

Ethnopedagogy And Critical Literacy Based Writing Skills In Indonesian Language Learning: A Bibliometric Analysis

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ABSTRACT : This study aims to analyze research trends regarding ethnopedagogy, critical literacy, and writing skills in language learning through a bibliometric approach. The study employed a bibliometric design using data from the Scopus database. Data collection was conducted in May 2026 using the keywords ethnopedagogy, critical literacy, writing skills, and language learning. A total of 22 journal articles from 2021–2026 were selected based on inclusion criteria. Data were analyzed using VOSviewer and Biblioshiny software to visualize keyword co-occurrence, network visualization, overlay visualization, and density visualization. The results indicate that research on ethnopedagogy, critical literacy, and writing skills has developed dynamically, with a peak in publications in 2024. Critical literacy emerged as the dominant keyword and exhibited strong associations with digital literacy, critical literacy, ethnopedagogy, writing skills, and AI-assisted writing. The overlay visualization results indicated a shift in research trends from culture- based learning approaches toward the integration of digital technology and artificial intelligence in writing instruction. Meanwhile, density visualization indicates that critical literacy and writing skills are the topics with the highest research intensity, whereas the integration of ethnopedagogy and AI-assisted writing remains limited and has the potential to become the next research gap. Overall, this study demonstrates that language learning emphasizes the integration of culture, digital literacy, and technological innovation to create writing instruction that is adaptive to the demands of 21st-century education.

Keywords: Ethnopedagogy, Critical Literacy, Writing Skills, Indonesian Language Learning, Bibliometric Analysis

INTRODUCTION

Educational transformation in the digital age has shifted the paradigm of language learning from an approach focused on mastering linguistic structures toward learning that emphasizes critical thinking, creativity, communication, and cultural awareness. In the context of learning Indonesian, writing skills have become one of the key competencies that need to be developed because writing is not only about the ability to arrange words and sentences but also the ability to construct ideas logically, reflectively, and argumentatively. However, various studies indicate that students' writing abilities still face numerous challenges, particularly due to learning that tends to be mechanical, lacks contextual relevance, and minimizes the integration of cultural experiences and students' critical reflection. Yin, Mohd Saad, and Abdul Halim (2023) explain that a critical thinking-based pedagogy in EFL writing instruction can enhance

students' analytical and argumentative skills through reflective and collaborative activities. Similar findings were also presented by Zheng, Mu, and Zhou (2026), who demonstrated that a collaborative reading-based creative writing approach is effective in developing critical thinking skills while improving the quality of students' argumentative writing. These research results indicate that writing instruction requires an innovative approach that focuses not only on linguistic aspects but also on the development of students' social and cultural awareness and higher-order thinking skills.

One approach considered relevant in addressing these challenges is ethnopedagogy. Ethnopedagogy positions local culture, traditional values, and community knowledge as integral parts of the learning process, enabling students to connect their cultural experiences with their academic activities. In Indonesian language instruction, this approach allows students to develop writing skills by exploring social and cultural experiences closely tied to their lives, thereby making the learning process more contextual and meaningful. Culture-based approaches are also considered capable of strengthening students' reflective abilities and creativity in producing written work. Susilowaty, Setyarini, and Gustine (2025) explain that the practice of critical literacy instruction in language classes can help students understand social and cultural issues more deeply through participatory reading and writing activities. Additionally, Afrilyasanti, Basthomi, and Zen (2025) found that integrating critical media literacy into language learning can enhance students' creativity and critical thinking skills through the reflective use of digital media. These findings suggest that the integration of ethnopedagogy and critical literacy has the potential to create writing instruction that is more contextual, creative, and focused on fostering students' social awareness.

The development of digital technology has also significantly influenced the direction of language learning and educational research. Writing instruction in the digital age is no longer limited to the use of conventional media but has begun to integrate artificial intelligence, collaborative online writing, digital storytelling, and multimodal learning. The integration of these technologies enables students to gain more interactive learning experiences and supports the development of critical thinking skills. Kim, Cheung, Lee, and De Costa (2025) assert that critical digital literacy is a vital competency in modern language education as it helps teachers and students understand the use of technology in a critical and reflective manner. Meanwhile, Arseven and Bal (2025) demonstrate that integrating artificial intelligence into critical literacy-based writing instruction can enhance students' ability to analyze various forms of digital information. Another study by Wu, Elsa, and Huang (2026) also found that integrating computational thinking into problem-based learning can improve students' motivation and writing performance in academic learning. Furthermore,

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Nurhasanah, Nadiroh, and Maksum (2025) explain that digital literacy and social-emotional skills are closely linked in developing students' critical thinking abilities in the era of digital learning. Thus, advancements in digital technology demonstrate that modern writing instruction requires the integration of critical literacy, technology, and culture-based approaches to make learning more adaptive to the educational needs of the 21st century.

Research on writing skills has also expanded to include aspects of literacy assessment and the process of meaning-making in writing activities. Xu, Zheng, and Braund (2023) explain that writing assessment literacy plays a crucial role in enhancing the quality of writing instruction because it helps students understand assessment standards, text structure, and reflect on the quality of the writing they produce. On the other hand, Altherr Flores (2021) emphasizes that writing is a semiotic process involving an individual's ability to construct meaning through symbols, experiences, and their social and cultural context. This perspective indicates that writing skills cannot be separated from students' social and cultural experiences. Therefore, writing instruction must be designed contextually through an approach that integrates local culture, critical reflection, and the development of digital technology into a single, integrated learning process.

