Bibliometric Analysis of Scientific Publication Trends on the Application of Physical Literacy in Physical Education

by Lutfi Nur

Submission date: 20-Jun-2026 12:21PM (UTC+0700)
Submission ID: 2986414245
File name: 2104-Article_Text-8689-1-18-20260611.pdf (3.68M)
Word count: 7636
Character count: 45564

IJPESS
Indonesian Journal of Physical Education and Sport Science
p-ISSN 2775-765X | e-ISSN 2776-0200
Volume 6, No. 2, June 2026. Page. x-xx
http://journal.unucirebon.ac.id/index.php ijpess

Bibliometric Analysis of Scientific Publication Trends on the Application of Physical Literacy in Physical Education

Deni Mulyadi[1], Lutfi Nur[2*], Sandra Arhesa[3]

[1,2]Departement of Elementary School Teacher Education Tasikmalaya Campus, Universitas Pendidikan Indonesia, Indonesia

[3]Departement of Physical Education, Universitas Majalengka, Indonesia

*Corresponding Author: Lutfi Nur, e-mail: lutfinur@upi.edu

Received: xx Month 2023, Approved: xx Month 2023, Published: xx Month 2023

Abstract

Study purpose. The problem raised is the lack of a comprehensive and quantitative overview of global trends, collaboration patterns, and the intellectual structure of this field, as most previous studies have been qualitative or single case studies

Materials and methods. This study used a bibliometric approach to analyse 312 documents from the Scopus database published between 1981 and 2025 related to the application of physical literacy in physical education. Data collection was conducted systematically using Boolean keywords and PRISMA guidelines to identify evolutionary patterns and emerging research trends in the field. The collected data were then exported to CSV format for statistical metric analysis, while VOSviewer software was used specifically to generate network, overlay, and density visualizations to map citation and publication trends.

Results. Document analysis reveals a dramatic increase in publications on the application of physical literacy in physical education, predominantly from the United States, while highlighting the interdisciplinary nature of this topic, which remains open for future researchers to explore. Furthermore, trends in titles and abstracts confirm that the current literature has successfully bridged clinical health theory with the practical implementation of physical literacy to improve students' skills, activity, and well-being in school settings.

Conclusions. Overall, this bibliometric study successfully charts the evolution of physical literacy applications in physical education as a rapidly growing multidisciplinary field, characterized by increasing publication trends and an emphasis on technology integration. These quantitative findings provide empirical guidance for practitioners to continuously update their teaching methods, while also encouraging researchers to explore under-researched topics and conduct systematic literature reviews in the future.

Keywords: Physical literacy, physical education, bibliometric analysis, publication trends, Scopus.

DOI: https://doi.org/10.52188/ijpess.v3i1

Introduction

Inadequate physical activity levels and sedentary lifestyles have become serious global health problems, contributing to the rise in non-communicable diseases across diverse populations (Guthold et al., 2018; Romadhoni et al., 2026). In this context, physical literacy has emerged as a key concept offering a holistic solution. Physical literacy is defined as the motivation, confidence, physical competence, knowledge, and understanding to value and assume responsibility for lifelong physical activity engagement (Giblin et al., 2014; Pot et al., 2018). To develop this crucial concept, physical education in schools is considered the most ideal and strategic environment, as it provides structured opportunities for students to develop the necessary skills, knowledge, and attitudes (Keegan et al., 2019; Tremblay et al., 2018). Thus, physical literacy focuses not only on motor skills but also on the affective and cognitive aspects that support students' active participation in physical activity.

Previous research has examined various aspects of physical literacy in physical education. Some studies have explored physical literacy from a teacher perspective, such as studies showing that even if teachers have a good level of physical literacy, its implementation in the classroom is still needed (Chapelski, 2021; Rutkauskaite et al., 2024). There is also research focusing on teacher assessment literacy, where teachers' understanding of digital-based assessment can improve their teaching practices (Thompson & Penney, 2015; Valle-Muñoz et al., 2025). Furthermore, other studies have attempted to define and apply the concept of physical literacy in specific contexts, such as Australia, to ensure its relevance to the local social and cultural environment (Keegan et al., 2019). These studies provide in-depth insights into the micro-aspects of physical literacy implementation, but do not provide a comprehensive overview.

Despite the increasing volume of research, significant gaps remain in the existing literature. Most previous studies have been qualitative or focused on single case studies, limiting our ability to identify global trends, collaboration patterns, and the intellectual structure of the field as a whole (Boateng et al., 2024; Santoveña-Casal & López, 2024). This lack of macro-level analysis hinders our understanding of the topic's evolution, the most influential authors and institutions, and emerging research directions. Therefore, a more comprehensive and quantitative approach is needed to objectively map the research landscape, highlight key emerging subfields, and identify opportunities for future research innovation (Donthu et al., 2021).

Therefore, the novelty of this study lies in the use of bibliometric methods to fill this gap. Unlike traditional literature reviews, bibliometric studies use large volumes of publication data to quantitatively analyze and map the research field. Using this method, this study will identify publication trends over time, collaborations between authors and institutions, and keyword clusters that reflect interrelated research themes (Ellegaard & Wallin, 2015; Mejia et al., 2021; van Eck & Waltman, 2010; Waltman et al., 2010; Zupic & Čater, 2015). This approach allows researchers to objectively and systematically visualize the knowledge structure and evolution of the field of physical literacy in physical education, providing an unprecedented perspective in the literature (Cobo et al., 2011).

Based on the background, previous research, and identified gaps, the main objective of this study is to analyze the trend of scientific publications on the application of physical literacy in physical education using bibliometric methods. Specifically, this study aims to: (1) analyze the annual growth of publications; (2) identify the most influential authors, organizations, and countries or regions; (3) map the intellectual structure of this field through keyword cluster analysis; and (4) provide recommendations for future research directions. The results of this study are expected to serve as strategic guidance for researchers, educators, and policymakers to advance research and practice related to physical literacy in physical education (Razali et al., 2024).

Materials and methods

Study organization

To address the needs of the study problem, this study adopted a bibliometric study because it allows researchers to analyze large amounts of data, the process is fast and accurate, and the interpretation of keyword metrics, title, and abstract is practical (Blegur & Hardiansyah, 2024). Bibliometric studies can support researchers in developing science and technology in a particular field while simultaneously deciding on meaningful future research projections (Donthu et al., 2021; Mejia et al., 2021; Razali et al., 2026). This study can also diagnose opportunities and update current research to contribute more to the development of science and technology in the future (Marmoah et al., 2022).

Search Strategies

The documents were systematically retrieved from established research sources within the Scopus database. The keywords used in Boolean expressions (AND or OR) were "application" OR " software" AND "physical" OR "body" AND "literacy" OR "skills" AND "education" OR "learning". The search was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline (Page et al., 2021).

