

# Research Hotspots and Trends in Physical Literacy Based on CiteSpace Analysis

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**Abstract:** This study employs CiteSpace software to conduct a bibliometric analysis of research on physical literacy from 2011 to 2024, aiming to explore the hotspots and trends in this field. The findings reveal a significant growth trend in physical literacy research, with a substantial increase in publications since 2015. Keyword analysis uncovers the evolution of research themes from basic concepts to practical applications, encompassing education practices, health promotion, psychological factors, motor skills, and the life cycle. Author collaboration network analysis indicates an international and interdisciplinary nature of this field. The research hotspots have gradually shifted from individual abilities to system design, from physical fitness to psychological factors, and from focusing on different age groups and cultural backgrounds. Co-citation analysis identifies key contributions from authors such as Longmuir PE, Edwards LC, and Dudley DA. Future research trends may further deepen the theoretical foundations, expand practical applications, and strengthen international cooperation and interdisciplinary research. This study provides a comprehensive overview of the current state of research in physical literacy, offering a reference for future research directions.

**Keywords:** CiteSpace; physical literacy; Hotspots and trends

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## 1. Introduction

Since British scholar Whitehead first introduced the concept of Physical Literacy<sup>[1]</sup> at an academic level, it has gained increasing attention as an important concept in the fields of sports and education. Physical literacy encompasses a wide range of attributes, including physical health, motor skills, psychological readiness, and social behavior, all of which collectively influence an individual's ability to participate in and benefit from physical activities. With the growing recognition of the importance of physical health and overall well-being, understanding and promoting physical literacy has become crucial<sup>[2]</sup>. Despite the rising interest in physical literacy research, the field remains fragmented, with varying definitions, measurement tools, and focus areas across different studies, such as the K-12 standards<sup>[3]</sup> in the United States and the CAPhysical Literacy assessment system in Canada [4,5]. This inconsistency highlights the need for a comprehensive analysis of existing literature to identify major research trends and emerging hotspots. Traditional literature reviews, while valuable, often lack the systematic approach needed to capture the evolution of a research field. This study aims to fill these gaps using CiteSpace, a powerful bibliometric analysis tool that can effectively reveal the structure, patterns, and distribution of scientific knowledge<sup>[6]</sup>. By using CiteSpace, we hope to systematically analyze research literature related to physical literacy, uncovering key trends, major research themes, and influential scholars in the field. The use of CiteSpace allows for a visual representation of the knowledge structure and developmental trajectory of physical literacy research, providing clearer insights into its evolution and future direction. This study aims to bridge the current gaps in physical literacy research, providing guidance for future studies and promoting theoretical development and practical application. The following sections will detail the analysis methods, present research results, and discuss their implications for the future of

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### About the Author

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physical literacy research.

2. Data Sources and Research Methods

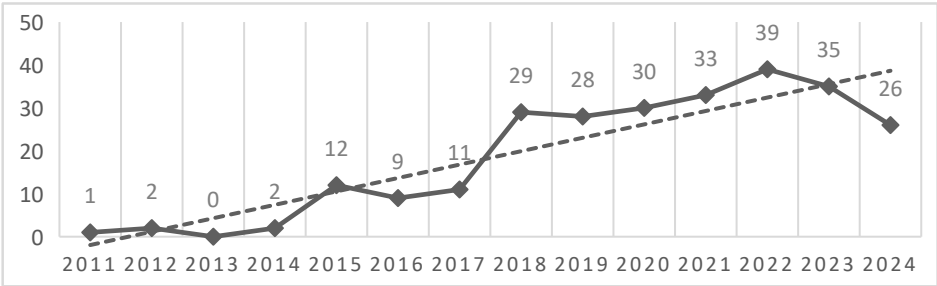
Data Sources :We used the WOS Core Collection database as the index. Based on the research objectives, a final thematic search formula was derived through repeated combinations, analyses, and comparisons of multiple search formulas: TS=(Physical Literacy). The search covered the period from 2011 to 2024, selecting the subject "sports science," document type "article," and language "English" as criteria, resulting in 257 initial documents. The search and data download were conducted on June 15, 2024.