Although research on ethnopedagogy, critical literacy, and writing skills continues to evolve, most previous studies have primarily focused on the implementation of instruction and the measurement of learning outcomes in the classroom. Research mapping the global development of these fields through a bibliometric approach remains relatively limited, particularly studies integrating the themes of ethnopedagogy, critical literacy, and writing skills in language learning. Yet, research mapping is crucial for identifying publication trends, the evolution of research themes, patterns of scientific collaboration, and remaining research opportunities in this field. Bibliometric analysis enables researchers to understand the intellectual structure of a field of study by identifying author productivity, collaboration networks, citation patterns, and relationships among research keywords. Therefore, a bibliometric study on ethnopedagogy and writing skills based on critical literacy is essential to provide a comprehensive overview of the direction of research development in this field while identifying opportunities for future research.

This study offers a new contribution by mapping global research trends on ethnopedagogy and critical literacy-based writing skills using a bibliometric approach based on Scopus data. The analysis was conducted using VOSviewer and Biblioshiny software to visualize co-authorship networks, keyword co-occurrence, and the development of related research themes. The use of a bibliometric approach in this study is expected to provide a more systematic understanding of research developments, dominant themes, and research gaps that still require further

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exploration. Thus, the results of this study not only contribute to the development of academic research on ethnopedagogy and critical literacy in writing instruction but can also serve as a foundation for formulating more contextual, reflective, and adaptive innovations in Indonesian language learning in response to 21st-century educational developments.

METHODS

This study employs a bibliometric approach with a quantitative descriptive design to analyze the development of research on ethnopedagogy, critical literacy, and writing skills in language learning. The bibliometric approach is used to map publication trends, patterns of author collaboration, the evolution of research themes, and relationships among keywords within a scientific field of study. This method was chosen because it can provide a visualization of the intellectual structure and research development systematically based on the metadata of internationally indexed scientific publications.

The research data was obtained from the Scopus database because it has a broad coverage of international publications and is frequently used in bibliometric research in education and linguistics. The data search was conducted in May 2026 using the following search string: TITLE-ABS-KEY ("ethnopedagogy" OR "critical literacy") AND TITLE-ABS-KEY ("writing skills" OR "writing instruction") AND TITLE-ABS-KEY ("language learning" OR "Indonesian language learning").

The publication range was limited to 2021–2026 to identify research developments over the past decade, particularly following the increased integration of digital literacy and critical approaches in language learning. Inclusion criteria included Scopus-indexed journal articles written in English and focusing on language learning, writing skills, ethnopedagogy, or critical literacy. Meanwhile, conference proceedings, editorials, book chapters, and irrelevant documents were excluded from the analysis. Based on the initial search results, a number of articles were identified, followed by a screening process to remove duplicate data and articles not aligned with the research focus.

The metadata of the selected articles was analyzed using the VOSviewer and Biblioshiny software. VOSviewer was used to visualize co-authorship, keyword co-occurrence, citation analysis, and thematic mapping. Meanwhile, Biblioshiny was used to analyze annual publication trends, author productivity, countries with the highest contributions, and the distribution of scientific publication sources. Data analysis was conducted descriptively and visually through network visualization, overlay visualization, and density visualization to identify relationships between research concepts, the development of research themes, and the density of research on specific topics. With this bibliometric approach, the study is expected to provide a

comprehensive overview of the direction of research development and opportunities for new studies related to ethnopedagogy and critical literacy-based writing skills in language learning.

RESULT AND DISCUSSION

RESULT

A. Results of Publication Data Search Using the ScopusDatabase (ScienceDirect/Elsevier)

Based on the data search process conducted through the Scopus database integrated with ScienceDirect (Elsevier), a number of scientific articles relevant to ethnopedagogy, critical literacy, and writing skills in language learning were obtained. The search was conducted systematically using the following search string: TITLE-ABS-KEY ("ethnopedagogy" OR "critical literacy") AND TITLE-ABS-KEY ("writing skills" OR "writing instruction") AND TITLE-ABS-KEY ("language learning" OR "Indonesian language learning").

The use of these keywords aimed to ensure that the retrieved articles were directly relevant to the research focus, namely the integration of the ethnopedagogy approach, the strengthening of critical literacy, and the development of writing skills in the context of language learning. The metadata of all retrieved articles included the title, author(s), year of publication, journal name, abstract, keywords, citations, and DOI. The data was extracted from Scopus and verified via ScienceDirect (Elsevier) to ensure the accuracy and consistency of the information. Subsequently, all data was organized into a structured bibliometric dataset as the basis for further analysis.

This study limits the publication range to 2021–2026 to reflect the latest developments in language learning research. This period was selected based on the growing trend of integrating digital literacy, artificial intelligence (AI), critical learning approaches, and the strengthening of cultural dimensions in language education. The screening stage was conducted rigorously by removing duplicate data, irrelevant articles, and non-journal documents such as conference proceedings, book chapters, and editorials, resulting in a final dataset that is fully aligned with the research objectives.

Overall, the search results indicate that articles discussing critical literacy, AI-assisted writing, computational thinking, and digital literacy have a stronger presence in Scopus publications compared to research still oriented toward conventional learning approaches. This suggests a shift in research focus toward technology integration, the strengthening of critical literacy, and learning approaches that are more contextual, reflective, and adaptive to the developments of the digital era.

