



Bibliometric Analysis of Evaluation in Physical Education: A Study Based on The Scopus Database From 2013 to 2023

Sefri Hardiansyah¹², Nurlan Kusmaedi^{1*}, Amung Ma'amun¹, Herman Subarjah¹

¹Universitas Pendidikan Indonesia, Indonesia

²Universitas Negeri Padang, Padang, Indonesia

*Correspondence to: nurlankusmaedi@upi.edu

Abstract: Evaluation in physical education provides information about the extent to which physical education objectives have been achieved and ensures that all processes have been carried out correctly. This study aims to investigate trends in evaluation research in physical education based on the Scopus database from 2013 to 2023. This is expected to provide an overview of the latest developments in evaluation research in physical education and to illustrate future research opportunities. Based on a search of the Scopus database through the Publish or Perish application with two title words, "Evaluation in Physical Education" and "Evaluation in PE," 50 articles were found suitable for analysis using VOSviewer visualization. The analysis results show that the most publications on evaluation in physical education occurred in 2021, with nine articles. Meanwhile, the highest citation amounted to 122 citations in 2020. Based on the analysis that has been carried out using VOSviewer, it is obtained that the term "Evaluation in Physical Education" or "Evaluation in PE" is still rarely discussed in academic literature; therefore, research on evaluation in physical education in the future has the potential to be carried out as an effort to ensure the quality of physical education learning.

Keywords: bibliometric analysis, physical education, evaluation

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INTRODUCTION

Evaluation determines how effectively something meets clearly stated goals or criteria, identifies what works well and poorly, and makes adjustments (Andrade & Du, 2007). Evaluation aims to ascertain the status of an object being evaluated and compare it with specific standards for decision-making (Burn, 2006). The evaluation phase is crucial in the education system (Coştu, 2012). The role of Evaluation is significant to improve the quality of a project, regardless of the size of the project, whether large or small; this is not a benchmark in Evaluation (Huber, 2017). In education, Evaluation is divided into macro and micro evaluations (Sabri & Baderiah, 2020). Macro Evaluation consists of educational programs that are projected to improve the education sector, while evaluations included in micro-evaluation are classroom evaluations, especially those related to student learning achievement. Therefore, each project has different evaluation needs (Oliver et al., 2002; Huber & Harvey, 2016; Stoner et al., 2012) included in the physical education learning process.

One of the most essential elements in achieving educational goals is the learning process, and another critical component is the assessment factors that support the learning process and outcomes (Sabri & Baderiah, 2020). To ensure the quality of student learning outcomes, an Evaluation needs to be carried out (Shahril et al., 2015) to see which learning objectives have been successfully realized and which have not been successfully realized (Varol, 2016). This will increase the effectiveness of the Evaluation. To improve the quality of teaching, an Evaluation of teachers' teaching abilities is needed (Zeng, 2020). Apart from that, it is also necessary to evaluate decisions made in the world of education and follow up on the results of these evaluations as a reference for decision-making (Mahajan et al., 2023; Sparkes & Werners, 2023). Although much research has been conducted on the Evaluation of physical education teaching by previous researchers, there is still room for study to improve the effectiveness and efficiency of physical education teaching (Zeng, 2020).

Evaluation must be carried out in all areas of education, including physical education (Quennerstedt et al., 2008). Accurate, unbiased, and scientific assessment of physical education instruction is essential (Zhao, 2017). Another vital part of physical education teaching is evaluating the curriculum, which directly impacts various aspects of the teaching process (Zhang & Zhang, 2023). Because physical education comprehensively affects students' psychomotor, cognitive, and affective domains, physical education must be prioritized and considered (Shahril et al., 2015). Physical education supports students' overall growth and development by providing learning opportunities focusing on cognitive, affective, and psychomotor domains (Freeman et al., 1992; Pangrazi & Beighle, 2019). Therefore, an understanding of the evaluation system is needed to assess the

desired objectives (Sabri & Baderiah, 2020). When all these processes run systematically and scientifically, the decisions taken will be more appropriate and meet the goals of the evaluation results (Shahril et al., 2015).

Several studies related to evaluation in physical education have been conducted including the development of ISO tests to evaluate the performance of prospective physical education teachers, the results showed that ISO tests meet the standards and are feasible to use as instruments to measure the performance of physical education teachers (Shahril et al., 2015). Furthermore, Moon examined the efficiency of using self-assessment and peer assessment techniques in assessing the basic skills of playing volleyball for prospective teachers, the results showed that the two assessments were not significantly different in the realm of evaluation quality. Then the research conducted by Rihatno (2023) examined PLS-SEM to test the structural model, the evaluation results, and the structural model met the requirements and the criteria. The research aimed at looking at the effect of supervision and moral spirit on the performance of physical education teachers in elementary schools, the results showed that supervision and moral factors had a significant effect on teacher performance (Basuki, 2019).

Evaluation in physical education is critical, but the research that has been carried out has not touched all the urgent aspects of physical education, such as evaluation of the curriculum, which can only be found in research by Šumanović (2013) and Wu (2020). Furthermore, research conducted by Esmailzadeh et al. (2017) evaluates the effectiveness of learning conducted by physical education teachers. Apart from that, several studies still focus on developing just one model, namely the Fuzzy evaluation model for assessing teaching in physical education (Wang et al., 2020; Zhao, 2021; Jiang et al., 2016). In physical education, teachers have a crucial role in determining the success of the learning process. Therefore, teachers need to carry out self-evaluation. To determine how well they teach and how competent they are, they evaluate themselves to make decisions about how to improve (Keller & Duffy, 2005). To plan future research development in a meaningful and relevant manner, researchers need a comprehensive literature meta-study to analyze previous findings carefully. Bibliometric studies are a recent literature review meta-study (Blegur et al., 2023). Researchers use bibliometric analysis for several purposes, such as examining the conceptual structure of a particular field and discovering new patterns in article and journal performance, collaboration trends, and research components (Donthu et al., 2021). Bibliometric analysis helps disentangle and map cumulative scientific knowledge and the intricacies of the evolution of established fields because it can rigorously make sense of enormous, unstructured volumes of data. Therefore, a well-conducted bibliometric study can lay a strong foundation for advancing in new and significant ways (Donthu et al., 2021).

