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Mapping the research landscape of game-centred approaches in physical education: a bibliometric analysis

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ABSTRACT

Background: Game-Centred Approaches (GCAs) have gained prominence in Physical Education (PE) for their potential to enhance student engagement, motivation, and learning outcomes. However, their implementation still faces pedagogical and institutional challenges. Despite growing interest, a comprehensive understanding of research trends and knowledge structures in this area remains limited. This study addresses that gap. **Research Objectives:** This study aims to analyse the related literature implementation of GCAs in PE teaching, identify past and current research trends and attempt to predict possible future research trends. **Methods:** A bibliometric approach was employed using data sourced from the Scopus database. VOSviewer software was utilized to visualize co-authorship, keyword co-occurrence, and thematic clusters, allowing identification of influential authors, institutions, and evolving research topics. **Findings/Results:** The analysis revealed increasing scholarly attention toward GCAs as tools for developing students' holistic learning—cognitive, social, and motor domains. Key themes included improving motor skills, decision-making, and tactical understanding through games. Recent trends also emphasize the importance of teacher training and professional development as critical to the effective integration of GCAs in PE. **Conclusion:** GCAs contribute significantly to the enhancement of student learning in PE. However, successful implementation depends on teacher readiness and ongoing pedagogical innovation. This study offers strategic insights for educators, curriculum designers, and researchers seeking to expand the application and impact of GCAs in physical education.

Keywords: Physical education; game-centered approaches; bibliometric analysis; teaching strategies; student engagement

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INTRODUCTION

PE is a form of learning implemented in schools as part of sports (Baena-Morales et al., 2023), and focuses on the body as an embodiment of a natural perspective (Aartun et al., 2022), and considers movement a critical principle (Clark et al., 2023). It is integral to development through sports, contributing to improved well-being and increased participation in sports, ultimately fostering a physically and socially healthy society (Ha et al., 2015). Stakeholders have concentrated their efforts on PE due to its potential to address numerous health and well-being issues, physical activity, and sports participation (Carse et al., 2018). Additionally, PE provides a foundation for developing

motor skills competence, the adoption of healthy lifestyles, and students' personal and social development (Bessa et al., 2020). As such, it is considered a crucial subject that equips students with the necessary skills, knowledge, and attitudes to remain active throughout their lives (Pangrazi & Beighle, 2019).

Game-Centered Approaches (GCAs) are recommended for PE learning because this is grounded in the philosophy of PE, which emphasizes games as central learning objects (Garcia-Puchades & Chiva-Bartoll, 2020). GCAs aim to develop autonomous, critical, responsible, and adaptable individuals, aligning with the demands of contemporary education (Gubacs-Collins & Dianna, 2015). Several studies have shown that learning through the GCAs approach significantly impacts motivation, participation, effort, and engagement (Ratinho & Martins, 2023; Soriano-Pascual et al., 2022). It also enhances perceived competence, enjoyment, decision-making, and comprehension (Morales-Belando et al., 2022), improves moderate and vigorous physical activity and fitness (Segovia & Gutiérrez, 2022), and contributes to the formation of behavioral norms (Sarmantayev et al., 2020). Therefore, these findings prove that GCAs have positive implications for achieving holistic learning outcomes and transforming teaching practices (Jarrett & Light, 2019).

The proper implementation of PE teaching using GCAs presents challenges for teachers and affects overall effectiveness (García-López et al., 2019). PE teaching should be implemented harmoniously to provide a positive sports experience, stimulate interest, and promote goal achievement (Guangxin et al., 2022). Teachers play a crucial role in this process, as they significantly influence student engagement in learning activities (D'isanto & D'elia, 2021). The pedagogical approach chosen by the teacher has the greatest impact on learning effectiveness (Mainsbridge et al., 2024). However, evidence shows that teachers often struggle to effectively apply a game-based approach (Goodyear et al., 2017). This struggle is often due to limited pedagogical understanding, leading to deviations from curriculum-recommended teaching practices (Roshid & Haider, 2024). Additionally, many teachers find it difficult to change established teaching habits (Casey & MacPhail, 2018), and are often not up-to-date with technological advancements or collaborative practices with colleagues (Bodsworth & Goodyear, 2017).