Research Methods:Method of Documentation: Utilizing CNKI literature for relevant visual analysis, knowledge mapping, and related books on physical literacy provided technical support and theoretical basis for this study.

Visual Analysis: The study employs CiteSpaceIII software based on the JAVA platform for knowledge mapping analysis.

3. Results and Analysis

Publication Trends Analysis: From 2011 to 2024, the number of publications in the field of physical literacy shows a significant growth trend. Particularly since 2015, there has been a marked increase in publications, rising from 12 articles to 39 articles by 2022. This indicates a growing interest in this field. From 2015 to 2022, the annual number of publications fluctuated mostly above 10, demonstrating a gradual deepening and steady growth of research. The number of publications from 2018 to 2022 remained above 20 annually, showing sustained interest and research activity. The peak years were 2020 and 2021, with 30 and 33 publications respectively, likely related to global pandemic-related research and increased attention to health management. The reasons for the changing publication trends are the growing interest in physical literacy research in recent years, driven by increased health awareness and emphasis on physical education. Government and institutional policy support and funding for sports and health have also likely contributed to the growth in this research area.



Keyword Emergence: As the research progressed, the emergence of key words showed a clear temporal evolution: 2014-2015: Early research focused on basic concepts such as "achievement", "students" and "skills". 2015-2018: Research focus shifts to practical application areas such as "curriculum", "education" and "fitness". 2018-2020: The emergence of psychological concepts such as "intrinsic motivation" and "performance". 2021-2024: Research expands to a wider range of theoretical and applied fields such as "self determination theory" and "quality of life". According to the intensity of emergence, the following keywords are most significant:1. "curriculum" (Intensity 2.59, 2015-2018) : indicates the important role of curriculum design in sports literacy research.2. "motor competence" (strength 2.63, 2019-2020) : reflects the core role of athletic ability in sports literacy.3. "self determination theory" (Strength 2.48, 2021-2022) : shows the important application of this theory in recent research. Research focuses range from individual competence (e.g., "skills", "achievement") to system design (e.g., "curriculum", "education"). From physical qualities (such as "fitness") to psychological factors (such as "intrinsic motivation", "self determination

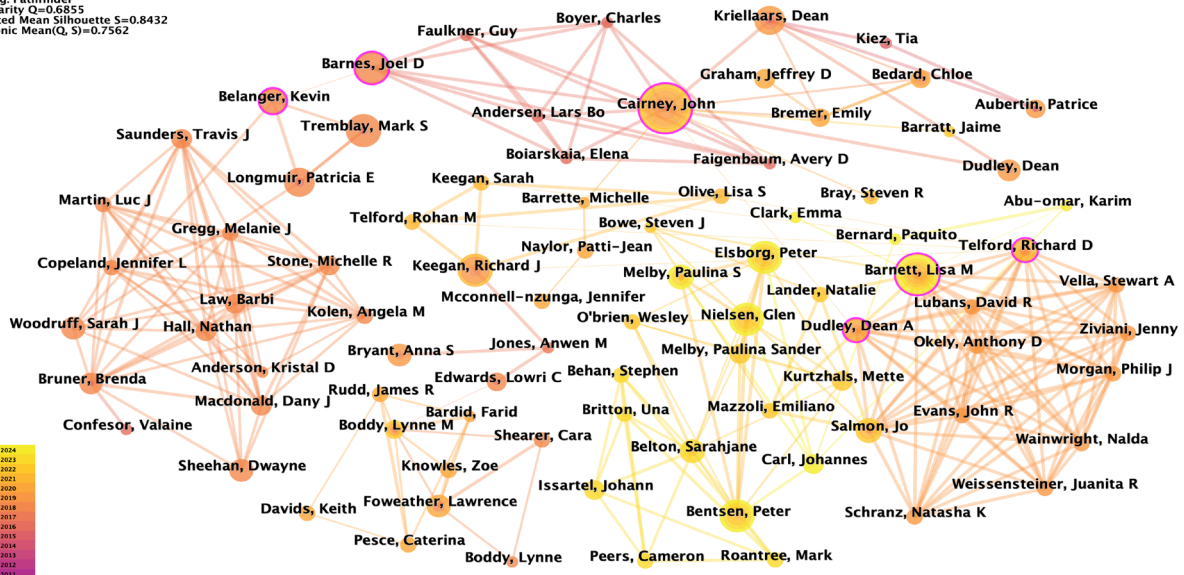
theory"). This ranges from specific groups (e.g. "students", "adolescents") to broad groups (e.g. "quality of life").

