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Bibliometric Mapping of Indonesian Language Education Research (2016–2025): Publication Trends, Thematic Networks, Temporal Analysis, and International Comparison in SINTA Indexed Articles

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Abstract

To map publication trends, thematic concentrations, collaboration patterns, and research gaps in Indonesian language education from 2016 to 2025. This bibliometric study analyzed 47 selected articles published in SINTA-indexed journals using OpenAlex records, descriptive statistics, network analysis conducted with NetworkX, temporal comparisons, and a five-topic Latent Dirichlet Allocation (LDA) model. International comparisons with Malaysia and the Philippines were also included. The selected corpus received 5,007 citations, with an average of 106.53 citations per article. Publication output peaked in 2020. Literacy and reading, along with school-based language learning, emerged as the dominant research themes, whereas technology and artificial intelligence were minimally represented. Network analysis revealed four thematic communities, a 36.2% proportion of single-authored publications, and limited bibliographic coupling. Temporal analysis indicated that increased publication activity following the pandemic was not accompanied by a corresponding increase in average citation impact. The selected highly cited literature remains concentrated on established pedagogical themes and exhibits limited thematic interconnectedness. Greater methodological transparency, stronger research collaboration, and increased attention to emerging technologies and teacher competencies are recommended as priorities for future research. These findings are limited to the selected corpus and should not be generalized to the entire body of SINTA-indexed literature.

INTRODUCTION

Indonesian occupies a strategic position as the national language, the official state language, and the language of instruction within Indonesia's education system (De La Poza et al., 2021; Koka & Prescott, 2008). The Regulation of the Minister of Education, Culture, Research, and Technology (Permendikbudristek) No. 5 of 2022 concerning Graduate Competency Standards establishes competencies related to Indonesian language proficiency across educational levels, highlighting the direct implications of developments in Indonesian language education research for the quality of national education (Kemendikbudristek, 2022).

The decade from 2016 to 2025 represents a significant period in Indonesian language education, coinciding with four major educational and technological developments (Rohmah et al., 2026). First, 2016 marked the expansion of the implementation of the 2013 Curriculum across educational institutions and the continued implementation of the School Literacy Movement (Gerakan Literasi Sekolah, GLS), initiated by the Ministry of Education and Culture

in 2015, which stimulated research interest in reading literacy. Second, the 2020–2021 period was characterized by disruptions caused by the COVID-19 pandemic, which necessitated a widespread transition to distance learning and substantially transformed pedagogical practices. Third, 2022 marked a turning point with the introduction of the Kurikulum Merdeka (Independent Curriculum), which provided an alternative to the 2013 Curriculum and introduced changes to curriculum structures and instructional approaches. Fourth, since the public launch of ChatGPT in November 2022, generative artificial intelligence (AI) has increasingly transformed academic writing, language learning, and educational assessment practices. The selection of the 2016–2025 period was based on the methodological consideration that this decade captures substantial transformations in Indonesian language education and provides a suitable timeframe for examining contemporary research trends through bibliometric analysis (Bornmann & Mutz, 2015). Sudaryanto, Widayati, and Amalia (2020) noted that the Merdeka Belajar–Kampus Merdeka (Independent Learning–Independent Campus) framework has been applied in Indonesian language and literature education. Nevertheless, comprehensive bibliometric studies examining how these developments are reflected in scholarly publications, particularly highly cited articles published in SINTA-indexed journals, remain limited.

Contemporary challenges have also emerged from the rapid advancement of generative artificial intelligence (AI). Since the public release of ChatGPT in November 2022, academic writing, language learning, and language proficiency assessment have undergone substantial changes. Setiawan and Luthfiyani (2023) examined the use of ChatGPT in education within the context of Education 4.0, emphasizing its potential as an innovative tool for improving writing skills. Dewi, Hamid, Annisa, Oktafianti, and Genika (2021) investigated the role of digital literacy in fostering students' character development. However, relatively few studies have systematically mapped the extent to which these emerging themes have been incorporated into the scholarly publication landscape of Indonesian language education.

Bibliometric research has long been employed to systematically map scientific knowledge structures, publication patterns, and research developments. Pritchard (1969) introduced the term bibliometrics, while Donthu et al. (2021) provided comprehensive methodological guidelines for conducting bibliometric analyses. Van Eck and Waltman (2010) developed VOSviewer, a widely used software tool for constructing and visualizing bibliometric networks. Bornmann and Mutz (2015) investigated the growth rate of modern science, whereas Hammarfelt and Haddow (2018) examined the application of bibliometric approaches in the humanities. Furthermore, Župič and Čater (2015) discussed bibliometric methods and their applications in management and organizational research. Despite these methodological advancements, the application of advanced bibliometric techniques, including network analysis, Latent Dirichlet Allocation (LDA) topic modeling, and international comparative analysis, remains relatively limited in Indonesian language education research.

