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A Bibliometric Analysis Mathematics Lesson Study

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Abstract

Japan has been successful in building a functional model that not only produces effective instructors but also produces successful students in mathematics. The main purpose of this research is to analyze the publications of mathematics lesson study research that are reported and indexed in the Scopus database and present them in the form of tables and diagrams. Specifically, this study aims to find bibliometric overview of mathematics lesson study research, reference source of mathematics lesson study research, and the most impactful sources of mathematics lesson study research. In this specific study, bibliometric analysis is carried out by utilizing the RStudio tool known as biblioshiny for bibliometrix, which is part of the R Statistical Package. This study evaluates mathematics lesson study research which was published from 1996 to 2022. These articles continue to grow. The author has used the term "lesson study" 196 times. Lesson study: A Japanese method to improve mathematics teaching and learning was the most cited document (264). The mathematics lesson study research demonstrates that has been mentioned in 36 other pieces of research. The United States topped the list with the most citations (1432). ZDM-Mathematics Education ranks highest in h-index (12), m-index (1.714), and g-index (16). Huang R had the highest g-index, which was 10, and Huang R and Isoda M had the highest h-index, which was 4.

Keywords: bibliometric, lesson study, matematics education, R

Abstrak

Jepang telah berhasil membangun model fungsional yang tidak hanya menghasilkan instruktur yang efektif tetapi juga menghasilkan siswa yang sukses dalam bidang matematika. Tujuan utama penelitian ini adalah menganalisis publikasi pada penelitian *Lesson Study* matematika yang dilaporkan dan terindeks di *database* Scopus serta menyajikannya dalam bentuk tabel dan diagram. Secara khusus penelitian ini bertujuan untuk mengetahui gambaran bibliometrik penelitian *Lesson Study* Matematika, sumber referensi penelitian *Lesson Study* Matematika, dan sumber penelitian *Lesson Study* Matematika yang paling berdampak. Pada penelitian khusus ini, analisis bibliometrik dilakukan dengan memanfaatkan alat RStudio yang disebut *biblioshiny for bibliometrix*, yang merupakan bagian dari *R Statistical Package*. Kajian ini mengevaluasi penelitian *Lesson Study* matematika yang terbit pada tahun 1996 hingga 2022. Artikel-artikel ini terus berkembang. Penulis telah menggunakan istilah "*lesson study*" sebanyak 196 kali. *Lesson study*: A Japanese method to improve mathematics teaching and learning adalah dokumen yang paling banyak dikutip (264). Penelitian *Lesson Study* matematika menunjukkan bahwa telah disebutkan dalam 36 penelitian lainnya. Amerika Serikat menduduki puncak daftar dengan kutipan terbanyak (1432). ZDM-*Mathematics Education* menempati peringkat tertinggi pada h-index (12), m-index (1,714), dan g-index (16). Huang R memiliki g-index tertinggi yaitu 10, dan Huang R serta Isoda M memiliki h-index tertinggi yaitu 4.

Kata Kunci: bibliometrik, *lesson study*, pendidikan matematika, R

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INTRODUCTION

Japan has been successful in building a functional model that not only produces effective instructors but also produces successful students in mathematics. This approach creates both teachers and students who are successful in mathematics. Because Japanese lesson study is an

activity for instructors, its success is entirely dependent on the teachers' performance (Eraslan, 2008). Since the beginning of the 20th century, lesson study has become increasingly popular in Japan. Many Japanese teachers say that taking part in lesson study was a key part of how their teaching methods have changed and improved over time (Murata, 2011).

The beginning of the Meiji period is considered to be the beginning of Japanese lesson study. During this time period, a novel approach to education known as the "object lesson" was first implemented. In order to disseminate the approach, the preparation of teachers becomes a significant concern. Normal schools provide their future instructors with opportunities to practice the object lesson by utilizing the criticism lesson. This indicates where the practice of studying lessons and their principles came from. In later years, the role of the criticism lesson grew to encompass both pre-service teacher training and in-service professional development. This explains how the concept of lessons study first emerged in Japan (Makinae, 2010).