### Top 25 Keywords with the Strongest Citation Bursts

Keywords	Year	Strength	Begin	End	2011 – 2024
achievement	2014	1.8	2014	2015	
students	2014	1.46	2014	2015	
skills	2014	1.44	2014	2018	
curriculum	2015	2.59	2015	2018	
education	2014	1.37	2015	2017	
fitness	2015	1.24	2015	2016	
adolescents	2016	1.61	2016	2017	
beliefs	2017	2.24	2017	2019	
sport	2018	2.04	2018	2019	
performance	2018	1.98	2018	2020	
youth	2018	1.84	2018	2019	
model	2018	1.47	2018	2021	
intrinsic motivation	2018	1.32	2018	2020	
motor competence	2019	2.63	2019	2020	
fundamental movement skills	2019	2	2019	2021	
perceptions	2019	1.75	2019	2020	
competence	2017	1.7	2020	2022	
self determination theory	2021	2.48	2021	2022	
obesity	2019	1.63	2021	2022	
exercise	2016	1.61	2021	2024	
validation	2020	1.38	2021	2024	
knowledge	2012	2.13	2022	2024	
early childhood	2022	1.97	2022	2024	
quality of life	2020	1.84	2022	2024	
play	2022	1.31	2022	2024	

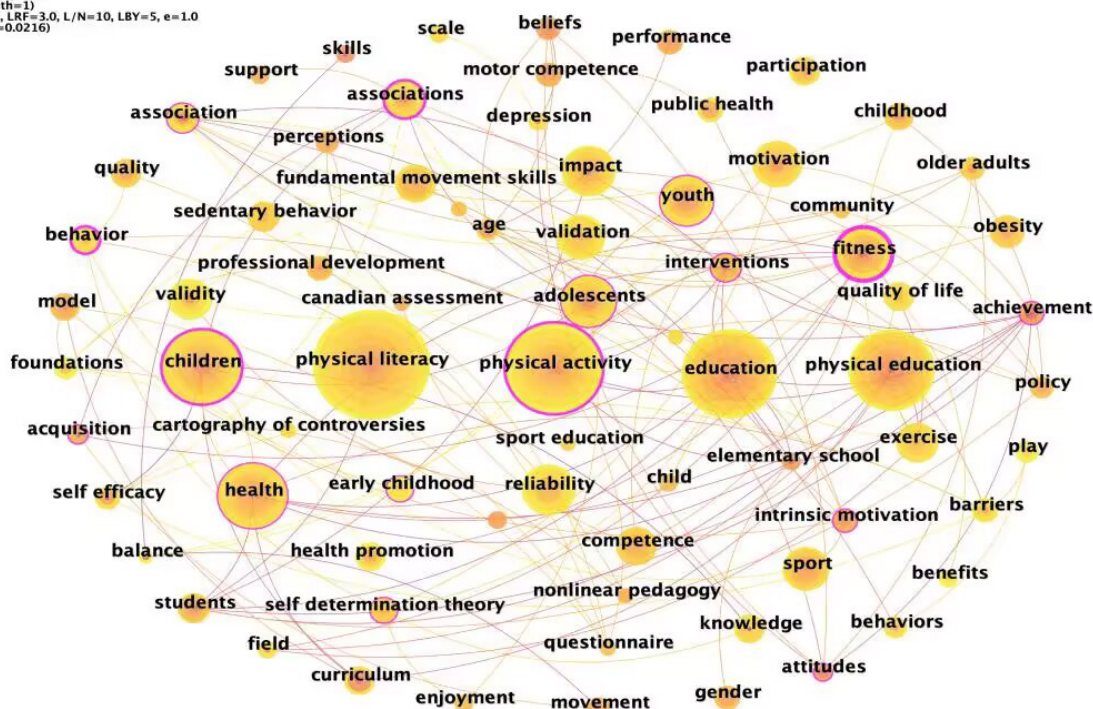
**Author Collaboration Network Analysis:** The author network includes researchers from multiple countries, such as Cairney (Canada), Dudley (Australia), and Whitehead (UK), reflecting the international and interdisciplinary nature of physical literacy research. This cross-national collaboration promotes the sharing and integration of research findings from different cultures and regions, further advancing the global progression of physical literacy research. Additionally, the network includes researchers from various disciplinary backgrounds, such as education, sports science, and public health, indicating the interdisciplinary direction of physical literacy research.