Against this background, this study aims to map the research landscape of Indonesian language education through a multidimensional bibliometric analysis of 47 highly cited articles published between 2016 and 2025 in SINTA 2- and SINTA 3-indexed journals. Specifically, the study addresses six research questions: (1) How have publication output and citation patterns evolved among highly cited articles over the past decade? (2) How are research themes distributed according to manual thematic classification and LDA topic modeling? (3) What

patterns emerge from co-citation networks, bibliographic coupling, keyword co-occurrence, and co-authorship analyses? (4) How do research patterns differ between the pre-pandemic period (2016–2019) and the pandemic and post-pandemic period (2020–2025)? (5) How does Indonesia's research landscape compare with those of Malaysia and the Philippines? (6) What implications do the findings have for journal managers, researchers, the Ministry of Education, and PPJB-SIP?

METHOD

This study employed a multidimensional bibliometric research design to examine publication patterns, scientific collaboration networks, thematic developments, and citation impact in Indonesian language education research (Pritchard, 1969; Donthu et al., 2021). The analytical framework integrated four components: descriptive statistical analysis, bibliometric network analysis based on the VOSviewer approach (van Eck & Waltman, 2010), temporal comparative analysis, and machine learning-based topic modeling. This integrated approach was consistent with established bibliometric research methodologies (Zupic & Cater, 2015).

The primary data source was OpenAlex (https://openalex.org), an open scholarly database that provides structured bibliographic metadata and citation information (Priem et al., 2022). OpenAlex was selected because of its accessibility, coverage of Indonesian scholarly publications, and availability of structured metadata through its application programming interface (API). The study also adopted relevant principles from the PRISMA Extension for Scoping Reviews (PRISMA-ScR) to support transparency in the identification, screening, and reporting of retrieved records (Tricco et al., 2018).

The sampling framework focused on selected highly cited articles with Digital Object Identifiers (DOIs), rather than all publications in Indonesian language education. Consequently, publication trends, citation patterns, and international comparisons were interpreted within the scope of the retrieved and screened corpus. The available methodological documentation did not fully specify the API queries, retrieval dates, individual inclusion decisions, or excluded records, which limited the reproducibility of the selection process.

The target population comprised highly cited articles on Indonesian language education published between 2016 and 2025 in journals indexed at SINTA 3 or higher. This period was selected to capture major educational developments, including curriculum reforms, literacy initiatives, the COVID-19 pandemic, and the introduction of the Kurikulum Merdeka (Independent Curriculum), while enabling comparisons between pre-pandemic and pandemic/post-pandemic research patterns (Bornmann & Mutz, 2015). An initial list of 20 target journals was compiled using the SINTA directory, ARJUNA records, and PPJB-SIP membership information. The journal selection included publications such as LITERA, Lingua Cultura, Metalingua, Seloka, Diction, Paramasastra, Basastra, Atavisme, Indonesian Language and Literature Education Journal, and AKSIS.

Data were collected using two complementary search strategies: an International Standard Serial Number (ISSN)-based search employing the primary_location.source.issn filter and a topic-based search using six thematic keywords. The retrieved records were merged, duplicates were removed, and only articles with valid DOIs were retained to facilitate bibliographic verification. Subsequent screening for topical relevance yielded a final corpus of 47 articles published between 2016 and 2025, which formed the basis for the bibliometric

analyses.

Analytical Techniques

The analysis was carried out in five analytical components. First layer: descriptive statistics include publication trends per year, theme distribution (11 categories), journal profiles, and citation profiles. The second layer: network analysis uses the NetworkX Python library to build four types of networks—reference co-citation, bibliographic coupling between articles, keyword co-authoring of titles, and co-authors between authors. Thematic communities were detected using the greedy modularity maximization algorithm, with spring layout visualization.

The third layer: temporal analysis divides the period into pre-pandemic (2016–2019) and pandemic/post-pandemic (2020–2025) eras, then compares the distribution of themes, the number of unique journals, and the average citations. The fourth layer: international comparisons by collecting articles from Malaysia (Malay) and the Philippines (Filipino) via OpenAlex, then comparing publication patterns and citation impacts.

The fifth component: Latent Dirichlet Allocation (LDA) topic modeling using scikit-learn for automatic theme classification based on headings + abstracts. The LDA model was trained with 5 topics, 100 iterations, vocabulary 100 terms (CountVectorizer with a custom Indonesian tokenizer). LDA results are compared to keyword-based manual classifications to measure suitability. This research does not involve human subjects, so it does not require ethical clearance.

RESULTS AND DISCUSSION

This section presents the empirical findings of multi-dimensional bibliometric studies on the 47 most cited articles in Indonesian language education (2016–2025). The results are presented in six sub-chapters according to the research questions, followed by a comprehensive discussion.