In the past decade, lesson study has garnered the interest of a global audience, and in 2002, it was one of the focal points of the Ninth Conference of the International Congress of Mathematics Education (ICME). Subsequently, it expanded to numerous other nations, and more than a dozen worldwide conferences and workshops were conducted in which participants discussed their experiences and progress with lesson study as they adopted this new form of professional growth in their respective cultural contexts (Murata, 2011).

Many countries have collaborated in lesson study, one of which is international collaborative lesson study through international exchange of teachers using ICT to understand different interpretations of teaching materials and instruction methods, and to create lessons with new values that have been integrated and developed in the education of both countries as part of Global Lesson Study (GLS) (Sakai et al., 2021).

Scholars throughout the world have examined lesson study. Global trends and possibilities for lesson study research were analyzed bibliometrically. Previous research was conducted by (Liao & Wu, 2022). This study reviews the publications of Lesson Study and Learning Study from 1999 to 2021. This study has several limitations. Among them, only bibliographic data taken from CNKI were selected; therefore, some relevant publications may not be included in this study. In addition, Chinese was the primary language for publication at CNKI, and other publications in English were not collected. Because of the limitations in this study, the authors conducted a similar study, namely reviewing the publication of lesson study mathematics with bibliometric analysis taken from the Scopus database. Scopus is considered a journal of high quality and is internationally recognized. In addition, data updates are carried out, namely sources covering the time period from 1996 to 2022.

The main purpose of this research is to analyze the publications of mathematics lesson study research that are reported and indexed in the Scopus database and present them in the form of tables and diagrams. Specifically, this study aims to find: bibliometric overview of mathematics lesson study research, reference source of mathematics lesson study research, and the most impactful sources of mathematics lesson study research.

METHODS

Explaining research chronological, including research design, research procedure (in the form of algorithms, Pseudocode or other), how to test and data acquisition (IEEE Standards Association, 2009). The description of the course of research should be supported references, so the explanation can be accepted scientifically.

The publication of mathematics lesson study research, which is indexed by the Scopus database, makes use of the bibliometric approach as its primary research methodology. The Scopus database was accessed on July 11, 2022, and the search terms "lesson study" and "mathematics" were used to retrieve the research data. The field of study was mathematics. For the sake of this analysis, we chose to look at every publishing type. Bibliographic information extracted in its entirety from the Scopus database and saved in.csv format. In the beginning, the bibliometrix package is loaded into R Studio after it has been installed. After that, the biblioshiny program is started by typing the command library (bibliometrix) followed by the biblioshiny () command in the R console (Cuccurullo et al., 2016; Aria & Cuccurullo, 2017; Supriyadi, 2022).

In this specific study, bibliometric analysis is carried out by utilizing the RStudio tool known as biblioshiny for bibliometrix, which is part of the R Statistical Package. An in-depth bibliometric research can be carried out with the assistance of the many elements that are included in this program. It is a piece of software that gives people who aren't skilled in coding access to the bibliometrix tool through a web interface. At after time, the Biblioshiny interface receives the Scopus file in *.csv format, having been uploaded from Scopus. In addition, in accordance with the aims of the research, the output of this biblioshiny was downloaded in the form of files ending in *.xls and *.png, and those files were used for the data analysis of this specific study (Cuccurullo et al., 2016; Aria & Cuccurullo, 2017; Supriyadi, 2022).

RESULTS AND DISCUSSION

Table 1 displays some fundamental bibliometric information that was received through the biblioshiny program and pertains to the mathematics lesson study. There were three hundred and ninety-eight (n-398) papers discovered from 145 different sources covering the time period of 1996 to 2022. The average number of citations for a single article is 10.25, while the average number of citations for a single document in one year is 5.8. The overall number of references for the documents that were retrieved is 11711, and the total number of author keywords is 662. There are a total of 237 journal articles, 57 conference papers, 9 reviews, and 74 book chapters contained among the documents.