Based on the search that has been done, we have not found any research that examines evaluation in physical education using bibliometric analysis. Therefore, we conducted this study to identify the development of publications, especially evaluation research articles in physical education, based on the Scopus database for the last 11 years, from 2013 to 2023, using bibliometric analysis. This research will provide an overview of publication trends, the number of documents by country, citation trends by year, and most cited articles. It is important to conduct this investigation to provide an overview of future research opportunities related to evaluation in physical education. In addition, this study is expected to increase the awareness of researchers in the field of physical education that evaluation in physical education is important to research to improve the quality of physical education.

METHODS

This research was quantitative research with a literature review method (Blegur et al., 2023). An objective and theoretical discussion of a particular topic or theme is the goal of a literature review (Rother, 2007). This article is a methodological investigation that collects research results from the Scopus database from 2013-2023. Researchers chose the Scopus database because of its orderliness and consistency and because it contains journals and conference proceedings that researchers consider more significant (Suprpto et al. 2021). This bibliometric research consisted of 5 stages referred to Masitoh et al. (2021)(see Figure 1) as follows: The first step is to determine the keywords used to search for papers that match the research objectives, namely using the title words "Evaluation in Physical Education" and "Evaluation in PE." In the second step, the title word is used for searching using Publish or Perish (PoP). Based on a PoP search using the 2 title words, 52 papers were found with the title word "Evaluation in Physical Education" and seven documents with the title word "Evaluation in PE," so the total number of papers was 59 (see Table 1).

Table 1. Citation metrics from the title word 'Evaluation in Physical Education' and 'Evaluation in PE'

Evaluation in Physical Education	Citation metrics	Evaluation in PE
2013-2023	Publication years	2013-2023
10 (2013-2023)	Citation years	10 (2013-2023)
52	Papers	7
345	Citations	43
34.50	Cites/years	6.14
6.63	Cites/paper	1.00
1.00	Author/paper	4
10	h-index	6
17	g-index	4
10	hl, norm	5
1.00	hl, annual	0.40
4	hA-index	2

In the third step, all collected papers are verified using Mendeley Desktop so that there are no duplicate articles while completing the abstract and keywords and ensuring that all collected writings match the title words entered so that there are only 50 articles that are relevant and meet the criteria. A total of 9 papers were eliminated because they did not match the title words used. For example, the article written by [Palmerini](#) (2015) with the theme "Creation of novel bisphosphonates based on indole and evaluation of their chelating capacity in PE/CA-PJ15 cells" and the article written by [Raj](#) (2020), "Evaluation of Thromboembolism Recurrence Score Veins in a Population with Unexplained Pulmonary Embolism: A Post-hoc Study of PADIS-PE Randomization" then the article on "Evaluation of deltamethrin 62.5 SC-PE long-term indoor residual spraying against malaria vectors in India" written by [Sahu](#) (2020) followed by an article written by [Wharton](#) (2013) with the theme "Evaluating a Changing Objective: Insights from Applying Practical Participatory Evaluation (P-PE) in Healthcare Environments." These four articles do not match the meaning of PE in the title word, an acronym for Physical Education. Meanwhile, PE in the four articles is an abbreviation for Polymer-Enhanced, so the five articles do not meet the requirements.

Next is an article by [Haroon et al.](#) (2021) with the title "Evaluation of Linum usitatissimum methanolic crude extract for biofilm removal in diabetic foot isolates" which is not related to Evaluation in physical education, then 4The next article uses the terms physical environment and physical therapist and is not included in the biological education category, namely articles with topics "Evaluation of the physical surroundings and architectural elements in the context for early childhood education" written by [Izadpanah](#) (2021) and the article "Creation and Evaluation of a Simulation-Based Acute Care Course in a Program for Physical Therapist Education" written by [Silberman](#) (2020) the last 2 articles written by [Sakurai](#) (2013) each with the topic "The creation of an education system that complies with OSCE standards and the standardization of clinical competency evaluation in the training of occupational and physical therapists" and "The creation of an education system that complies with OSCE standards and the standardization of clinical competency evaluation in the training of occupational and physical therapists". *Step four*, All papers are exported to Research Information Systems (RIS) format. Fifth step: Analyze with VOSviewer (See [Figure 1](#)). The next stage is to use the VOSviewer program to analyze the RIS to obtain a visualization of the graphical representation of the bibliometric map. VOSviewer can generate three drawings and learn co-authorship, citations, co-occurrences, co-citation relationships, bibliographic merging, and Visualization by network, overlay, or density ([Arruda et al. 2022](#)).

**Figure 1.** Stages in carrying out bibliometric analysis ([Masitoh et al. 2021](#))

RESULT AND DISCUSSION

Based on a search using the Publish or Perish (PoP) application, 50 journal articles related to "evaluation in physical education" and "evaluation in PE" were found in the Scopus database. The publication trend from 2013-2023 can be seen in [Figure 2](#). The number of documents during the period 2013-2023 fluctuated. In 2013, 7 articles were found, then decreased significantly in 2014 with only 1 article. After three consecutive years, there was an increase in publications, where in 2015 it produced two articles, in 2016 with three articles, and in 2017 there were six articles. Furthermore, it decreased again in 2018 when there were only 2 documents that

year. However, the trend of increasing publications again occurred three years in a row, namely in 2019 with three publications, in 2020 with six publications, and in 2021 with nine publications. Furthermore, the last two years have decreased again where there are only six articles in 2022 and five articles in 2023.

