



Reclaiming cultural roots through the among system: A bibliometric analysis of local wisdom integration in global educational discourse in the last decade



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Abstract This study aims to examine the research landscape of local wisdom integration in global educational discourse over the past decade (2016-2025), with particular focus on primary education contexts. The research seeks to identify publication trends, geographical distributions, thematic developments, and conceptual frameworks that characterize this evolving field, while addressing the critical balance between adopting international educational standards and preserving indigenous cultural values. A comprehensive bibliometric analysis was conducted using the PRISMA methodology framework. The study analysed 510 peer-reviewed articles from the Scopus database, covering publications from 2016 to 2025. Data analysis was performed using the R programming language with the 'bibliometrix' package, employing multiple analytical techniques including descriptive statistics, keyword co-occurrence analysis, thematic mapping, citation pattern analysis, and visualization techniques such as network analysis and strategic diagrams. The analysis revealed a significant annual growth rate of 7.36% in publications, with moderate citation impact averaging 5.084 citations per document. Indonesia emerged as the dominant contributor with 1,225 citations, significantly exceeding other nations. Four distinct thematic clusters were identified: Motor Themes (human, government), Basic Themes (education, indigenous population), Niche Themes (environmental protection), and Emerging Themes (policy development). Keyword networks showed strong connections between local wisdom, elementary education, and character development, indicating a shift from viewing local wisdom as cultural content toward recognizing it as a pedagogical framework. The findings demonstrate increasing scholarly recognition of local wisdom as a crucial component in primary education, emphasizing its role in cultural identity formation while preparing students for global citizenship. The research reveals significant methodological gaps, particularly in longitudinal studies examining cultural identity development. The study recommends embedding cultural knowledge within character education curricula, implementing place-based approaches integrating indigenous ecological knowledge, and utilizing digital tools to bridge traditional wisdom with modern educational technologies.

Keywords: primary education, traditional knowledge, character education, culturally responsive pedagogy, Indonesia

1. Introduction

In the rapidly evolving landscape of global education, primary schools face profound tension between adopting international educational standards and preserving indigenous cultural values (Khan et al., 2023). Globalization has significantly reshaped educational systems worldwide, particularly affecting young learners at their most formative stage of development (Sungwa, 2025). While this transformation offers advantages in terms of knowledge exchange and future competitiveness, it simultaneously threatens the preservation of local wisdom and cultural identity among elementary school children (Wahyu et al., 2023). As the foundation for character formation and identity development, primary education stands at this critical intersection of global educational demands and cultural preservation imperatives (Hölscher et al., 2024). The increasing standardization of curricula, assessment frameworks, and pedagogical approaches creates a homogenizing effect that can diminish cultural diversity in classroom practices, potentially alienating children from their cultural heritage during crucial developmental years (D'warte, 2021).

Local wisdom—defined as contextual knowledge and practices that evolved within communities over generations—provides children with essential cultural heritage, environmental understanding, and social values (Sakti et al., 2024). These wisdom traditions, transmitted through storytelling, community rituals, and daily practices, give young learners a sense of belonging that shapes their developing worldview (Omnia, 2025). However, standardizing pressures of global educational



frameworks frequently marginalizes these knowledge systems in primary school curricula, treating them as peripheral rather than integral components (Gunjebo et al., 2025). This marginalization risks disconnecting children from their cultural foundations precisely when their identities are being formed, potentially creating generational gaps in cultural knowledge transmission. For primary school students, whose cognitive and emotional development is particularly receptive to cultural imprinting, this disconnection can have profound implications for identity formation, cultural continuity, and psychological well-being (Samsonova & Gam, 2021).

The concept of local wisdom in primary education encompasses multiple dimensions: traditional ecological knowledge that connects children to their natural environment (Kamakaula et al., 2023); customary social practices that teach collaborative values and community responsibility (Murfiah et al., 2024); indigenous languages that embed unique worldviews and cognitive frameworks (Tsaure & Sani, 2024); oral traditions and folklore that transmit moral lessons and cultural history (Setiartin & Casim, 2021); and artistic expressions that embody cultural aesthetics and creative traditions (Suwanthada & Yuan, 2024a). Each of these dimensions offers rich educational potential for primary schools, provided that they can be meaningfully integrated within global educational frameworks rather than treated as cultural artifacts separate from "core" academic content.

The urgency of addressing this challenge in primary education is underscored by converging factors. With each elder who passes without transmitting cultural knowledge to younger generations, irreplaceable wisdom traditions risk being lost forever. Primary schools, as universal institutions that reach virtually all children in most societies, represent perhaps the most powerful institutional mechanism for systematic cultural transmission across generations (Ertugruloglu et al., 2024). Concurrently, research has demonstrated that culturally responsive education significantly enhances young students' academic engagement, achievement, and social development. Studies across diverse contexts consistently show that when primary education meaningfully incorporates children's cultural references, they demonstrate greater motivation, stronger academic self-concept, and improved learning outcomes across subjects (Abzhanova et al., 2024; Martínez-Vicente et al., 2023).

This study addresses these critical gaps through a systematic bibliometric analysis of scientific publications over the past decade (2016–2025) that explore the integration of local wisdom within the global educational discourse, with a particular focus on primary education contexts. Using the PRISMA methodology, we examine publication trends, citation patterns, geographical distributions, author networks, and thematic developments to provide a comprehensive landscape of this evolving research field as it pertains to elementary education. Through advanced visualization techniques, including keyword network analysis, thematic mapping, and three-field plots connecting authors, keywords, and journals, we identify conceptual relationships and research frontiers specific to the primary education context.

The analytical framework guiding this research draws from both bibliometric theory and educational philosophy. From the bibliometric perspective, we employ cocitation analysis, bibliographic coupling, and keyword co-occurrence methodologies to identify intellectual structure and conceptual relationships within the literature. This quantitative approach is complemented by qualitative content analysis of high-impact publications to extract nuanced insights regarding integration approaches specific to primary education contexts. Theoretically, the analysis is framed by concepts of culturally responsive pedagogy (Gay, 2018), funds of knowledge theory (Moll et al., 1992), and ecological systems theory by Bronfenbrenner (Guy-Evans, 2024), which collectively illuminate how children's cultural contexts inform educational experiences and developmental outcomes.