Table 1. Main Information Mathematics Lesson Study Research

Description	Results
Timespan	1996:2022
Sources (Journals, Books, etc)	145
Documents	398
Annual Growth Rate %	11.51
Document Average Age	5.88
Average citations per doc	10.25

Description	Results
References	11711
DOCUMENT CONTENTS	
Keywords Plus (ID)	345
Author's Keywords (DE)	662
AUTHORS	
Authors	757
Authors of single-authored docs	90
AUTHORS COLLABORATION	
Single-authored docs	118
Co-Authors per Doc	2.57
International co-authorships %	15.33
DOCUMENT TYPES	
Article	237
Book	5
book chapter	74
conference paper	57
conference review	12
Editorial	3
Erratum	1
Review	9

Figure 1 and Table 2 present a visual representation of the expanding body of mathematics lesson study papers. The quantity of documents has been showing signs of steady growth recently. The first decade (from 1996 to 2006), which saw the publication of only 9 documents, was followed by the second decade, which saw the publication of 140 documents (2006 to 2016). Indicating that mathematics lesson study is increasingly being examined by researchers or academics is the fact that there has been a rise in the amount of research into mathematics lesson study from the early decades of this research to the second decade of this research.

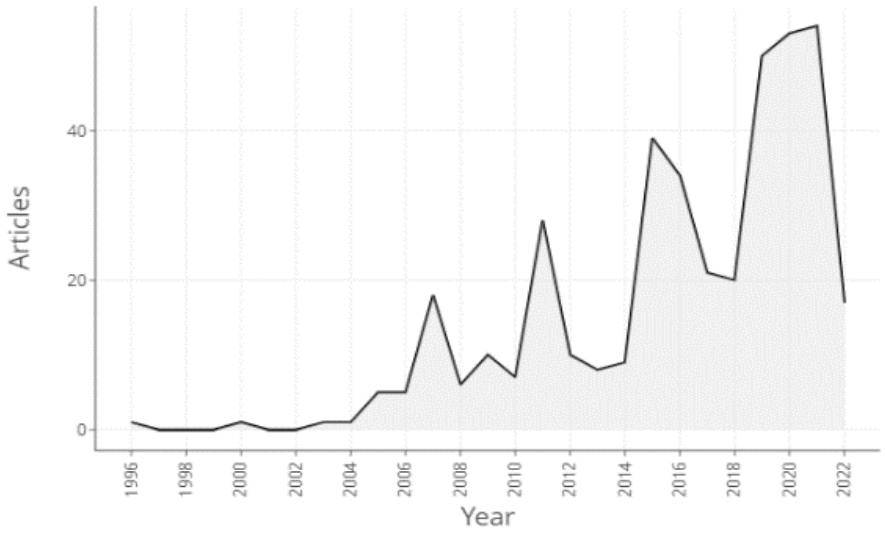

Figure 1. Annual scientific production in mathematics lesson study research

The number of these kinds of studies rose to a total of 249 documents throughout the years 2017-2022 (see Table 2), indicating a further rise in their frequency. Despite the fact that we did not get this data until the end of 2022, we are still able to forecast that research on mathematics lesson studies will continue to expand up until the end of this year. It was discovered that the Annual Growth Rate of this mathematics lesson study was 11.51% after the findings of the data processing that was carried out in the biblioshiny were analyzed.

