

Bibliometric Analysis: Ice Breaking Techniques in Elementary Schools

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ABSTRACT

This study, an extensive bibliometric analysis, was conducted to detect trends, collaboration patterns, and topic structures in the scientific literature on primary school icebreaking approaches. Scientific publication data was acquired from Google Scholar using relevant keywords. The investigation covered 2021–2025 article documents. This study used VOSviewer for mapping and visualization. Annual publication patterns, mapping author, institution, and country collaborations, and keyword co-occurrence analysis to identify dominating research subject clusters and emergent issues were examined. The finding indicated that from 2021 to 2025, 83 research articles examined elementary school icebreaking approaches. VOSviewer's visual map also identified three main thematic clusters: Cluster 1 (elementary schools, ice-breaking implementation and benefits, and the effect of ice-breaking implementation, assisted by ice-breaking, on learning interest), Cluster 2 (elementary schools, learning, the role of ice-breaking, and ice-breaking techniques), and Cluster 3 (ice, ice-breaking, and mathematics learning). This cluster discusses public elementary school icebreaking methods, roles, and implementation. The network visualization showed that icebreaking was the most explored topic. The density visualization term with the brightest color and greatest diameter is "ice breaking," indicating that journals commonly study this topic. Overlay visualizations and studies on primary school icebreaking procedures showed changes from 2021 to 2025. This topic saw a rise in research in 2021-2023 but a sharp fall in 2024-2025. Finally, this bibliometric analysis presents a clear and structured summary of elementary school icebreaking research, indicating underexplored subareas and prospective study goals. These findings help academics, practitioners, and policymakers construct evidence-based educational approaches.

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1. INTRODUCTION

Curriculum reforms are transforming the Indonesian education system, hoping to create a golden generation (Syahrir et al., 2024; Samala et al., 2024). Initially, Indonesian education utilized the 2013 curriculum, but experts deemed this current

curriculum insufficient to enhance the quality of education in Indonesia. Therefore, the government is attempting to develop a new curriculum, the "Merdeka Curriculum," which is currently being implemented. Learning, which was initially teacher-centered, is now student-centered (Amiruddin et al., 2023). This situation presents teachers with a new challenge to be more innovative in their approach to developing learning.

Elementary school education requires an approach that pays close attention to the psychological and cognitive development of students (Schonert-Reichl et al., 2015; Wang et al., 2019). Children at this age tend to have short attention spans, are distracted, and require diverse stimulation to maintain focus and build a positive learning environment. In this context, icebreaker techniques play a crucial role. Icebreaking is defined as a series of short activities designed to reduce awkwardness, enhance social interaction, manage classroom energy, and prepare students' minds to be more receptive to the subject matter (Ghasiyah et al., 2024; Mahendra, 2025). Teachers in elementary schools are in charge of choosing and using icebreaking techniques that are right for the age group and the learning goals (Chlup & Collins, 2010; Fitria, 2023). However, the quality and variety of techniques used often vary. While many beneficial practices are shared informally, a systematic, evidence-based understanding of the trends, impact, and evolution of research on icebreaking at the elementary school level remains limited.

The effective use of icebreaking has been shown to be positively correlated with increased student engagement, decreased learning anxiety, and improved short-term memory retention (Pranata et al., 2021; Sasan et al., 2023; Asmarani et al., 2023). However, although this practice is common among teachers, the academic knowledge base examining the trends, focus, and theoretical framework of research on icebreaking in elementary schools remains fragmented. "Icebreaking" is a term used to describe a process that facilitators or teachers need to undertake to change the state of mind of participants. These activities are usually humorous, fun, and sometimes simply informative or enlightening (Seftarini & Erdawati, 2025). Icebreaking in learning can be defined as breaking up a tense situation or a situation of mental or physical numbness in students (Algivari & Mustika, 2022). This icebreaking learning technique prioritizes a more enjoyable, cheerful, and enthusiastic learning atmosphere. This icebreaking learning technique can make students more enthusiastic and interested during the lesson (Tamamala et al., 2020). The benefits of this icebreaking technique in supporting student learning have been demonstrated by previous researchers (In'Ratnasari et al., 2023; Agustina et al., 2023; Mardatilla et al., 2025).