CiteSpace, v. 6.2.R4 (64-bit) Advanced  
 July 29, 2024 at 7:20:12 PM CST  
 WoS: /Users/zaz/Desktop/WOS-30/data  
 Timespan: 2011–2024 (Slice Length=1)  
 Selection Criteria: g-index (k=15), LRF=3.0, L/N=10, LBY=5, e=1.0  
 Network: N=210, E=373 (Density=0.017)  
 Largest CCs: 85 (40%)  
 Nodes Labeled: 1.0%  
 Pruning: Pathfinder  
 Modularity Q=0.6855  
 Weighted Mean Silhouette S=0.8432  
 Harmonic Mean(Q, S)=0.7562



**Keyword Co-occurrence:** Keywords with large nodes in the network represent the core research topics in this field, including: Physical literacy: As the core concept of research, physical literacy is at the center of the network. Physical activity: an important behavior closely related to physical literacy. Physical education: The main application direction of physical literacy in the field of education. Education: Reflects the overall context of the study. Health: Reflects the close relationship between sports literacy and health. By observing the aggregation of keywords, several main research themes can be identified: educational practice: including physical education, curriculum, sport education, etc. health promotion: health, public health, obesity, etc. Psychological factors: such as motivation, self efficacy, intrinsic motivation, etc. motor skills: including motor competence, fundamental movement skills, etc. Life cycle: children, adolescents, youth, older adults and other age groups are covered. Based on the change in node color, we can identify some of the newer research directions: Nonlinear pedagogy: reflects the innovation of teaching methods. Quality of life: reflects the expansion of research into the broader field of quality of life. Self determination theory: shows the application of psychological theory in sports literacy research.

CiteSpace, v. 5.2.R4 (64-bit) Advanced  
 July 29, 2024 at 6:45:01 PM CST  
 WoS: /Users/zaz/Desktop/WOS-30/data  
 Timespan: 2011–2024 (Slice Length=1)  
 Selection Criteria: g-index (k=15), LRF=3.0, L/N=10, LBY=5, e=1.0  
 Network: N=205, E=452 (Density=0.0216)  
 Largest 30 CCs: 205 (100%)  
 Nodes Labeled: 1.0%  
 Pruning: Pathfinder