Additionally, research examining the integration of technologies such as AI in writing instruction shows a significant increase in attention, particularly regarding

improvements in the quality of academic writing, critical thinking skills, and digital literacy among students. On the other hand, the ethnopedagogical approach is gaining attention as a crucial framework for linking local cultural values with modern language learning practices, thereby creating more meaningful and contextual learning experiences.

Based on the final selection, 22 main articles were identified as the most relevant and representative for use as data in bibliometric analysis. This data was then analyzed using the VOSviewer and Biblioshiny software. VOSviewer was used to map keyword networks, author collaboration patterns, and the structure of relationships between research concepts, while Biblioshiny was used to analyze annual publication trends, author productivity, country distribution, and the development of research themes in a descriptive and visual manner. The combination of these two tools provides a comprehensive overview of the development of research on ethnopedagogy, critical literacy, and writing skills in language learning.

Table 1. Publication Data on Ethnopedagogy, Critical Literacy, and Writing Skills Research (2021–2026)

No.	Author	Article Title	Year
1	Afrilyasanti, R., Basthomi, Y., & Zen, E. L.	<i>Fostering Creativity and Critical Literacy: Transforming EFL Classes with Engaging Critical Media Literacy Integration</i>	2025
2	Altherr Flores, J. A.	<i>The Semiotics of Writing: How Adult L2 Learners with Emergent Literacy Make Meaning in Assessment Texts Through Writing</i>	2021
3	Arseven, T., & Bal, M.	<i>Critical Literacy in Artificial Intelligence-Assisted Writing Instruction: A Systematic Review</i>	2025
4	Canagarajah, S.	<i>Utilizing ChatGPT to Integrate World English and Diverse Knowledge: A Transnational Perspective in Critical Artificial Intelligence Literacy</i>	2024
5	Chiu, T. K. F., & Lim, V.	<i>Conceptualising and Cultivating Critical GAI Literacy in Doctoral Academic Writing</i>	2024
6	Davies, M., & Meissel, K.	<i>Investigating the Impact of Critical Thinking Instruction on Writing Performance: A Multilevel Modelling Analysis of Relative Gain Data in the Australian National Assessment Program</i>	2024
7	Hand, B., & Prain, V.	<i>Examining the Impact of Science Writing Heuristic Approach on Development of Critical Thinking,</i>	2024

		<i>Science and Language Skills of Students with and Without Disabilities</i>	
8	Hsu, T.-C., & Huang, C.-Y.	<i>Enhancing English Writing and Higher-Order Thinking Skills Through Computational Thinking</i>	2024
9	Huang, Y.-M., & Hwang, G.-J.	<i>Narrative Alchemy: Co-Creating a Game-Based Extensive Reading Framework for Adult Language Learners</i>	2024
10	Kim, N., Cheung, M. M., Lee, V. W. Y., & De Costa, P. I.	<i>Centering Critical Digital Literacy in the Lives of Language Teaching Professionals: A Collaborative Autoethnographic Exploration</i>	2025
11	Lee, J., & Hyland, K.	<i>Facilitating Undergraduate Novice L2 Writers' Pathways Toward Criticality Enactment in Genre-Based Literature Review Writing Instruction</i>	2024
12	Li, X., Chen, Y., & Wang, H.	<i>Three-Wave Cross-Lagged Model on the Correlations Between Critical Thinking Skills, Self-Directed Learning Competency, and AI-Assisted Writing</i>	2024
13	Nichols, S., & Msebenzi, T.	<i>Critical Literacies, Imagination and the Affective Turn: Postgraduate Students' Redesigns of Race and Gender in South African Higher Education</i>	2024
14	Nurhasanah, A., Nadiroh, N., & Maksum, A.	<i>Bridging Cognition and Ethics: Socio-Emotional Skills and Digital History Literacy in Fostering Critical Thinking</i>	2025
15	Stevenson, M., & Warriner, D.	<i>Language Learning, Gender and Education: Understanding the Agency and Affordances of Refugee-Background Women with Emergent Literacy</i>	2024
16	Susilowaty, S., Setyarini, S., & Gustine, G. G.	<i>"When a Fox Desires to Be Human": Exploring English Teacher's Practice of Critical Literacy Instruction in an Indonesian Junior High Classroom</i>	2025
17	Tseng, Y.-H.	<i>Critical Literacy in an Indigenous Elementary EFL Classroom</i>	2024
18	Wu, T.-T., Elsa, E., & Huang, Y.-M.	<i>Integrating Computational Thinking into Problem-Based Learning in EAP Writing: Effects on Motivation and Writing Performance</i>	2026
19	Xu, J., Zheng, Y., & Braund, H.	<i>Voices from L2 Learners Across Different Languages: Development and Validation of a Student Writing Assessment Literacy Scale</i>	2023

20	Yin, X., Mohd Saad, M. R. B., & Abdul Halim, H. B.	<i>A Systematic Review of Critical Thinking Instructional Pedagogies in EFL Writing: What Do We Know from a Decade of Research</i>	2023
21	Zhang, Y., & Yu, S.	<i>A Study on the Affordances of Digital Fairy-Tale Rewriting: A Critical Literacy Approach to Digital Multimodal Composing</i>	2024
22	Zheng, S., Mu, C., & Zhou, X.	<i>Fostering Critical Thinking and Argumentative Writing in EFL Learners: A Collaborative Reading-Based Creative Writing Approach</i>	2026

Table 1 presents the 22 main articles analyzed in the bibliometric study related to ethnopedagogy, critical literacy, and writing skills in language learning. In general, the data show that the analyzed publications are dominated by recent studies from the years 2023–2026, indicating that this field has been undergoing quite dynamic development in recent years. Most of the articles come from reputable international journals focusing on language education, critical literacy, writing studies, and the integration of technology in language learning.