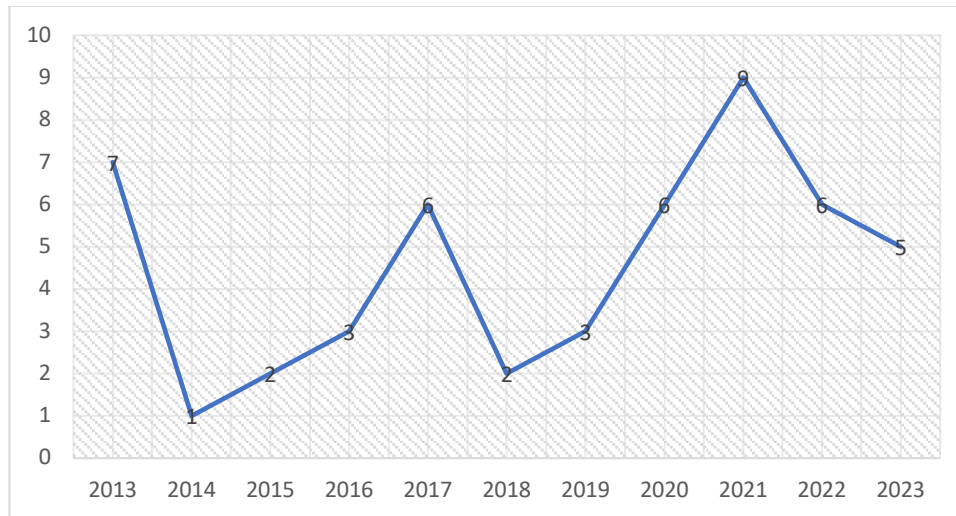


Figure 2. Publication trends from 2013-2023

Eighteen countries have contributed to the publication of 50 Evaluation in Physical Education articles (see Figure 3), but all authors only have one article published each. Of the 50 articles, 28% of the articles were written by a single author, 26% of articles were written by two authors, 20% of the pieces were written by three authors, 12% of the articles were written by four authors, 10% of the articles were written by five authors and 4% of the pieces were written by six authors. The 50 authors are spread across 18 countries (see Figure 3); China is the largest contributor of publications with 24 papers as the first author, then Germany and Iran with three authors, Indonesia together with Australia, Brazil, Iraq, and the United States with two authors and articles with a single author originating from Spain, Canada, Croatia, Czech, Jordan, Singapore, Slovenia, South Korea, and Turkey.

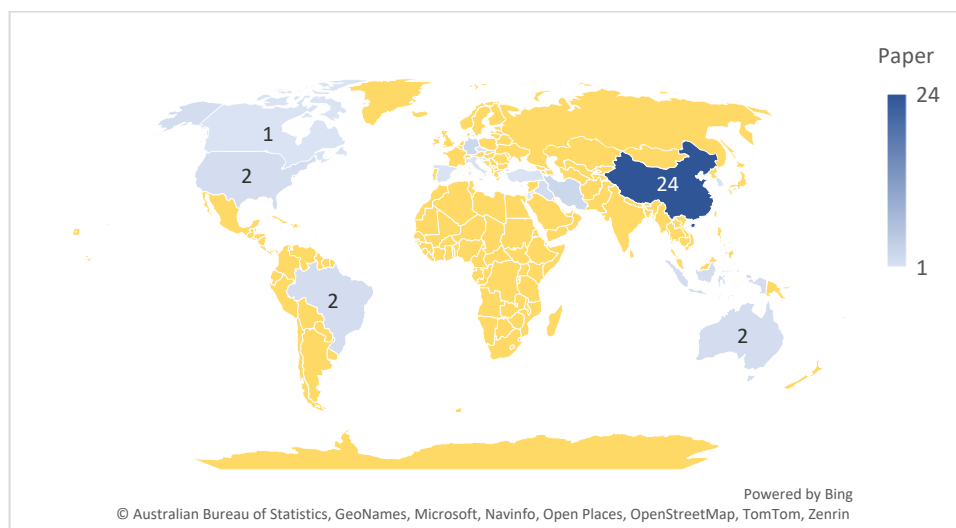


Figure 3. Number of Publications by Country

The total number of citations in the article "Evaluation in Physical Education" and the article "Evaluation in PE" was 332 citations with an average annual citation of 3.18 (see Figure 4). In 2013 there were 8 citations derived from 7 articles and in 2014 (1 publication) there were no article citations in that year. Furthermore, for 2015 there were 6 citations originating from 3 articles and experienced a significant increase in 2016 with 91 citations originating from 6 articles. Furthermore, there was a decrease in the number of citations for two consecutive years, namely in 2017 with a total of 58 citations originating from 6 publications, and in 2018 there were no citations at all. Then in 2019, the citation trend increased again with a total of 16 citations originating from 3 articles. Furthermore, the citation trend in the last 11 years reached its peak in 2020 with 122 citations

originating from 6 articles. Unfortunately, the trend has decreased again in the last three years, namely in 2021 with 24 citations, in 2022 with 6 citations, and 1 citation in 2023 even though the number of documents in the three years was 20 articles.