Eligibility Criteria

The inclusion criteria for this study exclusively included studies investigating the application of physical literacy in physical education. Data collection was completed on September 2, 2025, with subsequent analysis spanning the decade from 1981 to 2025. This time span facilitated a comprehensive assessment of the evolutionary patterns and emerging trends in the application of physical literacy in physical education.

Database Abstraction

The publication identification and screening phase began with the retrieval of 312 documents from the Scopus database. After an initial review of titles, abstracts, and keywords, the number of documents remained at 312. Subsequently, all 312 documents were retrieved, ranging from 1981 to 2025, as they met the established criteria of more than 300 documents for bibliometric analysis (Arhesa et al., 2024; Donthu et al., 2021), as illustrated in Figure 1.

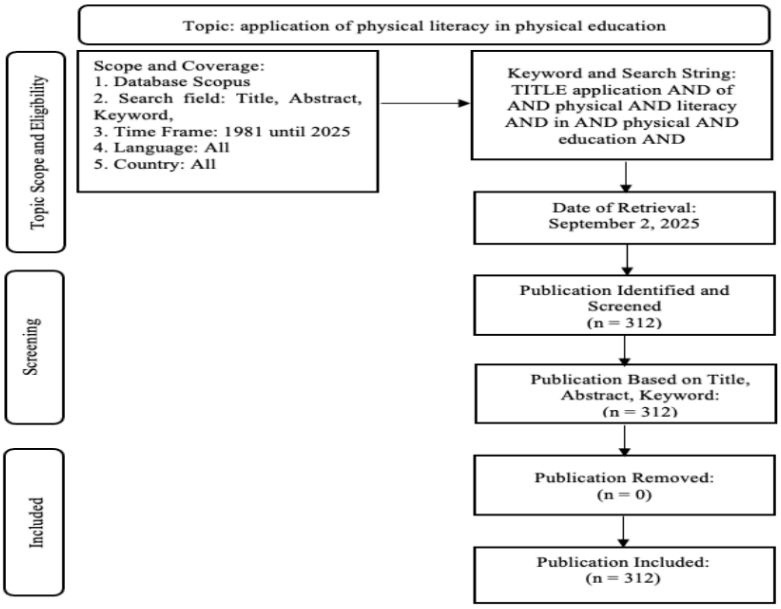

Figure 1. Research flow

Statistical analysis

The research process began by importing 312 documents from Scopus into Comma Separated Values (CSV) format to perform data metric analysis, such as frequency and percentage by year, source, author, affiliation, country, and document type. Publication trends were then analyzed using Scopus's analysis features and saved in JPEG format. VOSviewer software was used to identify citation trends and create network and overlay visualizations based on keywords, titles, and abstracts. Bibliometric methods were chosen because they facilitate researchers' interpretation of graphical representations of extensive bibliometric maps, allowing for more efficient operation and understanding of large amounts of data (Arhesa & Badriah, 2025; van Eck & Waltman, 2010).

VOSviewer visualization interpretation includes three main forms: network visualization, where label size indicates item weight and distance indicates interconnectedness; overlay visualization, which uses a color gradient from blue to yellow to indicate item scores; and density visualization, which shows the concentration of items at specific points, with yellow indicating the highest density (van Eck & Waltman, 2010). In the final stage, the research results are reported and discussed in the form of tables for citation metrics, bar graphs and pie charts (JPEG) for publication trends, and image formats (PNG) for network visualization results and overlays from VOSviewer.

Results

Publication Trends

Document by years

An analysis of the Scopus database from 1981 to 2025 recorded 312 documents related to the application of physical literacy in physical education, with a sharp surge in publications starting in 2020 and peaking in 2024. This dramatic increase during this period was closely related to the strengthening of global health awareness due to the pandemic crisis. This situation triggered a post-pandemic educational transformation that fundamentally re-highlighted the urgency of physical fitness, with physical literacy now widely recognized as a crucial element in maintaining students' well-being and resilience against sedentary lifestyles. Furthermore, the rapid shift to digital learning models demands innovative adaptations in physical education practices, ultimately driving a massive amount of academic research in this area. Although recent literature such as the findings of Rutkauskaite et al. (2024) and Weir et al. (2024) demonstrates that educators, including those in early childhood education, have an adequate conceptual understanding, the practical implementation of physical literacy in the field still requires significant improvement. Therefore, research continues to develop rapidly to formulate best practices and effective curriculum integration strategies to address the challenges of teaching physical activity in the era of digital transformation Figure 2.

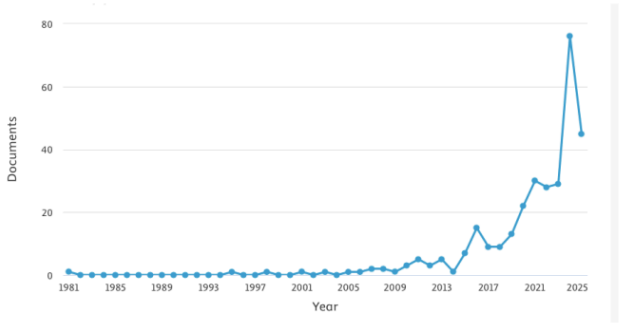

Figure 2. Document by years

Document per years by source

Publication trends on the application of physical literacy in physical education show a significant increase in research activity in recent years, particularly between 2020 and 2024. Studies on this topic have attracted the attention of leading journals across disciplines, led by the International Journal of Environmental Research and Public Health, which recorded its highest publication volume in 2024. Furthermore, significant contributions have come from other multidisciplinary and educational journals such as Applied Mathematics and Nonlinear Sciences, ACM Proceedings, Retos, and the Journal of Teaching in Physical Education. This diversity of publication sources indicates that the implementation of physical literacy is now viewed as a crucial issue, studied not only from a sports pedagogy perspective but also involving analysis from public health and applied science, as seen in Figure 3.

The various publications from these journals provide empirical evidence regarding the importance of innovation and structured interventions in physical education teaching. For example, a study by Knisel et al. (2020) demonstrated that well-designed educational programs can effectively improve health literacy and awareness in elementary school students. On the

other hand, innovative research by Zhu & Gu (2023). shows that analytical approaches such as mathematical approximation methods can be used to identify and optimize teachers' teaching strategies. Such innovations are crucial in physical literacy applications, as they help educators bridge the gap between the physical education curriculum and expected learning outcomes, thus developing more active and health-conscious students.