Over time, the number of scientific publications, proceedings, and research reports on icebreaking techniques in elementary schools has increased. To comprehensively understand this research landscape—from the most frequently studied methods and key contributors to inter-institutional collaborations and topic trends over time—a systematic and quantitative approach is required. Bibliometric analysis offers a powerful method for mapping the cognitive structure and evolution of a field (Donthu et al., 2021; Djeki et al., 2022; Gan et al., 2022; Qu et al., 2023), which has not been widely applied specifically to this topic in the context of elementary education. Therefore, this study aims to fill this gap by providing an in-depth quantitative review.

While several literature reviews on icebreaking or early childhood education have existed, no dedicated bibliometric analysis has mapped the global research landscape on icebreaking techniques within the specific context of elementary schools. This study is the first bibliometric analysis to exclusively limit the data corpus to the topic of "ice breaking" and apply it to elementary school, separating findings from the contexts of higher education (university) or corporate training, which have different dynamics. Using advanced visualization techniques (e.g., VOSviewer), this study aims to identify and visualize collaborative networks among authors, institutions, and countries most actively researching ice breaking in elementary schools. This work will reveal power structures and potential regional research gaps. This study will also explore the evolution of keywords (co-occurrence analysis) to identify shifts in research focus, for example, from "fun activities" to "emotional regulation" or "classroom management," providing guidance for researchers and practitioners regarding currently relevant pedagogical approaches.

This study offers a comprehensive literature review and establishes a vital quantitative framework to enhance the efficacy and evidence-based implementation of ice-breaking interventions in elementary school environments. In summary, this article not only reviews what has been researched but also how that research has been structured and developed, providing a valuable roadmap for academics, practitioners, and policymakers in the field of primary education.

2. METHOD

This research uses a quantitative approach with the bibliometric analysis method. Bibliometric analysis is a research model conducted by exploiting research data that has been published online regarding the number of publications and authors of publications, as well as articles with citations (Hassan & Duarte, 2024). Donthu et al. (2021) use bibliometric analysis to identify trends in articles and journals. Through this approach, data from various publications are analyzed to determine research development trends, author productivity, countries, institutions, and the journals that contribute the most. Bibliometric analysis also helps identify the most influential articles or authors based on the number of citations and sees relationships between topics with keywords. In the context of this article, bibliometric analysis is used to visualize the development of research related to icebreaking techniques in elementary schools, thus offering an in-depth survey of trends on the topic and future research directions.

This method was chosen because of its ability to provide an objective and comprehensive view of the structure and dynamics of research on icebreaking techniques in elementary schools, thus offering an in-depth review of trends on the topic and future research directions. Figure 1 presents the steps of bibliometric analysis (Donthu et al., 2021; Passas, 2024).

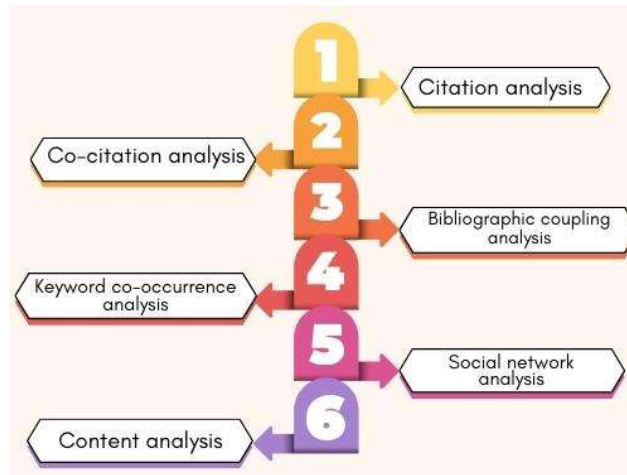


Figure 1. Bibliometric Analysis

Primary bibliographic data was collected from the scientific database Google Scholar. This database was chosen due to its extensive international journal coverage, the quality of its standardized metadata, and its reliability for citation and bibliometric analysis.

Data collection was conducted using a structured search strategy in Google Scholar from 2021 to 2025, using the Publish or Perish software version 8. A search string was created to find articles that talked about ice-breaking techniques in elementary schools. Data collection began with publications from 2021 to 2025 using Publish or Perish. The publications were then exported into a Research Information System (RIS) format, which included information related to the author, year of publication, title, volume, issue, pages, DOI, and keywords. The results from the Publish or Perish publications were then compiled into Mendeley and exported in Research Information System (RIS) format. The VOSviewer then visualized and evaluated trends using bibliometric maps (Zakariyya et al., 2022). The analysis results are displayed in three types of visualization, namely network visualization, overlay visualization, and finally density visualization.

