Salud, Ciencia y Tecnología. 2026; 6:2624
doi: 10.56294/saludcyt20262624

ORIGINAL

Research Trends in Lesson Study Based on Scopus from 2015-2024: A Bibliometric Analysis

Tendencias de Investigación en Lesson Study Basado en Scopus de 2015-2024: Un Análisis Bibliométrico

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Cite as: Yuli Lestari W, Koosbandiah Surtikanti H, Rahman T, Riandi. Research Trends in Lesson Study Based on Scopus from 2015-2024: A Bibliometric Analysis. Salud, Ciencia y Tecnología. 2026; 6:2624. https://doi.org/10.56294/saludcyt20262624

Submitted: 21-07-2025 **Revised:** 30-09-2025 **Accepted:** 16-12-2025 **Published:** 01-01-2026

Editor: Prof. Dr. William Castillo-González

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ABSTRACT

Introduction: this study aims to identify trends and research opportunities in lesson study development through bibliometric analysis.
Method: the article data were sourced from Scopus over 10 years (2015 to 2024) and analyzed using VOSviewer. A systematic literature review approach with bibliometric analysis was employed.
Results: research articles on lesson study showed fluctuating trends but generally increased, particularly in the last three years. The most productive countries were the United States, followed by the United Kingdom and Indonesia. Eleven clusters were identified, with 73 items related to lesson study. Research trends are associated with mathematics education, teacher development, community of practice, and professional development.
Conclusions: a bibliometric analysis of Lesson Study literature helps researchers align its development with related topics, promoting sustained growth and diversification. Opportunities exist for research related to online lesson study, mentoring, noticing, and secondary education.

Keywords: Lesson Study; Bibliometric Analysis; Teacher Professional Development; Educational Research Trends; Scopus Database.

RESUMEN

Introducción: este estudio tiene como objetivo identificar el desarrollo, las tendencias y las oportunidades de investigación del lesson study mediante un análisis bibliométrico.
Método: los datos de los artículos se obtuvieron de Scopus durante 10 años (2015 a 2024) y se analizaron utilizando VOSviewer. Se empleó un enfoque de revisión sistemática de la literatura con análisis bibliométrico.
Resultados: los artículos de investigación sobre lesson study mostraron tendencias fluctuantes, pero generalmente aumentaron, particularmente en los últimos tres años. Los países más productivos fueron Estados Unidos, seguido del Reino Unido e Indonesia. Se identificaron once clústeres, con 73 ítems relacionados con el lesson study. Las tendencias de investigación se asocian con la educación matemática, el desarrollo docente, la comunidad de práctica y el desarrollo profesional.
Conclusiones: un análisis bibliométrico de la literatura sobre Lesson Study ayuda a los investigadores a alinear su desarrollo con temas relacionados, promoviendo un crecimiento sostenido y una diversificación. Existen oportunidades para la investigación relacionada con el lesson study en línea, la mentoría, la observación y la educación secundaria.

Palabras clave: Lesson Study; Análisis Bibliométrico; Desarrollo Profesional Docente; Tendencias de Investigación Educativa; Base de Datos Scopus.

INTRODUCTION

Education is the acquisition of knowledge, skills, and attitudes, facilitated by teachers who employ effective teaching methods to transfer knowledge and experience to learners.[1] Lesson Study is a professional development approach for teachers that has gained considerable attention in education due to its effectiveness in improving teacher competencies, particularly in lesson planning.[2] Research suggests that incorporating Lesson Study into teacher capacity-building programs can yield significant benefits.[3,4,5,6] The method originated in Japan and has been widely adopted in many countries to enhance the quality of teaching and learning. Central to Lesson Study is teacher collaboration, where educators work together to design, observe, and reflect on their teaching practices.[7] This collaborative approach has positively influenced teacher competency and student learning outcomes.[8] Furthermore, adaptations of Lesson Study, such as engaging pre-service teachers through training and mentoring, have shown promise in developing future educators.[9] Understanding how Lesson Study is implemented and evaluated in different regions has become increasingly important in light of ongoing globalization and scientific advancements.

The lesson study approach enables teachers to collaboratively set goals, design lessons, and reflect on past experiences to enhance future teaching practices.[10] For students, Lesson Study can take the form of planning to improve learning quality[11]—addressing students' learning difficulties,[12] according to [13]. According to Nandiyanto et al.[14], Lesson Study can be linked to at least four dimensions: theories, students' interests and expectations, their interaction with learning materials, and their strengths and weaknesses in understanding concepts. Even [15] noted in their research that the success of Lesson Study could be attributed to connections, technology-supported teaching, the use of concrete materials, practice, teacher behaviour, and teaching styles.

With growing interest in Lesson Study, research on this method continues to evolve. Self-actualization factors significantly influence teacher involvement in Lesson Study research.[16] Recent Lesson Study research emphasizes collaborative and reflective teaching methods, particularly in lesson design.[7] However, the extent to which this development has been documented and analyzed remains pertinent. Over the past decade, from 2015 to 2024, scholarly publications discussing Lesson Study have increased. This indicates the need for an in-depth study to identify patterns, focus areas, and contributions of such research to the field of education.