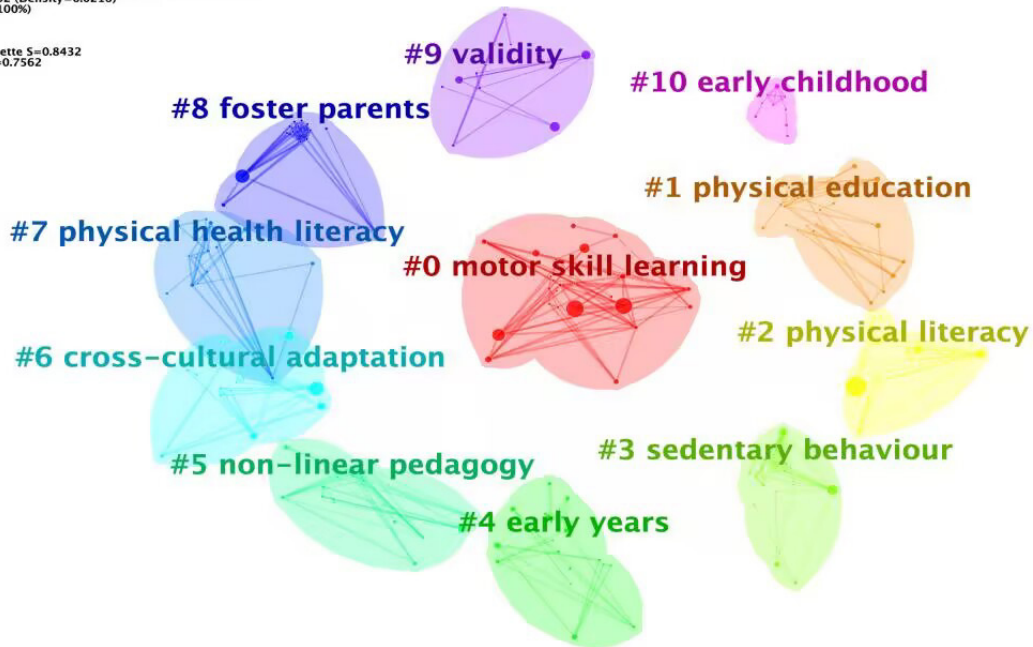


CiteSpace

**Keyword clustering:** The main research cluster #0 Motor skill learning: motor skill learning is the foundation of sports literacy. #1 Physical education: Physical education is the main way to implement physical literacy. #2 Physical literacy: An in-depth study as a core concept. #3 Sedentary behavior: Attention is paid to the influence of sedentary behavior and intervention. #4 Early years: Emphasize the importance of early intervention. #5 Non-linear pedagogy: It reflects the innovation of teaching methods. #6 Cross-cultural adaptation: It reflects the international trend of research. #7 Physical health literacy: Combine physical literacy with health literacy. The ranking and color change of clusters reflect the evolution trend of research hotspots: From basic concepts (e.g., physical literacy) to specific applications (e.g., sedentary behaviour intervention) from the general population to specific groups (e.g., early years, foster) From monocultural background to cross-cultural adaptation.

