (AKNM) illustrate how knowledge evolves through the interaction of different fields of study, with collaboration and connectivity as key factors. Future research directions must consider the integration of biology, social sciences, and technology within an adaptive knowledge system, leveraging grand theories such as Bronfenbrenner's *Ecological Systems Theory* and *Epigenetic Developmental Systems* to understand the complex interactions in human development. This new paradigm will position humans as bio-socio-digital entities, creating a more holistic and sustainable research model in the digital era.

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