Bibliometric analysis effectively identifies research trends, evaluates publication impact, and examines collaboration patterns.[17,18] Through this method, researchers can evaluate publication volume, the most productive authors, contributing institutions, and frequently discussed topics. In the context of Lesson Study, bibliometric analysis provides a comprehensive overview of research developments, identifies research gaps, and offers directions for future studies. This is crucial to ensure that Lesson Study significantly enhances education quality.

Previous research shows that implementing the Lesson Study approach significantly enhances teachers' competence in designing effective learning. Various studies also show that integrating Lesson Study into teacher capacity development programs positively affects student learning outcomes across different countries. A perfect bibliometric analysis can be built by selecting search fields, author performance indicators, methods for studying thematic evolution, and specific techniques such as bibliographic coupling.[19] Bibliometric studies provide comprehensive and integrative information regarding global trends and key research points[20,23]—keyword occurrence patterns.[4,24] Bibliometrics provides precise fact-based insights and findings[25]—offering an overview of research gaps.[26]

Bibliometric analysis has been widely applied across various studies, including Albugami et al.[27] on climate change, battery production[28], and dietary interventions to modulate immune function.[29] Various studies on lesson study have been conducted over the past decade, as reflected in Scopus publication trends from 2015 to 2024. Nandiyanto et al.[14] highlight the importance of mapping correlations between items in lesson study research to identify potential developments. Moktar et al.[30] and Anwar et al.[31] also indicate that bibliometric analysis can help understand publication patterns, geographical distribution, and emerging research trends in this field. However, previous studies still show gaps in the exploration of lesson study in science. Additionally, in past research, several topics, such as online lesson study, communication, mentoring, and TPACK, have received little attention. Therefore, this study aims to fill these gaps by analysing lesson study research trends in Scopus from 2015 to 2024 using a bibliometric approach to provide further insights into developments, research potential, and future research directions.

Given this background, this study aims to analyze the trends in Lesson Study research over the past

decade using bibliometric methods. Several bibliometric analyses have examined educational research trends, but relatively few have focused on lesson study. For instance, Nandiyanto et al.[14] mapped the correlations between lesson study topics but provided limited discussion on thematic evolution. Similarly, Moktar et al.[30] and Anwar et al.[31] explored publication patterns and geographical distributions; however, their analyses lacked a deeper focus on emerging trends, such as online lesson studies and their integration with technology. Previous studies have predominantly concentrated on mathematics education and teacher development, overlooking interdisciplinary applications of lesson study in science education and digital learning environments. This study builds on these bibliometric foundations by incorporating a decade-long analysis (2015–2024) and identifying new research opportunities in underexplored areas. By addressing these gaps, this study provides a more comprehensive and nuanced understanding of lesson study's evolution, impact, and future directions.

METHOD

This study employs a Systematic Literature Review (SLR) with bibliometric analysis to examine research trends in Lesson Study from 2015 to 2024. The SLR approach is essential for synthesizing existing knowledge, identifying research gaps, and providing direction for future studies. The methodology follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines[32] to ensure transparency, reproducibility, and methodological rigor. Additionally, bibliometric techniques analyze citation trends, the dataset's keyword co-occurrences, and thematic structures.

Data Source and Search Strategy

The Scopus database was selected as the primary data source due to its comprehensive indexing of peer-reviewed journal articles across various disciplines, ensuring the inclusion of high-impact research. The search strategy was developed by defining a Boolean query targeting Lesson Study research published within the last decade (2015–2024). The following structured query was used:

```
TITLE-ABS-KEY ( "lesson study*" OR "collaborative lesson research" OR "teacher learning cycle" )
AND PUBYEAR > 2014 AND PUBYEAR < 2026
AND (LIMIT-TO (SUBJAREA, "SOCI") OR LIMIT-TO (SUBJAREA, "EDUC"))
AND (LIMIT-TO (DOCTYPE, "ar"))
AND (LIMIT-TO (SRCTYPE, "j"))
AND (LIMIT-TO (LANGUAGE, "English"))
AND (LIMIT-TO (PUBSTAGE, "final"))
```

This search was conducted on 26 January 2025, retrieving all available Scopus publications that met the predefined criteria. The decision to use Scopus over other databases such as Web of Science or Google Scholar was based on its superior citation tracking, data accuracy, and peer-reviewed nature of indexed articles.

Inclusion and Exclusion Criteria

A set of inclusion and exclusion criteria was applied during the screening process to ensure the relevance and quality of the studies included. Articles were included if they were peer-reviewed journal articles indexed in Scopus, explicitly discussed Lesson Study, were published between 2015 and 2024, were written in English, and were categorized as original research articles. Articles were excluded if they were non-peer-reviewed sources such as conference proceedings, book chapters, dissertations, or grey literature. Additionally, studies that did not focus primarily on Lesson Study, were published in languages other than English, or were duplicates, were removed from the dataset.

Data Screening and Selection Process

The study selection process followed the PRISMA 2020 guidelines, ensuring a systematic approach to identifying, screening, and including relevant studies.[32] Initially, the 26 January 2025 records were retrieved from Scopus. After removing duplicates using Mendeley, the titles and abstracts were screened for relevance. Full-text screening was then performed to ensure the final selection aligned with the study's objectives. The final dataset comprised 747 articles.

To illustrate the study selection process, a PRISMA flow diagram was generated in Python and presented in figure 1.