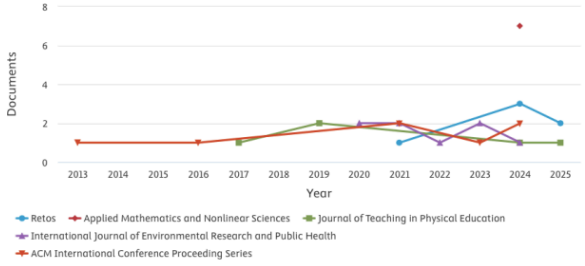

Figure 3. Document per years by source

Document by authors

Publication data mapping analysis reveals the diversity of authors' contributions to building the literature on the application of physical literacy in physical education. While 11 dominant documents lacked a specific author ID ("[No Author ID found]"), a number of researchers consistently contributed, publishing two documents each. These prominent authors include Arifin, S.; Barnett, L.M.; Castillo-Retamal, M.; Chan, S.; Dudley, D.A.; Finney, J.; Frömel, K.; Garrett, R.; and Ginani, V.C. This pattern indicates that, while most research remains unidentified, the study of physical literacy has begun to be seriously pursued by a group of academics dedicated to the development of the discipline of physical education. The work of these experts has had a significant impact on pedagogical innovation and policy in physical education. For example, collaborative research involving Syamsul Arifin demonstrated that project-based learning models are highly effective in helping students internalize physical literacy concepts, leading to increased independence in motor decision-making (Mashud et al., 2025). On a more macro scale, Lisa M. Barnett's contribution led to the creation of the Global Physical Literacy Action Framework (GloPL) through expert consensus. This initiative to create universal guidelines is crucial for standardizing and promoting the equitable implementation of physical literacy, ensuring a strong and focused foundation for physical education programs across countries (Carl et al., 2024). This can be seen in Figure 4.

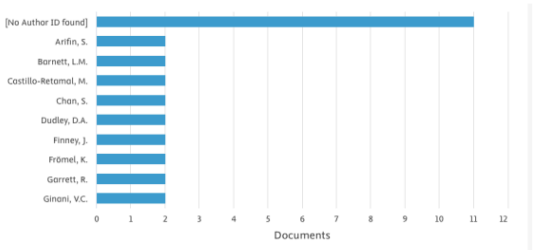

Figure 4. Document by authors

Document by affiliation

The University of Newcastle, Australia, was the top affiliate with 6 documents. This was followed by Deakin University with 5 documents and the University of Gloucestershire with 4 documents. Interestingly, there was a separate entry for the University of Newcastle, College of Health, Medicine, and Wellbeing, which also had 4 documents, indicating the institution's internal specialization. Furthermore, several other institutions contributed significantly, each with 3 documents. These institutions were Mount Royal University, Iowa State University, King's College London, the University of Florida, Tilburg University, and the National University of Singapore. This pattern suggests that research on this topic is not concentrated in just one or two institutions, but involves a wide range of universities and colleges from various countries, indicating that this topic is a subject of global research, as seen in Figure 5.

One research article from the University of Newcastle, Australia, entitled "Defining physical literacy for application in Australia: A modified Delphi method," was written by (Keegan et al., 2019). As a result, a definition of physical literacy tailored for application in Australia was developed using a modified Delphi method. Expert consensus indicated that physical literacy in Australia should include specific elements relevant to the country's social and cultural context.

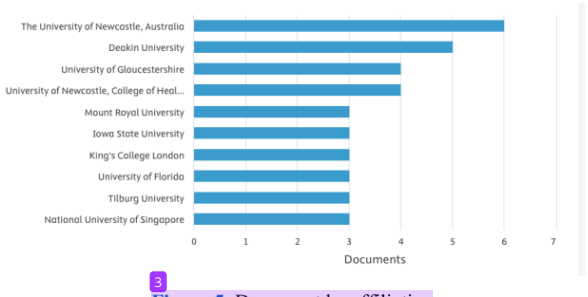

Figure 5. Document by affiliation

Document by country

Research on the application of physical literacy in physical education has attracted global attention, with the United States (68 papers) and China (41 papers) leading the way as the largest contributors. This dominance of developed countries is followed by significant contributions from countries across continents, such as Australia, the United Kingdom, Germany, and Indonesia, which contributed 14 academic papers. This broad geographic distribution indicates that the study of physical literacy implementation is no longer concentrated in one region but has become a growing global agenda. The presence of developing countries on the list of major contributors also demonstrates that adaptation and innovation of physical education curricula are becoming more widespread to address the challenges of student physical activity worldwide, as seen in Figure 6.

Clear evidence of the application of this concept is evident in literature focused on providing a practical framework for physical education teachers. For example, a study from the United States by Killough et al. (2020) emphasized that the practical application of physical literacy is crucial, as it not only focuses on motor skill development but is also effective in building student motivation, self-confidence, and awareness of the importance of lifelong physical activity. Meanwhile, contributions from Indonesian literature, such as research by Istikomah et al. (2021), highlighted the importance of web-based information literacy systems

in facing the Industrial Revolution 4.0 era. In the context of physical education, the adoption of such digital technologies and systems can be synergized as a powerful support tool to help teachers and students access, design, and evaluate physical fitness programs more critically and adaptively in the modern era.

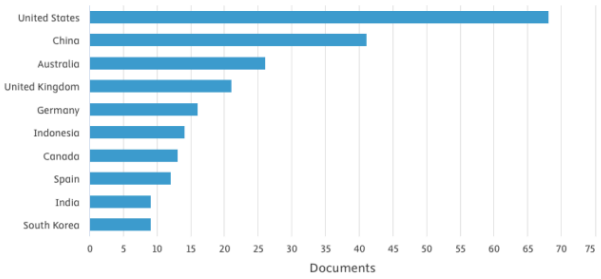

Figure 6. Document by country

Document by type

An analysis of published document types indicates that journal articles are the primary medium for disseminating findings related to the application of physical literacy in physical education. Of the 312 documents reviewed, 64.1% (200 documents) were published in journal articles, confirming the high quality and depth of research in this field. Furthermore, the contribution of conference papers, which reached 16.7% (52 documents), indicates that many innovations, new teaching methods, and preliminary findings regarding the implementation of physical literacy are actively discussed in international academic forums. The diversity of other publication formats, including reviews and book chapters, further emphasizes that the discourse on physical literacy continues to evolve and receives serious attention from the global scientific community. In practice, published literature strongly emphasizes the importance of evaluation skills in supporting the implementation of physical literacy in schools. For example, a crucial study by Thompson & Penney (2015) highlighted that assessment literacy among elementary school physical education teachers is key to ensuring effective and meaningful learning. This emphasizes that physical literacy applications focus not only on delivering movement skills but also require educators to continuously develop their capacity to design accurate measurement tools. Assessments aligned with the objectives of the physical education curriculum will ensure that each student's physical literacy development is facilitated and comprehensively evaluated, as seen in Figure 7.