3. RESULTS AND DISCUSSION

Results

In the data search and collection process, researchers collected 108 articles on icebreaking techniques in elementary schools from the Publish or Perish software. These articles were then filtered and combined with journals matching keywords, then compiled into the Mendeley application.

A total of 83 journal articles were collected. These journals and articles were collected through Google Scholar, using a search and data collection process from the Publish or Perish software, and then compiled into Mendeley. The collected article data included the article title, publication year, journal, number of citations, and URL. This

data was then processed to generate metadata. The researchers selected the 10 most cited articles, as shown in Table 1.

Table 1. Number of Citations

No	Article Code	Source	Years	Citation
1.	A1	Google Scholars	2022	200
2.	A2		2022	71
3.	A3		2022	68
4.	A4		2022	61
5.	A5		2022	47
6.	A6		2021	26
7.	A7		2023	25
8.	A8		2023	20
9.	A9		2022	20
10.	A10		2022	19

Table 1 above shows the development of research data on icebreaking techniques in elementary schools published by Google Scholar-indexed journals. Table 1 shows that the number of research articles on icebreaking techniques in elementary schools reached 83 between 2021 and 2025. In 2021, six articles were identified, then increased to 13 in 2022, then increased to 24 in 2023, then decreased to 23 in 2024, and then decreased again to 17 in 2025.

Building upon the number of publications listed, it can be concluded that research on icebreaking techniques in elementary schools fluctuates, indicating an unstable number of studies each year. Furthermore, the total number of articles counted from 2021 to 2025 yielded 83.

Table 2. Development of Research in Icebreaking Techniques in Elementary Schools

Year of publication	Number of publications
2021	6
2022	13
2023	24
2024	23
2025	17
Total	83

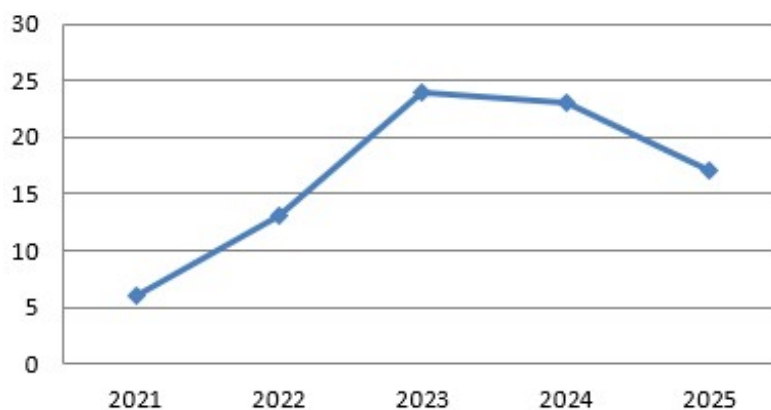


Figure 2. Graph of Learning Media Publication Data

Visualization of Research Distribution on Icebreaking Techniques in Elementary Schools Using VOSViewer

Cluster Mapping

There are a total of six clusters for the keyword "icebreaking techniques in elementary schools." The following is a list of clusters:

1. Cluster 1 has five items marked in red: elementary schools, implementation and benefits of icebreaking, and the effect of icebreaking implementation, assisted by icebreaking, on learning interest. This cluster indicates that the research focuses extensively on the implementation of ice-breaking strategies in elementary schools, particularly in relation to increasing student learning interest. The primary focus is on how the application of icebreaking techniques can create a pleasant learning atmosphere and foster students' intrinsic motivation to actively engage in the learning process.
2. Cluster 2 has four items marked in green: elementary schools, in learning, the role of icebreaking, and icebreaking techniques. This cluster discusses the basic concept of icebreaking and its application as a learning strategy that can increase student learning motivation. Research in this cluster emphasizes that icebreaking activities are not merely refreshing but are an integral part of active learning strategies that can foster positive relationships between teachers and students.
3. Cluster 3 has three items marked in blue: ice, ice breaking, and mathematics learning. This cluster highlights the techniques, role, and implementation of icebreaking in the learning process in public elementary schools. A prominent theme is how teachers adapt various icebreaking techniques, such as educational games, reflective activities, or icebreakers, to support the achievement of learning objectives and enhance classroom interaction.
4. Cluster 4 has three items marked in yellow: "the influence of ice," "the influence of ice use," and "elementary schools." This cluster focuses on the empirical impact of icebreaking on student learning outcomes. Research in this group is generally experimental, testing the extent to which icebreaking impacts learning achievement, student engagement, and the effectiveness of the learning process in elementary grades.
5. Cluster 5 has two items marked in purple: "increasing learning motivation" and "the application of ice." This cluster demonstrates a direct relationship between icebreaking implementation and increased student learning motivation. The emerging theme confirms that icebreaking activities are an innovative learning strategy that helps create a positive psychological environment for students, particularly in fostering enthusiasm and self-confidence while learning.
6. Cluster 6 has two items marked in turquoise: "in elementary schools" and "the use of ice." This cluster illustrates research linking the use of icebreaking specifically in elementary school settings, both in terms of implementation, contextual appropriateness, and impact on the learning process. The focus of this study group is on the implementation context, namely how teachers use icebreakers in elementary