The central research questions guiding this study include the following: (1) How have publication volumes and patterns concerning local wisdom integration in primary education evolved over the past decade? (2) Which countries, institutions, or authors lead research in this domain, and which collaboration networks have emerged? (3) What thematic clusters dominate the discourse on local wisdom integration in primary education, and how have these evolved over time? (4) What methodological approaches characterize research in this field, and what methodological gaps exist? (5) What conceptual frameworks guide integration efforts, and how do these frameworks address the developmental distinctiveness of primary-aged students?

The significance of this research extends across multiple dimensions. For primary school teachers and curriculum developers, this study provides evidence-based insights into effective approaches for integrating local wisdom into globally oriented elementary education. The identification of thematic clusters and conceptual relationships offers a navigational framework for educators seeking to balance cultural preservation with global educational demands in age-appropriate ways. The geographical mapping of research activity highlights both centers of expertise and underrepresented regions where integration approaches may require further development or adaptation to local educational contexts.

From a cultural preservation perspective, this study supports the development of educational approaches that strengthen young children's cultural identity while preparing them for global citizenship—a balance increasingly recognized as essential for psychological well-being and social cohesion in multicultural societies. By mapping the research landscape concerning cultural integration approaches, we contribute to the broader goal of sustaining cultural diversity through formal educational institutions, particularly at the primary level where foundational attitudes toward cultural difference and identity are established.

From a policy perspective, this analysis provides education ministries and international organizations with comprehensive data regarding research activity and knowledge gaps in this domain. The identification of leading countries, institutions, and collaboration networks offers potential models for policy development in regions where local wisdom integration remains underexplored or inadequately implemented. Furthermore, the thematic mapping of research focus areas helps policymakers identify aspects of integration that have received substantial scholarly attention versus those requiring targeted research support or policy development.

2. Methods

This study employed a comprehensive bibliometric analysis approach to systematically examine the research landscape concerning local wisdom integration in global educational discourse over the past decade (2016--2025). Bibliometric analysis offers quantitative insights into research productivity, collaboration patterns, and conceptual developments through statistical examination of publication metadata and citation networks (Donthu et al., 2021). The preferred reporting items for systematic reviews and meta-analyses (PRISMA) framework is followed to ensure methodological rigor and transparency throughout the analytical process (Liberati et al., 2009; Page et al., 2021). The PRISMA flowchart in Figure 1 illustrates the systematic process of identification, screening, eligibility, and inclusion that was followed to curate the final dataset for this bibliometric analysis.

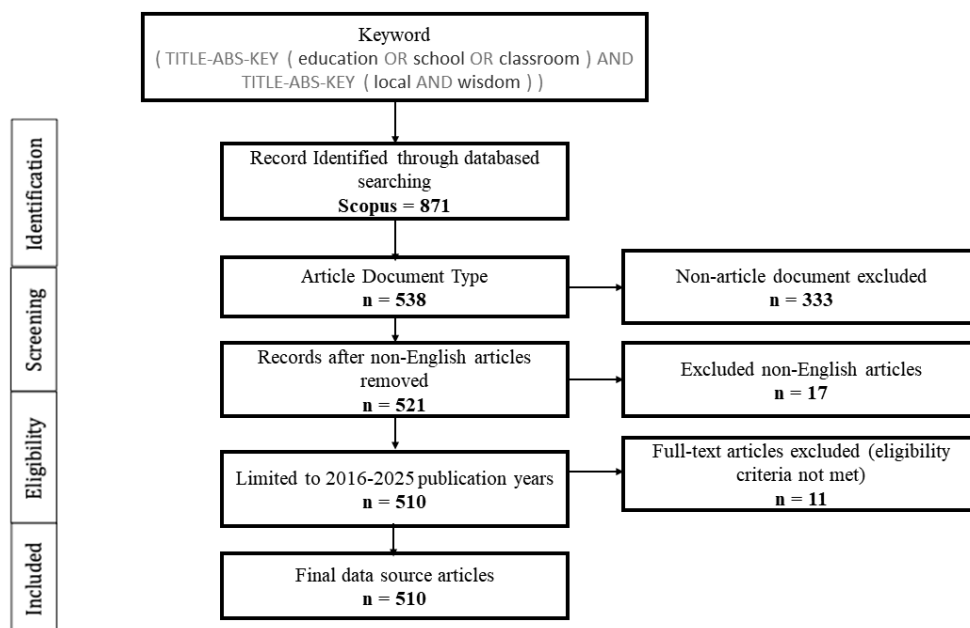


Figure 1 PRISMA methods.

The data collection process began with a carefully formulated search strategy targeting the Scopus database, which was selected for its comprehensive coverage of peer-reviewed literature across multiple disciplines and its established position as the largest abstract and citation database of peer-reviewed literature. The search query was constructed to capture publications addressing the intersection of education and local wisdom: (TITLE-ABS-KEY (education OR school OR classroom) AND TITLE-ABS-KEY (local AND wisdom)). This query targeted articles containing education-related terms (education, school, classroom) and local wisdom concepts in their titles, abstracts, or keywords, ensuring relevance to our research focus. The initial search yielded 871 records from the Scopus database.

Following the identification phase, a multistage screening process governed by predefined inclusion and exclusion criteria was implemented. First, we restricted our analysis to scholarly articles, excluding conference papers, book chapters, reviews, and other nonarticle publications. This filtering process eliminated 333 nonarticle documents, yielding 538 records for further consideration. Second, to ensure comprehensive analysis and interpretation, we limited our corpus to English-language publications. This criterion led to the exclusion of 17 non-English articles, resulting in 521 remaining records. Third, we established a timeframe of 2016--2025 to focus on contemporary research developments in this field. This temporal constraint excluded 11 additional articles that fell outside the specified publication years, providing a final dataset of 510 articles for comprehensive bibliometric analysis.