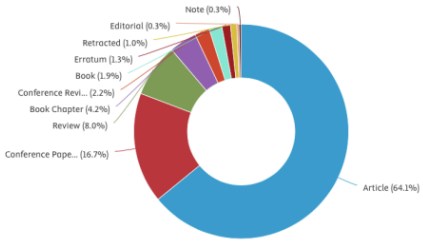

Figure 7. Document by type

Citation Trends

A 44 year literature review identified several highly cited primary reference articles that directly focused on the application of physical literacy in physical education. One crucial work in this area was written by Lubans et al. (2017), entitled "Framework for the design and delivery of organized physical activity sessions for children and adolescents: Rationale and description of the 'SAAFE' teaching principles," which outlined principles for teaching physical activity and received 124 citations. More specifically, Keegan et al. (2019) work, "Defining physical literacy for application in Australia: A modified Delphi method," received 116 citations. Published in the Journal of Teaching in Physical Education, this article marked a significant milestone in defining guidelines for the practical application of physical literacy in educational settings. Can be seen in Table 1.

Table 1. Citation Trends

No	Cites	Author (years)	Title	Publication identity
1	124	(Lubans et al., 2017)	Framework for the design and delivery of organized physical activity sessions for children and adolescents: Rationale and description of the 'SAAFE' teaching principles	International Journal of Behavioral Nutrition and Physical Activity
2	116	(Keegan et al., 2019)	Defining physical literacy for application in Australia: A modified delphi method	Journal of Teaching in Physical Education

This citation trend also demonstrates the strong global academic ecosystem's support for research on physical literacy and physical activity. Key studies in this field are actively published in leading journals such as the International Journal of Environmental Research and Public Health. In terms of institutional affiliation, the University of Newcastle, College of Health, Medicine, and Wellbeing, has made significant research contributions to the development of this literature. Overall, the United States emerged as the most productive country, leading the development of this theme, producing 68 papers and garnering a total of 1,183 citations, demonstrating its dominance and significant influence in advancing physical literacy research globally.

Keyword Trends

Keyword metric analysis provides a visual mapping that confirms that the application of physical literacy in physical education operates within a highly dynamic interdisciplinary ecosystem. The formation of three main clusters represents a crucial paradigm shift; traditional pedagogical domains and student activities (green cluster) can no longer stand alone but must intersect with clinical health interventions (red cluster) and engineering innovations (blue cluster) Table 2 Critically, the interconnectedness of these clusters demonstrates that contemporary physical education serves as a strategic bridge. This field is tasked with transforming theoretical understandings of health literacy into a measurable set of physical

activities, with monitoring and evaluation processes increasingly driven by engineering and technology.

Table 2. Cluster of 28 item

Cluster	Colour	Items	Total
1	Red	Exercise, health education, health literacy, health promotion, human, humans, mobile application, physical activity, procedures, psychology, self care, telemedicine	12 items
2	Green	Adult, aged, article, controlled study, female, major clinical study, male, questionnaire	8 items
3	Blue	Education, engineering education, literacy, motivation, physical education, physical literacy, students, teaching	8 item

Within the education ecosystem, the interaction between technology, literacy, and health creates a preventative and data-centric learning environment. Despite their significant conceptual potential, the limited frequency of keywords such as *physical education* (ranked 10th), *mobile application* (ranked 20th), and *physical literacy* (ranked 21th) highlights the vast scope for exploration (see **Figures 8** and **9**). Technology is now required to be present not merely as a tool, but as a primary catalyst for example, through the use of integrated fitness tracking apps or artificial intelligence (AI)-based tactical movement detection systems that enable educators to monitor students' health levels in real time. The synergy of these three elements ensures that students are not only actively moving but also have the literacy capacity to independently manage their physical well-being using digital tools.

Moving forward, this research landscape is projected to give rise to new themes focused on pedagogical digitization and institutional policy. One crucial issue for the future is the urgency of designing a comprehensive and standardized physical literacy governance model, which can be implemented from elementary school to integrated into the healthy campus movement in universities. Furthermore, researchers will face significant challenges related to downstream innovation, such as ensuring widespread access to health and fitness apps in education. Future trends will also depend heavily on how effectively immersive technologies, such as augmented reality (AR) and gamification, can be integrated into the curriculum to not only present accurate biomechanical data but also build students' character and psychological resilience.

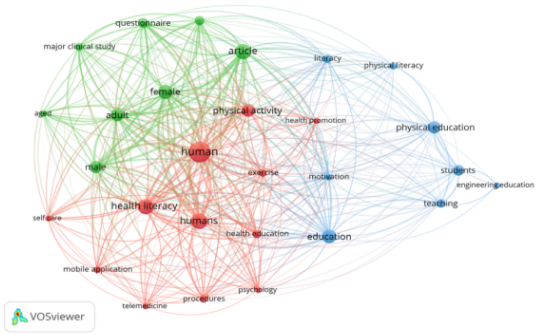

Figure 8. Network visualization of keywords trends

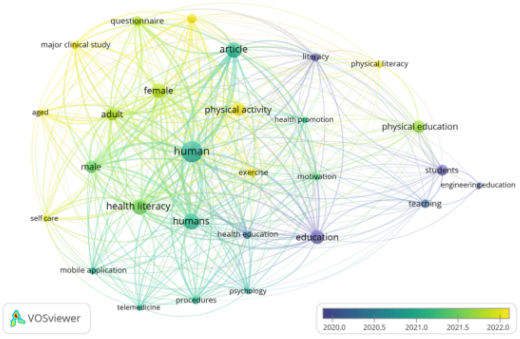

Figure 9. Overlay visualization of keywords trends

Subject Area Trends

Studies on the application of physical literacy in physical education are essentially interdisciplinary, with a strong dominance from the fields of Medicine and Social Sciences. Medicine ranks highest with 24.3% (141 publications), indicating that physical literacy is still predominantly explored from a health and medical perspective. Social Sciences, on the other hand, follows with 19.1% (111 documents), specifically highlighting behavioral aspects of teaching. Interestingly, significant contributions also came from Computer Science (12.7%), Health Professions (9.6%), and Engineering (7.1%), which are closely related to digital technology innovation. This diversity of disciplinary backgrounds confirms that physical literacy is a complex, dynamic, and highly relevant issue for cross-sector development. This can be seen in Figure 10.

The involvement of these various disciplines, particularly the integration with computer science and technology, has a direct impact on the practice of physical literacy applications in the field. One example of this application is seen in the study by Fletcher et al. (2024), which

examined digital-based assessment practices in physical education. The research findings demonstrate that effective use of technology can significantly improve the assessment literacy of elementary school teachers. Through measurable digital assessment tools, educators can better understand their students' capacities, refine assessment strategies, and ultimately support improvements in the overall quality of physical literacy instruction.