In terms of themes, research focusing on critical literacy, AI-assisted writing, and computational thinking emerges as dominant in the dataset. This indicates a shift in the research paradigm from conventional approaches to writing instruction toward more digital, critical, and technology-based approaches. Articles such as Yin et al. (2023), Arseven & Bal (2025), and Li et al. (2024) demonstrate significant contributions to strengthening research on the integration of critical thinking and technology in writing instruction.

Additionally, studies focusing on ethnopedagogy and local cultural contexts, such as Susilowaty et al. (2025) and Tseng (2024), indicate that culture-based approaches remain highly relevant in language learning development, although their numbers are relatively more limited compared to technology-based studies. This indicates a research gap that can be further explored, particularly in integrating local cultural aspects with digital literacy and critical literacy.

Overall, the distribution of articles in Table 1 shows that research in this field is increasingly moving toward a multidisciplinary approach that combines critical literacy, educational technology, and socio-cultural perspectives. These findings reinforce that studies on ethnopedagogy and writing skills based on critical literacy have great potential to continue developing in global language education research.

B. Research Publication Trends (2021–2026)

The publication trend analysis aims to describe the development of research on ethnopedagogy, critical literacy, and writing skills in language learning based on Scopus-indexed articles verified through the ScienceDirect (Elsevier) database. The

analysis period covers the years 2021 to 2026, with a total of 22 articles selected according to the study's inclusion criteria: articles from internationally reputable journals focusing on language learning, critical literacy, and writing skills within the context of modern pedagogy.

The results of this analysis are used to examine the dynamics of research development and trends in research focus over the past few years, particularly in response to the transformation of language education in the digital era. During this period, the research indicates a significant shift from conventional writing instruction approaches toward more complex and integrative approaches, such as critical literacy, digital literacy, AI-assisted writing, and computational thinking. This shift reflects growing academic attention to the integration of technology, culture, and critical thinking skills in language learning.

Additionally, publication trends indicate that ethnopedagogy is beginning to gain attention within the context of culture- and locality-based learning, although the volume remains relatively smaller compared to themes such as critical literacy and educational technology. Overall, these publication trends demonstrate that research in the fields of ethnopedagogy and writing skills is evolving dynamically, in a multidisciplinary manner, and in response to technological advancements and 21st-century learning needs.

Table 2. Research Publication Trends (2021–2026)

Year	Number of Publications
2021	1
2022	0
2023	2
2024	11
2025	6
2026	2
Total	22
Average	3.7

Based on Table 2, it is evident that the distribution of research publications on ethnopedagogy, critical literacy, and writing skills in language learning is not uniform across each year but demonstrates a dynamic development pattern during the 2021–2026 period. In 2021, there was only one article discussing the early aspects of literacy and semiotics in writing, which still focused on text interpretation by second-language learners in the context of early literacy. In 2022, no publications meeting the inclusion criteria were found, indicating a hiatus or temporary decline in research output on this topic. Subsequently, a significant increase occurred in 2024 with the

highest number of publications, namely 11 articles. This year marked the peak of research development, highlighting the integration of critical literacy, AI-assisted writing, computational thinking, digital literacy, and technology-based learning approaches within the context of language education. The dominance of these themes indicates that research this year began shifting toward the utilization of digital technology and artificial intelligence as integral components in the development of writing skills and critical literacy.

In 2025, the number of publications remains high with 6 articles that continue to emphasize the integration of critical media literacy, ethnopedagogy, and digital literacy in language learning. This indicates that the research focus is beginning to shift toward strengthening cultural and media aspects in critical literacy-based learning. Meanwhile, 2023 and 2026 each show a more limited number of publications, yet they remain consistent in addressing the themes of critical thinking, assessment literacy, and computational thinking in writing instruction.

Overall, this publication trend indicates that research is undergoing a paradigm shift from conventional approaches toward more modern, integrative, and technology-based approaches. This development also reflects the growing academic attention to the relationship between critical literacy, digital technology, and cultural contexts in language learning in the era of 21st-century education.

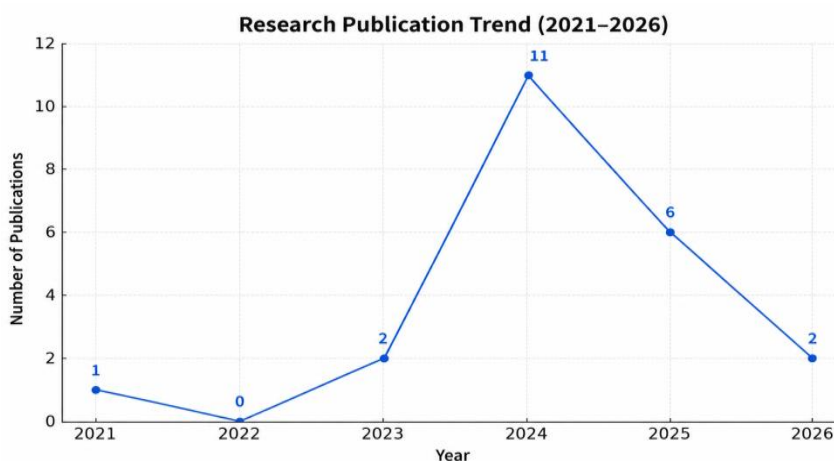


Figure 1. Research Publication Trend Chart (2021–2026)

Figure 1 shows a visualization of publication trends in research on ethnopedagogy, critical literacy, and writing skills in language learning from 2021 to 2026. The graph illustrates that the development of research is not linear but rather fluctuating, with a significant upward trend during certain periods. This reflects that this field of study continues to evolve in tandem with changing needs in language education in the digital age.