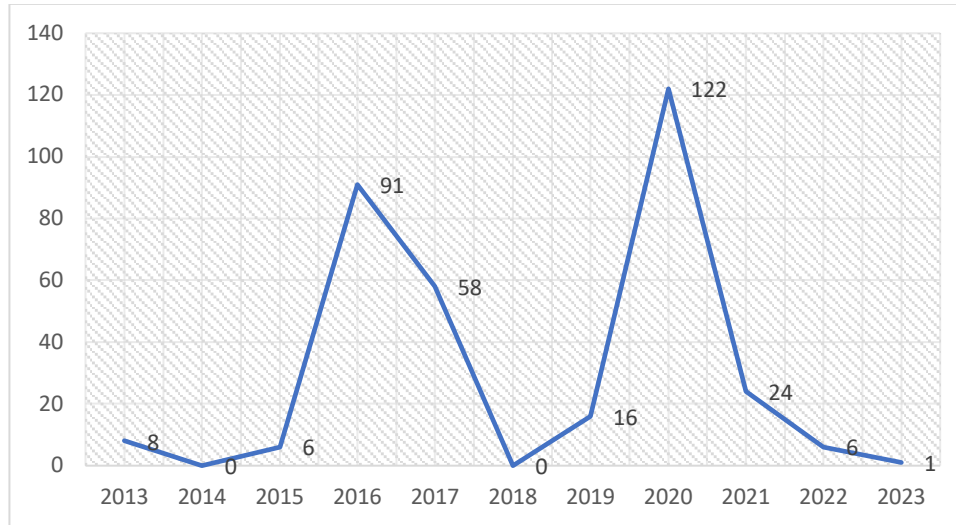


Figure 4. Citation Trends by Year

Of the 50 articles processed, the top three with the highest number of citations were obtained by [Jiang et al. \(2016\)](#) with the topic "Fuzzy evaluation theory-based assessment of public physical education instructors' quality of instruction in colleges" with a total of 60 citations, then an article with the theme "Gamification in physical education: An evaluation of its effects on academic performance and motivation in postsecondary education" written by [Ferriz-Valero et al. \(2020\)](#) with 53 citations and an article by [Zeng \(2020\)](#) with the title "Evaluation of the quality of physical education instruction provided by universities using a hybrid data mining and hidden Markov model" with a total of 35 citations (See [Table 2](#)).

Table 2. The five most cited articles

Citations	Title	Journal name	Author	Affiliations	Year
50	Evaluation of teaching quality of public physical education in colleges based on the fuzzy evaluation theory	Journal of Computational and Theoretical Nanoscience	Jiang. Y, Wang, Yanxiu	Jingdezhen Ceramic Institute, Jingdezhen, China	2016
14	Gamification in physical education: Evaluation of impact on motivation and academic performance within higher education	International Journal of Environmental Research and Public Health	Ferriz-Valero. A, Osterlie. Ove, Martinez. Salvador Garcia	Department of General and Specific Didactics, University of Alicante, 03690 San Vicente del Raspeig, Spain	2020
8	Evaluation of physical education teaching quality in colleges based on the hybrid technology of data mining and hidden Markov model	International Journal of Emerging Technologies in Learning	Y. Zeng	Chongqing Technology and Business University, Chongqing, China	2020
3	Proposal for an enhanced physical education program in the primary school: Evaluation of feasibility and effectiveness in improving physical skills and fitness	Journal of Physical Activity and Health	Dallolio. L, Ceciliani Andrea. Sanna Tiziana. Garulli Andrea, Erica Leoni	Department of Biomedical and Neuromotor Sciences, University of Bologna, 40126, Bologna, Italy	2016

3	Research on the diversified evaluation index system and evaluation model of physical education teaching in colleges and universities	Journal of Computational and Theoretical Nanoscience	Y. Zhao	Physical Science College, Lingnan Normal University, Zhanjiang 520048, Guangdong, China	2017
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In the co-authorship analysis process, the counting method is used with the number of co-authorship authors determined to have published at least one article (because different authors write all papers), so 129 meet the threshold of 129 authors appearing on the VOSviewer networking map. The analysis results (select no on unconnected items) verify that there are 11 authors spread across 49 clusters, forming 156 links. In this section, we only report the first 3 clusters and the last 3 clusters (bearing in mind that the clusters that appear are too broad, namely 49 clusters). The first three clusters: Cluster 1 (6 authors), including Beauchamp, T. Diallo, N. Eather, D. Lubans, E. Mclachlan, and B. Sylvester. Cluster 2 (6 authors), namely Cassani Juliana Martins, Neto Amarillo Ferreira, Paula S De, Wagner Dos Santos, Ronildo Stieg, and Aline de Oliveira. Cluster 3 (5 authors): Behrouz Arbabshirani, Seyed Reza Hejazi, Z. Poruakbar, Gholam-Ali Raissi, and Shirouyehzad Hadi. Meanwhile, the last three clusters are Cluster 47 (1 author) Y. Zeng, cluster 48 (1 author) Y. Zhao, and finally, cluster 49 (1 author) M. Šumanović.

The author who published articles in the latest year (2023) has five pieces (see Figure 5), each written by Moon and Park (2023) with the topic "An analysis of the methods used to evaluate volleyball abilities in preservice physical education instructors during blended learning" and an article written by Rihatno (2023) with the topic "PLS-SEM Method for Evaluating Online Health and Physical Education Programs in Elementary Schools" next is the article "The 2-tuple linguistic neutrosophic number MAGDM method and its applications to the evaluation of physical education instruction quality in higher education institutions" written by T. Song, then the article "The modified taxonomy technique for double-valued neutrosophic number MADM and its applications to the evaluation of physical education instruction quality in higher education institutions" by J. Rao, L. Peng, optimization model" written by J. Zhang, C. Zhang.