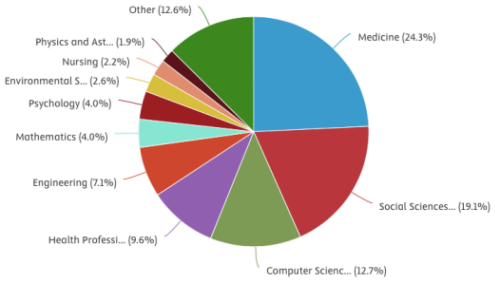

Figure 10. Subject area trends

Title and Abstract Trends

Analysis of title and abstract trends shows that of the 10,799 terms extracted, 56 were the most relevant, forming two main clusters with 1,518 links and a total link strength of 14,348. The ten most frequently occurring terms, such as literacy, student, technology, health, learning, intervention, and skill, reflect the primary focus of the current literature. The dominance of these terms indicates that studies in this area are highly focused on student development and efforts to improve health literacy through learning interventions, where the role of technology and teaching systems is a crucial supporting component. Specifically, in the context of physical literacy applications in physical education, this analysis highlights the position of core terms within the topic. The term "*physical education*" ranked 14th with 62 occurrences, followed by "*physical literacy*" at 42nd, and "application" at 47th. Interestingly, although the term "*application*" had a lower frequency of occurrence (32 occurrences), it recorded the highest relevance score (1.91) among other specific keywords. This confirms that the study of the practical implementation or application of physical literacy in physical education settings is a crucial and relevant topic. Existing literature attempts to bridge physical literacy theory with real-world applications, often involving technological interventions to effectively improve students' skills and health status. This can be seen in Table 3.

Table 3. Cluster of 56 item

Cluster	Colour	Item	Total
1	Red	Age, app, benefit, change, effect, effectiveness, evaluation, evidence, factor, group, health, health literacy, individual, intervention, lack, level, life, outcome, participant, patient, person, physical activity, population, program, questionnaire, total, user, year	28 items
2	Green	Article, assessment, attitude, concept, engagement, environment, experience, field, goal, learning, literacy, order, paper, perspective, physical education, physical literacy, problem, process,	28 items

school, science, skill, student, system, teacher,
technology, topic, world

Network visualization and overlay mapping using VOSviewer demonstrate the formation of two main, complementary clusters in the literature. The first cluster (red) focuses on health aspects and clinical interventions, while the second cluster (green) focuses specifically on physical education, student development, and motor skill acquisition. This mapping clearly illustrates that research in this field has a dual dimension linking fitness status to motor competency achievement in the school environment. The close connection between the two clusters, bridged by keywords such as "literacy" and "program," confirms that current research is no longer limited to examining theoretical concepts alone. Instead, the primary focus of the literature has shifted directly to the practical application of physical literacy in physical education. The implementation of concrete, structured learning programs in schools is seen as the most essential intervention strategy to facilitate improvements in physical health while comprehensively honing students' motor skills Figures 11 and 12.

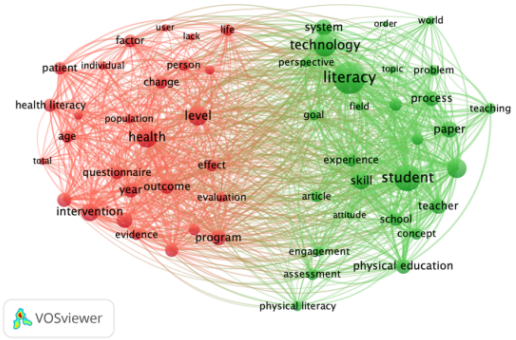

Figure 11. Network visualization of title and abstract trends

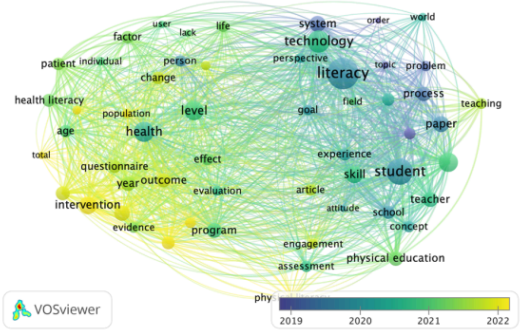

Figure 12. Overlay visualization of title and abstract trends

Discussion

This bibliometric study successfully presents a comprehensive overview of the publication landscape on the application of physical literacy in physical education, a previously uncharted quantitative area. The analysis shows a significant year-on-year upward trend in publications, particularly in the 2020-2024 period (Mejia et al., 2021). This pattern confirms that physical literacy has become a relevant research subject and is attracting global academic attention (Boldovskaia et al., 2023; Bopp et al., 2022). Journals such as the International Journal of Environmental Research and Public Health play a crucial role in disseminating research findings, while the dominance of the United States and China in the number of publications (Ellegaard & Wallin, 2015) indicates that these two countries are leading research centers in this field. These findings provide a strong empirical basis for understanding the evolution and geographic focus of physical literacy research.

This analysis also highlights the advantages of a bibliometric approach. This method allows for the identification of collaboration patterns among authors and institutions, providing insight into the existing intellectual networks in the field (Cobo et al., 2011). Furthermore, data visualizations, such as keyword clusters, help uncover interconnected research themes and emerging subfields, such as clusters linking physical literacy to health, physical education, and technology (Valle-Muñoz et al., 2025; van Eck & Waltman, 2010; Waltman et al., 2010; Weir et al., 2024). This approach also helps identify the most influential authors and institutions at the core of this research field (Zupic & Čater, 2015). Thus, this study not only presents quantitative data but also maps the knowledge structure, providing clear guidance for researchers wishing to contribute to this area.

However, this study also has several limitations. The results of this analysis are highly dependent on the quality and completeness of the databases used, such as Scopus. Unindexed documents or incomplete metadata can affect the accuracy of the findings, such as the 11 documents without identified author IDs (Jing et al., 2024). Another limitation is that bibliometric methods cannot delve deeply into the quality of content or the meaning behind a publication (L et al., 2023; Rostami et al., 2024). While we can identify trends and patterns, we cannot assess the methodological quality or substantive arguments of each article solely from data analysis (Saltan et al., 2025; Zupic & Čater, 2015). Therefore, this study should be seen as an initial step, providing a macro framework, which needs to be followed by a more in-depth systematic literature review (Andrade Girón et al., 2024; Donthu et al., 2021).