The PRISMA diagram visually represents the filtering process. The process began with a comprehensive search on Scopus using a structured Boolean query targeting Lesson Study research published between 2015 and 2024. After retrieving 747 records, duplicates were removed using Mendeley, and a two-stage screening process was conducted: (1) Title and abstract screening, where studies unrelated to Lesson Study were excluded, and (2) Full-text review, ensuring alignment with predefined inclusion criteria. The final dataset comprised 747

articles that met all quality and relevance standards. Bibliometric analysis was performed using VOSviewer to generate co-occurrence networks, citation relationships, and thematic clusters, providing insights into the evolution of Lesson Study research. Citation impact and keyword distribution were also analyzed to identify influential studies and emerging research themes. These methodological steps ensure that the study's findings are replicable and verifiable, allowing future researchers to adopt a similar approach when conducting bibliometric analyses in educational research.

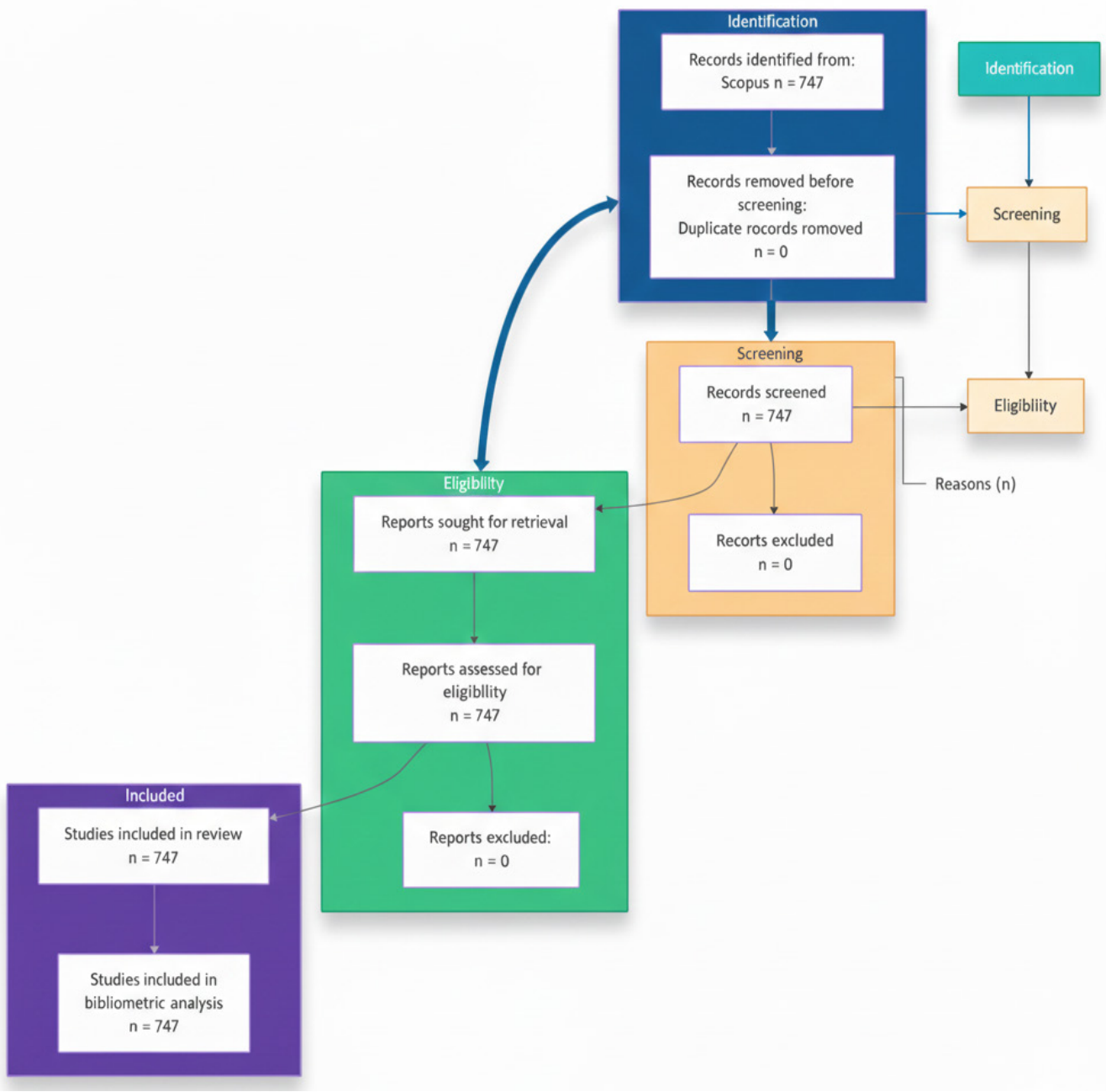

Figure 1. PRISMA Flow Diagram

Data Extraction and Analysis

The extracted data were systematically coded and analyzed using bibliometric and content analysis techniques. Bibliometric analysis was conducted using VOSviewer to generate keyword co-occurrence networks, citation relationships, and thematic clusters. Content analysis was performed to categorize key trends and thematic patterns within Lesson Study research. The geographical distribution of publications was analyzed to determine country-wise contributions, while citation analysis identified the most influential studies, authors, and journals. The findings from these analyses were used to map the evolution of research themes over time.