school teaching and learning activities to improve social interaction, student attention, and the effectiveness of the learning process.

Each cluster demonstrates the relationships between keywords, building upon the previous clusters. Meanwhile, we divide the visualization analysis into three sections, each serving different functions and objectives: network visualization, density visualization, and overlay visualization.

Network Visualization

Network Visualization of Ice Breaking Techniques

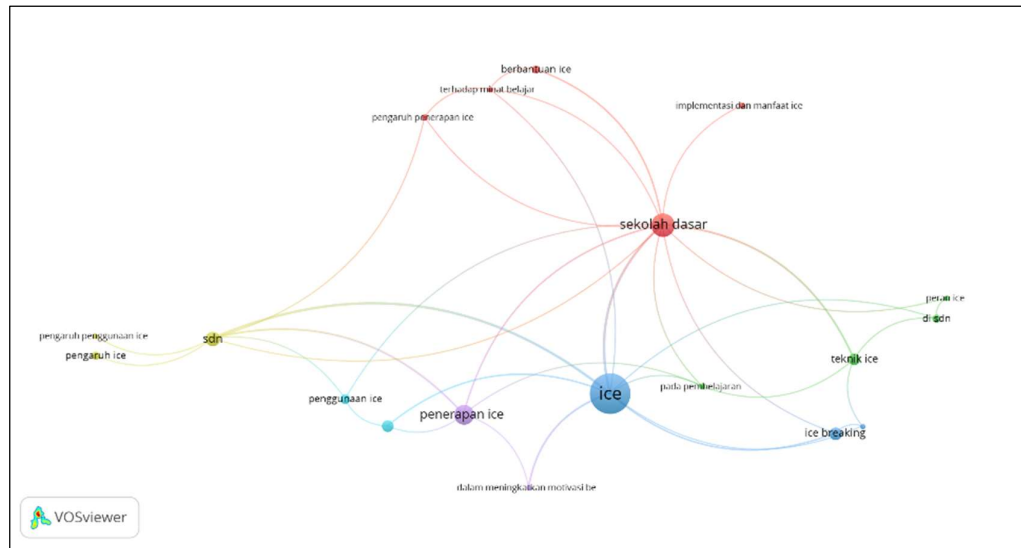


Figure 3. Network Visualization of Ice Breaking Techniques

Figure 3 indicated the relationships or networks between these terms, presented with interrelated results. The figure above shows that icebreaking is the most frequently researched topic within each cluster.