The results of this study have broad benefits for various parties. For students, academics, and universities, these findings serve as a strategic guide for determining relevant and up-to-date thesis or dissertation research topics (Donthu et al., 2021). They can identify existing research gaps and join established collaborative networks. These findings can also map the most influential works and authors, enabling them to build a strong theoretical foundation and a focused research plan (Moral-Muñoz et al., 2020; Santoveña-Casal & López, 2024). For sports teachers or lecturers, this research helps them understand global trends in physical literacy and integrate innovative concepts into their curricula and teaching methods, such as the use of technology to enhance literacy (Thompson & Penney, 2015). This research can provide a scientific basis for the implementation of new pedagogical models that have proven effective, such as project-based learning (Arufe-Giráldez et al., 2022; Cavus et al., 2023). This can also encourage their professional development by keeping up with the latest scientific developments.

Further benefits extend to other stakeholders, such as policymakers and funding agencies. This quantitative data can be used to formulate more effective physical education policies, strategically allocate resources to support research in emerging areas, and foster international collaboration (Razali et al., 2024). Similar research has demonstrated how bibliometric analysis can map the policy research landscape, helping identify trends and

strategic priorities for interventions and funding allocation (Chen et al., 2023; Gholampour et al., 2019; Pachumwon et al., 2025; Pirina et al., 2024; Sukjairungwattana et al., 2025). This analysis can also help policymakers identify priority topics for funding and intervention programs. With a better understanding of global trends, they can design programs that are not only locally relevant but also aligned with global developments, ultimately contributing to improved public health and well-being more broadly.

Conclusions

Overall, this bibliometric study successfully maps the scholarly landscape of physical literacy applications in physical education, a field showing significant growth and dynamic collaboration. The findings provide empirical confirmation that physical literacy has evolved from a theoretical concept into a vibrant and multidisciplinary area of research. The identification of increasing publication trends, geographic dominance by certain countries, and thematic clusters, such as the relationship between physical literacy and technology, all suggest that the field has a strong foundation for continued growth. While this study has limitations in assessing the quality of content in depth, it provides a valuable quantitative framework for understanding the knowledge structure and the direction of the field's evolution at a macro level.

The implications of this study are significant. For researchers, the findings suggest that future studies could focus on underrepresented topics, such as the implementation of physical literacy in developing countries or further explore the role of technology in physical education. Teachers and practitioners are encouraged to integrate these findings into their teaching practices, ensuring that their curricula and teaching methods are relevant to global trends. In the future, it is recommended to conduct a more in-depth systematic literature review to complement these quantitative findings, so as to provide a richer understanding of the methodological quality and substantive findings of each study.

Acknowledgment

This research is funded by Kementerian Pendidikan Tinggi, Sains, dan Teknologi through the research scheme/program of Master's Thesis Research with Contract No. 556/UN40.F7/PT.01.01/2026.

Conflict of interest

There is no conflict of interest.

References

Andrade Girón, D. C., Zúñiga Rojas, M. G., Lioo Jordán, F. de M., Vellón Flores, V. I., Garivay Torres de Salinas, F. de M., & Solano Armas, T. (2024). Longitudinal overview of digital and media literacy: A taxonomy-based research trends analysis from 1954 to 2023. *Iberoamerican Journal of Science Measurement and Communication*, *4*(3), 1–11. https://doi.org/10.47909/ijsmc.1424

Arhesa, S., & Badriah, D. L. (2025). *Mapping global research trends in swimming anatomy and physiology : A bibliometric analysis (2015-2025).* *10*(3), 341–355. https://doi.org/10.25299/sportarea.2025.vol10(3).23643

Arhesa, S., Ma'mun, A., Mulyana, B., & Sutresna, N. (2024). Research trends in swimming and diving: A five-year bibliometric analysis (2019-2023). *Journal Sport Area*, *9*(3), 408–418. https://doi.org/10.25299/sportarea.2024.vol9(3).16626

Arufe-Giráldez, V., Sanmiguel-Rodríguez, A., Ramos-Álvarez, O., & Navarro-Patón, R. (2022). Gamification in Physical Education: A Systematic Review. *Education Sciences*, *12*(8), 1–20. https://doi.org/10.3390/educsci12080540

Blegur, J., & Hardiansyah, S. (2024). Differentiation instruction publications in physical

education: bibliometric analysis of the last ten years. *Journal of Education and Learning*, *18*(3), 902–913. https://doi.org/10.11591/edulearn.v18i3.21307

Boateng, S. L., Penu, O. K. A., Boateng, R., Budu, J., Marfo, J. S., & Asamoah, P. (2024). Educational technologies and elementary level education – A bibliometric review of scopus indexed journal articles. *Heliyon*, *10*(7), e28101. https://doi.org/10.1016/j.heliyon.2024.e28101

Boldovskaia, A., Dias, N. M. G., Silva, M. N., & Carraça, E. V. (2023). Physical literacy assessment in adults: A systematic review. *PLoS ONE*, *18*(7 July), 1–18. https://doi.org/10.1371/journal.pone.0288541

Bopp, T., Vadeboncoeur, J. D., Roetert, E. P., & Stellefson, M. (2022). Physical Literacy Research in the United States: A Systematic Review of Academic Literature. *American Journal of Health Education*, *53*(5), 282–296. https://doi.org/10.1080/19325037.2022.2100524

Carl, J., Mazzoli, E., Mouton, A., Sum, R. K. W., Singh, A., Niederberger, M., Martins, J., Kriellaars, D., Green, N., Elsborg, P., Dudley, D. A., Cairney, J., Barratt, J., & Barnett, L. M. (2024). Development of a Global Physical Literacy (GloPL) Action Framework: Study protocol for a consensus process. *PLoS ONE*, *19*(8 August), 1–18. https://doi.org/10.1371/journal.pone.0307000

Cavus, N., Ibrahim, I., Ogbonna Okonkwo, M., Bode Ayansina, N., & Modupeola, T. (2023). The Effects of Gamification in Education: A Systematic Literature Review. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, *14*(2), 211–241. https://doi.org/10.18662/brain/14.2/452

Chapelski, M. (2021). The Effect of a Fundamental Movement Skill Intervention on the Physical Literacy Levels of Children with Congenital Heart Disease – A CHAMPS* Cohort Study: Physical Literacy in Pediatric Congenital Heart Disease. *USURJ: University of Saskatchewan Undergraduate Research Journal*, *7*(2). https://doi.org/10.32396/usurj.v7i2.577

Chen, X. X., Ji, Z. G., Wang, Y., Xu, J., Wang, L. Y., & Wang, H. B. (2023). Bibliometric analysis of the effects of mental fatigue on athletic performance from 2001 to 2021. *Frontiers in Psychology*, *13*(January). https://doi.org/10.3389/fpsyg.2022.1019417