For each of the 510 articles in the final dataset, bibliometric information was extracted, including publication metadata (title, authors, journal, publication year, DOI), abstract and keywords, citation data (cited references, citation count), authors' institutional affiliations and countries, and research area classifications. Data extraction was performed via Scopus' export functionality, and the extracted data were converted into a format compatible with bibliometric analysis software. Data

cleaning was conducted to ensure consistency in author names, institutional affiliations, and keyword terminology, addressing variations in spelling and formatting that could affect the analytical results.

The curated dataset of 510 articles underwent multiple analytical procedures via the R programming language with the 'bibliometrix' package, which provides specialized functions for bibliometric analysis (Aria & Cuccurullo, 2017). The analytical approach encompassed several complementary techniques. Descriptive statistics were generated to identify temporal publication trends, document types, languages, and sources. This provided an overview of research productivity and publication patterns over the decade under investigation. The geographical distribution of research output was also mapped to identify leading countries contributing to this discourse. This analysis revealed regional emphases and potential geographical gaps in research attention.

Author productivity, collaboration networks, and institutional affiliations were examined to identify influential researchers and collaboration patterns in the field. This included analysis of coauthorship networks and author production over time. Keyword co-occurrence analysis and thematic mapping were performed to identify dominant themes, conceptual relationships, and evolving research fronts. This included three-field plot analysis connecting authors, keywords, and sources; keyword network visualization with force-directed algorithms; strategic diagram mapping to position themes according to centrality and density metrics; and keyword heatmap construction to visualize the intensity of topical relationships.

Citation patterns and impact metrics, including average citations per year and article citation networks, were assessed to identify influential publications and measure the scholarly impact of research in this domain. To enhance interpretability and communication of results, multiple visualization techniques were employed: time series plots for annual publication trends and citation patterns, geographical maps showing research productivity by country, network visualizations depicting author collaborations and keyword cooccurrences, strategic diagrams positioning research themes by centrality and density, and heatmaps illustrating the intensity of relationships between concepts. These visualizations were created via the 'bibliometrix' package in R.

To ensure the reliability and validity of the analysis, several quality control measures were implemented: Scopus was chosen for its comprehensive coverage and quality control processes; the search query was pilot tested and refined to ensure optimal recall and precision; clear inclusion/exclusion criteria were established a priori to minimize selection bias; random samples of extracted data were cross-checked against original sources; and all analytical decisions and procedures were documented to enable replication. These methodological considerations ensured that the bibliometric analysis provided a robust and representative mapping of research concerning local wisdom integration in global educational discourse over the past decade.

3. Results

The bibliometric analysis, covering the time span from 2016--2025, encompasses a curated dataset of 510 documents sourced from 291 distinct publication outlets. A total of 1,713 authors contributed to this body of work, with 71 documents being single-authored, highlighting a predominant trend toward collaborative research. The international coauthorship rate stands at 11.96%, indicating moderate cross-border collaboration in the discourse surrounding local wisdom integration in education. An overview of the core metadata for the 510 articles included in the final analysis is presented in Figure 2, summarizing key characteristics such as the number of authors, documents, and references.

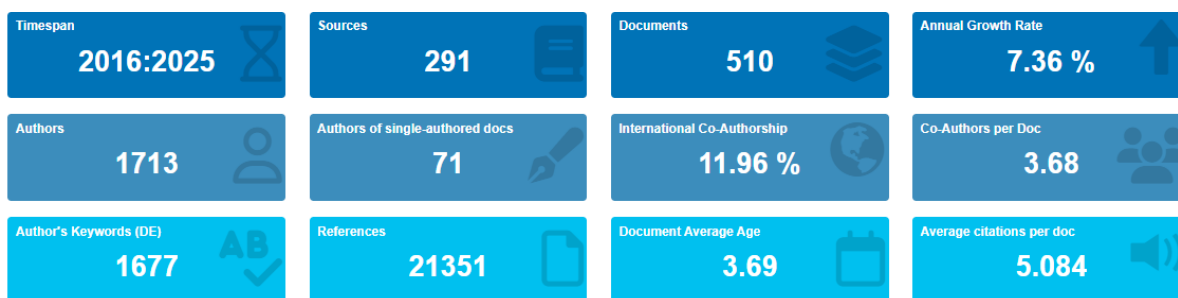


Figure 2 Overview of the entire article(s) included in the analysis. Source: Biblioshiny.

The corpus reflects a healthy annual growth rate of 7.36%, suggesting increasing scholarly attention to the topic over the decade. Each document, on average, involved approximately 3.68 coauthors, underscoring the collaborative nature of research within this domain. The dataset includes 1,677 distinct author keywords and draws upon 21,351 references, reflecting broad and interdisciplinary engagement with the literature.

The average age of the documents is 3.69 years, indicating a relatively contemporary research focus, and each document has accrued an average of 5.084 citations, suggesting moderate academic impact and visibility. Collectively, these characteristics reveal a dynamic and expanding research landscape, underlining the growing recognition of the importance of integrating local wisdom into global educational frameworks, particularly at the foundational level of primary education. The



trend in annual scientific production from 2016 to 2025 is depicted in Figure 3, showing a clear upward trajectory in research activity on this topic.

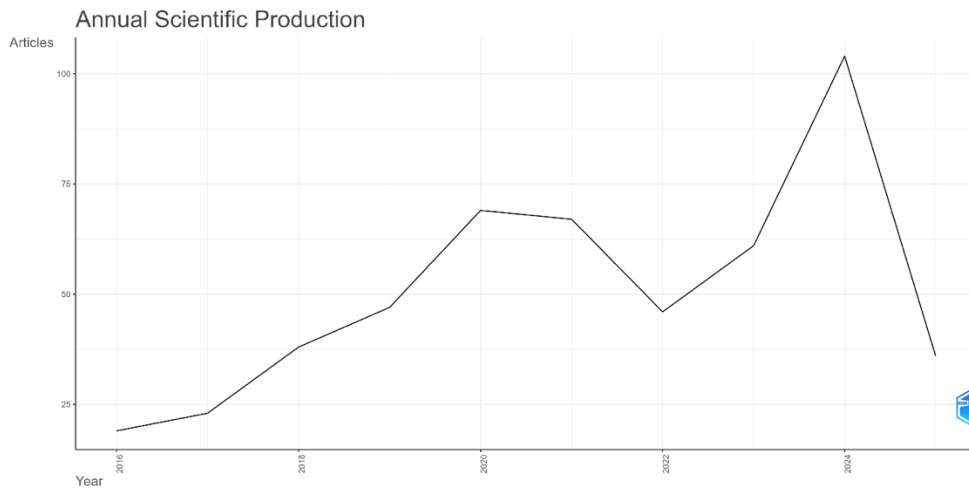


Figure 3 Annual Scientific Publication. *Source:* Biblioshiny.