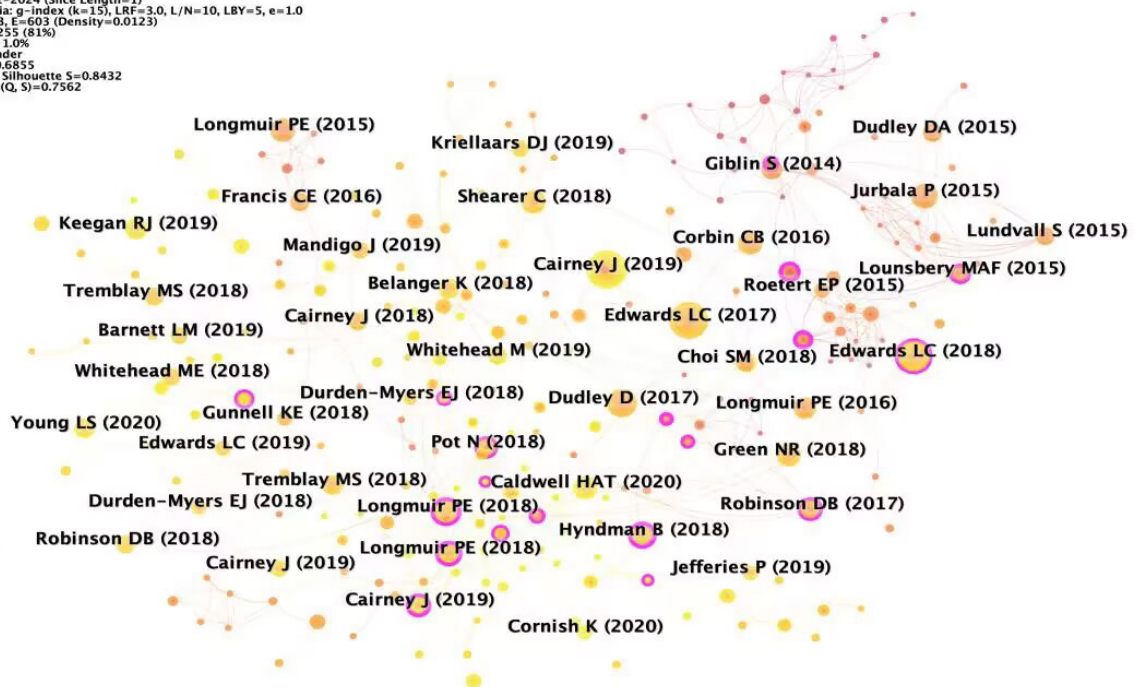


CiteSpace, v. 6.2.R4 (64-bit) Advanced  
 July 29, 2024 at 6:45:01 PM CST  
 WoS: /Users/zaz/Desktop/WOS-30/data  
 Timespan: 2011–2024 (Slice Length=1)  
 Selection Criteria: g-index (k=15), LRF=3.0, L/N=10, LBY=5, e=1.0  
 Network: N=205, E=452 (Density=0.0216)  
 Largest 30 CCs: 205 (100%)  
 Nodes Labeled: 1.0%  
 Pruning: Pathfinder  
 Modularity Q=0.6855  
 Weighted Mean Silhouette S=0.8432  
 Harmonic Mean(Q, S)=0.7562



CiteSpace

CiteSpace, v. 6.2.R4 (64-bit) Advanced  
 July 29, 2024 at 7:32:47 PM CST  
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 Timespan: 2011–2024 (Slice Length=1)  
 Selection Criteria: g-index (k=15), LRF=3.0, L/N=10, LBY=5, e=1.0  
 Network: N=313, E=603 (Density=0.0123)  
 Largest 1 CCs: 255 (81%)  
 Nodes Labeled: 1.0%  
 Pruning: Pathfinder  
 Modularity Q=0.6855  
 Weighted Mean Silhouette S=0.8432  
 Harmonic Mean(Q, S)=0.7562



CiteSpace

Co-cited literature: The literature with large nodes in the network can be regarded as the core literature in this field, including Longmuir PE (2015), Edwards LC (multiple years, such as 2017, 2018, 2019), Dudley DA (2015). These literature occupy a central position in the network, indicating that they have an important influence in sports literacy research. By observing the literature aggregation, several research topic clusters can be roughly divided: The cluster centered on Longmuir PE may focus on the measurement and evaluation of sports literacy, the cluster centered on Edwards LC may focus on the educational practice of sports literacy, and the cluster centered on Dudley DA may explore the theoretical framework of sports literacy. Based on the change of node color, we can observe the temporal evolution of the research focus: 2015-2016: laying the theoretical foundation (e.g. Longmuir PE 2015, Dudley DA 2015), 2017-2019: Further research themes (e.g. Edwards LC series), beyond 2020: new research directions (e.g. Young LS 2020).

#### 4. Conclusion

This study utilizes CiteSpace to conduct a bibliometric analysis of physical literacy research from 2011 to 2024, revealing key trends and evolutionary patterns in the field. The results indicate a significant increase in research output since 2015, highlighting growing academic interest and the importance of physical literacy. Keyword co-occurrence and burst detection analyses trace the progression from basic concepts to more applied research areas, such as curriculum design, motor competence, and self-determination theory. The analysis of author collaboration networks demonstrates a robust international and interdisciplinary research community, underscoring physical literacy as a global issue that transcends traditional academic boundaries. Key research clusters, including motor skill learning, physical practice, and cross-cultural adaptation, provide a comprehensive map of the current research landscape. The temporal evolution of the research focus—from individual abilities to system approaches, and from purely physical aspects to the integration of psychological factors—reflects the field's maturation and expansion. These findings suggest that future research in physical literacy could benefit from further theoretical consolidation, expanded practical applications in diverse populations and cultural contexts, and increased interdisciplinary collaboration. Overall, this bibliometric analysis offers a thorough overview of physical literacy research prospects, providing valuable insights for researchers, educators, and policymakers.

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