Cobo, M. ., López-Herrera, A. ., Herrera-Viedma, E., & Herrera, F. (2011). Science Mapping Software Tools: Review, Analysis, and Cooperative Study Among Tools. *Journal of the American Society for Information Science and Technology*, *64*(July), 1852–1863. https://doi.org/10.1002/asi.21525

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research*, *133*(April), 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Ellegaard, O., & Wallin, J. A. (2015). The bibliometric analysis of scholarly production: How great is the impact? *Scientometrics*, *105*(3), 1809–1831. https://doi.org/10.1007/s11192-015-1645-z

Fletcher, C., Iannucci, C., & Scanlon, D. (2024). A teacher's self-study of digitally-enabled assessment practices to support enhancements in assessment literacy in primary physical education. *Curriculum Studies in Health and Physical Education*, *15*(3), 255–273. https://doi.org/10.1080/25742981.2023.2265903

Gholampour, S., Noruzi, A., Gholampour, B., & Elahi, A. (2019). Research trends and bibliometric analysis of a journal: Sport management review. *Webology*, *16*(2), 223–241. https://doi.org/10.14704/web/v16i2/a200

Giblin, S., Collins, D., & Button, C. (2014). Physical literacy: Importance, assessment and future directions. *Sports Medicine*, *44*(9), 1177–1184. https://doi.org/10.1007/s40279-014-0205-7

Guthold, R., Stevens, G. A., Riley, L. M., & Bull, F. C. (2018). Articles Worldwide trends in insufficient physical activity from 2001 to 2016 : a pooled analysis of 358 population-based surveys with 1 · 9 million participants. *The Lancet Global Health*, *6*(10), e1077–e1086. https://doi.org/10.1016/S2214-109X(18)30357-7

Istikomah, Puji Astutik, A., & Jannah, M. (2021). The Website-based Information Literacy system and Application in Education Facing the Age of Industrial Revolution 4.0. *Journal of Physics: Conference Series*, *1779*(1), 0–9. https://doi.org/10.1088/1742-6596/1779/1/012055

Jing, Y., Wang, C., Chen, Y., Wang, H., Yu, T., & Shadiev, R. (2024). Bibliometric mapping techniques in educational technology research: A systematic literature review. *Education and Information Technologies*, *29*(8), 9283–9311. https://doi.org/10.1007/s10639-023-12178-6

Keegan, R. J., Barnett, L. M., Dudley, D. A., Telford, R. D., Lubans, D. R., Bryant, A. S., Roberts, W. M., Morgan, P. J., Schranz, N. K., Weissensteiner, J. R., Vella, S. A., Salmon, J., Ziviani, J., Okely, A. D., Wainwright, N., & Evans, J. R. (2019). Defining physical literacy for application in Australia: A modified delphi method. *Journal of Teaching in Physical Education*, *38*(2), 105–118. https://doi.org/10.1123/jtpe.2018-0264

Killough, B. P., Sluder, J. B., Howard-Shaughnessy, C., & Rhodes, A. C. (2020). Physical Literacy and Practical Applications for Physical Educators. *Journal of Physical Education, Recreation and Dance*, *92*(2), 30–39. https://doi.org/10.1080/07303084.2020.1853633

Knisel, E., Rupprich, H., Wunram, A., Bremer, M., & Desaive, C. (2020). Promotion of elementary school students' health literacy. *International Journal of Environmental Research and Public Health*, *17*(24), 1–13. https://doi.org/10.3390/ijerph17249560

L, M. K., George, R. J., & P.S, A. (2023). Bibliometric Analysis for Medical Research. *Indian Journal of Psychological Medicine*, *45*(3), 277–282. https://doi.org/10.1177/02537176221103617

Lubans, D. R., Lonsdale, C., Cohen, K., Eather, N., Beauchamp, M. R., Morgan, P. J., Sylvester, B. D., & Smith, J. J. (2017). Framework for the design and delivery of organized physical activity sessions for children and adolescents: Rationale and description of the "SAAFE" teaching principles. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 1–11. https://doi.org/10.1186/s12966-017-0479-x

Marmoah, S., Gestiardi, R., Sarwanto, S., Chumdari, C., & Maryani, I. (2022). A bibliometric analysis of collaboration skills in education (2019-2021). *Journal of Education and Learning (EduLearn)*, *16*(4), 542–551. https://doi.org/10.11591/edulearn.v16i4.20337

Mashud, Arifin, S., Warni, H., Rachman, A., Amka, Fadillah, M., Pebriyandi, Prima Putra, M. F., Indra Bayu, W., & Yanti, N. (2025). Developing Students' Movement Independence: Internalizing Physical Literacy in Project-based Physical Education Learning. *Physical Education Theory and Methodology*, *25*(3), 524–532. https://doi.org/10.17309/tmfv.2025.3.07

Mejia, C., Wu, M., Zhang, Y., & Kajikawa, Y. (2021). Exploring Topics in Bibliometric Research Through Citation Networks and Semantic Analysis. *Frontiers in Research Metrics and Analytics*, *6*(September), 1–16. https://doi.org/10.3389/frma.2021.742311

Moral-Muñoz, J. A., Herrera-Viedma, E., Santisteban-Espejo, A., & Cobo, M. J. (2020). Software tools for conducting bibliometric analysis in science: An up-to-date review. *Profesional de La Informacion*, *29*(1). https://doi.org/10.3145/epi.2020.ene.03

Pachumwon, T., Rudto, N., Boonkwang, K., Hongthong, B., & Jantakoon, T. (2025). A Bibliometric Analysis of Digital Literacy in Remote Learning. *Higher Education Studies*, *15*(2), 54. https://doi.org/10.5539/hes.v15n2p54

Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw,

J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., … Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *Bmj*, *372*. https://doi.org/10.1136/bmj.n71

Pirina, D. M. G., Farooq, M., Solinas, D. R., Macia Andreu, M. J., Quero Calero, C. D., Gallardo, A. M., & Cano, L. A. (2024). Bibliometric analysis of sports management competencies in women's semi-professional sport: A comprehensive analysis at the literature with data visualization software. *Procedia Computer Science*, *239*(2023), 1568–1577. https://doi.org/10.1016/j.procs.2024.06.332

Pot, N., Whitehead, M. E., & Durden-Myers, E. J. (2018). Physical literacy from philosophy to practice. *Journal of Teaching in Physical Education*, *37*(3), 246–251. https://doi.org/10.1123/jtpe.2018-0133

Razali, Mansur, Blegur, J., Berliana, Ilham, M., Alif, M. N., Sintiani, I., Souisa, M., Lubis, A. E., & Tlonaen, Z. A. (2024). Teaching Life Skills to Students with Disabilities in Physical Education: Publication Trend in the Last 51 Years. *Retos*, *59*, 881–891. https://doi.org/10.47197/retos.v59.107669