The analysis of annual scientific production from 2016--2025 reveals a clear upwards trend in research activity concerning the integration of local wisdom within the global educational discourse. Initial publication volumes were modest, but a steady increase was observed, particularly between 2018 and 2020, reflecting a growing scholarly interest in the topic. A slight dip occurred approximately 2022, potentially indicating that external factors affect research productivity; however, this dip was followed by a significant surge in 2024, when the highest annual output was reached within the observed period.

This substantial growth aligns with the increasing global recognition of the need to balance international educational standards with cultural preservation efforts, particularly at the primary education level. The subsequent decline projected for 2025 may be attributed to the incomplete dataset for that year at the time of analysis. Overall, the rising trajectory underscores the expanding academic engagement with culturally responsive education frameworks and highlights the relevance of local wisdom integration as a critical area of inquiry within global education studies. The annual scholarly impact of the publications, as measured by the average number of citations per year, is shown in Figure 4.

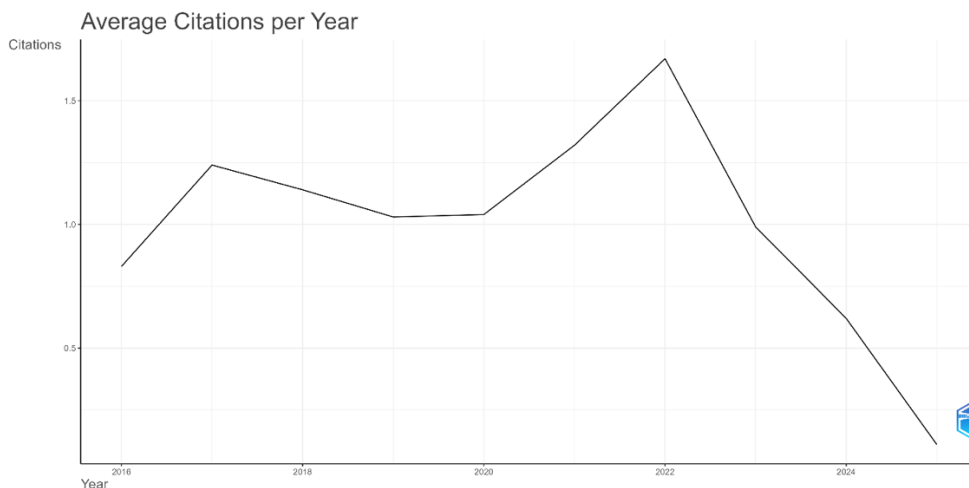


Figure 4 Average Citation Per Year. *Source:* Biblioshiny.

The trend of average citations per year from 2016--2025 demonstrates the fluctuating scholarly influence within the field of local wisdom integration in education. After a steady rise between 2016 and 2017, the average citation rate slightly declined and then stabilized approximately 2019--2020, reflecting a phase of consolidation in research recognition. A noticeable peak occurred in 2022, indicating that the articles published around this time received increased academic attention.

However, following this peak, there is a marked decline in average citations through 2024 and 2025. This decline can be partially attributed to the citation lag effect, as more recent publications typically have less time to accumulate citations. Nevertheless, the earlier upwards trend and 2022 peak suggest the growing relevance and impact of research addressing the integration of local wisdom within global education frameworks, aligning with the increasing urgency highlighted in global



educational discourses. The global contribution to the research field, measured by the total citations per country, is visualized in Figure 5, highlighting Indonesia's dominant role.

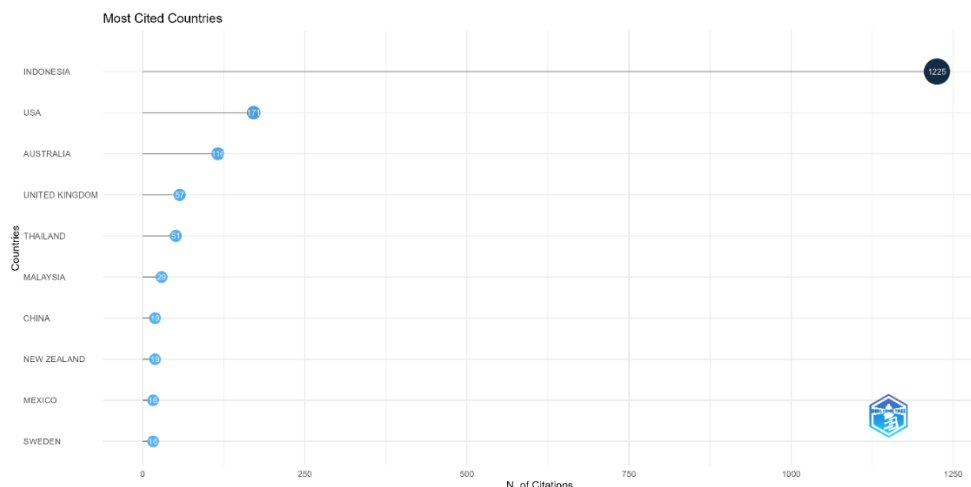


Figure 5 Most relevant country(ies). Source: Biblioshiny.

The analysis of the most cited countries reveals a pronounced dominance by Indonesia, which accounts for a substantial 1,225 citations—significantly exceeding all other nations. This result underscores Indonesia’s central role in advancing research related to the integration of local wisdom in educational discourse, likely reflecting the country’s rich cultural diversity and active scholarly efforts to preserve indigenous knowledge within educational frameworks.