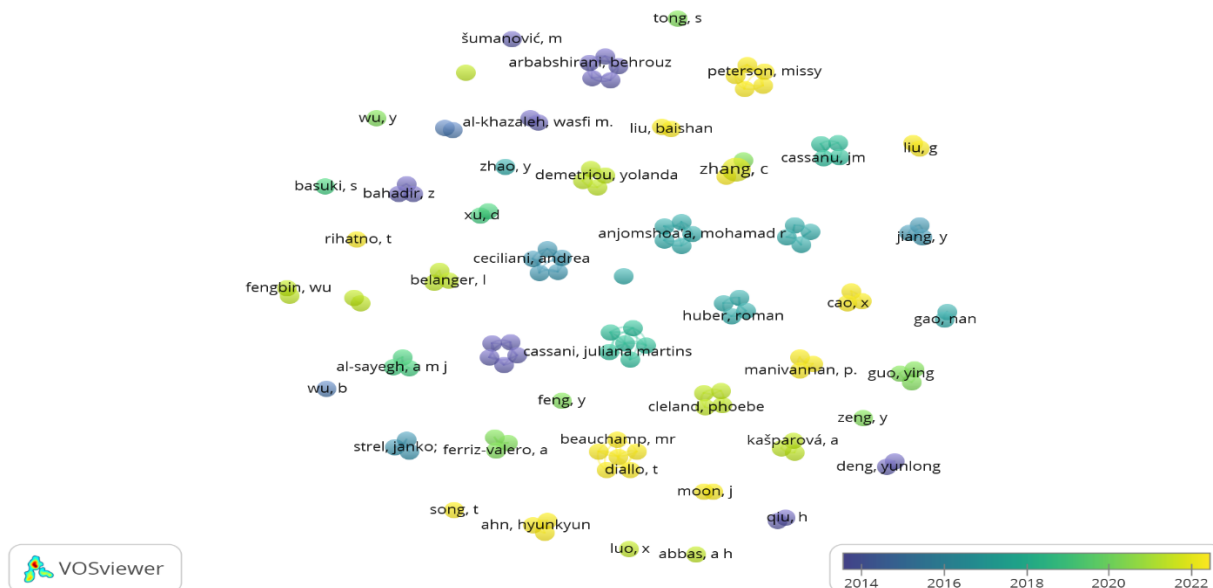


Figure 5. Co-authorship overlay visualization

Co-occurrence analysis is helpful in frequencying closely structured keywords in a corpus of data to visualize future research opportunities based on keywords' occurrence (semantic closeness). This analysis uses the complete counting method with the number of co-occurrence keywords set at a minimum of 2 so that all meet the threshold representing 19 keywords. Appears in the VOSviewer networking map. The analysis results (select yes on unconnected items) verify that 18 keywords form 4 clusters, 37 links, and 51 link strengths. Cluster 1 (6 items) includes deep learning, health behavior, health education, physical activity, sports, and students. Cluster 2 (6 items) consists of colleges, evaluation system, fuzzy Evaluation, physical education, quantitative analysis, and teaching quality. Cluster 3 (4 items) includes colleges and universities, evaluation

index system, evaluation mode, and physical education teaching. Cluster 4 (2 items) includes Evaluation, physical education teacher.

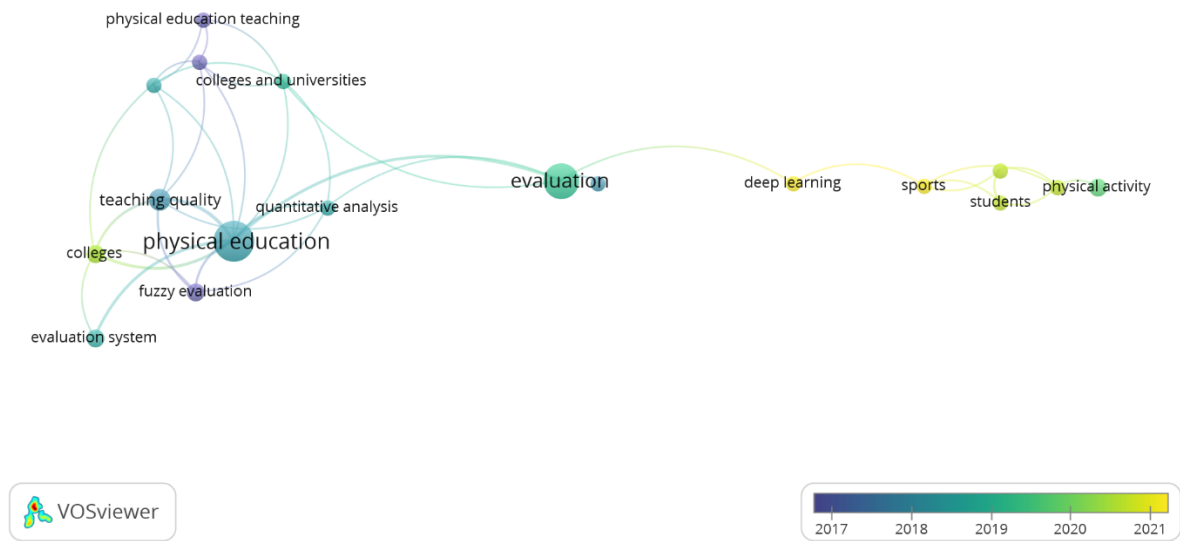


Figure 6. Co-occurrence overlay visualization

In the choose threshold display, ten minimum numbers of occurrences of a term are used, from 1477 terms, thus successfully forming 26 meet the threshold. However, four times were eliminated in the next stage (verify selected words) because they did not reflect the variable terms, including "participant, sport, program, university." The analysis found that 12 items formed 2 clusters (see Table 3), 40 links, and 838 link strengths (See Table 3). The term with the highest occurrence is "quality," 59, and the word with the lowest occurrence is "quality education," which is 11. In contrast, the term "evaluation index system" gets an occurrence of 18, and the word "evaluation method" only gets 13. Term Evaluation in Physical Education has a low density, as seen in Figure 7 (right image). The VOSviewer visualization results show that Evaluation in Physical Education still has an excellent opportunity to be developed and studied to improve the quality of physical education and the quality of students (See Figure 7).

Table 3. Cluster of 12 items

Clusters	Color	Items	Total
1	Ed	Collage, Evaluation index system, Evaluation Method, Physical education teaching, Quality, Quality Evaluation	6
2	Green	Implementation, Performance, Physical Activity, Physical education teacher, School, Teacher	6