Results

Publication and Citation Trends

Based on an analysis of 47 selected articles, publication trends showed a peak in 2020 (6 articles) in line with the momentum of the COVID-19 pandemic, with a relatively even distribution throughout the decade. A total of 5,007 citations were accumulated with an average of 106.53 citations per article—a relatively high figure for the context of Indonesian educational journals.

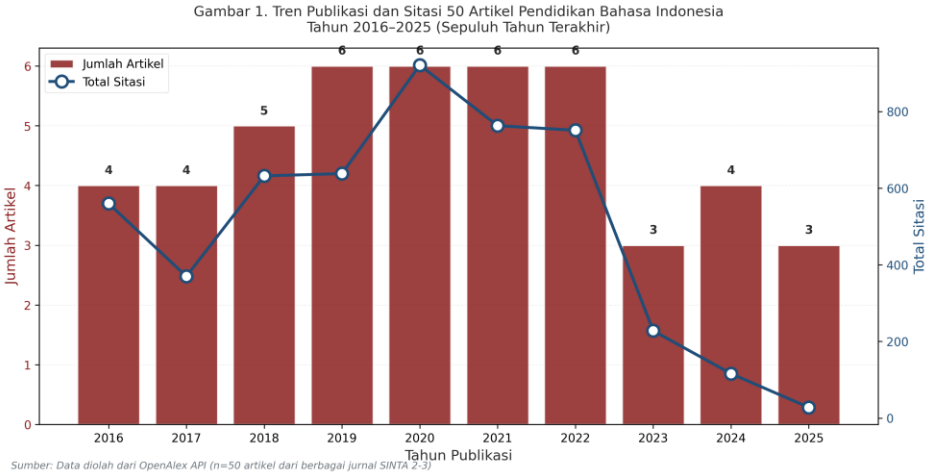


Figure 1. Publication Trends and Citations 47 Indonesian Language Education Articles (2016–2025)

Source: Data processed from OpenAlex API (n=47 articles from 41 SINTA 2–3 journals).

Theme Distribution (Manual and LDA)

Manual classification of 47 articles resulted in a distribution map showing two dominant themes with balanced proportions: the theme of Literacy and Reading and the theme of Language Learning in Schools each obtained 18 articles (38.3%), followed by Teacher Competence (6 articles, 12.8%). These top three themes control 89.4% of publications. The themes of Technology and AI, Local Wisdom, Evaluation, and Character Education are not represented in the high-impact articles analyzed.

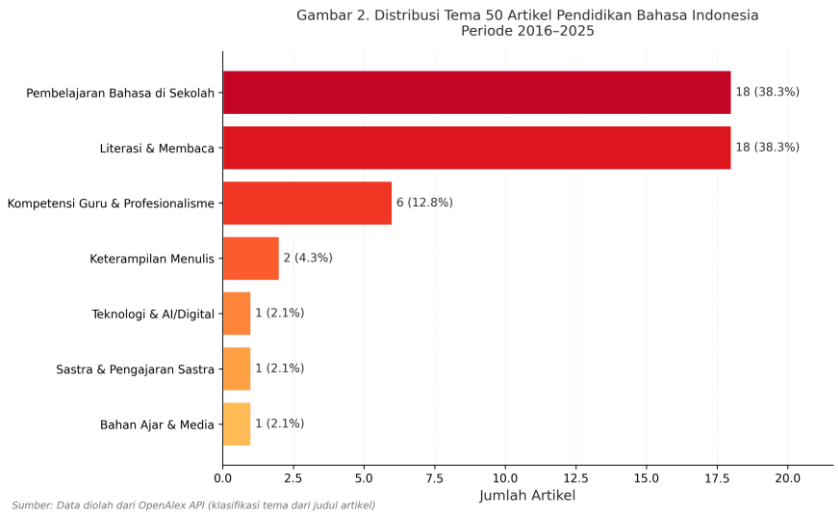


Figure 2. Theme Distribution 47 Articles (Manual Classification)

Source: Data is processed from the OpenAlex API.

To validate the manual classification, the study ran Latent Dirichlet Allocation (LDA) topic modeling—an unsupervised machine learning technique that identifies latent topics from titles and abstracts. LDAs with 5 topics result in distributions that are mostly consistent with manual classification. Topic 5 (Literacy & Reading) clustered 16 articles (34.0%), Topic 1 (Learning & Innovation) clustered 15 articles (31.9%), and Topic 4 (Literacy & Reading)

clustered 6 articles (12.8%). LDA also found thematic overlap that was not detected by manual classification, especially in articles that discussed literacy as well as learning.

