



Bibliometric Analysis of Articles Published in the Scope of Web of Science (WOS) Related to Lesson Study

Ahmet Aykan¹

(Research Article)

Abstract

The aim of this study is to examine articles on the lesson study professional development model through a bibliometric analysis approach. The analysis focuses on studies published between 2000 and 2022, retrieved from the Web of Science (WoS) database, specifically the Social Sciences Citation Index (SSCI) and Science Citation Index Expanded (SCI-E). The keyword “lesson study” was used to identify relevant publications. After a rigorous screening process, a total of 318 articles meeting the inclusion criteria were selected for analysis. Descriptive and bibliometric analysis methods were employed to analyze the data. The findings indicate that most studies were published in 2022, while the highest number of citations occurred in 2020. It was also found that the majority of the studies were conducted in the United States. In terms of journals, the International Journal for Lesson and Learning Studies published the highest number of articles, and De Vries emerged as the most prolific author. Furthermore, the study by Fernandez received the highest number of citations. Based on these findings, it is suggested that future research should address the lesson study model from diverse perspectives and across different cultural contexts. Additionally, including studies from other WoS databases may enhance the scope of future research. Conducting meta-analysis and meta-synthesis studies is also recommended to achieve a more comprehensive understanding of the lesson study model.

Keywords: Bibliometric analysis, Lesson study, Teacher education, Teacher professional development, Web of Science

INTRODUCTION

Lesson study is a professional development model used to provide continuity in the professional development of teachers, to increase the quality of teaching, and to increase student success as a result. The model enables teachers to come together and collaboratively make plans while it also provides teachers the opportunity to observe and take notes during the implementation of this plan in the classroom. Then, the observation notes and video footage taken during the observations made in the classroom environment are discussed by the teachers with other colleagues after the lesson. The model provides the opportunity for teachers to listen to each other's opinions and suggestions and allows them to acquire many professional gains

¹Educational Sciences, Education Faculty, Muş Alparslan University, Muş, Turkey, a.aykan@alparslan.edu.tr, <https://orcid.org/0000-0002-8033-0821>

by concentrating on improving the teaching process. In this process, teachers who develop their creative and critical thinking skills analyze the teaching process in depth and therefore try to increase the success of their students.

The lesson study research model was first started to be used in Japan and then became widespread all over the world (Makinae, 2019). At the beginning, the model was applied without any pedagogical foundation in a conventional way in Japan but later, it has gained a systematic structure with international studies, especially carried out in the US and Europe (Aykan & Dursun, 2021). The lesson study research model has started to become widespread in the US, England, and many other countries, especially after the studies carried out by Yoshida in 1999 and by Stigler and Hiebert in the same year (Saito, 2012; Takahashi and Yoshida, 2004). Xu and Pedder (2015) indicated that out of 67 studies on the model, 34 were conducted in North America, 23 in Asia, 8 in Europe and 2 in Africa.

The increasing interest in the model is also reflected in the studies conducted on the subject. Especially in recent years, it is seen that the number of studies has increased, and the model has begun to be applied in different countries and cultures (Dudley, 2015). The model has started to be investigated in a wide range in countries such as the US, England, China, Japan and the Netherlands, yet it is noticed that it has started to be studied with increasing interest in countries such as Scotland, Switzerland, Italy, Germany, Portugal and Turkey and in many countries of the world (Quaresma, Winslow, Clivaz, Ponte, Ni SShuilleabhain, & Takahashi, 2018). Tepylo and Moss (2011) emphasized that studies on lesson study research model became widespread, but more studies should be carried out to better understand the model. It is thought that descriptive analysis and bibliometric methods can be significant to better analyze what kind of studies should be done about the model.

The bibliometric analysis method examines huge body of data systematically, objectively and in depth and presents these data to the readers with graphs and relationship networks. The method has become popular for exploring and analyzing large-scale scientific data (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). Researchers use the bibliometric analysis method to reveal trends related to their field of study and to obtain objective findings about that field. The method, which is frequently used in fields such as tourism, business, and agriculture, has recently been used in studies related to education (Gülmez, Özteke, & Gümüş, 2021). The method, which has only recently been used in educational research, offers researchers a general perspective on the subject studied. From this point of view, it also provides researchers with information such as the direction of interest in the field of study and which aspects of the subject matter should be focused on. In this vein, it seems necessary to investigate recent research trends in the literature on the subject matter.

Based on all these considerations, the present study aims to reveal the trend of qualified articles published in SSCI and SCI-expanded journals within WoS related to the lesson study research model. As the literature review shows that the model is being investigated more everyday by researchers and there is no study approaches the subject matter from this angle, the present study was decided to be carried out. The main objective of this study is to examine the studies in the Web of Science (WoS) database on the lesson study research model through

descriptive and bibliometric analysis. On this basis, answers were sought to the following questions on the articles published in the SSCI and SCI-E journals in the WoS database about the lesson study research model:

- What is the distribution of articles published on the model by years?
- What is the distribution of the articles published on the model by country?
- What is the distribution of the articles published on the model by journals?
- What is the distribution of the total number of citations of the articles published on the model by years?
- What are the most cited articles carried out on the model?
- What is the numerical distribution of the articles on the model according to researchers?
- How is the analysis on the most cited researcher’s work published on the model?
- How is the keyword analysis used in the articles published on the model?