Quality Assessment and Reliability

To ensure methodological rigor, the selected studies were critically appraised using the Mixed Methods Appraisal Tool (MMAT). This tool evaluates research quality across different study designs by assessing methodological transparency, validity, and reliability. Each study was scored based on the clarity of the research questions, the appropriateness of the methodology, the data collection procedures, and the interpretation of the findings. Inter-rater reliability was ensured through independent assessment by two reviewers, with discrepancies resolved through discussion. The final dataset included only studies that met the predefined quality criteria.

Ethical Considerations

Ethical approval was not required because this study is based on secondary data analysis from publicly available literature. However, all referenced studies were appropriately cited to maintain academic integrity. This study's systematic literature review methodology follows a rigorous and replicable approach, ensuring transparency and reliability in the synthesis of Lesson Study research. This study provides a comprehensive and structured analysis of research trends over the past decade by integrating PRISMA guidelines, bibliometric techniques, and content analysis.

RESULT

Various studies on lesson study have developed significantly over the past decade, particularly from 2015 to 2024. The trend of article publications in the Scopus database shows fluctuations, with the highest peak in 2024. After increasing from 2015 to 2016, the number of publications declined to 43 in 2017. However, from 2018 to 2020, there was a significant increase, followed by a decline in 2021 and a resurgence from 2022 to 2024. After filtering, 747 articles discussing lesson study were found. The continued increase in publications over the past four years indicates that lesson study remains a relevant and widely studied topic in academia. Additionally, lesson study research is not limited to the field of education but also connects to various other disciplines.

Further analysis shows that lesson study is related to 11 other fields, with the most significant dominance in the social sciences (67,7 %), followed by mathematics, the arts, and the humanities. Furthermore, the geographical distribution indicates that Lesson Study research was determined by the first author's country of affiliation in Scopus-indexed articles. The United States had the highest contribution (147 articles), followed by the United Kingdom (72), Indonesia (65), Japan (54), and the Netherlands (44). The visualisation of keyword relationships in lesson study research reveals 11 main clusters, comprising 73 items and totalling 1244 link strengths. The main clusters include teacher development, inclusive education, professional learning, and the use of open approaches in teaching.

Meanwhile, lesson study research in the field of science remains limited, with only six links and a total link strength of 9, opening opportunities for further exploration in science education. The topic density visualization shows that research on professional development, mathematics education, and communities of practice is widespread. In contrast, topics such as online lesson study, communication, mentoring, and TPACK remain underexplored, providing potential for innovative research in the future.

Significant research on lesson study has been conducted over the last decade, from 2015 to 2024. Figure 2 shows the results of lesson study research during this period, revealing a fluctuating trend, with the highest number of studies conducted in 2024.

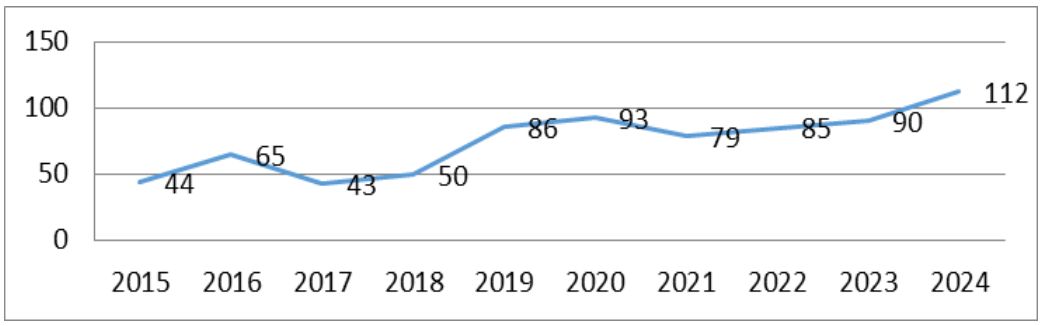

Figure 2. Development of Article Document from 2015 to 2024

Figure 2 indicates that the number of publications fluctuated over the years. It started at 44 in 2015, increased to 65 in 2016, and then dropped to 43 in 2017. A slight recovery occurred in 2018, with 50 publications, followed by a significant rise in 2019 (86) and 2020 (93). However, there was a decline in 2021 (79), but the numbers gradually increased again, reaching 85 in 2022, 90 in 2023, and peaking at 112 in 2024. A total of 747

articles were identified after data screening. Figure 2 highlights a growth in lesson study research over the past four years, signifying its sustained popularity and relevance.

Lesson study research relates to various fields, as depicted in figure 3 below.