Density Visualization

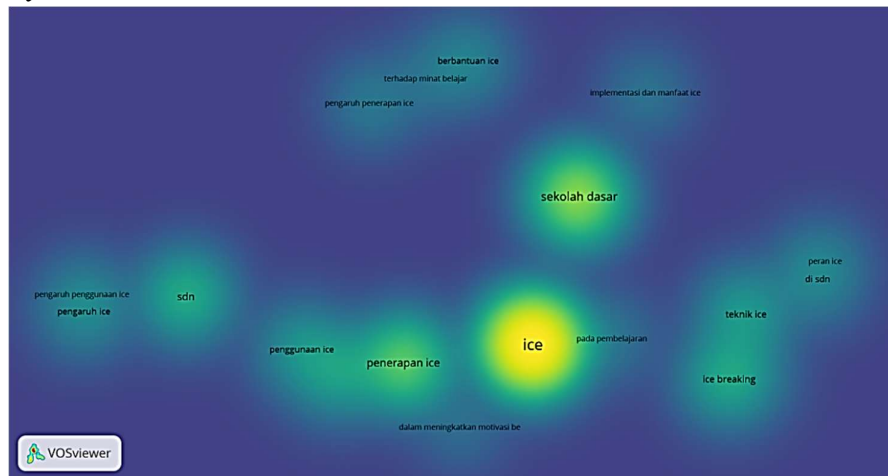


Figure 4. Density Visualization

The density visualization is depicted based on color and size. The brighter the yellow color and the larger the diameter of the keyword circle, the more frequently the keyword appears in research articles. The density visualization above, obtained from VOSviewer, shows that the word with the brightest color and largest diameter is "ice breaking," indicating that this topic is frequently researched in journals in Figure 4. Conversely, if the color fades and the diameter decreases, the topic is less frequently researched.

Overlay Visualization

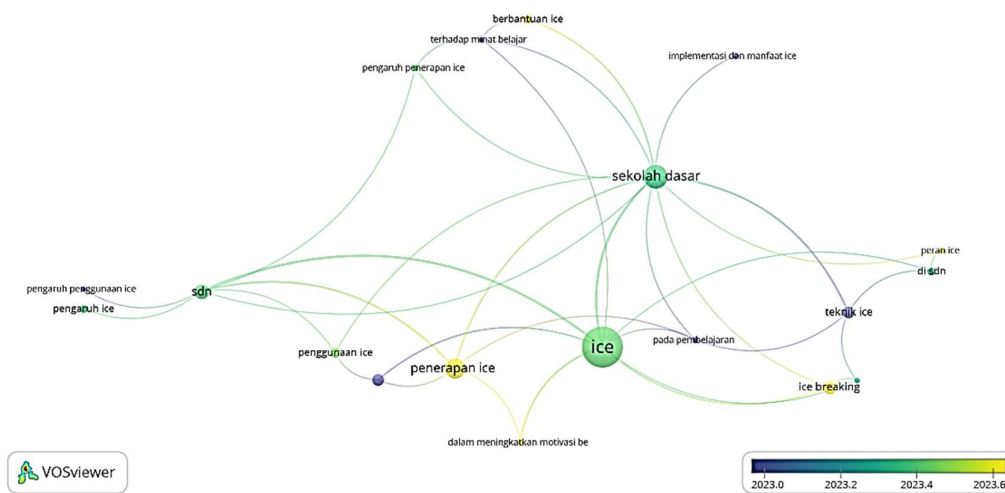


Figure 5. Overlay Visualization

Overlay visualizations depict trending research topics or keywords, or research keywords, over a specific time period. Based on the visualization in Figure 5, research on icebreaking techniques in elementary schools experienced varying developments from 2021 to 2025, with fluctuations in development or trends. Research on this topic began to increase in 2021-2023 but experienced a drastic decline in 2024-2025.

Discussion

This discussion section interprets the quantitative findings from a bibliometric analysis of 83 research articles focusing on icebreaking techniques in the elementary school context, published between 2021 and 2025. This interpretation aims to explain the structure and direction of contemporary research developments in this area, highlight theoretical and practical implications, and compare them with general trends in educational research.

The findings from the visualization of research distribution on icebreaking techniques in elementary schools, as presented by Cluster 1 using VOSViewer, reveal extensive research on strategies to boost student learning interest through ice-breaking activities. The main focus is on how icebreaking techniques can create a pleasant learning environment and motivate students to actively learn. Cluster 2 introduces

icebreaking as a learning strategy to motivate students. Icebreaking activities are refreshing and essential to active learning strategies that can improve teacher-student relationships, according to research in this cluster. Cluster 3 discusses public elementary school icebreaking methods, roles, and implementation. How teachers use educational games, reflective activities, and icebreakers to support learning objectives and classroom interaction is a major theme.

Additionally, cluster 4 examines how icebreaking affects student learning. In this group, experiments test how icebreaking affects elementary school learning achievement, student engagement, and learning process effectiveness. Cluster 5 shows that icebreaking motivates students to learn. The emerging theme shows that icebreaking activities are an innovative learning strategy that helps students feel positive about learning, especially by boosting enthusiasm and self-confidence. Cluster 6 shows research on elementary school icebreaking's implementation, contextual appropriateness, and learning impact. This study group examines how elementary school teachers use icebreakers to improve social interaction, student attention, and learning.