METHODOLOGY

Document analysis, which is one of the qualitative research methods, was implemented in the present study. Document review is an approach that includes the examination and evaluation of electronic or printed resources (May, 2011). In the present study, the articles published in the Social Sciences Citation Index (SSCI) and Social Citation Index Expanded (SCI-E) journals in the WOS database within the scope of the lesson study research model were obtained in the electronic environment and then discussed in detail using descriptive and bibliometric analysis methods.

Data Collection

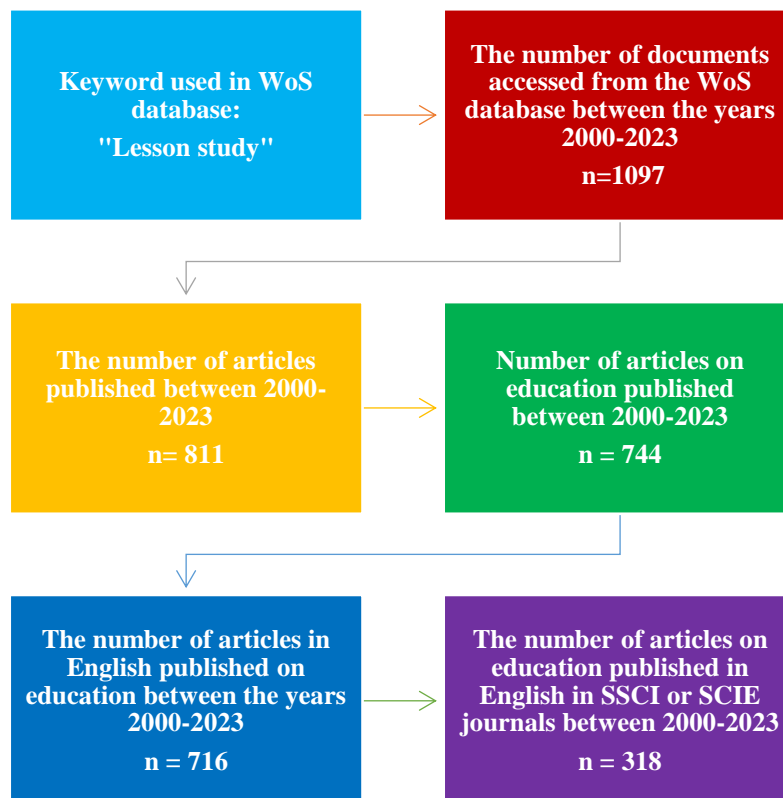


Figure 1. *The process of determining the articles*

As seen in Figure 1, a review was conducted on WoS database with the keyword "lesson study" and a total of 1097 documents were found. Since the scope of the research covers the studies between the years 2000-2023, two publications, one in 1998 and one in 1999, were excluded from the research, and the process continued with a total of 1095 documents. By excluding 351 publications such as books, book chapters, conference publications, and articles published in non-educational fields, 744 articles were obtained. It was seen that 28 of these articles were in languages other than English, and the process continued with 716 articles. Finally, 398 articles published in journals other than SSCI and SCI-E were eliminated, and 318 articles within the scope of the study were selected.

Data Analysis

The data obtained within the scope of the study were primarily analyzed through descriptive analysis within WoS database itself. While analyzing the distribution of articles by years, countries, journals, and the number of citations, analyses such as the number of publications of the researchers and the most cited articles were also carried out. After this analysis process, the VOSviewer program was used for bibliometric analysis. Files related to 318 articles downloaded over the WoS system were uploaded to the VOSviewer program. The distribution of the articles by countries, the journals in which the articles were published the most, the most cited author analysis, and the most used keyword analysis were conducted.

FINDINGS

Descriptive and bibliometric findings of 318 articles included in the study are presented in his section.

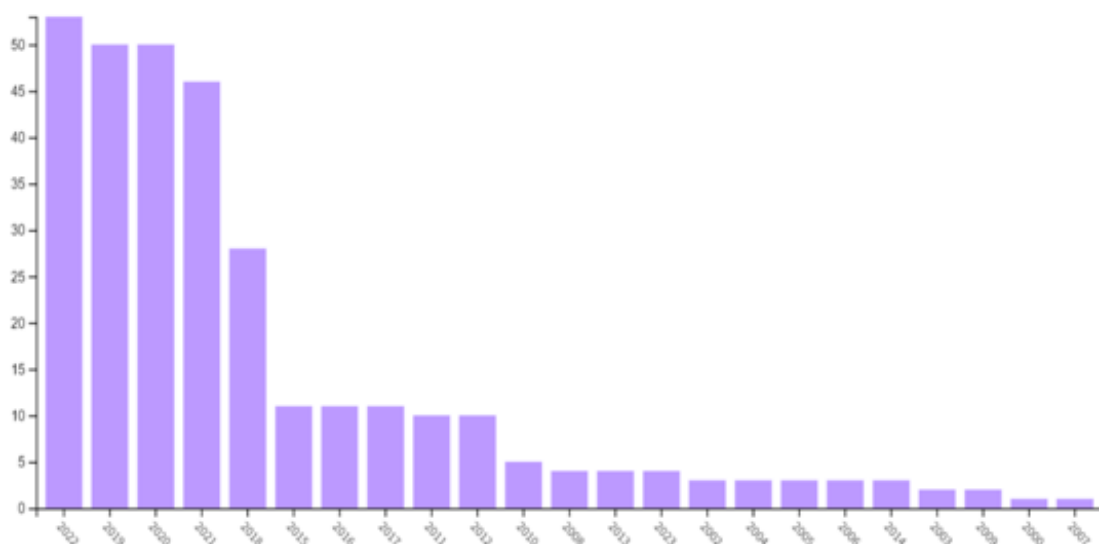


Figure 2. *Distribution of articles by years*

In Figure 2, it is seen that the articles within the scope of the lesson study research model were published in 2022 with 53 articles at most, then in 2020 and 2019 with 50 articles, in 2021