In addition to Indonesia, the United States (171 citations) and Australia (116 citations) also emerged as important contributors, suggesting a growing international engagement with culturally responsive education, albeit at a comparatively lower scale. Other countries, including the United Kingdom, Thailand, Malaysia, China, New Zealand, Mexico, and Sweden, demonstrate more modest citation counts, indicating a dispersed but globally emerging interest in the topic.

The overwhelming representation of Indonesia aligns with the broader research trend emphasizing the need to contextualize education within local cultural frameworks, particularly in regions with high cultural and linguistic diversity. The productivity and impact of the most prominent authors in this field over time are charted in Figure 6.

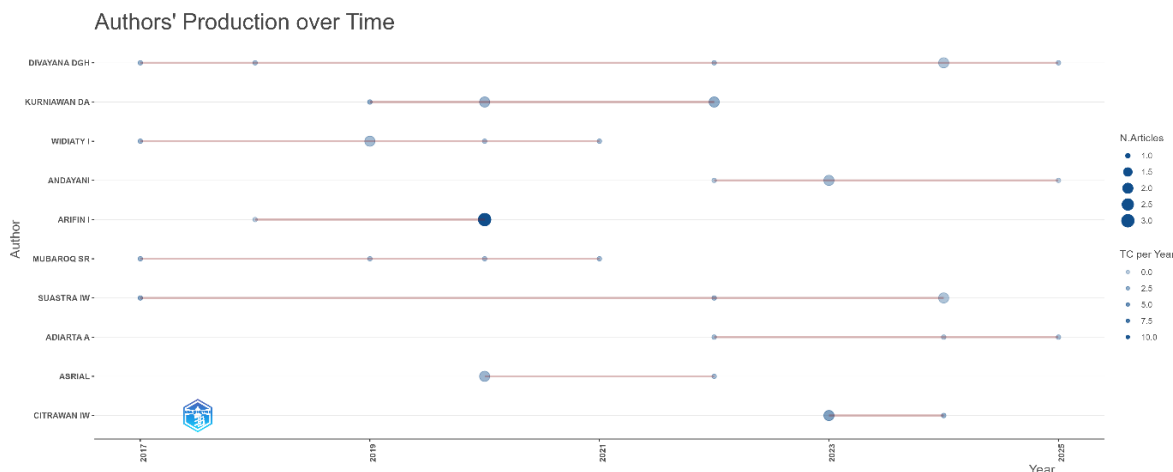


Figure 6 Author(s) production over time. Source: Biblioshiny.

The analysis of authors' production over time reveals varying patterns of scholarly contribution in the field of local wisdom integration within global education. The authors included in the dataset exhibit a range of productivity levels, with some researchers producing consistent output, whereas others have more sporadic publication patterns.

A prominent contributor is Divayana DGH, whose research output is marked by several publications between 2017 and 2023, with a notable peak in 2020. This trend reflects a sustained focus on the topic of local wisdom, potentially influencing both academic discussions and the broader discourse on culturally responsive education. The number of articles (N.Articles) produced by Divayana DGH seems to increase in volume, with a parallel increase in total citations (TCs) per year, reflecting the growing impact of this author's work over time. This pattern suggests the increasing recognition of the author’s research within the field, with articles gaining traction and visibility among scholars and policymakers concerned with educational frameworks that incorporate indigenous knowledge.



Another author, Kurniawan DA, has more modest but consistent production, with a steady publication flow in the early years and a slight increase in 2023. While Kurniawan DA's total citations are not as high as those of Divayana DGH's, the steady contribution could reflect a more specialized or regional approach, potentially impacting specific local educational systems or contextual applications of local wisdom in education.

On the other hand, Arifin I and Mubarak SR show more concentrated efforts, with spikes in specific years. Arifin I, in particular, had a marked increase in output approximately 2021–2022, suggesting a period of focused research or collaborative work, whereas Mubarak SR's contributions remain somewhat stable over time, indicating a consistent, although less prolific, body of work. Sustra IW follows a similar pattern to that of Mubarak SR, suggesting a steady, more focused engagement in the field without the same fluctuations seen with other authors.

This graphic provides valuable insights into how individual scholars' research contributions evolve, showcasing how certain authors have become more prominent over time, both in terms of the volume of their publications and their scholarly influence, as reflected by the citations they receive. The production and impact of these authors underscore the growing interest in and recognition of local wisdom integration within the global educational discourse. The conceptual structure of the research field is mapped in Figure 7, which categorizes key themes into four quadrants based on their development and relevance.

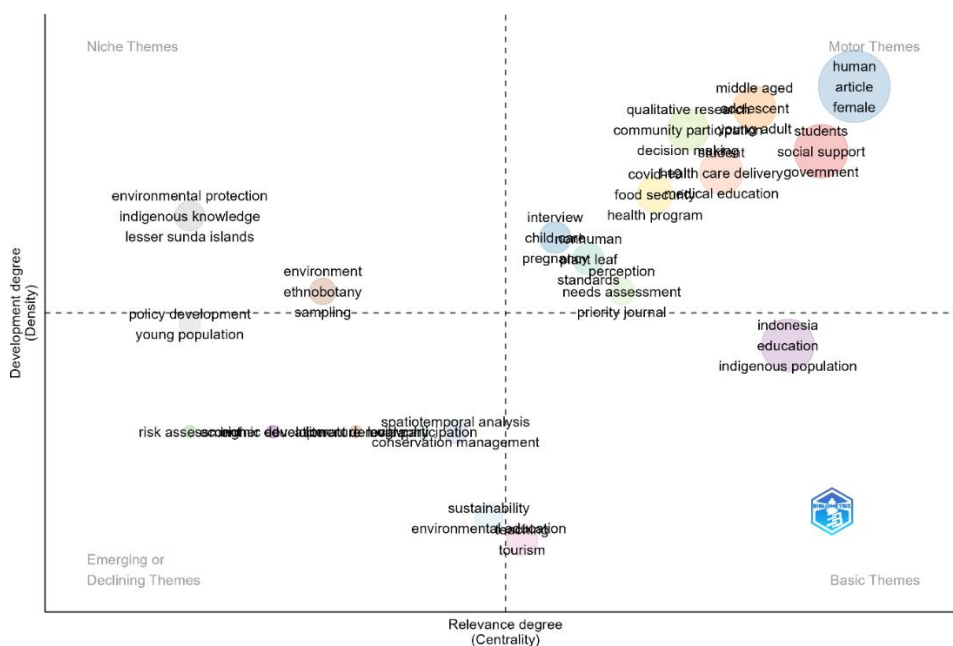


Figure 7 Thematic Maps. Source: Biblioshiny.