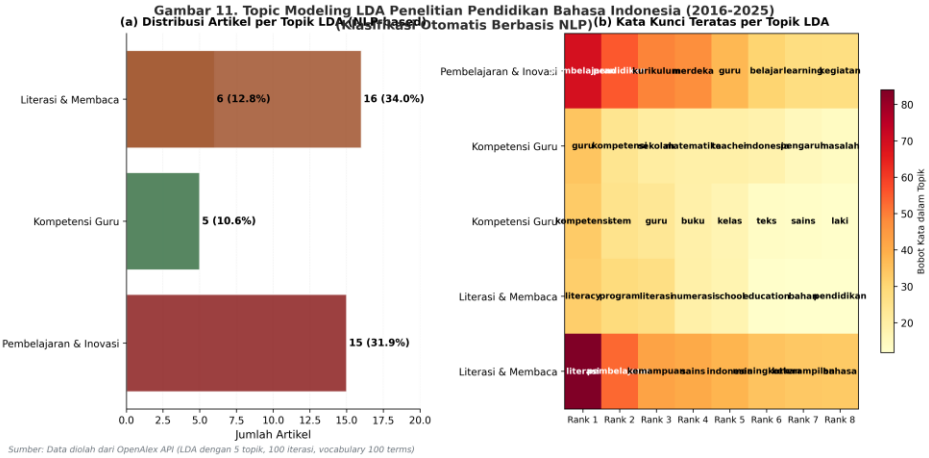


Figure 3. Topic Modeling LDA Indonesian Language Education Research (2016-2025)
Source: Data processed from OpenAlex API (LDA with 5 topics, vocabulary 100 terms, 100 iterations).

Journal and Author Profiles

An analysis of 41 source journals shows a decentralized distribution. Basicedu Journal (3 articles) occupies the first position, followed by LITERA, Journal of Science Education Innovation, EDUKATIF, and Indonesian Journal of Education and Learning with 2 articles each. Most other journals contribute 1 article each. This composition indicates that there is no flagship journal in the field of Indonesian language education.

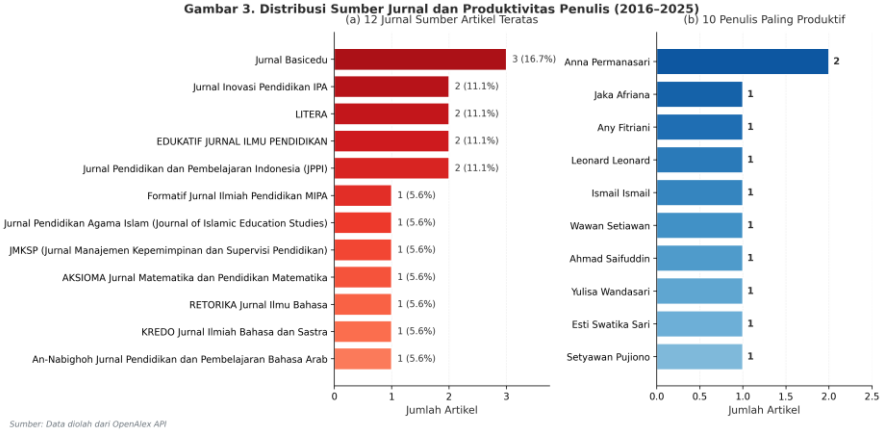


Figure 4. Journal Source Distribution and Author Productivity (2016-2025)
Source: Data is processed from the OpenAlex API.

Citation Profile

The distribution of citations is relatively even, with the largest category at 11–50 citations and ≤50 citations. The top ten articles are dominated by literacy themes (Afriana et al., 2016 with 317 citations), Independent Curriculum (Jojor & Sihotang, 2022), and learning management (Gemnafle & Batlolona, 2021).

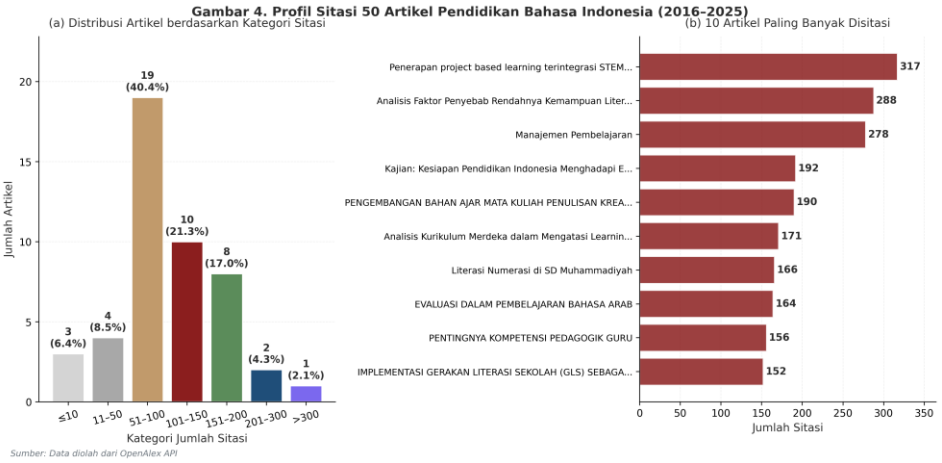


Figure 4. Citation Profile 47 Indonesian Language Education Articles (2016-2025)
Source: Data is processed from the OpenAlex API.