Most reviews on the implementation of GCAs present systematic analyses. For example, Miller et al. (2015) reviewed 15 articles focused on student outcomes of GCA implementation. Elumalai et al. (2022) examined PE learning through different approaches to improving physical fitness, academic performance, and student enjoyment. Additionally, Ortiz Gómez et al. (2023) studied pedagogical approaches applicable to PE teachers at various levels. Camacho-Sánchez et al. (2023) reviewed the effects of game-based learning (GBL) and gamification on several variables in each investigation. Furthermore, Fernandez-Rio and Iglesias, (2024) provided an overview of the implementation of pedagogical models. These studies highlighted important content related to implementation, key theories adapted, and gaps for further research. However, the analyses conducted did not present the knowledge structure related to teaching with GCAs in a manner consistent with the nature of PE, which focuses on the human body and movement. To address this gap, this study applied a bibliometric approach to enhance understanding of the current research landscape and future trends, complementing traditional literature reviews with an objective analysis (Saini et al., 2022).

This study aims to explore the literature related to the implementation of GCA in PE teaching through bibliometric analysis in order to identify past and current research trends and try to predict possible future research trends. This study presents a network visualisation using cluster analysis and science mapping techniques to generate temporal

structure and identify topics related to GCA implementation. The existence of this study will help in identifying research trends that are being conducted by current researchers. However, it is necessary to first analyse the previous trends underlying the current research. Furthermore, research trends are recommended to be conducted in the future.

METHOD

Bibliometric Approach

The bibliometric approach is a valuable scientific method for academics to summarize and synthesize literature (Zupic & Čater, 2014). It serves as a crucial tool for systematically investigating publication patterns, bridging the gap between quantitative data and qualitative interpretations of published research (Lim et al., 2024). Bibliometric analyses offer a critical complement to traditional reviews, allowing for the examination of a field's evolution, current state, and future trends (Ardiansyah et al., 2024). Furthermore, bibliometric analysis helps identify research priorities while processing and analyzing data at various levels of complexity (Mejia et al., 2021).

In this study, the analysis was conducted by examining published literature through qualitative interpretation, allowing for an exploration of the evolution, current state, and future trends in the field. Bibliometric analysis is typically divided into two approaches: performance analysis, which focuses on the number of publications, citations, and publication productivity, and science mapping, which uses network visualization to identify the knowledge structure and relationships between studies (Tiberius et al., 2020). This study employed the science mapping approach in its bibliometric analysis to identify potential current and future research trends through keyword analysis. The science mapping approach utilized three types of analysis: co-citation, bibliographic coupling, and co-occurrence analysis. These methods were instrumental in helping the author reveal research trends related to GCAs.

Study design and data collection procedure

The document search was conducted using the Scopus database to identify literature related to the implementation of GCAs. Scopus was chosen due to its status as a leading database, widely utilized by researchers globally (Khan & Muktar, 2020). Additionally, Scopus allows researchers to export and analyze the required data, making it ideal for conducting bibliometric studies (Zyoud et al., 2024). The search results were further analyzed using VOSviewer software version 1.6.20, which creates maps based on either a corpus of text or a network of citations, offering valuable insights into the content of the literature (Sinkovics, 2016). In this study, VOSviewer was employed to visualize co-citation networks, bibliographic coupling, and co-occurrence maps.

This study was used steps beginning with the determination of study design, where research objectives and frameworks are established. The process continues with the compilation of bibliometric data, involving accessing publications (e.g., via Scopus), filtering relevant studies, and exporting the data for further use. Once the data is collected, it undergoes processing through the selection of appropriate software and analytical techniques to prepare it for visualization. The constructing network linkages using VOSviewer to uncover relationships and patterns. Finally, the interpretation phase involves describing and analyzing the visualized data to derive meaningful insights and conclusions. This systematic approach ensures clarity and depth in bibliometric research. The steps outlining the study's process flow are presented in Figure 1.