In summary, each cluster illustrates the interconnections among keywords, expanding upon the preceding clusters. We categorize the visualization analysis into three distinct sections, each with specific functions and objectives: network visualization, density visualization, and overlay visualization.

Publication Trends and Contemporary Relevance (2021–2025)

The 2021–2025 period showed a significant increase in publication volume (83 articles), confirming that the topic of icebreaking in elementary schools has become a major focus in post-pandemic educational research. Research on icebreaking techniques in elementary schools underwent inconsistent advancements from 2021 to 2025, characterized by fluctuations in development and trends. Research on this topic surged from 2021 to 2023 but underwent a significant decline in 2024–2025. Two main factors are likely driving this increase in research:

1. Issues of Learning Loss and Emotional Well-Being: The transition from online learning back to in-person (or hybrid models) post-COVID-19 has created an urgent need to restore students' social skills and address issues of anxiety or awkwardness (including icebreaking as an early intervention) ([Leni et al., 2022](#)).
2. Emphasis on Student Engagement: In modern curricula, particularly the Independent Curriculum (in the Indonesian context) and its global equivalents, the focus has shifted to student-centered learning ([Simarmata & Mayuni, 2023](#); [Hunaepi & Suharta, 2024](#)). Icebreakers are considered fundamental to achieving active engagement.

These findings suggest that icebreakers have evolved from simple pedagogical practices to evidence-based interventions relevant for learning recovery and improvement.

Keyword Analysis (Co-Occurrence) and Research Focus

The co-occurrence analysis of dominant keywords reveals important thematic shifts, reflecting the research focus for the 2021–2025 period:

Table 3. Keyword Analysis (Co-Occurrence) and Research Focus

Dominant Keyword Clusters	Research Direction Interpretation
"Student Engagement," "Intrinsic Motivation," "Active Learning"	Shows that icebreakers are no longer simply a way to "fill time," but are seen as a motivational driving mechanism and a prerequisite for active learning.
"Classroom Management," "Emotion Regulation," "Student Well-Being"	Reflects the integration of icebreakers with psychosocial components. Research focuses on how this technique helps create a safe classroom climate and supports students' well-being.
"Digital Games," "Interactive Technology," "Gamification"	Highlights efforts to integrate technology, particularly in the context of icebreakers. This demonstrates the adaptation of research to find icebreaker formats that are relevant to the digital generation (Gen Alpha).

These findings validate the novelty proposed in the introduction: research now focuses more on the psychopedagogical impact of icebreaking than simply describing the activity.

Implications and Future Directions

Based on the analysis of 83 articles from 2021–2025, the main implications of this research are:

1. Theoretical Implications: Icebreaking research should be explicitly linked to theoretical frameworks in educational psychology, such as Self-Determination Theory (for motivation) or Social Learning Theory (for interaction), rather than simply being used as an ad hoc activity.
2. Practical Implications: Elementary school teachers should be provided with training that focuses on the specific purpose of icebreaking (e.g., icebreaking to improve focus vs. icebreaking to improve group cohesion), rather than simply providing a list of games.
3. Future Research Directions: Co-citation analysis revealed a methodological gap in longitudinal studies. Therefore, future research should employ more robust experimental designs with delayed post-tests to measure the impact of icebreakers on knowledge retention and changes in students' social behavior over a longer period.

4. CONCLUSION

The bibliometric analysis of the topic of icebreaking in elementary schools reveals that this area has transitioned from a supplementary pedagogical practice to a principal research focus in post-pandemic educational studies. The period 2021–2025 was recorded as the most significant surge in publications, driven by the urgent need for interventions to address learning loss and emotional well-being issues for elementary school students following the transition to distance learning. Research was found to

concentrate most on the role of icebreaking in increasing student engagement and supporting the implementation of modern curricula (such as the Merdeka Curriculum in the Indonesian context). Despite the high publication volume, analysis of collaborative networks indicates that research remains largely local and fragmented, with a lack of significant cross-institutional and international collaboration.