Table 2. Annual scientific production in mathematics lesson study research

Year	Articles	Year	Articles	Year	Articles
1996	1	2005	5	2014	9
1997	0	2006	5	2015	39
1998	0	2007	18	2016	34
1999	0	2008	6	2017	21
2000	1	2009	10	2018	20
2001	0	2010	7	2019	50
2002	0	2011	28	2020	53
2003	1	2012	10	2021	54
2004	1	2013	8	2022	17

Table 3 and Figure 2 demonstrate that the term "lesson study" has been used by the author keyword a total of 196 times, making it the most often used term. This is followed by the phrase "teacher learning," which has been used 21 times, the term "professional development," which has been used 46 times, mathematics, which has been used 36 times, mathematics education, which has been used 22 times, and other words. There are probably fewer than twenty occurrences total. If the size of the phrase in Figure 3 is larger, it indicates that there are more occurrences of that keyword, and vice versa if the size of the term is smaller.

Table 3. Most frequent word in mathematics lesson study research

Terms	Frequency
lesson study	196
professional development	46
Mathematics	36
mathematics education	22
teacher learning	21
teacher education	12
pedagogical content knowledge	11
mathematics teaching	10
professional learning	10
reflection	8

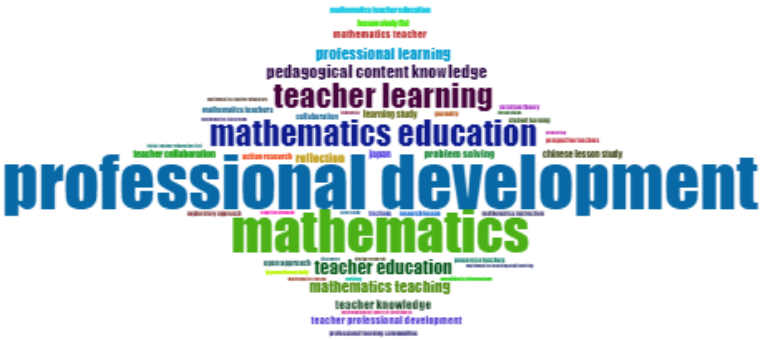

Figure 2. Word cloud from author keyword in mathematics lesson study research

Following this, a study into the time-dependent dynamics of author keyword occurrence is carried out, and the results are displayed in Figure 3, which can be found below. It has been noted that the overall number of occurrences of the primary word in each year has been increasing over the course of time. On the other hand, the expansion of some of these occurrences is occurring at a quicker rate than that of others. The percentage of times the phrases *"Lesson Study," "Professional Development," "Mathematics," "Mathematics Education," "Teacher Learning," "Teacher Education," "Pedagogical Content Knowledge," "Professional Learning," "Mathematics Teaching," and "Reflection" have been used has increased the most for the phrases "Teacher Learning," "Teacher Education,"* and *"Teacher Learning."*