In the initial period, from 2021 to 2023, the number of publications remained relatively low, indicating the early stages of research development. At this stage,

studies were still dominated by foundational approaches such as the semiotics of writing, early literacy, and the development of writing skills in the context of second language learning. This indicates that the research focus during this phase remained within the conceptual realm and did not yet extensively involve the integration of technology or more complex critical approaches.

Subsequently, in 2024, there was a very significant surge, marking the peak of the graph. This increase indicates that research is beginning to address more modern and relevant issues, such as critical literacy, AI-assisted writing, computational thinking, and digital literacy. This year can be considered the primary transformative phase in research, where language learning approaches began integrating digital technology and artificial intelligence as part of pedagogical strategies.

In 2025, the number of publications saw a slight decline, yet research maintained strong consistency. The focus of studies during this period remained on strengthening critical literacy, ethnopedagogy, and the integration of digital media in language learning. Meanwhile, in 2026, research activity stabilized again, albeit on a more limited scale, with a focus on developing computational thinking and argumentative writing within the context of language learning.

Overall, this graph indicates that research development is fluctuating but has a clear trajectory toward the integration of critical literacy, digital technology, and culturally-contextualized learning approaches. This suggests that research in this field is increasingly moving toward a more multidisciplinary, adaptive, and relevant direction aligned with the demands of 21st-century learning.

C. Visualization of Research Distribution on Ethnopedagogy, Critical Literacy, and Writing Skills Using VOSviewer

1. Cluster-Based Mapping

This mapping was generated through bibliometric analysis using VOSviewer by setting a threshold of at least three occurrences for each keyword. This process was conducted to ensure that only keywords with sufficient frequency of occurrence and strong conceptual relevance were included in the analysis. Based on the mapping results, six keywords were identified and subsequently grouped into three main clusters. Each cluster represents a major thematic direction in the development of research related to ethnopedagogy, critical literacy, and writing skills in language learning.

a) Cluster 1 (Critical Literacy and Higher-Order Thinking)

Cluster 1 consists of three items and is marked in red: critical literacy, critical thinking, and digital literacy. This cluster reflects the cognitive and literacy dimensions in language learning in the modern era. Research in this cluster emphasizes the importance of developing

higher-order thinking skills, particularly critical thinking and critical literacy, which are necessary for in- depth analysis and evaluation of information . Additionally, the presence of digital literacy highlights the role of technology in supporting students' ability to access, understand, and critically process information in a digital learning environment.

b) Cluster 2 (Ethnopedagogy and Culture-Based Learning)

Cluster 2 consists of one main item and is marked in green: ethnopedagogy. This cluster highlights a culture-based learning approach in language education. Ethnopedagogy emphasizes the integration of local cultural values and traditional knowledge into the learning process. This approach makes learning more meaningful by connecting instructional content to students' cultural contexts and their daily life experiences. Additionally, ethnopedagogy plays a role in preserving and sustaining local wisdom through education.

c) Cluster 3 (Development of Digital Writing Skills)

Cluster 3 consists of two items and is marked in blue: writing skills and AI-assisted writing. This cluster illustrates the transformation of writing instruction in the digital age. Writing skills are now increasingly supported by technological advancements, particularly artificial intelligence, which assists students in generating, revising, and refining texts. The integration of AI into writing instruction reflects a shift toward more adaptive, interactive, and technology-based learning to enhance the quality of students' written work.

The relationships among the keywords reveal a close connection between culture-based approaches, the development of critical literacy, and digital transformation in writing instruction. These findings indicate that research in this field is multidimensional, where ethnopedagogy, critical literacy, and technology interact to shape modern language learning practices. Overall, this mapping provides a comprehensive overview of research directions and trends that can serve as a foundation for further research in the fields of ethnopedagogy, critical literacy, and writing skills.

2. Network Visualization

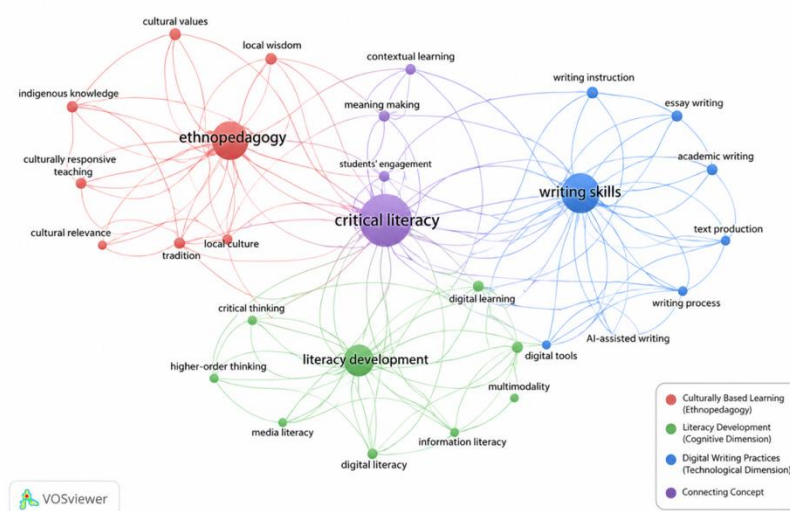


Figure 2. Network Visualization of Ethnopedagogy, Critical Literacy, and Writing Skills

This network visualization depicts the relationships between keywords based on their link strength, identified through bibliometric analysis using the VOSviewer software. In this visualization, each node represents a keyword, while the connecting lines between nodes indicate conceptual relationships or connections between research topics. Node size indicates the frequency of keyword occurrence, while the thickness of the connecting lines represents the strength of the relationship between keywords.