with 46 articles and in 2018 with 28 articles. It is understood that 15 articles were published in 2017, 2016 and 2015, 10 articles were published in 2012 and 2011, and 5 articles were published in 2010 and 2023. When the figure is examined, it is seen that there has been a significant increase in the number of articles published especially after 2018. It is thought that the increasing interest in the lesson study research model, because of its widespread use, has led to an increase in the number of studies conducted within the scope of the model.

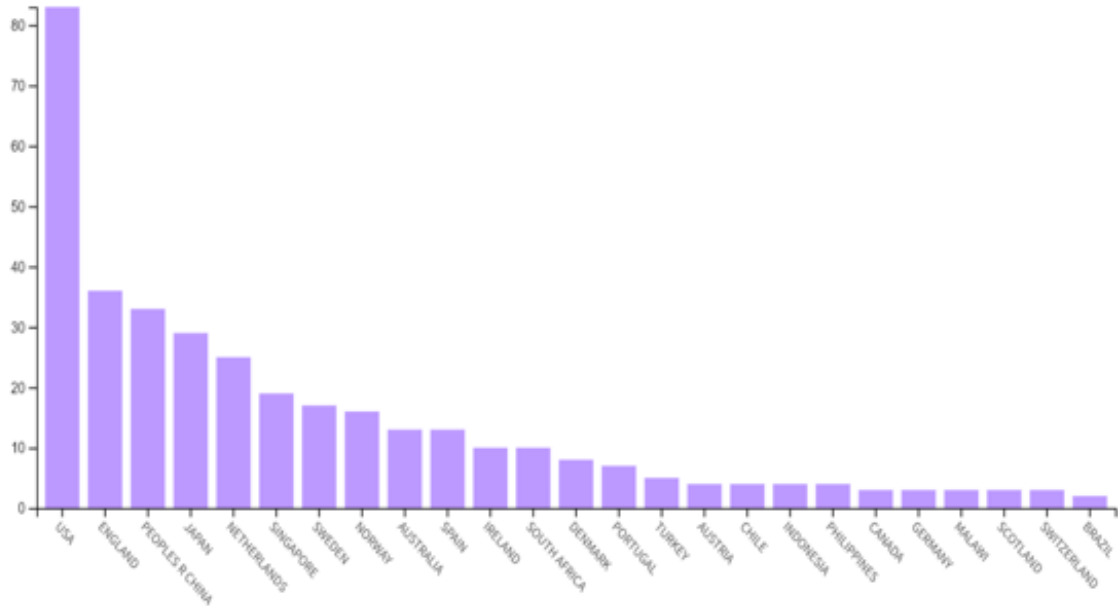


Figure 3. *Distribution of articles by countries*

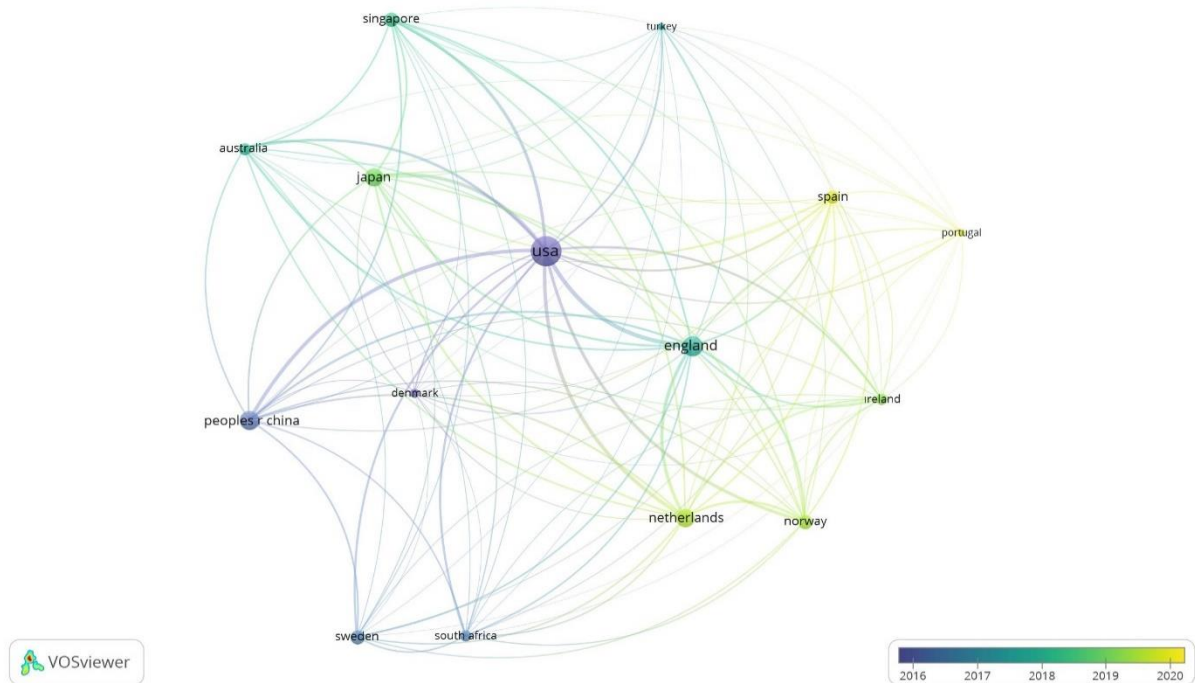


Figure 4. *Distribution of articles by countries*

When Figure 3 and Figure 4 are examined, it is seen that 83 articles were published in the US. It is thought that the fact that educators such as Yoshida, Stigler and Hiebert, who greatly contributed the pedagogical foundation of the lesson study research model, work in this country and carry out many studies, bring this country to the fore. It is understood that England, which is in the second place with 36 articles, comes to the fore with the work of an educator named Dudley. The fact that China is in the