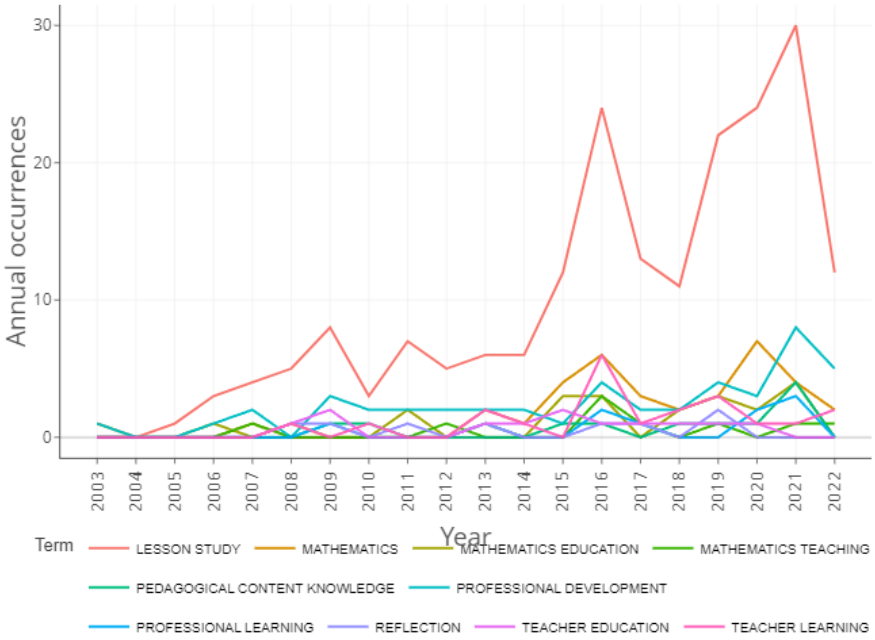

Figure 3. Word growth from author keyword in mathematics lesson study research

References Source of Mathematics Lesson Study Research

In recent years, thanks to the rise in popularity of databases such as the Science Citation Index and the Social Science Citation Index, some academics have compiled data sets that use the number of citations to a scientist's work as an indicator of that scientist's impact. These data sets can be found

on websites such as the Science Citation Index and the Social Science Citation Index (Diamond Jr, 1986). These bibliometric signals are accessible in every region of the world, enabling the prompt detection of outstanding researchers (Jacob et al., 2007).

In this study, we have compiled data from the top 10 documents of mathematics lesson study that have received the most citations from researchers all over the world. The document entitled *Lesson study: A Japanese approach to improving mathematics teaching and learning* from (Fernandez & Yoshida, 2004) published in 2004 was the most cited document (264) followed by (C. C. Lewis et al., 2009) with 196 citations, (Fernandez et al., 2003) with 185 citations, (C. Lewis, 2015) with 124 citations, (Takahashi & McDougal, 2016) and (Hiebert & Stigler, 2000) has the same citation of 112 and (Fernández, 2010) with 107 citations and the remaining under a hundred citations are shown in Table 4 below.

Table 4. Most global cited documents in mathematics lesson study research

Authors	Total Citations
(Fernandez & Yoshida, 2004)	264
(C. C. Lewis et al., 2009)	196
(Fernandez et al., 2003)	185
(C. Lewis, 2015)	124
(Takahashi & McDougal, 2016)	112
(Hiebert & Stigler, 2000)	112
(Fernández, 2010)	107
(Ono & Ferreira, 2010)	95
(Murata, 2011)	80
(Lieberman, 2009)	76

The 10 local sources that were cited the most frequently by researchers in the mathematics lesson study research are presented in Table 5. Table 5 shows that the work done by (C. Lewis et al., 2006) has been cited in a total of 36 other pieces of research. The purpose of this study is to avoid the fate of so many previous once promising reforms, which is to have them abandoned before they are completely understood or adequately implemented. The suggested research will involve the creation of a descriptive knowledge base, an explanation of the innovation mechanism, and an iterative cycle of research aimed at improvement.

Table 5. Most local cited references in mathematics lesson study reserach

Cited References	Citations
(C. Lewis et al., 2006)	36
(Fernandez, 2002)	19
(Shulman, 1986)	18
(Ball et al., 2008)	15
(Doig & Groves, 2011)	14
(C. C. Lewis et al., 2009)	14
(C. C. Lewis, 2002)	13
(Chokshi & Fernandez, 2004)	12
(Fujii, 2014)	12
(Fernandez, 2005)	10

Table 6 shows the most productive countries in terms of citations on mathematics lesson study. The United States topped the list with the highest citations (1432). From the first position, the United States has a very far distance from the second rank, namely United Kingdom as another productive country with 228 citations. From the top 10 research on mathematics lesson study, as a representative of the Asian continent, Japan is the country with the most citations with 114 citations, followed by Indonesia with 63 citations.