The thematic map provides a visual representation of the development and relevance of various themes within the research on local wisdom integration in global education. This map categorizes themes into four quadrants: motor themes, basic themes, niche themes, and emerging or declining themes.

In the Motor Themes quadrant, terms such as human, article, female, and government are placed. These themes are characterized by high relevance and high development, indicating that they are central to current discussions and research. These themes represent the core focus of educational research that connects cultural identity, gender perspectives, and governmental education policies.

The Basic Themes quadrant includes Indonesia, education, and the indigenous population. These themes, while still relevant, are somewhat less developed than motor themes are. They are foundational concepts in the research landscape, signifying the ongoing importance of understanding the intersection of local wisdom and educational systems, particularly within Indonesian contexts, where there is a rich focus on indigenous knowledge.

Niche Themes such as environmental protection, ethnobotany, and lesser Sunda Islands represent areas that are highly specialized and have niche academic development. These themes have lower relevance but are significant within specific research domains, highlighting the ecological and environmental knowledge embedded in local wisdom. These niche areas often explore the unique connections between indigenous knowledge and sustainable environmental practices, although they may not be central to the broader global educational discourse.

Finally, the Emerging or Declining Themes quadrant features terms such as policy development, sampling, and academic development. These themes are in a transitional phase, with their development and relevance potentially fluctuating. The decline of certain themes, such as risk assessment and spatiotemporal analysis, suggests a shift in research focus, possibly due to changing global priorities or advancements in more prominent areas such as sustainability or environmental conservation.



This thematic map offers an insightful overview of how different topics related to local wisdom integration are positioned within the academic landscape. This highlights the evolving nature of research, with a focus on sustainable and culturally relevant education, especially in contexts such as Indonesia, where indigenous knowledge plays a critical role. The intellectual relationships between major research themes, contributing countries, and leading authors are illustrated in the three-field plot shown in Figure 8.

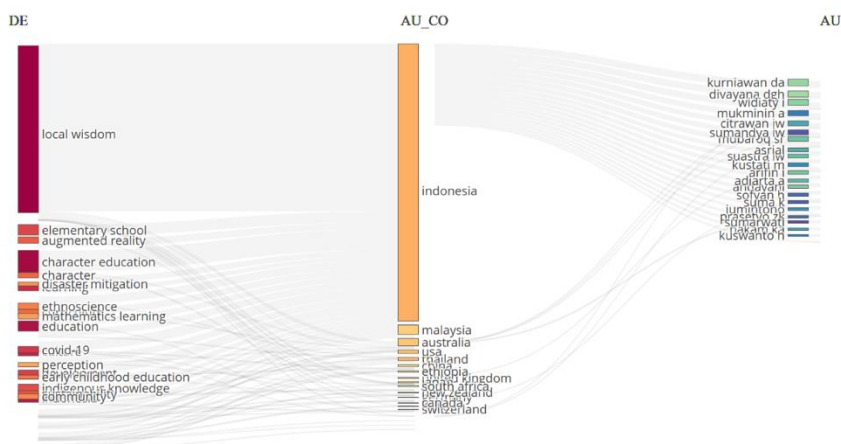


Figure 8 Three Field Plots. Source: Biblioshiny.

The three-field plot presented here visualizes the interconnections between key themes, countries, and authors within the research field of local wisdom integration in global education. This type of visualization is highly valuable for understanding how research focuses are distributed across countries and which authors are contributing to various themes within the broader discourse.

In the Theme (DE) field, the primary focus is on local wisdom, with related themes such as elementary school, augmented reality, and character education being most prominently associated with it. This reflects the centrality of local wisdom within educational contexts, particularly in relation to primary education and its role in shaping character development. Other themes, such as disaster mitigation, ethnoscience, and mathematics learning, also highlight the interdisciplinary nature of research, suggesting that local wisdom is often integrated with environmental, scientific, and mathematical education.

In terms of countries (AU_CO), Indonesia stands out significantly, being the most prominent country in terms of research production. This dominance could be attributed to the rich cultural heritage of Indonesia and the importance of local wisdom in shaping its educational frameworks. Countries such as Malaysia, Australia, and the USA follow closely, indicating that while Indonesia leads, there is a growing international interest in this area of research. Lesser-represented countries such as South Africa, Ethiopia, and Switzerland also contribute, suggesting more global engagement with local wisdom in education, although at a relatively smaller scale.

The Author (AU) field highlights key contributors to this research area. Authors such as Kurniawan DA, Divayana DGH, and Widiaty I are among the most influential in terms of publication volume and impact, reflecting their central roles in driving the discourse around local wisdom and its integration into education. The presence of various authors from Indonesia further reinforces the country's leading position in this field, whereas other contributors from countries such as Australia and Malaysia reflect international collaboration and cross-country research efforts.

This visualization not only captures the dominant themes but also emphasizes the collaborative nature of research across borders and disciplines. It serves as an insightful tool for identifying key researchers, themes, and countries that are central to the study of local wisdom in education. The network of co-occurring keywords, demonstrating the interconnectedness of core concepts in the literature, is presented in Figure 9.

The keyword network visualization offers a compelling representation of the key themes and their interconnections within the research on local wisdom integration into education. The central node, labelled local wisdom, is tightly connected to various themes, signifying its pivotal role in the overall academic discourse. This centrality underscores the importance of local wisdom as a primary area of focus, with strong linkages to other critical educational concepts such as character education, early childhood education, and elementary school.