first place with 33 articles and Japan with 29 articles can be explained by the fact that the lesson study research model originally came out in these countries, especially Japan. It is interesting to note that Turkey is far behind in the rankings with only five articles. This situation is thought to be based on the fact that the lesson study research model is not yet fully understood and applied.

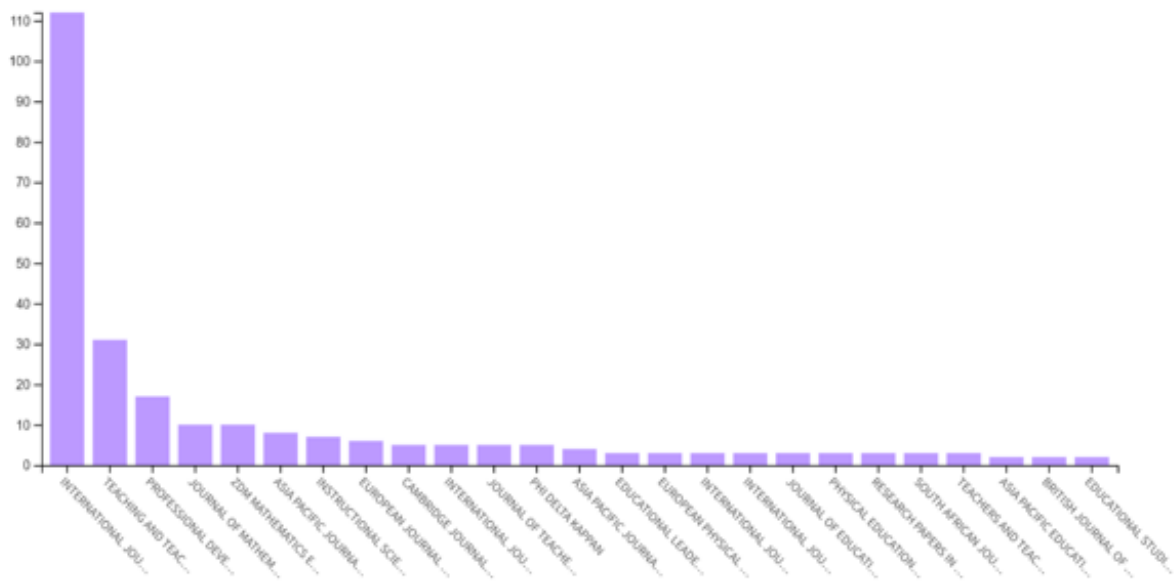


Figure 5. Journals in which articles were published

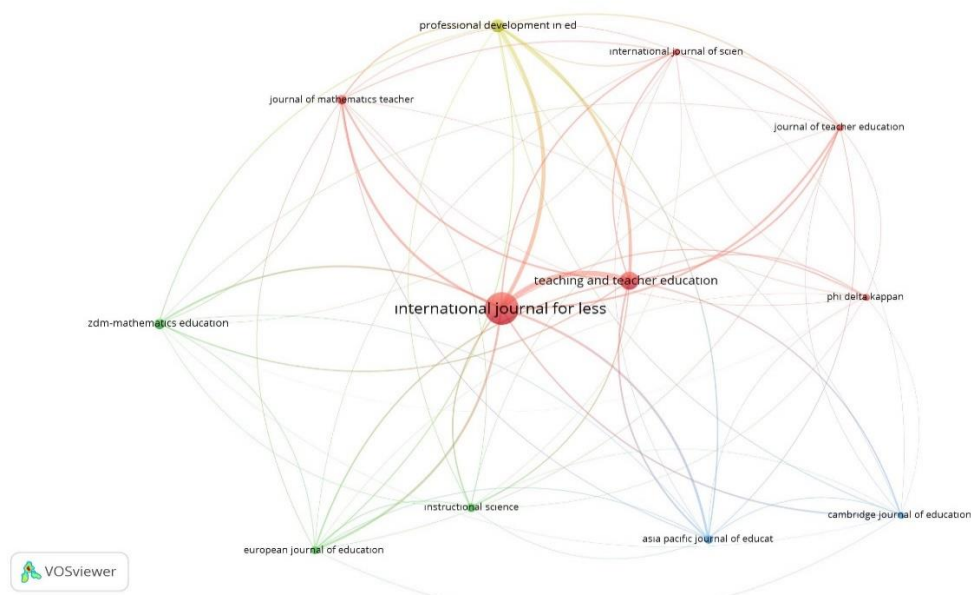


Figure 6. Journals in which articles were published

As can be seen in Figure 5 and Figure 6, the highest number of articles were published in the International Journal for Lesson and Learning Studies with 112 articles and followed by the Teaching and Teacher Education journal with 31 articles. It is seen that 17 articles are published in Professional Development in Education, 11 articles are in the Journal of Mathematics Teacher Education, and 10 articles are in ZDM Mathematics Education. The reason why the most articles were published in Journal for Lesson and Learning Studies is because the journal publishes articles only on the lesson study model. No study has been published in this journal from Turkey.