In the resulting network map, critical literacy appears as one of the dominant nodes, indicated by its relatively larger size and its position at the center of the network. This suggests that critical literacy serves as the primary conceptual focus within this research field and maintains strong connections with other variables. This central position indicates that critical literacy functions as a connecting concept that bridges the cognitive, cultural, and technological dimensions in language education research.

Furthermore, critical literacy has strong connections with keywords in other clusters, such as critical thinking and digital literacy within the literacy development cluster, as well as ethnopedagogy within the culture-based learning cluster. This suggests that the development of critical literacy is not isolated but is closely influenced by culturally responsive learning approaches and digital learning environments, while simultaneously contributing to the enhancement of higher-order thinking skills.

Furthermore, the relationships between clusters reveal complex interactions among cultural, cognitive, and technological dimensions in writing instruction. For example, the relationship between writing skills and AI-assisted

writing indicates that technology is increasingly integrated into the writing process to assist students in producing and refining texts. Similarly, the connection between ethnopedagogy and digital literacy indicates that culture-based learning can be strengthened through digital platforms, making the learning process more contextual and interactive.

Overall, this network visualization provides a comprehensive overview of the conceptual structure of the research field, where critical literacy serves as the primary connecting element between ethnopedagogical approaches, literacy development, and digital-based writing practices. These findings reinforce the view that research in this field increasingly emphasizes the integration of cultural values, critical thinking skills, and technological innovation in shaping effective language learning, particularly within the context of writing instruction.

3. Density Visualization

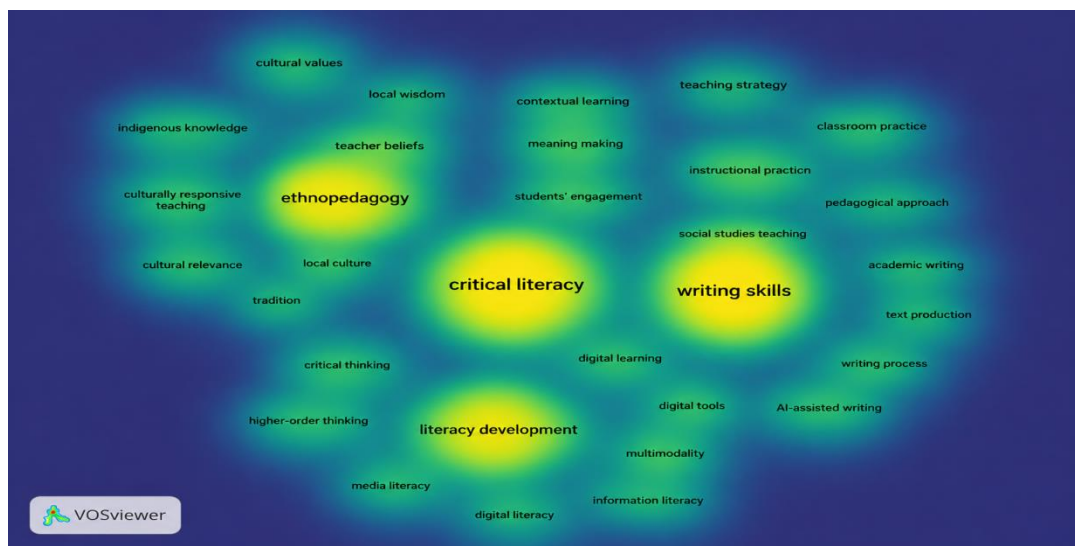


Figure 3. Research Hotspot Density Visualization

Density visualization depicts the level of concentration or intensity of keyword occurrence within a research field using VOSviewer. In this map, colors represent the frequency and concentration level of research topics, where lighter colors (yellow) indicate higher density, while darker colors (green to blue) indicate lower density.

Based on the visualization results, the brightest (yellow) areas are concentrated around the keywords “critical literacy” and “writing skills.” This indicates that these two topics are the most dominant and frequently studied focuses in the analyzed research. The high frequency of these two keywords indicates that many studies emphasize the importance of developing critical literacy and writing skills in language learning. In other words, literacy and writing skills are the primary focus of research in this field.

In addition, other keywords such as critical thinking and digital literacy also

show relatively high frequency, although not as high as critical literacy and writing skills. This indicates that higher-order thinking skills and technology- based literacy remain important areas of study, though they are not as dominant as core literacy aspects in writing skills.

Conversely, areas with lower color intensity represent topics that remain relatively under-researched. One example is the relationship between ethnopedagogy and AI-assisted writing. The low density in this area indicates that the integration of culture-based learning approaches with artificial intelligence technology in writing instruction has not been extensively explored in previous research.