A key finding from the map is the close association between local wisdom and Indonesia, which is prominently represented within the network. This highlights the significance of Indonesia in the global conversation on the integration of indigenous knowledge into educational practices. The thematic connections with sustainability, indigenous populations, and cultural values further reinforce the cultural and ecological dimensions that shape local wisdom, particularly in the context of Indonesia's rich heritage.



The keyword heatmap visually captures the intensity and distribution of themes related to local wisdom within the global educational discourse. The central keyword, local wisdom, is the focal point, indicated by the brightest yellow region in the map, signifying its prominence in the field. This highlights local wisdom as a central theme in ongoing research related to integrating indigenous knowledge into education.

Surrounding local wisdom, we find a high concentration of terms such as Indonesia, sustainability, indigenous population, and education, reflecting the geographical and thematic focus on Indonesia and the critical role of local wisdom in sustainable education practices. The close proximity of these keywords highlights the strong scholarly focus on the connection between local wisdom and its application in terms of environmental sustainability, cultural preservation, and educational systems in Indonesia. Other important clusters are observed around terms such as character education, early childhood education, and elementary school, indicating significant interest in how local wisdom intersects with educational stages, particularly in nurturing character and values from a young age. This suggests that a growing body of research explores how indigenous knowledge can be incorporated into curricula and teaching methodologies aimed at fostering well-rounded character development.

The heatmap also highlights a variety of interdisciplinary themes, such as disaster mitigation, COVID-19, and ethnoscience, suggesting a growing trend in the application of local wisdom to address contemporary global challenges. The presence of sustainability and ethics further underscores the relevance of indigenous knowledge in tackling environmental issues and promoting ethical education. In addition to educational and ecological themes, the heatmap reveals interest in gender and psychology, with terms such as male, female, psychology, and perception highlighting research into how local wisdom relates to gender dynamics and psychological development in educational settings.

Overall, the keyword heatmap effectively illustrates the multifaceted nature of local wisdom integration, showing its strong connections to environmental, educational, gender, and psychological themes. It provides a clear visual representation of the research trends and thematic connections within the broader discourse, pointing to areas of increasing academic interest and potential growth.

4. Discussion

The bibliometric analysis of research concerning local wisdom integration in the global educational discourse from 2016-2025 provides comprehensive insights into the evolving landscape of this field, particularly as it relates to primary education contexts. By examining publication patterns, geographical distributions, thematic developments, and conceptual frameworks, we can address the study's central research questions with evidence-based conclusions. This discussion synthesizes our findings to provide a coherent overview of this rapidly developing research area.

Our analysis reveals a clear upwards trajectory in research activity, with a 7.36% annual growth rate, culminating in a significant peak in 2024. This growth aligns with Triyanto & Handayani, (2020) who observed that global educational systems increasingly recognize the value of integrating indigenous knowledge with standardized curricula, a movement often described as a form of educational localization in response to globalization. The sustained growth in publications reflects a paradigm shift in educational research, moving from viewing local wisdom as peripheral content to recognizing it as a central educational component. As Nganga et al. (2025) argue, this represents a "decolonization of primary education" through recentring indigenous epistemologies within formal schooling structures. The temporary decline observed in 2022, followed by robust recovery, demonstrates research resilience despite external disruptions that likely affected academic productivity globally—a pattern similarly noted by Semerikov & Mintii, (2025) in their analysis of educational research trends during global crises.

Citation patterns indicate moderate academic impact, with an average number of citations per document of 5.084, which positions this field favourably over other emerging educational research. The notable citation peak in 2022 suggests that publications from this period were particularly influential in shaping discourse around local wisdom integration, with many addressing the challenges of cultural transmission in digital learning environments following pandemic-era educational disruptions (Kakkar, 2023). As Antara (2023) noted in their analysis of postpandemic learning approaches, this period witnessed increased urgency in preserving traditional knowledge transmission pathways for primary school students navigating hybrid learning models.

The geographical analysis reveals Indonesia's pronounced dominance with 1,225 citations—substantially exceeding all other nations in the dataset. This aligns with Seno et al. (2022) the findings of that Indonesia's national curriculum reforms explicitly prioritize local wisdom integration as a cornerstone of cultural identity formation in primary education. This emphasis likely stems from Indonesia's extraordinary cultural diversity (with over 1,300 ethnic groups and 700 languages), and educational policy focuses on preserving indigenous knowledge within formal schooling. Similarly, Fitriadi et al., (2024) identify Indonesia as a "global laboratory" for culturally responsive education models. The United States (171 citations) and Australia (116 citations) emerged as secondary contributors, reflecting their engagement with indigenous education frameworks.

Key contributors include Divayana DGH, with consistent output between 2017 and 2023 and strong citation impact, particularly for work connecting local wisdom with technological integration in rural Indonesian classrooms (Udiyana & Arnyana, 2022). The international coauthorship rate of 11.96% indicates that while research is predominantly collaborative (3.68 coauthors per document average), most collaboration occurs within national boundaries rather than across them.

Keyword co-occurrence analysis revealed several distinct clusters, with "local wisdom" occupying a central position strongly connected to "elementary school," "character education," and "early childhood education." This confirms (Wood, 2020) assertion that foundational educational stages represent critical windows for cultural knowledge transmission. The thematic map categorizes four distinct clusters: Motor Themes (high relevance, high development), including "human," "female," and "government"; Basic Themes, including "Indonesia," "education," and "indigenous population"; Niche Themes, including "environmental protection," "ethnobotany," and "lesser Sunda islands"; and Emerging/Declining Themes, including "policy development," "sampling," and "academic development." This classification framework demonstrates the multidimensional nature of local wisdom integration research, which spans from policy considerations to specific ecological knowledge systems.

Significant thematic evolution includes a shift from treating local wisdom as cultural content toward viewing it as a pedagogical framework, supporting (Tsaure & Sani, 2024) the argument of that indigenous knowledge represents not merely what to teach but also how to teach in culturally responsive classrooms. The growing prominence of environmental sustainability themes, as evidenced by keyword clusters around "environmental protection" and "ethnobotany," aligns with Kamakaula et al., (2023) findings regarding the ecological dimensions of indigenous knowledge and their relevance to contemporary environmental education. The emergence of technological integration approaches such as "augmented reality" for cultural knowledge transmission in primary classrooms reflects what Suwanthada & Yuan, (2024b) described as the "technologically mediated cultural heritage" approaches increasingly adopted in forward-thinking educational systems.