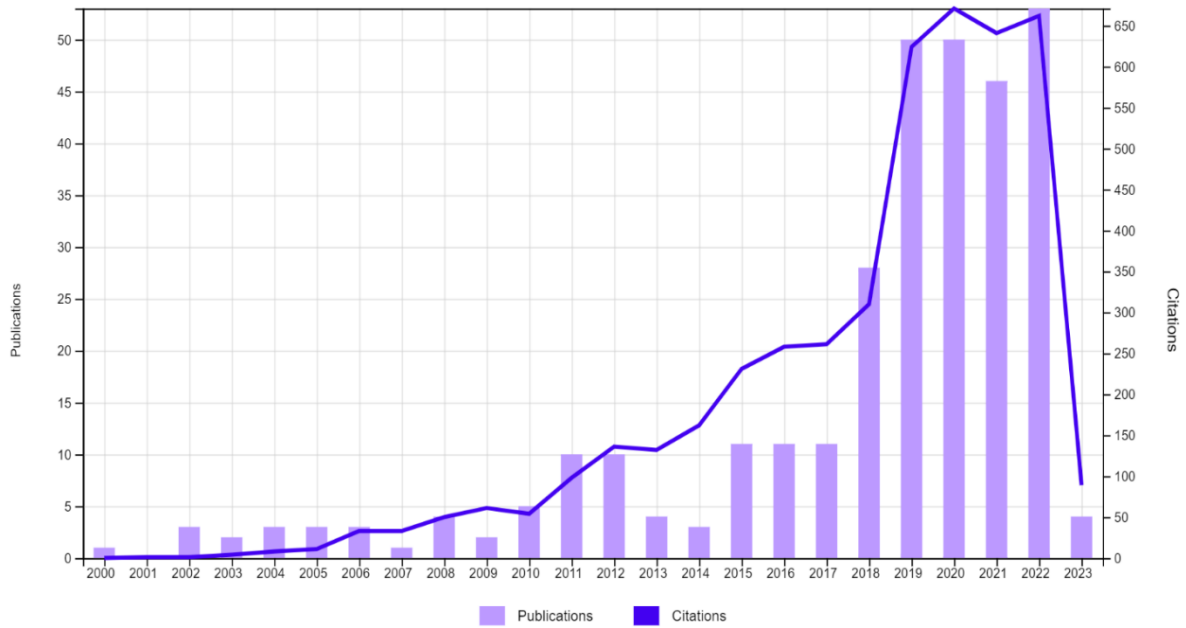


Figure 7. Total number of citations by years

Figure 7 shows the total number of citations received by the articles over the years. When Figure 5 is examined, it is seen that 50 articles were published in 2020 and received 671 citations in total. It is also understood that 53 articles published in 2022 received 662 citations in total, while 46 articles published in 2021 received 641 citations in total. In addition, it is seen that 50 articles published in 2019 received a total of 623 citations, and 28 articles published in 2018 received a total of 311 citations. The fact that five articles published in 2023 received a total of 125 citations shows that studies and citations for the lesson study model have been on the rise since 2018.

In Table 1 below, the 10 most cited articles among the articles chosen from the WoS database and the number of citations of these articles are given in order.

Table 1. The most cited articles

Order	Article	Number of citation
1	Fernandez, C. (2002). Learning from Japanese approaches to professional development: The case of lesson study. <i>Journal of Teacher Education</i> , 53(5), 393-405.	216

2	Fernandez, C., Cannon, J., & Chokshi, S. (2003). A US–Japan lesson study collaboration reveals critical lenses for examining practice. <i>Teaching and Teacher Education</i> , 19(2), 171-185.	178
3	Dudley, P. (2013). Teacher learning in Lesson Study: What interaction-level discourse analysis revealed about how teachers utilised imagination, tacit knowledge of teaching and fresh evidence of pupils learning, to develop practice knowledge and so enhance their pupils' learning. <i>Teaching and Teacher Education</i> , 34, 107-121.	160
4	Pang, M. F., & Marton, F. (2003). Beyond "lesson study": Comparing two ways of facilitating the grasp of some economic concepts. <i>Instructional Science</i> , 31, 175-194.	135
5	Lewis, C., Perry, R., & Hurd, J. (2004). A deeper look at lesson study. <i>Educational Leadership</i> , 61(5), 18-22.	103
6	Puchner, L. D., & Taylor, A. R. (2006). Lesson study, collaboration and teacher efficacy: Stories from two school-based math lesson study groups. <i>Teaching and Teacher Education</i> , 22(7), 922-934.	101
7	Hiebert, J., & Stigler, J. W. (2000). A proposal for improving classroom teaching: Lessons from the TIMSS video study. <i>The Elementary School Journal</i> , 101(1), 3-20.	92
8	Fernandez, M. L. (2010). Investigating how and what prospective teachers learn through microteaching lesson study. <i>Teaching and Teacher Education</i> , 26(2), 351-362.	91
9	Pang, M. F., & Marton, F. (2005). Learning theory as teaching resource: Enhancing students' understanding of economic concepts. <i>Instructional Science</i> , 32(2), 159-191.	90
10	Chokshi, S., & Fernandez, C. (2004). Challenges to importing Japanese lesson study: Concerns, misconceptions, and nuances. <i>Phi Delta Kappan</i> , 85(7), 520-525.	87