Table 6. Most productive countries in mathematics lesson study research

Country	TC	Average Article Citations
USA	1432	21.06
United Kingdom	228	22.80
Ireland	140	11.67
Australia	118	11.80
Japan	114	5.70
South Africa	113	14.13
Sweden	68	9.71
Indonesia	63	3.32
Denmark	42	8.40
Portugal	34	6.80

The Most Impactful Sources of Mathematics Lesson Study Research

In the following Table 7, lists the top ten journals that researchers in the field of mathematics lesson study find most useful. Researchers determined that the International Journal for Lesson and Learning Studies was the journal that they favored the most out of all the others, and it has been published in 16 different countries throughout the world. During the time period under consideration, it was discovered that the publication with the title Teaching and Teacher Education was the one that received the most number of citations, with a total of 509. In terms of the h-index (12), the m-index (1.714), and the g-index, the journal ZDM-Mathematics Education is currently in first place (16). It is important to take into consideration the fact that the recently launched journal is currently ranked among the top ten journals.

Table 7. Source impact in mathematics lesson study research

Element	h index	g index	m index	TC	NP
ZDM—Mathematics Education	12	16	1.714	472	16
International Journal for Lesson and Learning Studies	9	14	0.818	259	36
Journal of Mathematics Teacher Education	9	10	0.5	362	10
Lesson Study Research and Practice In Mathematics Education: Learning Together	8	16	0.667	289	16
Teaching And Teacher Education	8	8	0.4	509	8
New Icmi Study Series	5	8	0.294	67	8
Action In Teacher Education	4	4	0.222	101	4
Journal Of Physics: Conference Series	4	5	0.8	46	20
Lesson Study: Challenges In Mathematics Education	4	5	0.5	38	8
Professional Development In Education	4	7	0.286	173	7

Table 8 displays the results of the top ten most prolific writers according to the number of publications, citations, and h-indexes they have earned. Huang has created the largest number of publications among these top 10 ranks, with a total of 10 publications. MURATA A's four papers have received the greatest number of citations (201) and have been given the highest h-index score (4). HUANG R supplied the greatest value for the g-index, which was 10, and HUANG R and ISODA M contributed the highest value for the h-index, which was 4, as shown in Table 8. HUANG R and ISODA M both contributed the same value.

Table 8. Authors impact in mathematics lesson study research

Element	h_index	g_index	m_index	TC	NP
Huang R	6	10	0.429	140	10
Isoda M	6	6	0.375	143	6
Hobri	4	7	0.8	51	8
Hourigan M	4	5	0.571	58	5
Lewis C	4	4	0.308	180	4
Murata A	4	4	0.333	201	4
Sarkar Arani MR	4	4	0.5	27	4
Vermunt JD	4	4	0.571	146	4
Bruce CD	3	3	0.25	71	3
Doig B	3	3	0.25	65	3

Based on the results of this bibliometric study, there are four meaningful points worth being addressed in detail in the following:

1. Lesson study of mathematics is increasingly being studied by researchers or academics.

This can be seen from the increase in the number of Lesson Study studies from the initial decade of the study (1996-2006) to the second decade (2006-2016) of this study. Even the number of studies from 2017-2022 has surpassed the number in the second decade even though 2022 is not yet over. This is because of the benefits of lesson study, namely to improve mathematics instruction and learning in the classroom (Fernandez, C., & Yoshida, M., 2004).

Whatever the situation, professional learning always happens. Those who have shared their experiences through Lesson Study agree that Lesson Study is a very positive experience for all participants and has even more potential to enhance mathematics teaching and learning with an effective network of teachers and outside experts in the process (Burghes & Robinson, 2010). In addition to the benefits for developing learning and teacher experience, lesson study is also a means of building a learning community. The development of information technology makes it easier to build a learning community.

2. Many authors use the terms *lesson study* as a keyword followed by the term *professional development.*

There are many other terms that are juxtaposed with lesson study as a keyword. But the term "professional development" is the most common. This means that a lot of research links lesson study as a form or effort in developing teacher professionalism. Lesson Study has the potential to support the professional development of teachers. This is because the dimensions of the empowerment of the

lesson study model, both in terms of content and form, can be adopted as a model for effective and sustainable teacher professional development (Ustuk & Çomoglu, 2019).