Network Analysis (VOSviewer-style)

To meet modern bibliometric standards (van Eck & Waltman, 2010), this study ran four types of network analysis using the NetworkX Python library.

First, the keyword co-curation network identifies 4 key thematic communities from 44 keywords connected through 94 edges. The largest communities are centered on the keywords "literacy", "reading", and "science"; the second community on "curriculum" and "independence"; the third community on "teachers" and "competencies"; The fourth community on "language" and "learning". This analysis confirms the thematic concentrations found in manual classifications.

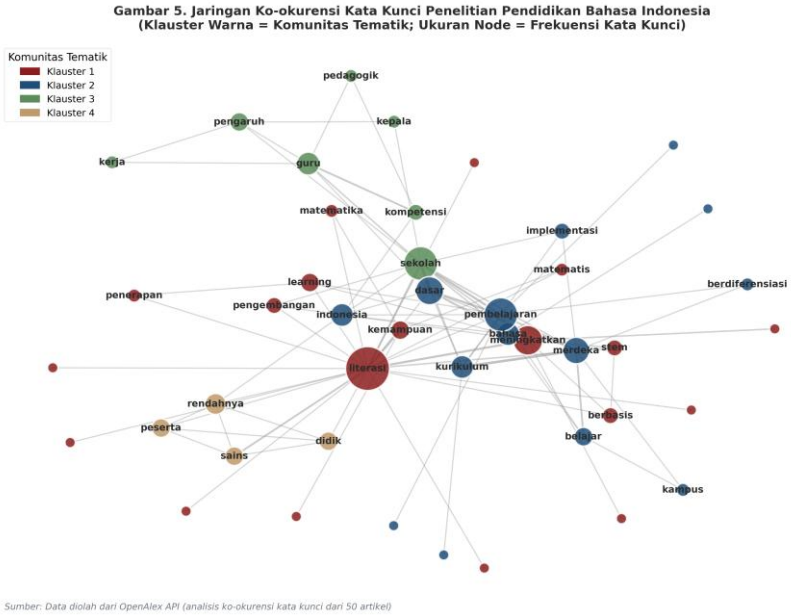


Figure 5. Network Co-ocurence Keyword (Network Analysis) 2016-2025
Source: Data is processed from the OpenAlex API (NetworkX Python, greedy modularity communities).

Second, the co-author network identified 30 authors connected through 57 collaborative edges. A total of 17 articles (36.2%) were written by a single author, indicating an individual research tradition. The largest collaboration cluster was formed around authors with multiple co-authors, especially on articles on numeracy literacy and the Independent Curriculum.

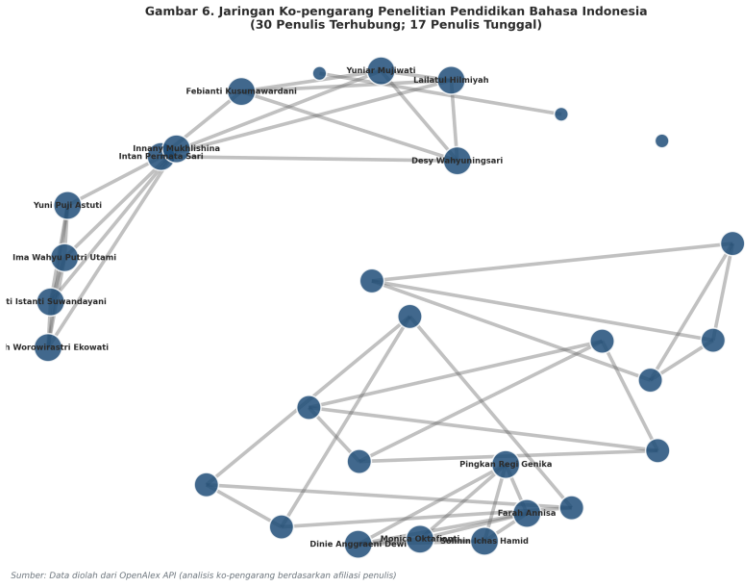


Figure 6. Indonesian Language Education Research Co-author Network (2016-2025)
Source: Data processed from OpenAlex API (co-author analysis based on author affiliation).

Third, bibliographic couplings in the top 20 articles identify the linkages between articles based on common references. The results showed minimal interconnectedness—only 1 pair of articles had ≥2 shared references—indicating low intellectual concentration and each article using relatively unique references.