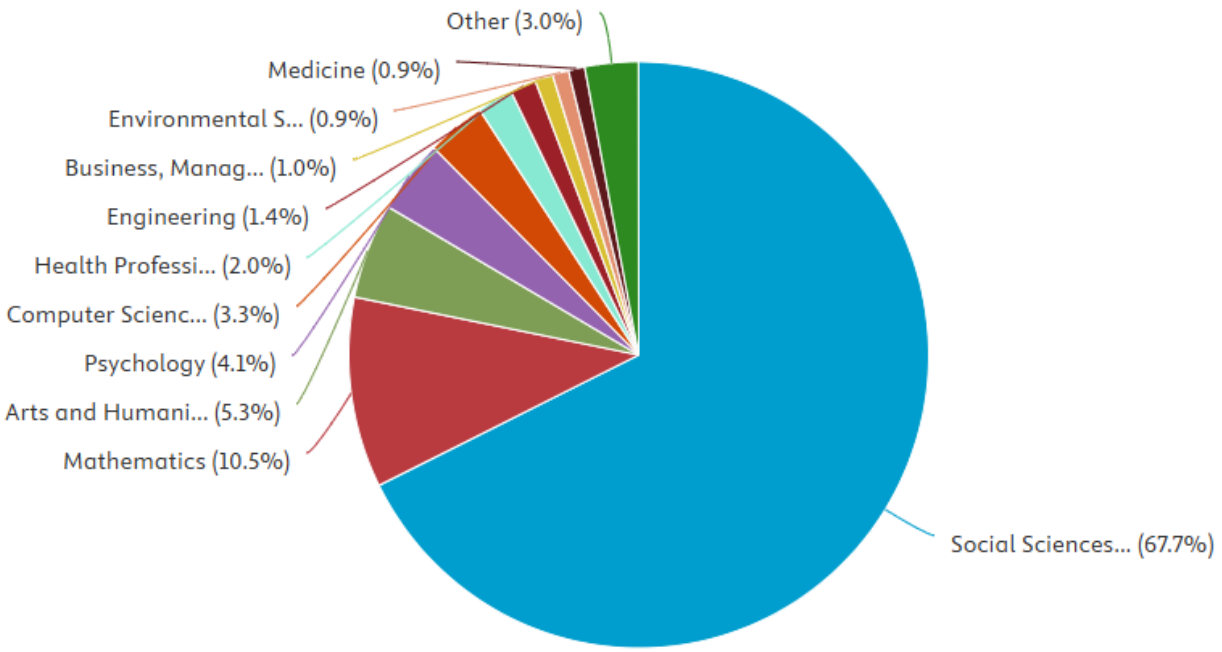

Figure 3. Lesson Study Across Different Fields

Figure 3 illustrates that lesson study research intersects with 11 other fields. Most studies are linked to the social sciences (67,7 %), followed by mathematics and the arts and humanities in second and third place, respectively.

The data in figure 4 below provides insights into the number of articles produced by various countries over the past decade (2015–2024). The figure highlights the countries contributing the most to lesson study research. The top five countries are the United States (147 articles), the United Kingdom (72 articles), Indonesia (65 articles), Japan (54 articles), and the Netherlands (44 articles).

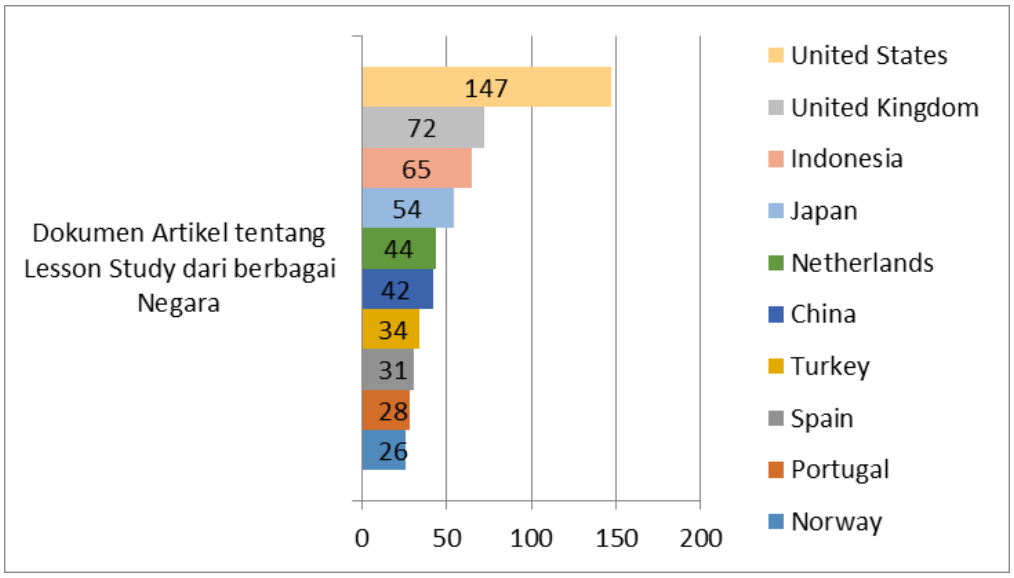

Figure 4. Number of Lesson Study Articles by Country

Figure 4 presents a mapping or actualization of the correlation levels between various items. This mapping helps identify potential new areas of research.[14] Each item cluster has a specific relationship strength, identified and analysed by discerning meaningful patterns in the dataset.[30,31]