As seen in Table 1, the first most cited article includes Fernandez as the only author (2002), while the second article includes Fernandez (2003) and others. It is understood that third place belongs to Dudley (2013)'s article on which he is the only author. When the journals in which the most cited articles are published are examined, it is seen that the *Journal of Teaching and Teacher Education* comes to the fore. Again, it is noteworthy that most of the articles are written by one or at most two authors.

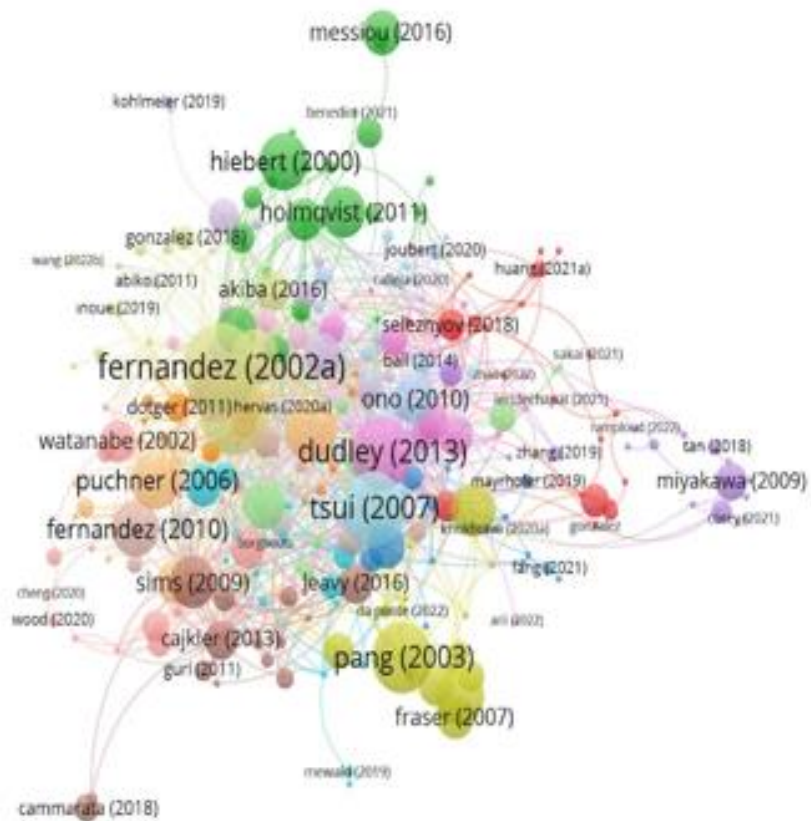


Figure 8. Most cited author analysis

Figure 8 shows the analysis of the most cited authors obtained from the VOSviewer program. It is understood that Fernandez (2002), which is seen very clearly with a light green color, received the most citations. It is stated that Dudley (2013), which is also highlighted in pink, received many citations. In addition, it is also seen that Pang and Marton (2003)’s article received high number of citations and it highlighted with green color.