3. The top document on mathematics lesson study that received the most citation from researchers round the world was entitled Lesson study: A Japanese approach to improve math teaching and learning from Fernandez & Yoshida, 2004.

Why many are used as reference sources, here's James' review. W. Stigler from the University of California at Los Angeles regarding the document "Clea Fernandez and Makoto Yoshida have made major contributions to our understanding of lesson study, and this book clearly is one of the most important of these. They tell the story of lesson study at one school in a way that is accurate and true to Japanese practice, yet accessible and comprehensible to U.S. audiences....This book presents the details of Japanese lesson study, and these details can take your breath away....Those of us interested in lesson study, and in improving teaching and learning in U.S. schools, should be grateful for the care and clarity with which Clea Fernandez and Makoto Yoshida have presented the substance of Japanese lesson study. There is much learned in these pages."

4. The journal ZDM-Mathematics Education is the most impactful sources of Mathematics Lesson Study research.

Like looking for reference sources related to research, we are also encouraged to read previous research as a reference. This study succeeded in tracking down the most influential journals in the lesson of mathematics studies. The search results show that the journal ZDM-Mathematics Education is the most impactful source of Mathematics Lesson Study research. This will certainly make it easier for researchers to find references, no need to do a lot of random searches, can be directed based on the results of this bibliometric study.

CONCLUSION

This study evaluates mathematics lesson study research published from 1996 to 2022. These articles are constantly evolving. The author has used the term "lesson study" 196 times, then followed by the term professional development as a juxtaposed keyword. The most cited document is Lesson study: A Japanese method for improving the teaching and learning of mathematics from Fernandez & Yoshida, published in 2004. The Lesson Study of mathematics shows that (C. Lewis et al., 2006) has been mentioned in 36 studies. other. The United States topped the list with the most citations (1432). The journal ZDM-Mathematics Education ranks highest in the h-index (12), m-index (1.714), and g-index (16). HUANG R has the highest g-index, which is 10, and Huang R and Isoda M have the highest h-index, which is 4.

REFERENCES

Aria, M., & Cuccurullo, C. (2017). bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics*, *11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Ball, D. L., Thames, M. H., & Phelps, G. (2008). Content knowledge for teaching: What makes it special?. *Journal of Teacher Education, 59*(5), 389-407. https://doi.org/10.1177/0022487108324554

Burghes, D. N., & Robinson, D. (2010). *Lesson study: enhancing mathematics teaching and learning*. CfBT Education Trust Plymouth.

Chokshi, S., & Fernandez, C. (2004). Challenges to importing Japanese lesson study: Concerns, misconceptions, and nuances. *Phi Delta Kappan*, *85*(7), 520–525. http://dx.doi.org/10.1177/003172170408500710

Cuccurullo, C., Aria, M., & Sarto, F. (2016). Foundations and trends in performance management. A twenty-five years bibliometric analysis in business and public administration domains. *Scientometrics*. https://doi.org/10.1007/s11192-016-1948-8

Doig, B., & Groves, S. (2011). Japanese lesson study: Teacher professional development through communities of inquiry. *Mathematics Teacher Education and Development*, *13*(1), 77–93.

Eraslan, A. (2008). Japanese lesson study: Can it work in turkey? *Egitim ve Bilim*, *33*(149), 62–67.

Fernandez, C. (2002). Learning from Japanese approaches to professional development: The case of lesson study. *Journal of Teacher Education*, *53*(5), 393–405. https://doi.org/10.1177/002248702237394

Fernandez, C. (2005). Lesson study: A means for elementary teachers to develop the knowledge of mathematics needed for reform-minded teaching? *Mathematical Thinking and Learning*, *7*(4), 265–289. https://psycnet.apa.org/doi/10.1207/s15327833mtl0704_1

Fernandez, C., Cannon, J., & Chokshi, S. (2003). A US-Japan lesson study collaboration reveals critical lenses for examining practice. *Teaching and Teacher Education*, *19*(2), 171–185. https://doi.org/10.1016/S0742-051X(02)00102-6