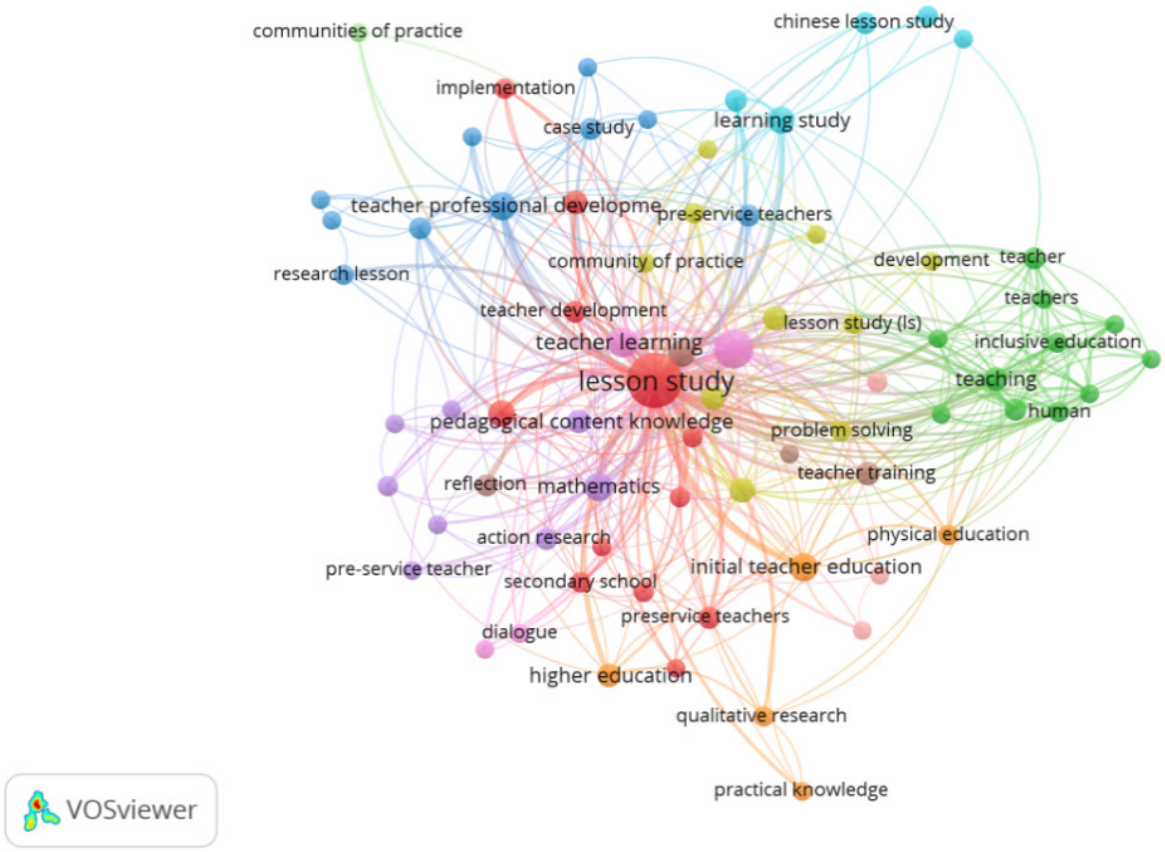

Figure 5. Visualization of Keyword Relationships in Lesson Study

Based on figure 5, there are 11 clusters with 73 items, 440 links, and a total link strength of 1244. Cluster 1, marked in red, consists of several items: implementation, Japan, lesson planning, lesson study, mathematics teachers, noticing, open approach, pre-service teachers, professional learning community, secondary school, teacher development, and teacher education. Cluster 2 includes 11 items: article, education, human, inclusive education, learning, primary school, student, teacher, teacher beliefs, teachers, and teaching. Cluster 3 comprises boundary crossing, case study, online lesson study, pre-service teachers, professional learning community, research lesson, sustainability, teacher knowledge, teacher professional development, and TPACK. Cluster 4 consists of 10 items: a community of practice, development, EFL teachers, lesson study, mathematics education, mathematics teaching, problem-solving, professional growth, professional learning, and teacher collaboration. Cluster 5 consists of 8 items: action research, collaborative learning, communication, mathematics, pedagogical content knowledge, pre-service teaching, secondary education, and teaching practice. Cluster 6 comprises five items: Chinese lesson study, design research, learning study, lesson study for learning, and variation theory. Cluster 7 includes five items: higher education, initial teacher education, physical education, practical knowledge, and qualitative research. Cluster 8 contains four items: collaboration, mentoring, reflection, and teacher training. Cluster 9 includes dialogue, professional development, science, and teacher learning. Cluster 10 consists of anthropological theory, reflective practice, and theory of didactical situations. Meanwhile, Cluster 11 has only 1 item: communities of practice. In the science-related items, connections are made with mathematics, teacher education, dialogue, professional development, professional learning, and lesson study. Research on lesson study in the field of science is still limited, with only six links, a total link strength of 9, and 5 occurrences. Thus, this represents an opportunity to conduct lesson study research in science education.

Figure 6 presents the density visualization results from Vosviewer, highlighting the frequency of specific topics, keywords, or terms used in research. Topics or terms in bright colors indicate frequent research focus, while darker colors indicate less-explored or infrequent research areas.[33]

Based on figure 6, frequent research trends include professional development, mathematics education, teacher development, and community of practice. Meanwhile, science, online lesson study, teacher practice, communication, mentoring, and TPACK have received less research attention, presenting opportunities for further exploration and innovation.