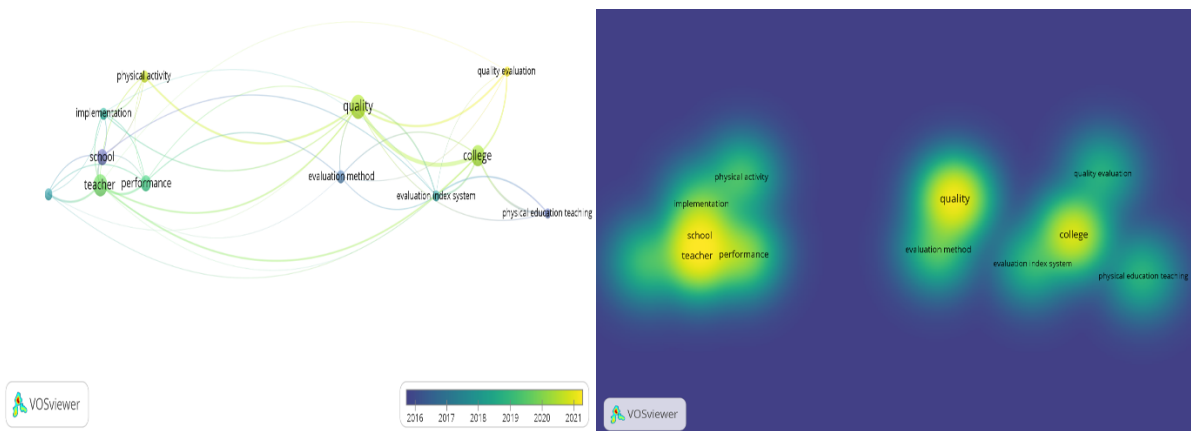


Figure 7. Title and abstract overlay visualization and Density visualization

Evaluation is essential to determine the learning process's strengths and weaknesses and make

decisions (Saputro, 2023). The teacher must carry out the evaluation process to determine the achievement of the goals and objectives of the physical education subject (Shahril et al. 2015). And, of course, the proper method is needed, such as using evaluation models to improve program deficiencies (Rihatno, 2023), including in physical education. Based on the analysis using VOSviewer, information was obtained that the terms "Evaluation in Physical Education" or "Evaluation in PE" are still rarely discussed in academic literature. Previous research has reported evaluations of teaching in physical education (Tong, 2020; Frossard et al. 2018; Xu & Rappaport, 2019; Paula et al. 2018; Rihatno, 2023; Zeng, 2020). Furthermore, research on the contribution of agility and social network-based education to the evaluation of industry 4.0 skills-based PE learning has also been conducted by Putnik et al. (2023). A teaching evaluation aims to collect data that will serve as a basis for evaluating teachers' effectiveness in their classrooms and the level of student learning progress, development, and achievement. The main tasks involved in learning evaluation are measurement and assessment. Despite the importance of teaching evaluation, Evaluation from other perspectives on physical education is still needed, as has been reported by analysis using VOSviewer that Evaluation of the physical education curriculum is rarely found in the literature. Based on data from the Scopus database from 2013-2023, curriculum evaluation was only reported by two publications (Wu, 2020; Šumanović, 2013). In any educational environment, curriculum review is essential in introducing a new curriculum. The aim is to determine whether the implemented curriculum achieves the objectives and produces the expected results. A further purpose of curriculum evaluation is to gather information to help identify areas requiring adjustment or improvement.

Apart from that, VOSviewer also provides information that the Evaluation of assessment techniques also needs to be carried out because we only found one publication in the literature we collected related to the Evaluation of assessment in physical education (Moon & Park, 2023). Educators must carefully and precisely carry out the assessment process to accurately assess students' abilities. According to Kolade et al. (2024), assessment is part of learning and aims to measure learning outcomes. This opinion is then reinforced by Memarian and Doleck (2023), who reveal the purpose of assessment in education is to connect what the teacher expects with what students must show as evidence of learning. Therefore, it is necessary to evaluate the assessment techniques used in physical education because there are limited publications reported regarding the Evaluation of assessment techniques in physical education; this sends a message that future researchers need to conduct research related to the Evaluation of assessment in physical education. Thus, these results provide a more comprehensive picture of the development of Evaluation in physical education because current research has not touched on the essential elements of physical education evaluation.

To improve the quality of physical education, future researchers can discuss several topics, including evaluating teacher and student interactions. Evaluation of teacher-student interactions indicates social aspects that need to be measured and interpreted (Sahin, 2021). The next step is self-evaluation, that needs to be carried out by the teacher. Self-evaluation is a process in which a person assesses the adequacy and effectiveness of performance for self-improvement (Keller & Duffy, 2005). Through self-evaluation, teachers can make personal internal corrections. Thus, continuous educational innovation in the academic program process, including learning evaluation, must be implemented immediately (Sabri & Baderiah, 2020). Assessment and Evaluation must be carried out continuously and require recording the progress level as feedback for teachers to evaluate learning activities (Firman, 2014). However, theory regarding the role of teacher evaluation in social learning within and within educational organizations is still lacking (King & Paufler, 2020). One of the problems experienced in this process is how to carry out quality evaluations of students during the educational process (Makhachashvili, 2021). Therefore, more extensive research on Evaluation in physical education in the future is highly desirable. This research contributes to physical education as a reference to improve the quality of physical education, but this research has limitations where the data analyzed is only data available on Scopus from 2013 to 2023 based on searches conducted with Publish or Perish (PoP) which may not accommodate all publications on evaluation in physical education so the number is very limited. In addition, some publications may not have complete information. Therefore, it is recommended that future researchers conduct an analysis using references outside of Scopus such as the Web of Science (WoS) database, Google Scholar, PubMed, and Semantic Scholar. In addition, future researchers also need to use analyses other than bibliometrics to enrich references related to evaluation in physical education and examine other variables that have not been studied related to assessment in physical education.

CONCLUSION

In this study, the authors use bibliometric analysis to study the state of research in the Evaluation of physical education. Publication trends related to Evaluation in physical education experienced fluctuations; the highest number of publications occurred in 2021. The United States was reported as the country with the most authors researching Evaluation in physical education, and articles published in 2020 were the most frequently cited papers. Meanwhile, the author with the most citations is (Jiang et al. 2016) with affiliation of Jingdezhen

Ceramic Institute, Jingdezhen, China. Overall, this research can report that research on Evaluation in physical education in the Scopus database for 2013-2023 is still low, where only 50 journal articles were found. This allows future researchers to examine other variables related to Evaluation in physical education.