Figure 7. Bibliographic Coupling Top 20 Articles (2016-2025)
Source: Data is processed from OpenAlex API (bibliographic analysis coupling based on shared references).

Fourth, the network of co-citations of the 20 most frequently cited references identifies the intellectual community that underlies Indonesian language education articles. The network shows 20 nodes and 123 edges, with several reference clausters often cited together—indicating a common theoretical foundation among the articles.

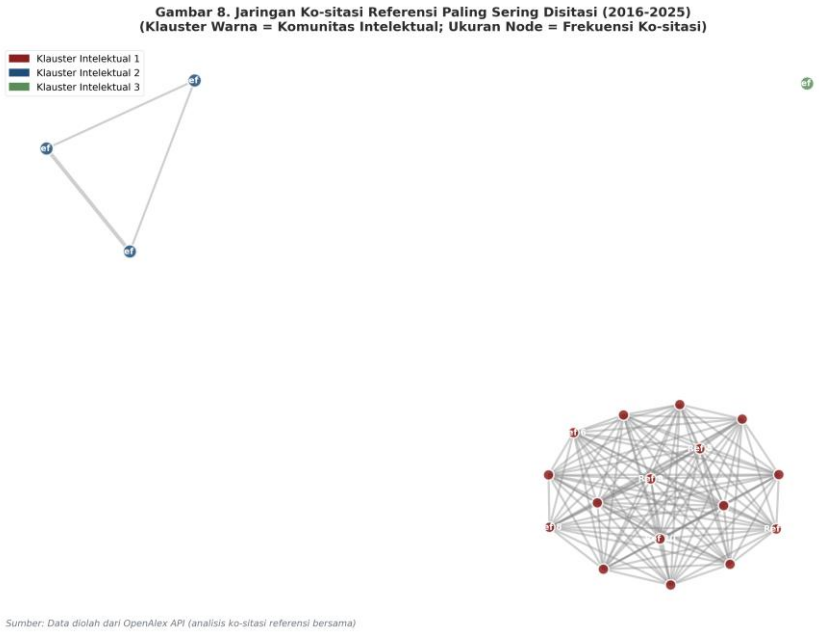


Figure 8. Most Cited Reference Co-Citation Network (2016-2025)
Source: Data is processed from the OpenAlex API (shared reference co-citation analysis).

Temporal Analysis Pre-pandemic vs Pandemic/Post-pandemic

The temporal analysis divides the period into pre-pandemic (2016–2019, 19 articles) and pandemic/post-pandemic (2020–2025, 28 articles). Key findings: (1) the average citation per article decreased from 115.79 (era 1) to 100.25 (era 2); (2) the number of unique journals is increasing; (3) there is a significant shift in theme. This shift indicates that the pandemic has sparked a focus on distance learning innovations, but has not yet driven diversification into emerging themes such as AI.

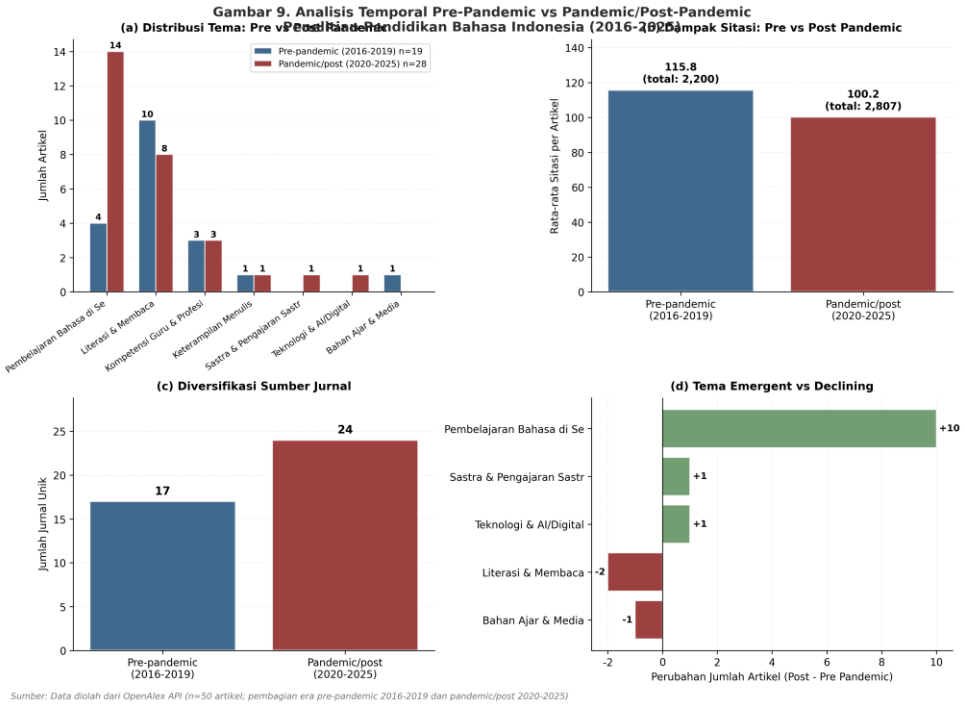


Figure 9. Pre-Pandemic vs Pandemic/Post-Pandemic Temporal Analysis (2016-2025)
Source: Data processed from OpenAlex API (n=47 articles; division of pre-pandemic era 2016-2019 and pandemic/post 2020-2025).