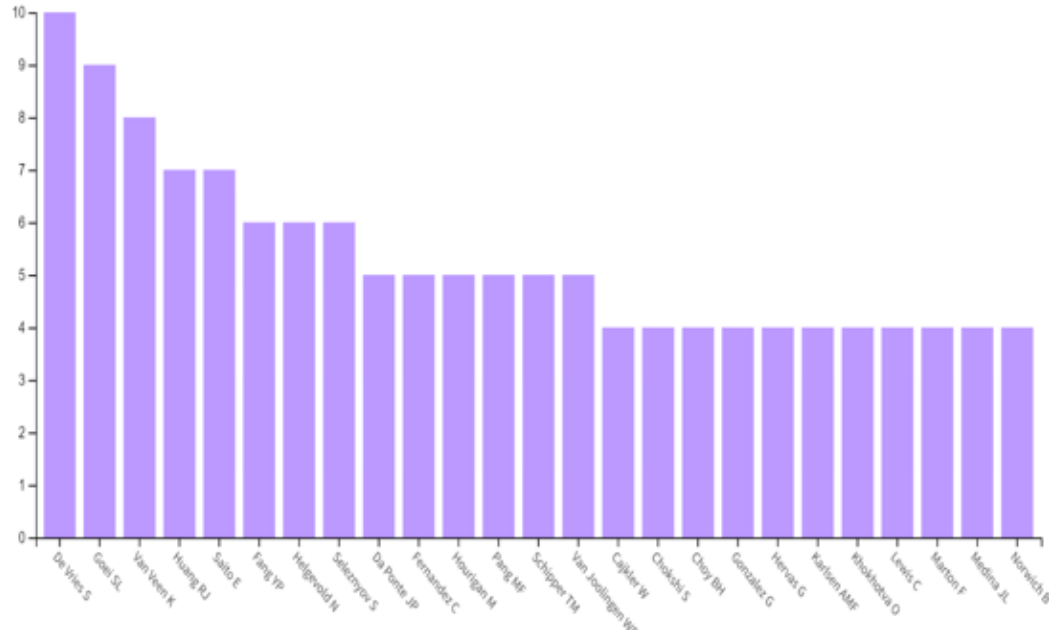


Figure 9. Number of articles by authors

As seen in Figure 9, the author with the most published articles is De Vries with 10 articles. It is understood that the second author who published the most articles was Goei with nine articles, the third author was Van Veen with eight articles, and the fourth authors were Huang and Saito with seven articles. In addition, authors such as Fang, Helgevold and Seleznyov published six articles, while authors such as Da Ponte, Fernandez, Hourigan, Pang, Schipper and Van Joolingen published five articles. It is also seen that there is no author from Turkey in this list.

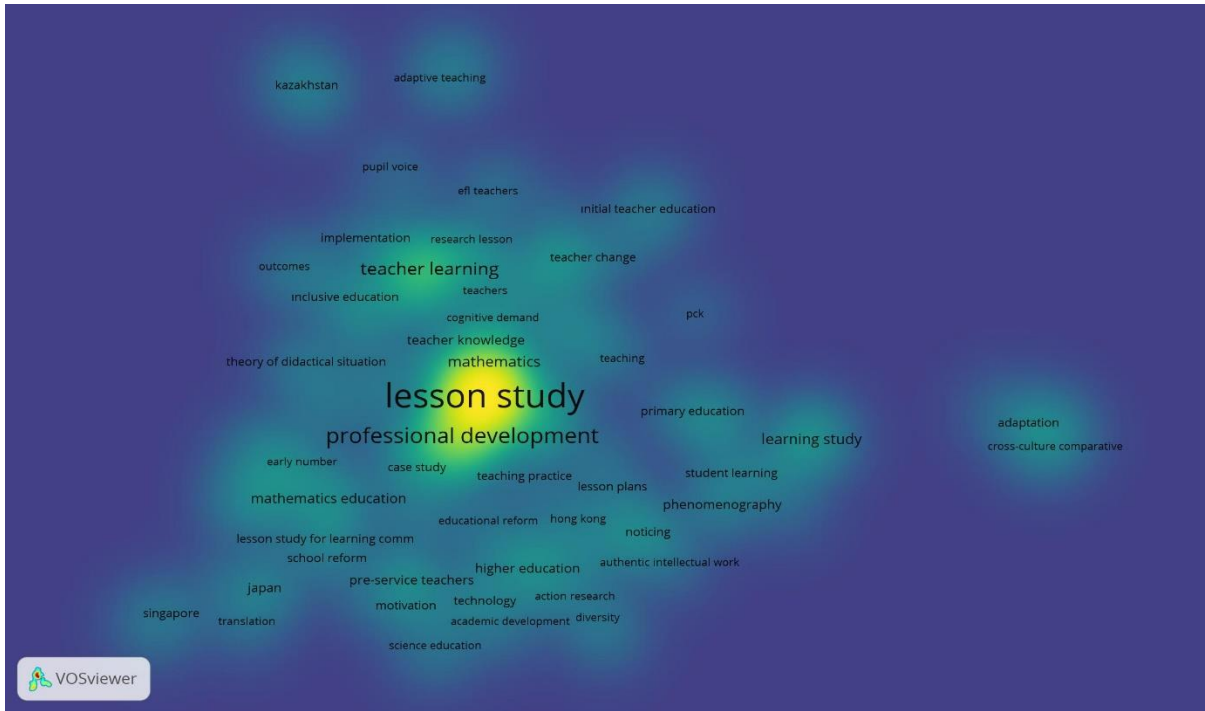


Figure 10. *The most used keywords analysis*

In Figure 10, the most used keyword analysis in the articles obtained from the VOSviewer program can be seen. Here, it is seen that keywords such as “lesson study”, “professional development” and “teacher learning” come to the fore, especially with larger fonts. In addition to these, it is understood that words such as “teacher knowledge”, “mathematics education”, “pre-service teachers”, “higher education”, “lesson plan”, “teaching practice” and “case study” are also used as keywords.

DISCUSSION

The articles published in SSCI and SCI-E indexed journals within WoS database between the years 2000-2023 on the lesson study research model were evaluated with descriptive and bibliometric analyses in the present study. Looking at the distribution of articles by years, it is seen that the number of publications varies from 1 to 11 from 2000 to 2017. This can be explained by the fact that the lesson study research model has just begun to be recognized by researchers with the success of Japan in mathematics in the TIMSS exam results in 1999. It is understood that there has been a significant increase in the distribution of the number of articles by years, especially in the period after 2018. It is seen that the interest of researchers in the lesson study model reached its peak in the years 2019, 2020, 2021 and finally in 2022. It is

understood that this interest continues to increase in the first four months of 2023. It is thought that the model, which can be applied in different countries and cultures in the coming years, may be the subject of more studies. In this vein, Liao and Wu (2022)'s findings support the ones of the present study by arguing that interest in the lesson study research model is increasing every year.