Romadhoni, W. N. ., Aji, T. ., Kurnianto, H. ., & Nugroho, A. I. . (2026). A Descriptive Quantitative Study of Physical Activity Levels Among Drug Rehabilitation Residents Using IPAQ . Indonesian Journal of Physical Education and Sport Science, 6(1), 13-21. https://doi.org/10.52188/ijpess.v6i1.1947

Rostami, C., Nemati-Anaraki, L., Asadzandi, S., & Saberi, M. K. (2024). Bibliometric Analysis and Visualization of Scientific Publications of Iran University of Medical Sciences during 1980-2020. *International Journal of Information Science and Management*, *22*(1), 223–240. https://doi.org/10.22034/ijism.2023.1977996.0

Rutkauskaite, R., Baravykiene, J., Maciuleviciene, E., & Sukys, S. (2024). Physical Literacy of Physical Education Teachers and the Application of Physical Literacy Components During Physical Education Classes. *Education Sciences*, *14*(12). https://doi.org/10.3390/educsci14121391

Saltan, N., Olkhovyi, O., Fishchuk, I., Saltan, O., Semenova, Y., & Orlenko, O. (2025). Priority modern scientific trends and approaches in physical education research: bibliometric analysis of scientometric databases. *Slobozhanskyi Herald of Science and Sport*, *29*(1), 14–27. https://doi.org/10.15391/snsv.2025-1.02

Santoveña-Casal, S., & López, S. R. (2024). Mapping of digital pedagogies in higher education. *Education and Information Technologies*, *29*(2), 2437–2458. https://doi.org/10.1007/s10639-023-11888-1

Sukjairungwattana, P., Luo, Z., Hu, H., Liu, W., & Xu, W. (2025). A bibliometric analysis of Chinese higher education policy in the past two decades: Sustainable development and internationalization. *Journal of Infrastructure, Policy and Development*, *9*(1), 6597. https://doi.org/10.24294/jipd6597

Thompson, M. D., & Penney, D. (2015). Assessment literacy in primary physical education. *European Physical Education Review*, *21*(4), 485–503. https://doi.org/10.1177/1356336X15584087

Tremblay, M. S., Costas-Bradstreet, C., Barnes, J. D., Bartlett, B., Dampier, D., Lalonde, C., Leidl, R., Longmuir, P., McKee, M., Patton, R., Way, R., & Yessis, J. (2018). Canada's Physical Literacy Consensus Statement: Process and outcome. *BMC Public Health*, *18*(Suppl 2), 1–19. https://doi.org/10.1186/s12889-018-5903-x

Valle-Muñoz, V. M., Mendoza-Muñoz, M., & Villa-González, E. (2025). Physical Literacy as a Pedagogical Model in Physical Education. *Children*, *12*(8), 1008. https://doi.org/10.3390/children12081008

van Eck, N. J., & Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, *84*(2), 523–538. https://doi.org/10.1007/s11192-

009-0146-3

Waltman, L., van Eck, N. J., & Noyons, E. C. M. (2010). A unified approach to mapping and clustering of bibliometric networks. *Journal of Informetrics*, *4*(4), 629–635. https://doi.org/10.1016/j.joi.2010.07.002

Weir, N., Pringle, A., & Roscoe, C. M. P. (2024). Physical Literacy and Physical Activity in Early Years Education: What's Known, What's Done, and What's Needed? *Children*, *11*(11). https://doi.org/10.3390/children11111355

Zhu, L., & Gu, R. (2023). Analysis of the framework for realizing core literacy in teaching physical education and health curriculum based on the ordinary differential error approximation method. *Applied Mathematics and Nonlinear Sciences*, *8*(2), 3383–3392.

Zupic, I., & Čater, T. (2015). Bibliometric Methods in Management and Organization. *Organizational Research Methods*, *18*(3), 429–472. https://doi.org/10.1177/1094428114562629

Information about the authors:

Deni Mulyadi: denimulyadi@upi.edu, Master's Student in the Departement Elementary School Teacher Education at the Tasikmalaya Campus of the Universitas Pendidikan Indonesia (UPI), Indonesia.

Dr. Lutfi Nur, S.Pd., M.Pd., M.M: lutfinur@upi.edu, https://orcid.org/0000-0003-1944-8510, Departement of Elementary School Teacher Education at the Tasikmalaya Campus of the Universitas Pendidikan Indonesia (UPI), Indonesia.

Dr. Sandra Arhesa, S.Si., M.Pd: arhesasandra@unma.ac.id, https://orcid.org/0000-0002-4150-9597, Department of Physical Education, Faculty of Teacher Training and Education, Universitas Majalengka, Indonesia.

Cite this article as:

Mulyadi, Deni *et al*. (2026). Bibliometric Analysis of Scientific Publication Trends on the Application of Physical Literacy in Physical Education. *Indonesian Journal of Physical Education and Sport Science (IJPESS)*, *6*(2), xx-xx. doi

Bibliometric Analysis of Scientific Publication Trends on the Application of Physical Literacy in Physical Education

ORIGINALITY REPORT

12%	8%	8%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	Submitted to Universitas Negeri Malang Student Paper	2%
2	journal.uir.ac.id Internet Source	2%
3	oasis.col.org Internet Source	1%
4	iris.unive.it Internet Source	1%
5	Renata Rutkauskaite, Julita Baravykiene, Edita Maciuleviciene, Saulius Sukys. "Physical Literacy of Physical Education Teachers and the Application of Physical Literacy Components During Physical Education Classes", Education Sciences, 2024 Publication	1%
6	"Proceedings of the 6th Yogyakarta International Seminar on Health, Physical Education, and Sports Science", Springer Science and Business Media LLC, 2025 Publication	1%
7	Submitted to Universitas PGRI Palembang Student Paper	1%
8	dergipark.org.tr Internet Source	1%
9	revistas.um.es Internet Source	1%

10	journal.unucirebon.ac.id Internet Source	1 %
11	Agung Budiawan, Murti Kusuma Wirasti, Dwi Kusumawardani. "Trends and collaborations in case-based learning for online health education: a bibliometric analysis (2014-2024)", Jurnal EDUCATIO: Jurnal Pendidikan Indonesia, 2024 Publication	1 %
12	Jusuf Blegur, Sefri Hardiansyah. "Differentiation instruction publications in physical education: bibliometric analysis of the last ten years", Journal of Education and Learning (EduLearn), 2024 Publication	1 %
13	Liz Durden-Myers. "Routledge Handbook of Physical Literacy", Routledge, 2026 Publication	1 %
14	www.jhse.es Internet Source	1 %

Exclude quotes	On	Exclude matches	< 1%
Exclude bibliography	On		