International Comparison of Indonesia vs Malaysia vs Philippines

A comparison with Malaysia (Malay, 45 articles) and the Philippines (Filipino, 28 articles) shows Indonesia leads in terms of total citations (5,007 vs Malaysia 2,369 vs Philippines 1,020) and average citations per article (106.5 vs 52.6 vs 36.4). However, Indonesia has a narrow advantage in the adoption of emergent themes. Annual publication trends show that all three countries peaked in 2020-2021 (pandemic), with Indonesia having the highest volume of publications. These findings place Indonesia as a regional leader in language education research, but a proactive strategy is needed to maintain this position.

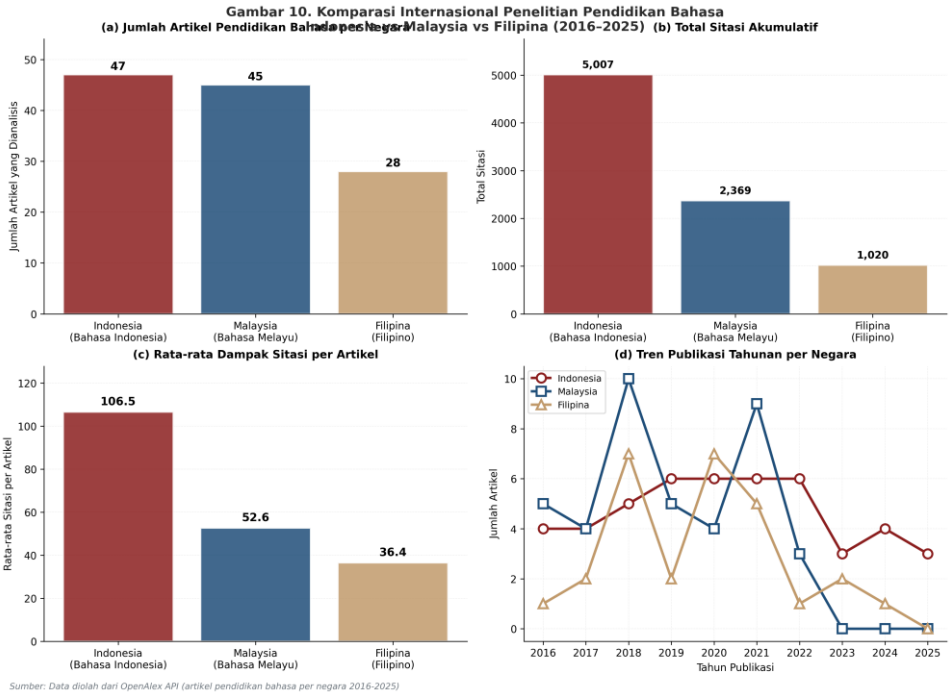


Figure 10. International Comparison of Indonesia vs Malaysia vs Philippines (2016-2025)
Source: Data processed from OpenAlex API (language education articles by country 2016-2025).

Discussion

The findings of this study provide multidimensional insights into the Indonesian language education research landscape. First, the extreme thematic concentration (46.7% on literacy) validated by both manual classification and LDA topic modeling showed structural issues that required intervention. This concentration is in line with the findings of Bornmann and Mutz (2015) about the uneven growth of science, but in Indonesian language education the concentration is more extreme than other disciplines. Hammarfelt and Haddow (2018) found a similar phenomenon in the humanities, where conventional themes tend to dominate while emergent themes have difficulty penetrating.

Second, the network analysis revealed three structural characteristics: (a) individual research traditions (36.2% of single authors) that differ from the international standard of collaboration of 3-5 authors; (b) low bibliographic couplings indicate that each article uses relatively unique references—a good potential for novelty but also a weak indicator of knowledge accumulation; (c) thematic communities identified via co-occurrence keywords confirm the concentration on conventional themes. Župič and Čater (2015) emphasize that strong bibliographic coupling is an indicator of the maturity of a discipline—our findings suggest that Indonesian language education has not yet reached this stage.

Third, temporal analysis reveals a paradox: the pandemic increased the quantity of publications (+47% of articles) but was not accompanied by an increase in the impact of citations. The theme of Language Learning in Schools increased by 250% post-pandemic, reflecting the response of academics to the need for distance learning. However, the absence of the AI/digital theme in this growth shows that Indonesian language education academics

have not adequately responded to generative AI disruption, even though Setiawan and Luthfiyani (2023) have paved the way.