When we look at the distribution of studies on the lesson study research model by country, it is seen that the USA is in the first place. The studies of researchers such as Lewis, Tsuchida, Yoshida, Stigler and Hiebert working in the USA since 1998 have made significant contributions to this situation. Under the leadership of these researchers, a pedagogical and systematic infrastructure was provided to the model. Following that, lesson study research started to be used widely in the USA and this widespread use was also reflected in following studies (Yoshida, 2012). The second country with the highest number of studies on the lesson study research model was England. Here, Dudley, who works at both Cambridge University and the UK Ministry of Education, comes to the fore. It is seen that Dudley's studies on the model contributed greatly to the recognition and understanding of it in Europe. Looking at the studies, these two countries are followed by Japan (Takahashi, 2014) and China, where the lesson study research model was originated. The large number of studies carried out in these countries can be explained by the fact that they are the countries that present the model and implement it at all levels. The number of articles published in Turkey is low due to the fact that researchers are still in the process of just being aware of the existence of the model.

It is seen that the International Journal for Lesson and Learning Studies was the most popular journal among the journals in which the articles were published. The fact that this journal only publishes articles within the scope of the lesson study research model is considered to be an important factor in achieving this result. It is understood that Teaching and Teacher Education, one of the prestigious journals within WoS database, is the second most published journal. The reason why this journal is preferred is that it is a well-known and cited journal in the field. In addition, it is understood that the Journal of Professional Development in Education ranks third in the number of publications. It is thought that the lesson study research model is a professional development approach and the planning of the articles in this framework also reflects the selection of the journal. Finally, it is apparent that the number of articles published in Journal of Mathematics Teacher Education and ZDM Mathematics Education journals is high. The reason for this is that the lesson study research model first emerged on the basis of the mathematics lesson (Isoda, 2010) and more work has been done in this area.

Considering the total number of citations received by the articles by years, it is understood that the highest number of citations was 671 in 2020, when 50 articles were published. It is seen that 662 citations were received in 53 articles in 2022, 641 in 46 articles in 2021, 623 in 50 articles in 2019, and 311 in 28 articles in 2018. It is understood that the increase in the number of articles, especially since 2018, is also reflected in the number of citations. The fact that 5 articles published in the first four months of 2023 received an average of 125 citations is considered to be an indication that the average number of citations may be higher at the end of this year compared to previous years because the lesson study research model is getting more and more popular everyday (Dudley, 2015).

Regarding the most cited articles within the scope of the study, it is understood that the study carried out by Fernandez in 2002 came to the fore. It is thought that this study was published in the first years that the lesson study research model emerged in the USA and was published in a journal with a high impact value. It is seen that the study conducted by Fernandez, Cannon and Chokshi in 2003 is the second most cited study because this study proved through practice that the lesson study research model improves teachers' professional skills, and this point is critical in terms of receiving citation. In addition, it is understood that the study conducted by Dudley in 2013 is the third most cited study. In this study, which was published in a journal with high impact factor, Dudley tried to reveal how and what teachers learned within the scope of lesson study model, and how this process contributed to students' learning. Dudley was the first researcher in Europe (in the UK) to discuss this model in detail and his in-depth analysis of the model and handling of student learning may have led to numerous citations.

It was investigated that De Vries from the Netherlands ranked first with 10 articles. The fact that his area of expertise is teacher professional development, and he focuses on lesson study model for practical reasons can explain the fact that he has done a lot of work on the model. The second researcher who has carried out the most studies on the model, Goei, who is also working in the Netherlands and whose area of expertise is also teacher professional development, has been involved in nine studies in journals with high impact value within the scope of the lesson study research model.

It is seen that Van Veen, who is in the third place, works at the same university as De Vries in the Netherlands, is also an expert in teacher professional development and has participated in eight studies on the model. Regarding countries, it is thought that the Netherlands' current rank after the USA, England, China, and Japan can be explained by the contributions of these three researchers and the use of lesson study in teacher professional development (Bosma & Goei, 2021).

When the most used keyword analysis within the scope of the lesson study research model is examined, it is understood that the keywords "lesson study" and "professional development" are mostly used in the studies. Again, keywords such as "teacher learning", "teacher knowledge" and "mathematics education" are emphasized by the VOSviewer program. The reason why these keywords come to the fore is because the model emphasizes professional development of teachers (Aykan & Yildirim, 2022), questions what type of knowledge and experience teachers should have (Dudley, 2013), and it originally emerged on mathematics lessons (Lewis, Perry & Hurd, 2009). Again, it can be thought that the intensive study of the model within the scope of qualitative research methods (Aykan & Kincal, 2016) enables the concept of "case study" to come to the fore. It can be thought that the intensive study of the model within the scope of qualitative research methods (Aykan & Kincal, 2016) enables the concept of "case study" to be prominent.

Limitations and Recommendations

The present study covers articles published between 2000-2023 in SSCI and SCI-E indexed journals within WoS database related to lesson study research model. On this basis, it can be

seen as a limitation that other databases such as ERIC and AHCI are not included in the study. Revealing the status and trends of articles published in journals with high impact factors by using descriptive and bibliometric analyzes can be seen as a limitation of the study. In this context, studies such as meta-analysis or meta-synthesis can be conducted to investigate the articles published on the lesson study in more depth. In addition, based on the results of the study, it can be suggested to carry out studies in which different dimensions of the lesson study research model can be discussed and applied in different countries and cultures.

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