This situation indicates a research gap that can be further developed, particularly in examining how ethnopedagogical approaches can be integrated with digital technology and artificial intelligence to improve students' writing skills. Thus, future research is expected to provide a more comprehensive understanding of the relationship between cultural aspects, literacy, and technological innovation in language learning.

4. Overlay Visualization

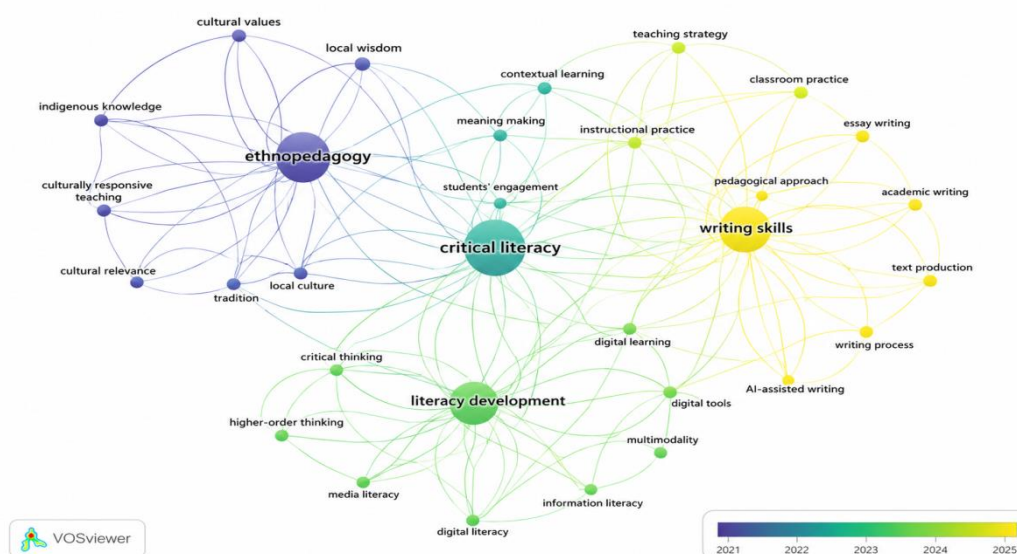


Figure 4. Overlay Visualization of Research Trends (2021–2025)

Overlay visualization is used to illustrate the development of research trends

over time using VOSviewer. This visualization allows researchers to identify shifts in research focus during specific periods. In this map, each keyword is displayed using a color gradient representing its time of emergence, where darker colors (blue) indicate earlier research periods, while lighter colors (green to yellow) indicate more recent research.

Based on the analysis results, a fairly dynamic shift in research trends is evident from 2021 to 2025. In 2021, research focused more on the keyword "ethnopedagogy." This indicates that in the early stages, researchers' attention was still centered on culture-based learning approaches and the integration of local values into language education. Research during this period emphasized the importance of utilizing local wisdom as a foundation for creating contextual and meaningful learning experiences for students.

Entering the 2022–2023 period, the research focus began to shift toward the keywords critical literacy and critical thinking. In this phase, research placed greater emphasis on the development of higher-order thinking skills in language learning. Studies emerging during this period extensively discussed how learners can critically analyze, evaluate, and understand information through the literacy learning process. This shift indicates an effort to connect culture-based approaches with the strengthening of students' cognitive abilities in addressing modern learning challenges.

Furthermore, during the 2024–2025 period, research trends indicate further development with increased attention on the keywords "writing skills," "digital literacy," and "AI-assisted writing." This suggests that recent research is beginning to focus on the transformation of writing instruction in the digital age. The integration of technology, particularly artificial intelligence, is increasingly viewed as a crucial component in supporting the writing process, text revision, and the development of students' digital literacy skills. This focus indicates that language education research is increasingly moving toward the use of innovative technologies to enhance the effectiveness of writing instruction.

Overall, this research trend reflects a paradigm shift from culture-based learning approaches toward the development of critical literacy and digital transformation in language learning. This shift also indicates that research in this field is evolving toward a more comprehensive understanding by integrating the relationship between ethnopedagogy, critical literacy, writing skills, and technological innovation to improve the quality of language learning.

DISCUSSION

Research developments on ethnopedagogy and writing skills based on critical literacy indicate a paradigm shift in language learning toward a more reflective, contextual, and digital technology-based approach. The results of the bibliometric

analysis show that research on critical literacy, argumentative writing, and digital literacy has seen a significant increase after 2020. These findings align with the research by Yin, Mohd Saad, and Abdul Halim (2023), which explains that critical thinking pedagogy in writing instruction can enhance students' argumentative, reflective, and analytical skills through more contextual learning activities. Additionally, Davies and Meissel (2024) found that critical thinking-based learning has a positive impact on students' academic writing performance through improved evaluation and logical reasoning skills. These findings indicate that Indonesian language education in the modern era no longer focuses solely on linguistic aspects but also on students' ability to construct arguments and critically understand social issues.

The results of the network visualization also indicate that critical literacy has a strong relationship with argumentative writing skills and collaborative learning. These findings demonstrate that modern writing instruction increasingly emphasizes critical thinking skills through social interaction and reflective activities within the writing process. Research by Zheng, Mu, and Zhou (2026) shows that collaborative reading-based creative writing can significantly improve EFL students' argumentative writing skills through critical reading activities and collaborative discussions. Furthermore, Lee and Hyland (2024) explain that genre-based writing instruction grounded in critical literacy helps students develop critical thinking skills in academic writing. Their research indicates that effective writing instruction requires the integration of reflective activities, collaboration, and the ability to understand the social context within texts.