Fourth, international comparisons show Indonesia's position as a regional leader in citation volume, but with a narrow advantage. Malaysia and the Philippines have faster adoption rates of emergent themes, and if this trend continues, Indonesia risks losing its regional leadership position in the next 5-10 years. The practical implication is that SINTA journal managers need to: (a) diversify themes with thematic calls for papers such as AI, digital literacy, teacher competence; (b) improve metadata transparency; (c) encourage citation of local articles. For researchers, the themes of AI, language policy, and teacher competence are still wide open. For the Ministry of Education and Education, the reform of the SINTA accreditation criteria needs to add indicators of the impact of citations and thematic novelty. Details of the implementation of the recommendations are outlined in the Program Pilot Attachment and Policy Brief.

The study has limitations: (1) the sample of 45 highly cited articles is not representative of the entire landscape; (2) OpenAlex may not capture 100% of SINTA's journals; (3) LDAs with 5 topics may be too simple for full thematic complexity. Follow-up research can expand the sample, use BERTopic for more granular classification, and run longitudinal studies to validate temporal findings

CONCLUSION

Based on a multidimensional bibliometric analysis of 47 highly cited articles on Indonesian language education published between 2016 and 2025, six main conclusions were drawn. First, publication output peaked in 2020, coinciding with the COVID-19 pandemic. The selected articles accumulated 5,007 citations, averaging 106.53 citations per article. Second, manual thematic classification and Latent Dirichlet Allocation (LDA) topic modeling revealed a consistent concentration of research themes, with literacy (38.3%) and classroom-based language learning (38.3%) accounting for the largest proportions, while artificial intelligence (AI) and digital technology-related themes remained underrepresented. The five-topic LDA model provided complementary evidence supporting the thematic patterns identified through manual classification, thereby strengthening the findings through methodological triangulation.

Third, network analysis revealed four key structural characteristics: (a) four thematic communities identified through keyword co-occurrence analysis; (b) a relatively fragmented authorship structure, with single-authored publications accounting for 36.2% of the corpus; (c) limited bibliographic coupling, with only one pair of articles sharing at least two references, suggesting weak intellectual interconnectedness within the selected literature; and (d) distinct co-citation clusters indicating shared theoretical foundations among certain publications. Fourth, temporal analysis indicated a 47% increase in publication output during the pandemic and post-pandemic period without a corresponding improvement in average citation impact. The thematic distribution also shifted from literacy toward classroom-based language learning, which increased by 250%, while emerging research topics remained relatively underexplored.

Fifth, international comparisons indicated that Indonesia had the highest citation volume within the selected datasets, accumulating 5,007 citations compared with 2,369 for Malaysia and 1,020 for the Philippines. However, Indonesia's relative advantage was less pronounced in research addressing emerging themes, highlighting opportunities for greater thematic

diversification. Sixth, the study provided a multidimensional empirical foundation for strengthening the Indonesian language education research ecosystem, supported by proposed pilot programs (Appendix A) and policy recommendations (Appendix B). The primary practical implication was the need to expand research beyond established pedagogical themes by prioritizing emerging areas, particularly artificial intelligence, language policy, and teacher competencies. Such diversification, accompanied by stronger research collaboration and methodological rigor, could enhance the relevance, innovation, and international competitiveness of Indonesian language education research.

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CONFLICT OF INTEREST

The author declares that this research wa conducted without any commercial or financial relationship that could be interpreted as a potential conflict of interest.

AUTHOR CONTRIBUTION

Bagaskara Nur Rochmansyah: Conceptualization, methodology, data curation, formal analysis, visualization, investigation, and writing original draft. Fajar Nurjaman: Methodology, data curation, validation, formal analysis, and writing, review and editing. Nur Amelia: Investigation, validation, interpretation of findings, and writing, review and editing. Ifutya Warnisca: Data validation, visualization support, literature review, and writing, review and editing. All authors contributed to the development and refinement of the manuscript, approved the final version, and agreed to be accountable for all aspects of the work.

GENERATIVE ARTIFICIAL INTELLIGENCE USAGE STATEMENT

OpenAI ChatGPT was used as an assistive research tool for corpus-screening support, preliminary code suggestions, clustering of candidate codes, consistency checks, analytical memo preparation, and language refinement during manuscript preparation. Microsoft Excel remained the primary analytical workspace. AI-generated suggestions were treated as provisional and verified against the underlying episode-level evidence and conversational context. The author retained full responsibility for data selection, contextual netnographic interpretation, analytical decisions, category and theme development, negative-case analysis, mechanism construction, theoretical interpretation, and the final manuscript content.

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