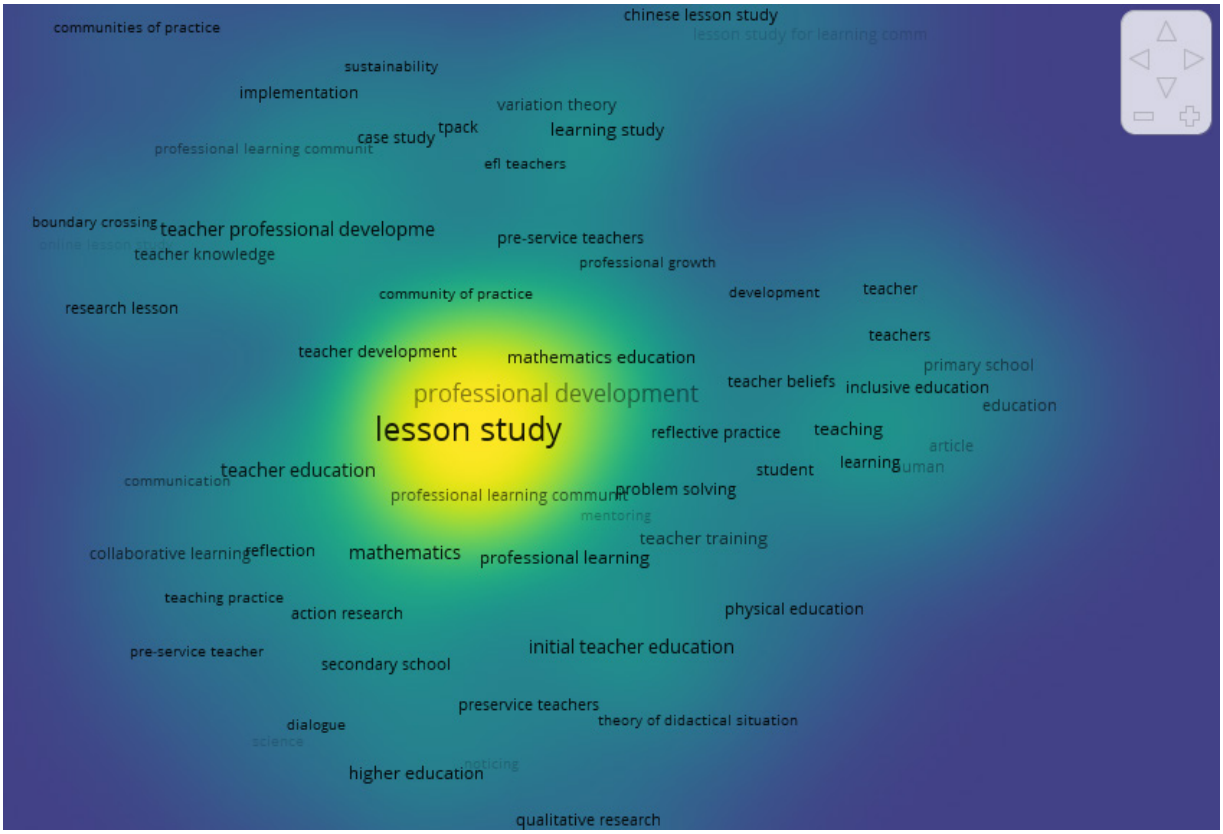

Figure 6. Density Visualization of Lesson Study Keywords

DISCUSSION

This study's discussion highlights key findings from a bibliometric analysis of Lesson Study research between 2015 and 2024, directly addressing the research questions on publication trends, thematic clusters, and gaps in the literature. It then compares these findings with the existing body of research to assess alignment and discrepancies. The findings indicate that research on Lesson Study has experienced a fluctuating trend, with a notable increase in the last three years. This trend aligns with previous studies emphasizing the growing importance of collaborative professional development models in education.[2,7] This study confirms that Lesson Study effectively enhances teacher competencies and student learning outcomes, aligning with prior research.[8,13] However, this study also identifies gaps in the literature, particularly in the underexplored areas of Lesson Study in science education, online learning, communication, mentoring, and TPACK integration.

The findings align with the theoretical framework that positions Lesson Study as a reflective, collaborative, and cyclical process for teacher professional development. Previous studies have emphasized the role of Lesson Study in fostering teachers' pedagogical content knowledge[5] and enhancing their reflective teaching practices.[9] This bibliometric analysis reinforces these perspectives by showing that teacher development remains a dominant theme in the literature. However, an important divergence from prior research is the relatively limited attention to online Lesson Study, particularly in the context of digital transformation in education. This gap is significant as integrating digital tools and online collaboration has transformed many aspects of teaching and learning, yet Lesson Study has not fully adapted to these changes. The lack of research in this area limits educators' potential to leverage technology to enhance collaborative lesson planning and reflective practice. Addressing this gap could lead to more inclusive and scalable professional development opportunities, particularly for educators in remote or resource-constrained settings. While Zhang[8] explored the potential of AI-powered and MOOC-based Lesson Study models, the present study highlights that such digital adaptations remain significantly underrepresented in the broader research landscape.