REFERENCES

- Andrade, H., & Du, Y. (2007). Student responses to criteria-referenced self-assessment. *Assessment & Evaluation in Higher Education*, 32(2), 159–181.
- Arruda, H., Silva, E. R., Lessa, M., Proença Jr, D., & Bartholo, R. (2022). VOSviewer and bibliometrix. *Journal of the Medical Library Association*, 110(3), 392.
- Basuki, S. (2019). The role of supervision and moral aspect towards performance: An evaluation of physical education teachers in Indonesia. *International Journal of Advanced Science and Technology*, 28(8), 360–372.
- Blegur, J., Ma'mun, A., Mahendra, A., Mahardika, I. M. S., & Tlonaen, Z. A. (2023). Bibliometric Analysis of Micro-teaching Model Research Trends in 2013-2023. *Journal of Innovation in Educational and Cultural Research*, 4(3), 523–533.
- Çoştu, B. (2012). Ölçme ve Değerlendirmeye İlgili Temel Kavramlar, Eğitimde Ölçme ve Değerlendirme. Nobel.
- Donthu, N., Kumar, S., Pandey, N., & Lim, W. M. (2021). Research constituents, intellectual structure, and collaboration patterns in Journal of International Marketing: An analytical retrospective. *Journal of International Marketing*, 29(2), 1–25.
- Esmailzadeh, R., Anjimshoa'a, M. R., Deyhim, J., Attork, M., & Kiani, M. (2017). The evaluation of teachers' effectiveness in physical education: Evidence from Iran. *International Journal of Economic Perspectives*, 11(1), 214–219.
- Ferriz-Valero, A., Østerlie, O., & Martínez, S. G. (2020). Gamification in physical education: Evaluation of impact on motivation and academic performance within higher education. *International Journal of Environmental Research and Public Health Miguel García-Jaén*, 17(12), 1–16.
- Firman, F. (2014). Penerapan Teknik Penilaian Berbasis Kelas untuk Meningkatkan Prestasi Belajar Bahasa Indonesia. *Jurnal Pendidikan Iqra*, 2(1), 42.
- Freeman, W. H. (1992). *Physical education and sport in a changing society*. MacMillian Publishing Company.
- Frossard, M., Cassanu, J., Stieg, R., & Paula, S. (2018). Appropriations of the evaluation practices for the teaching of undergraduate students in physical education. *Journal of Physical Education (Maringá)*, 29(1).
- Haroon, M., Iqbal, M. J., Hassan, W., Ali, S., Ahmed, H., & Hassan, S. U. (2021). Evaluation of methanolic crude extract of *Linum usitatissimum* for the removal of biofilm in diabetic foot isolates. *Brazilian Journal of Biology*, 83, e245807.
- Huber, E. (2017). Introducing a new learning and teaching evaluation planning framework for small internally funded projects in higher education. *Journal of University Teaching & Learning Practice*, 14(1).
- Huber, E., & Harvey, M. (2016). An analysis of internally funded learning and teaching project evaluation in higher education. *International Journal of Educational Management*, 30(5), 606–621.
- Izadpanah, S. (2021). Evaluation of the architectural features and physical environment in early childhood education framework. *Civil Engineering Journal (Iran)*, 7(2), 330–342.
- Jiang, Y., Wang, & Yanxiu. (2016). Evaluation of teaching quality of public physical education in colleges based on the fuzzy evaluation theory. *Journal of Computational and Theoretical Nanoscience*, 13(12), 9848–9851.
- Keller, C. L., & Duffy, M. L. (2005). "I Said That?" How to Improve Your Instructional Behavior in Just 5 Minutes per Day through Data-Based Self-Evaluation. *Teaching Exceptional Children*, 37(4), 36–39.
- King, K. M., & Paufler, N. A. (2020). Excavating theory in teacher evaluation: Implementing evaluation frameworks as Wengerian boundary objects. *Education Policy Analysis Archives*, 28, 57.
- Kolade, O., Owoseni, A., & Egbetokun, A. (2024). Is AI changing learning and assessment as we know it? Evidence from a ChatGPT experiment and a conceptual framework. *Heliyon*.
- Mahajan, S. L., Tanner, L., Ahmadi, G., Becker, H., DeMello, N., Fidler, R., Harborne, A. R., Jagadish, A.,