Additionally, the researchers found that 83 obtained articles are relevant to the topic of discussion. Between 2021 and 2025, 83 studies examined elementary school icebreaking methods. VOSviewer's visual map also identified three main thematic clusters: Cluster 1 (elementary schools, ice-breaking implementation and benefits, and the effect of ice-breaking implementation, assisted by ice-breaking, on learning interest), Cluster 2 (learning, the role of ice-breaking, and ice-breaking techniques), and Cluster 3 (ice, ice-breaking, and mathematics learning). This cluster covers public elementary school icebreaking roles, methods, and implementation. Icebreaking was the most-visited topic in the network visualization. As "ice breaking," the density visualization term with the brightest color and largest diameter, journals frequently study this topic. From 2021 to 2025, overlay visualizations and primary school icebreaking studies showed changes. Research on this topic increased in 2021-2023 but plummeted in 2024-2025.

As a recommendation, researchers are advised to expand their collaborative networks internationally. This is crucial for comparing the effectiveness of icebreaking practices across cultural contexts and educational systems, as well as for enriching evidence-based intervention theory. Future research should move beyond descriptive or single-point case studies to longitudinal research. This study aims to measure the long-term impact of icebreaking on elementary school students' socio-emotional development and academic achievement. Efforts are needed to develop and test standardized and validated icebreaking models or modules for the Indonesian curriculum, particularly those specifically designed to address anxiety relief and improve student well-being post-pandemic. Moreover, academic institutions and researchers ought to prioritize the direct dissemination of bibliometric findings and effective icebreaking intervention models to elementary school teachers via workshops or practical training.

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APPENDIX

Article Code	Article Title
A1	: Harianja, M. M., & Sapri, S. (2022). Implementasi dan manfaat ice breaking untuk meningkatkan minat belajar siswa sekolah dasar. <i>Jurnal Basicedu</i> , 6(1), 1324-1330.
A2	: Zakiyyah, D., Suswandari, M., & Khayati, N. (2022). Penerapan Ice Breaking Pada Proses Belajar Guna Meningkatkan Motivasi Belajar Siswa Kelas Iv Sd Negeri Sugihan 03. <i>Journal of Educational Learning and Innovation (ELIa)</i> , 2(1), 73-85.
A3	: Algivari, A., & Mustika, D. (2022). Teknik Ice Breaking pada Pembelajaran Tematik di Sekolah Dasar. <i>Journal of Education Action Research</i> , 6(4), 433-439.
A4	: Prayuda, I. C., Agung, P., Mashari, A., & Tohir, A. (2022). Pengaruh Teknik Ice Breaking Terhadap Minat Belajar Peserta Didik Kelas II SD. <i>Jurnal Evaluasi Dan Pembelajaran</i> , 4(1), 1-5.
A5	: Pujiarti, T. (2022). Pengaruh penggunaan teknik ice breaking terhadap hasil belajar Matematika Siswa Sekolah Dasar. <i>Ainara Journal (Jurnal Penelitian Dan PKM Bidang Ilmu Pendidikan)</i> , 3(1), 30-35.
A6	: Selvia, M. (2022). Pengaruh Ice Breaking Terhadap Hasil Belajar Peserta Didik Pada Pembelajaran Tema 8 Sub Tema 2 Kelas Ii Sekolah Dasar. <i>Jurnal Ika Pgsd (Ikatan Alumni Pgsd) Unars</i> , 10(2), 122-132.
A7	: Puspitasari, F. (2023). Implementasi penerapan ice breaking untuk meningkatkan konsentrasi belajar siswa kelas III UPT SDN 52 Gresik. <i>Jurnal Pengabdian masyarakat</i> , 4(02), 5405-5411.
A8	: Lena, M. S., Nisa, S., Utari, T., & Anas, H. (2023). Efektivitas Implementasi Ice Breaking untuk Meningkatkan Minat dan Semangat Belajar Siswa Sekolah Dasar. <i>PUSTAKA: Jurnal Bahasa dan Pendidikan</i> , 3(3), 240-248.
A9	: Zuhariyah, Z., & Fahmi, I. (2022). Pengaruh Ice Breaking Terhadap Hasil Belajar Peserta Didik Kelas Ii Di Sd Negeri Pusakajaya Utara I Kabupaten Karawang. <i>Pendas: Jurnal Ilmiah Pendidikan Dasar</i> , 7(1), 25-38.
A10	: Noviyanti, S., Puspita Sari, D. E., & Tanti, R. (2022). Implementasi Teknik Ice Breaking Pada Pembelajaran Di Sd 64/I Muara Bulian. <i>Jurnal pendidikan dan Konseling</i> , 4(3), 501-510.