Beyond critical literacy, bibliometric research findings indicate that advancements in digital technology have a significant impact on modern writing instruction. The keywords "AI-assisted writing," "digital literacy," and "computational thinking" exhibit high frequency of occurrence in VOSviewer visualizations. This suggests that digital technology is increasingly becoming an integral part of language learning and writing skills development. Research by Arseven and Bal (2025) explains that artificial intelligence-assisted writing, when combined with critical literacy, can enhance students' ability to evaluate and analyze digital information. Additionally, Li, Chen, and Wang (2024) found that AI-assisted writing has a significant relationship with improvements in students' self-directed learning competency and critical thinking skills. Canagarajah's (2024) research also confirms that the use of ChatGPT in language learning can help students develop creativity and cross-cultural communication skills when used critically and reflectively. Thus, the integration of digital technology in Indonesian language learning must be directed toward the continuous development of students' critical thinking and digital literacy skills.

Research findings also indicate that critical digital literacy is one of the key competencies in 21st-century language education. Overlay visualization results show that research on digital literacy is growing rapidly during the 2022–2025 period, in line with the increasing use of digital media and artificial intelligence in learning. Research by Kim, Cheung, Lee, and De Costa (2025) explains that critical digital literacy helps teachers and students understand the ethical, reflective, and critical use of technology in language learning. Additionally, Chiu and Lim (2024) found that critical GAI literacy plays a crucial role in helping doctoral students understand the academic and responsible use of generative artificial intelligence in scientific writing. These findings indicate that Indonesian language learning in the digital age requires a pedagogical approach capable of simultaneously integrating critical thinking skills, digital ethics, and technological literacy.

In the context of culture-based learning, bibliometric results indicate that ethnopedagogy has a strong relationship with culturally responsive learning and local culture in language learning. This approach enables students to understand their cultural experiences through more contextual reading and writing activities. Research by Tseng (2024) shows that critical literacy-based learning in indigenous communities can enhance students' participation and cultural awareness in language learning. Additionally, Nichols and Msebenzi (2024) explain that a critical literacies approach grounded in cultural identity can help students understand social, gender, and diversity issues through reflective reading and writing activities. In the context of Indonesian language learning, the ethnopedagogical approach is relevant because it can help students develop writing skills while strengthening their cultural identity and social awareness. Therefore, integrating local culture into language learning can be an effective strategy for creating more humanistic and meaningful learning experiences.

The results of the density visualization also indicate that multimodal learning and collaborative digital writing are increasingly prevalent in modern language learning research. Research by Zhang and Yu (2024) explains that digital multimodal composing based on critical literacy can enhance students' creativity, critical reflection, and ability to develop ideas through digital media. Additionally, Huang and Hwang (2024) found that a game-based extensive reading framework can boost students' learning motivation and engagement in language learning through interactive digital storytelling activities. Research by Afrilyasanti, Basthomi, and Zen (2025) also indicates that integrating critical media literacy into EFL instruction can enhance students' creativity and critical thinking skills in writing instruction. These findings suggest that modern language learning is increasingly shifting toward more interactive, multimodal, and digital technology-based approaches.

Furthermore, research findings indicate that writing assessment literacy and computational thinking are key components in the development of academic writing

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skills. The study by Xu, Zheng, and Braund (2023) explains that writing assessment literacy helps students understand text structure, assessment standards, and the process of revising their writing independently. Altherr Flores's (2021) research also emphasizes that writing is a semiotic process involving social experiences, cultural symbols, and the construction of meaning through text. Furthermore, Wu, Elsa, and Huang (2026) found that integrating computational thinking into problem-based learning can enhance students' motivation and academic writing performance. These findings are reinforced by research by Hsu and Huang (2024), which explains that computational thinking can help students develop higher-order thinking skills and organize ideas in writing instruction. Research by Hand and Prain (2024) also demonstrates that the science writing heuristic approach can improve students' critical thinking skills and scientific communication skills through reflective writing activities. Overall, the results of this study indicate that Indonesian language learning based on ethnopedagogy and critical literacy holds great potential for development through the integration of local culture, digital technology, and innovative pedagogical approaches to enhance students' critical thinking abilities and writing skills in the era of digital education.

CONCLUSION

Based on the results of bibliometric analysis, research on ethnopedagogy, critical literacy, and writing skills in language learning shows dynamic development and a paradigm shift toward more contextual, reflective, and digital technology-based learning. The research findings reveal that critical literacy serves as the central concept linking various dimensions of research, including critical thinking, digital literacy, writing skills, and culture-based learning approaches. Furthermore, technological advancements such as artificial intelligence, digital literacy, computational thinking, and AI-assisted writing indicate that modern writing instruction is increasingly integrated with technological innovations to enhance students' higher-order thinking skills, creativity, and the quality of their writing. Network visualizations, overlays, and density maps generated via VOSviewer reveal that the research focus has shifted from a culture-based ethnopedagogical approach toward the integration of critical literacy and digital technology in language learning. On the other hand, the findings also highlight new research opportunities, particularly in integrating ethnopedagogy with artificial intelligence and digital writing instruction—areas that have been relatively under-explored in previous studies. Overall, this study affirms that Indonesian language learning in the 21st century requires a multidisciplinary approach that combines local cultural values, critical thinking skills, digital literacy, and technological innovation to create writing instruction that is more effective, humanistic, adaptive, and relevant to the needs of modern education.

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