One of the unique contributions of this study is its identification of research gaps and emerging opportunities in Lesson Study, particularly in areas that have been overlooked in previous research. While existing studies have predominantly focused on mathematics education, teacher collaboration, and professional development, this study reveals that Lesson Study in science education, online collaboration, and digital pedagogies remain relatively unexplored. By highlighting these gaps, this study extends the scope of Lesson Study research beyond traditional contexts and provides a roadmap for future investigations into underrepresented domains. While much of the existing literature focuses on mathematics education, teacher collaboration, and professional development, the findings suggest that Lesson Study in science education, online collaboration, and digital

pedagogies remain relatively unexplored. This study addresses this gap by providing a systematic bibliometric analysis that maps under-researched areas, paving the way for future research in these domains. Furthermore, the study highlights Indonesia's growing contribution to Lesson Study research, indicating that developing countries increasingly recognize its importance in improving educational quality.

This study contributes to the academic discourse by filling a critical gap in the literature through a comprehensive bibliometric approach that systematically examines research trends, keyword co-occurrence networks, and thematic clusters. Using bibliometric analysis to identify underrepresented areas, this study enables scholars to align Lesson Study with emerging educational needs, particularly in digital and interdisciplinary contexts.[34]

The practical implications of this study are significant for various stakeholders, including educators, policymakers, and researchers. For example, policymakers could use these findings to develop policies integrating Lesson Study into national teacher training programs, ensuring sustainable professional development. Additionally, initiatives such as government-funded online Lesson Study platforms could help bridge the gap for educators in remote areas. Universities and teacher training institutions might incorporate technology-driven Lesson Study models into their curricula to enhance digital pedagogical skills, while education practitioners could leverage these insights to design more effective collaborative learning environments. First, the findings suggest that policymakers should support Lesson Study initiatives beyond mathematics education, extending their application to science and interdisciplinary learning. Second, educators should explore digital adaptations of Lesson Study, particularly in response to the increasing need for hybrid and online professional development models. Third, universities and teacher training institutions should incorporate technology-enhanced Lesson Study models into their curricula to prepare future teachers for evolving educational challenges. Lastly, researchers should prioritize underexplored areas such as online Lesson Study, teacher mentoring, and interdisciplinary applications to ensure the continued evolution and relevance of Lesson Study in contemporary education.

In conclusion, this study offers a comprehensive understanding of Lesson Study research trends, aligning its findings with the existing literature while highlighting key divergences and unexplored areas. By identifying underrepresented topics such as online Lesson Studies, interdisciplinary applications, and digital pedagogies, this study maps existing research gaps and provides a framework for future investigations. The insights gained from this analysis can shape subsequent research directions by encouraging studies that integrate technology into Lesson Study, explore its impact across various subject domains, and assess its effectiveness in diverse educational settings. By mapping research gaps and emerging themes, this study provides valuable insights that can guide future research, inform policy decisions, and enhance the implementation of Lesson Study across diverse educational contexts.

Limitations

Despite providing valuable insights into trends in Lesson Study research, this study has several limitations that should be acknowledged. First, the analysis relied exclusively on the Scopus database, potentially excluding relevant studies indexed in other databases such as Web of Science, ERIC, or Google Scholar. This selection bias may have influenced the geographical distribution patterns and thematic clusters identified, as database coverage varies across regions and publication types.

Second, the search strategy was limited to English-language publications and peer-reviewed journal articles, excluding conference proceedings, books, book chapters, and non-English literature. This restriction may have omitted significant contributions from non-English speaking regions, particularly in Asia and Latin America, where Lesson Study has been widely implemented. Consequently, the findings may not fully represent the global landscape of Lesson Study research.

Third, the bibliometric analysis focused primarily on quantitative metrics (publication counts, citation patterns, keyword co-occurrence) rather than qualitative content analysis of individual studies. While this approach effectively maps research trends and collaborations, it provides limited insight into the methodological rigor, theoretical frameworks, or practical implications of the included studies. The identified "gaps" in research areas such as science education or online Lesson Study should therefore be interpreted as quantitative underrepresentation rather than qualitative importance.

Fourth, the study's time frame (2015-2024) may not capture the complete evolution of Lesson Study research, particularly foundational works published before 2015 that continue to influence contemporary studies. Additionally, as the final year includes publications up to early 2025, the most recent developments may not be fully represented.

Finally, the use of VOSviewer for network visualization, while standard in bibliometric research, involves subjective decisions in parameter selection (minimum occurrence thresholds, clustering algorithms) that can influence the resulting maps and thematic clusters. Alternative bibliometric tools or different parameter settings might yield slightly different visualizations and interpretations.

These limitations suggest caution when generalizing the findings and highlight opportunities for future research to address these methodological constraints through multi-database analyses, mixed-methods approaches, and more inclusive literature sampling strategies.

CONCLUSION

This article comprehensively analyses trends in Lesson Study research in the Scopus database from 2015 to 2024. While the data reveal fluctuations in publication trends, there has been an overall increase in research interest, particularly in the last three years. The most frequently explored topics include professional development, mathematics education, teacher development, and communities of practice, confirming Lesson Study's established role in improving teaching quality. However, several critical areas remain underexplored, including its applications in science education (e.g., biology, chemistry, and physics), online and technology-enhanced Lesson Study, teacher mentoring, and communication within collaborative teaching practices. The limited attention given to these areas highlights significant research gaps that future studies should address. By identifying these gaps, this study contributes to the existing literature by providing a roadmap for future research directions. Integrating Lesson Study with interdisciplinary fields and digital platforms can enhance its scalability and impact on teacher development and student learning outcomes.

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FINANCING

The authors received no funding for this research.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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