Methodological analysis reveals predominantly collaborative research (85.5% multi-authored documents) reflecting the interdisciplinary nature of this field—a characteristic that Donthu et al. (2021) identify as essential for comprehensive investigations of complex educational phenomena. Content analysis indicates a predominance of qualitative methodologies, particularly case studies documenting integration approaches in specific educational contexts, with less frequent use of quantitative approaches measuring integration outcomes. Significant methodological gaps include the scarcity of longitudinal studies examining sustained impacts on students' cultural identity development—an issue highlighted by Hölscher et al. (2024) in their work on adolescent identity formation. Additional gaps include the underutilization of mixed-methods approaches despite their potential for comprehensive evaluation, the rarity of participatory research methodologies involving indigenous knowledge holders as coresearchers, and the absence of experimental designs that compare different integration approaches across grade levels.

Several prominent conceptual frameworks guide local wisdom integration efforts across the examined literature. Character education has emerged as a dominant framework, emphasizing how traditional cultural values foster moral development among young learners—an approach that Sakti et al. (2024) describe as "ethnopedagogy" in their case study of preschool education in Yogyakarta. The ecological knowledge systems framework positions local wisdom as a source of environmental understanding and sustainability practices, which aligns with Omma's (2025) exploration of traditional ecological knowledge in environmental education. The epistemological integration framework, evident in publications linking local wisdom to "ethnoscience," positions indigenous knowledge systems as valid ways of knowing alongside Western scientific paradigms—a perspective that Murfiah et al. (2024) apply specifically to social studies instruction in elementary settings.

While these frameworks attract increasing attention to children's developmental stages, notable gaps remain. Many approaches insufficiently address the concrete operational thinking characteristics of primary-aged students, inadequately consider developing cultural identity during this formative period, and provide limited attention to how digital media influences children's reception of traditional wisdom. These limitations echo D'warte's (2021) critique of culturally responsive pedagogies that fail to account for developmental appropriateness in diverse classroom settings.

For practice, our findings suggest embedding cultural knowledge within everyday character development activities rather than treating it as separate curricular content; implementing place-based approaches integrating indigenous ecological knowledge with scientific curriculum; and utilizing digital tools to bridge traditional wisdom with educational technologies. These recommendations align with Gunjebo et al. (2025) guidelines for curriculum integration in Ethiopian contexts. For policy, substantial Indonesian research offers potential models for systematic integration within national curriculum frameworks while highlighting the need for policies specifically addressing primary education as a critical period for cultural knowledge transmission—an argument similarly advanced by Ertugruloglu et al. (2024) in their analysis of cultural impacts on educational systems.

Future research directions should include comparative studies across diverse cultural contexts to identify transferable integration principles; longitudinal studies examining long-term impacts on students' cultural identity development; methodological diversification through mixed-methods and participatory approaches; grade-specific pedagogical strategies aligned with developmental stages; and interdisciplinary collaborations enhancing cultural authenticity and pedagogical effectiveness. These recommendations address what Abzhanova et al. (2024) identify as critical gaps in our understanding of how cultural integration approaches affect learning motivation and identity formation in primary-aged children.

This bibliometric analysis demonstrates the increasing scholarly recognition of primary education as a critical period for cultural knowledge transmission where integration approaches must be developmentally appropriate. The conceptual connections between local wisdom and themes such as character education, sustainability, and indigenous science offer

promising avenues for educational approaches that honor cultural heritage while preparing children for global citizenship. Khan et al. (2023) argue that this represents the central challenge for contemporary primary education in an era of globalization.

5. Final Considerations

This bibliometric analysis reveals the transformative impact of artificial intelligence (AI) on education over the last decade. From 2016 to 2025, AI evolved from experimental applications to a fundamental component of global educational ecosystems, driving substantial shifts in teaching and learning paradigms. The integration of AI has not only enhanced existing models of education but also fundamentally redefined the relationship between human cognition and machine intelligence, challenging conventional notions of education and pedagogy.

The explosive growth in research, particularly after the onset of the COVID-19 pandemic, highlights the urgency and necessity of AI adoption in education. The pandemic acted as a catalyst for accelerated digital transformation, compelling institutions worldwide to incorporate AI technologies rapidly. As seen in the thematic evolution, AI's role in education has expanded beyond traditional tools to encompass more specialized applications, such as medical education, personalized learning systems, and AI-driven collaborative environments.

However, the analysis also identifies critical gaps. Despite significant technological advancements, there is limited engagement with posthuman theoretical frameworks, which are crucial for understanding the deeper implications of AI's role in reshaping educational practices. The posthuman perspective challenges the boundaries between human intelligence and machine intelligence, offering a more nuanced view of AI's potential to coconstruct knowledge in educational settings. The lack of theoretical exploration in this area reflects the broader dominance of techno-optimist views, which focus on AI's potential to solve educational challenges without critically addressing its social, ethical, and philosophical implications.

Moreover, while global collaboration in AI research is commendable, the study points to underrepresentation from developing countries and the need for more inclusive research ecosystems. There is a significant disparity in research access, resources, and capacity, which must be addressed to ensure equitable participation in AI-driven educational innovations.

This study suggests several avenues for future research. First, strengthening theoretical frameworks, particularly those incorporating posthuman perspectives, is essential to explore the full scope of AI's impact on educational practices. Second, longitudinal studies are needed to assess the long-term effects of AI integration on learning outcomes and student development. Additionally, expanding the focus to include diverse socioeconomic and cultural contexts will enrich our understanding of how AI can be applied globally.

In conclusion, AI's role in education is not just a technological innovation but a paradigm shift that necessitates continuous dialogue among educators, researchers, and policymakers. The future of education in the posthuman era will depend on how AI is integrated into pedagogical frameworks that prioritize both technological advancement and the fundamental human aspects of learning.

Ethical Considerations

Not applicable.

Conflict of Interest

The authors declare that they have no conflicts of interest.

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