Fernandez, C., & Yoshida, M. (2004). Lesson study: A Japanese approach to improving mathematics teaching and learning. In *Lesson Study: A Japanese Approach to Improving Mathematics Teaching and Learning*. Lawrence Erlbaum Associates. https://doi.org/10.4324/9781410610867

Fernández, M. L. (2010). Investigating how and what prospective teachers learn through microteaching lesson study. *Teaching and Teacher Education*, *26*(2), 351–362. https://doi.org/10.1016/j.tate.2009.09.012

Fujii, T. (2014). Implementing Japanese lesson study in foreign countries: misconceptions revealed. *Mathematics Teacher Education and Development*, *16*(1), n1.

Hiebert, J., & Stigler, J. W. (2000). A Proposal for Improving Classroom Teaching: Lessons from the TIMSS Video Study. *Elementary School Journal*, *101*(1), 3–20. https://doi.org/10.1086/499656

Lewis, C. (2015). What Is Improvement Science? Do We Need It in Education? *Educational Researcher*, *44*(1), 54–61. https://doi.org/10.3102/0013189X15570388

Lewis, C. C. (2002). *Lesson study: A handbook of teacher-led instructional change*. Research for better schools.

Lewis, C. C., Perry, R. R., & Hurd, J. (2009). Improving mathematics instruction through lesson study: A theoretical model and North American case. *Journal of Mathematics Teacher Education*, *12*(4), 285–304. https://doi.org/10.1007/s10857-009-9102-7

Lewis, C., Perry, R., & Murata, A. (2006). How should research contribute to instructional improvement? The case of lesson study. *Educational Researcher*, *35*(3), 3–14.

Liao, M., & Wu, J.-F. (2022). Lesson Study & Learning Study in China (1999-2021): Bibliometric Analysis Based on CNKI. *International Journal of Modern Education & Computer Science*, *14*(2).

Lieberman, J. (2009). Reinventing teacher professional norms and identities: The role of lesson study and learning communities. *Professional Development in Education*, *35*(1), 83–99. https://doi.org/10.1080/13674580802264688

Makinae, N. (2010). The origin of lesson study in Japan. *The 5th East Asia Regional Conference on Mathematics Education: In Search of Excellence in Mathematics Education, Tokyo*, *2*, 140–147.

Murata, A. (2011). Introduction: Conceptual overview of lesson study. *Lesson Study Research and Practice in Mathematics Education: Learning Together*, 1–12. https://doi.org/10.1007/978-90-481-9941-9_1

Ono, Y., & Ferreira, J. (2010). A case study of continuing teacher professional development through lesson study in South Africa. *South African Journal of Education*, *30*(1), 59–74.

Sakai, T., Akai, H., Ishizaka, H., Tamura, K., Ozawa, H., & Lee, Y.-J. (2021). Development of program for "Global Lesson Study" in mathematics education. *International Journal for Lesson and Learning Studies*, *10*(4), 317–330. https://doi.org/10.1108/IJLLS-02-2021-0015

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, *15*(2), 4–14. https://doi.org/10.3102/0013189X015002004

Supriyadi, E. (2022). A Bibliometric Analysis: Computer Science Research From Indonesia. *TIERS Information Technology Journal*, *3*(1), 28–34. https://doi.org/10.38043/tiers.v3i1.3706

Takahashi, A., & McDougal, T. (2016). Collaborative lesson research: maximizing the impact of lesson study. *ZDM - Mathematics Education*, *48*(4), 513–526. https://doi.org/10.1007/s11858-015-0752-x

Ustuk, Ö., & Çomoglu, I. (2019). Lesson Study for Professional Development of English Language Teachers: Key Takeaways from International Practices. *Journal on Efficiency and Responsibility in Education and Science*, *12*(2), 41–50. https://doi.org/10.7160/eriesj.2019.120202