- Mills, M., Cairney, P., & others. (2023). Accelerating evidence-informed decision-making in conservation implementing agencies through effective monitoring, evaluation, and learning. *Biological Conservation*, 286, 110304.
- Makhachashvili, R. (2021). Digital hybrid learning individual quality assessment in european and oriental languages programs: Student case study in Ukraine. *14th International Conference on ICT, Society, and Human Beings, ICT 2021*, 14(1), 11–22.
- Masitoh, P. N. A., Latifah, S., Saregar, A., Aziz, A., Jamaluddin, W., & others. (2021). Bibliometric analysis of physics problem solving. *Journal of Physics: Conference Series*, 1796(1), 12009.
- Memarian, B., & Doleck, T. (2023). A review of assessment for learning with artificial intelligence. *Computers in Human Behavior: Artificial Humans*, 100040.
- Moon, J., & Park, Y. (2023). Evaluation of assessment techniques for preservice physical education teachers in volleyball skills during blended learning. *Journal of Physical Education and Sport*, 23(3), 648–657.
- Oliver, M., MacBean, J., Conole, G., & Harvey, J. (2002). Using a toolkit to support the evaluation of learning. *Journal of Computer Assisted Learning*, 18(2), 199–208. <https://doi.org/10.1046/j.0266-4909.2002.00227.x>
- Palmerini, C. A. (2015). Synthesis of new indole-based bisphosphonates and evaluation of their chelating ability in PE/CA-PJ15 cells. *European Journal of Medicinal Chemistry*, 102, 403–412.
- Pangrazi, R. P., & Beighle, A. (2019). *Dynamic physical education for elementary school children*. Human Kinetics Publishers.
- Paula, S. de, Neto, A. F., Stieg, R., Cassani, J. M., Vieira, A. de O., & Santos, W. dos. (2018). Evaluation in the physical education of basic education: Dialogues with students of seven federal universities. *Journal of Physical Education (Maringa)*, 29(1). <https://doi.org/10.4025/jphyseduc.v29i1.2957>
- Putnik, G., Alves, C., Varela, L., Pinheiro, P., Victor, M., & Manuel, Z. (2023). A contribution to the definition of students group agility measures within the Social Network based Education in the context of evaluation of students' effective learning of Industry 4.0 skills. *Procedia CIRP*, 118, 1050–1055.
- Quennerstedt, M., Öhman, M., & Eriksson, C. (2008). Physical education in Sweden: a national evaluation. *Education-Line*, 1–17.
- Raj, L. (2020). Evaluation of Venous Thromboembolism Recurrence Scores in an Unprovoked Pulmonary Embolism Population: A Post-hoc Analysis of the PADIS-PE trial. *American Journal of Medicine*, 133(8).
- Rihatno, T. (2023). Evaluation of Physical and Health Education Online Learning in Elementary Schools: PLS-SEM Approach. *International Journal of Information and Education Technology*, 13(7), 1156–1168.
- Rother, E. T. (2007). Systematic literature review X narrative review. *Acta Paulista de Enfermagem*, 20, v–vi.
- Sabri, J., & Baderiah. (2020). Learning Evaluation Management Improving the Quality of Graduates in State Islamic Institute of Palopo. *Online Submission*, 1(2), 61–72. <https://doi.org/10.46966/ijae.v1i2.39>
- Sahin, T. (2021). Self-evaluated teacher effectiveness in physical education and sports during schools closedown and emergency distance learning: Teacher effectiveness in physical education. *International Journal of Curriculum and Instruction*, 13(2), 1493–1507.
- Sahu, S. S. (2020). Evaluation of long-lasting indoor residual spraying of deltamethrin 62.5 SC-PE against malaria vectors in India. *Malaria Journal*, 19(1). <https://doi.org/10.1186/s12936-020-3112-4>
- Sakurai, H. (2013). Standardization of clinical skill evaluation in physical/occupational therapist education - Effects of introduction of an education system using OSCE-. *Journal of Physical Therapy Science*, 25(9), 1071–1077. <https://doi.org/10.1589/jpts.25.1071>
- Saputro, A. A. (2023). Evaluation Of Physical Education Learning During Covid-19 At Jombang District Junior High School. *International Journal of Educational Research and Social Sciences*, 4(1), 16–22.
- Shahril, M. I. Bin, Salimin, N. Bin, & others. (2015). The validity and reliability of iso test towards the performance assessment of future physical education teachers in teaching and learning process. *Procedia-Social and Behavioral Sciences*, 195, 814–820.
- Silberman, N. (2020). Development and Evaluation of a Simulation-Based Acute Care Course in a Physical Therapist Education Program. *Journal of Physical Therapy Education*, 34(1), 76–85.
- Sparkes, E., & Werners, S. E. (2023). Monitoring, evaluation and learning requirements for climate-resilient development pathways. *Current Opinion in Environmental Sustainability*, 64, 101329.

- Stoner, J. B., Meadan, H., Angell, M. E., & Daczewitz, M. (2012). Evaluation of the Parent-implemented Communication Strategies (PiCS) project using the Multiattribute Utility (MAU) approach. *Educational Assessment, Evaluation and Accountability*, 24(1), 57–73.
- Šumanović, M. (2013). Evaluation of the PE curriculum in the higher grades of primary school. *Croatian Journal of Education*, 15, 169–193.
- Suprpto, N., Prahani, B. K., & Deta, U. A. (2021). *Research trend on ethnoscience through bibliometric analysis (2011-2020) and the contribution of Indonesia*.
- Tong, S. (2020). An evaluation model of the learning effect of physical education major courses in colleges. *International Journal of Emerging Technologies in Learning*, 15(7), 17–28.
- Varol, Y. K. (2016). The predictive power of the self-efficacy beliefs of physical education candidate teachers on their attitudes towards the assessment and evaluation in education. *Universal Journal of Educational Research*, 4(6), 1458–1463.
- Wang, Y., Sun, C., & Guo, Y. (2020). A Multi-Attribute Fuzzy Evaluation Model for the Teaching Quality of Physical Education in Colleges and Its Implementation Strategies. *International Journal of Emerging Technologies in Learning*, 16(2), 159–172. <https://doi.org/10.3991/ijet.v16i02.19725>
- Wharton, T. (2013). Evaluating a Moving Target: Lessons Learned from Using Practical Participatory Evaluation (P-PE) in Hospital Settings. *American Journal of Evaluation*, 34(3), 402–412.
- Wu, Y. (2020). Study on Evaluation of Marine Physical Education Curriculum System in the Context of Marine Power. *Journal of Coastal Research*, 115, 259–261. <https://doi.org/10.2112/JCR-SI115-082.1>
- Xu, D., & Rappaport, T. S. (2019). Construction on teaching evaluation index system of track and field general course for physical education major in light of wireless network technology. *Journal of Intelligent and Fuzzy Systems*, 37(3), 3435–3443. <https://doi.org/10.3233/JIFS-179147>
- Zeng, Y. (2020). Evaluation of physical education teaching quality in colleges based on the hybrid technology of data mining and hidden markov model. *International Journal of Emerging Technologies in Learning*, 15(1), 4–15. <https://doi.org/10.3991/ijet.v15i01.12533>
- Zhang, J., & Zhang, C. (2023). Teaching quality monitoring and evaluation of physical education teaching in ordinary college based on edge computing optimization model. *Journal of Supercomputing*, 79(15), 16559–16579. <https://doi.org/10.1007/s11227-023-05324-x>
- Zhao, X., & Zheng, C. (2021). Fuzzy Evaluation of Physical Education Teaching Quality in Colleges Based on Analytic Hierarchy Process. *International Journal of Emerging Technologies in Learning*, 16(6), 217–230.
- Zhao, Y. (2017). Research on the diversified evaluation index system and evaluation model of physical education teaching in colleges and universities. *Journal of Computational and Theoretical Nanoscience*, 14(1), 99–103. <https://doi.org/10.1166/jctn.2017.6132>