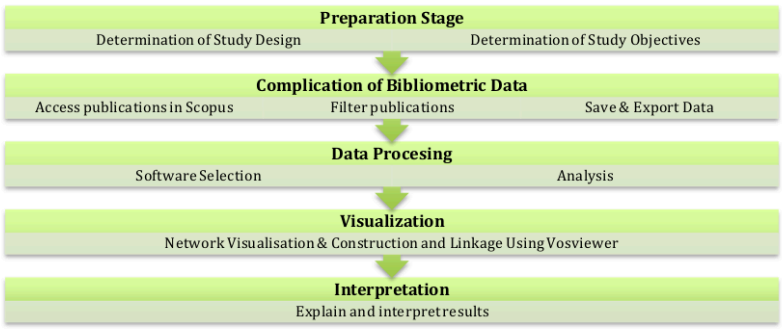

Figure 1. Flowchart of Study Steps

The document search was conducted on 22 July 2024 in the Scopus database. The criteria used in the search included keywords relevant to PE and GCA to find relevant literature related to the implementation of GCA in PE teaching. The search strings used were (('physical education' OR 'movement education') AND ('game-based approach' OR 'game-centred approach' OR 'game-based learning' OR 'teaching games for understanding' OR 'tactical game model' OR 'stepwise game approach, invasion game competency model' OR 'game sense' OR 'play practice')) with the topic of disbursement in the title, abstract, and keywords. Initially, 278 documents were identified. Filtering was then applied based on criteria such as research article document type, completion of the final review process, publication in a journal, and English language. This filtering reduced the number of documents to 207 documents. Based on Rogers et al. (2020) this number is considered to meet the minimum criteria for the number of samples to be qualitatively reviewed. The results are then exported in CSV format for further processing.

RESULTS AND DISCUSSION

Co-citation Analysis

Co-citation analysis is based on widely cited publications and aims to measure the relationship between documents cited in the database (Sarin et al., 2020). The goal of co-citation analysis is to identify influential authors and publications, as well as relationships between them, to reveal changes and coherence in the literature (Weerakoon, 2024). In this study, co-citation analysis included 7 cited references out of 8.887, with a threshold of 43 cited references. This threshold was determined through multiple finite-level tests to ensure the identification of adequate and robust clusters that are distinct and non-overlapping. The network map resulting from the co-citation analysis, illustrated in Figure 2, reveals three closely interconnected clusters: Cluster 1 (red), Cluster 2 (green), Cluster 3 (blue) and Cluster 4 (yellow). Additionally, the author conducted a qualitative interpretation by labeling each cluster according to its emerging themes.

Cluster 1 (red) consists of 16 items labeled "games approach in PE for the all-around development of students' skills." Learning is understood as an activity shaped by specific situations and characteristics (Lave & Wenger, 1991). The TGfU model is designed to teach students how to effectively learn a game, understand its rules and tactics, and develop their skills (Bunker & Thorpe, 1982; Kirk & MacPhail, 2002). TGfU is implemented through games to provide a holistic learning experience that fosters cognitive, affective, social, and physical development simultaneously (Light & Fawns,

2003). Some TGfU approaches include Game Sense, an engaging and innovative method that encourages students to develop skills in realistic contexts, with a focus on tactical awareness, decision-making, and enjoyment (Light, 2012).

Meanwhile, Cluster 2 (green) consists of 11 items labeled "encouraging skills development and lifelong engagement through pedagogical models." Pedagogical models have been positioned as frameworks for organizing the interrelated elements of curriculum, learning, and teaching to achieve specific learning outcomes (Hastie & Casey, 2014). For teachers, the implementation of this pedagogical model still requires greater effort and more time (Casey, 2014). Pedagogical models using GCA are important for promoting change in the current adult-centered culture of youth sports and encouraging lifelong engagement in physical activity (Harvey & Jarrett, 2014). They also encourage the development of game-based decision-making and execution skills (Miller, 2015).

In addition, Cluster 3 (blue) consisted of 9 items labelled "new approaches in physical education that overcome resistance to change" PE is in a position of resistance to change due to the dominance of an entrenched sport-based curriculum and the academicization of teacher education, putting it at risk of falling behind (Kirk, 2009). In light of this, model-based instruction was designed as a teaching model to improve the learning outcomes of students with diverse abilities (Metzler, 2017), and facilitate teachers to deliver holistic learning that promotes social, physical and cognitive learning outcomes with an emphasis on active learning (Dyson et al., 2004).

Furthermore, Cluster 4 (yellow) consisted of 7 items labelled "Promoting Holistic Development through Game-Centered Approaches in Physical Education." According to Dyson et al. (2004), GCAs foster social, physical, and cognitive development by engaging students in meaningful and enjoyable experiences. This approach aligns with Siedentop (1994) vision for physical educators to create engaging and effective PE programs that nurture holistic development in students. Moreover, models like TGfU emphasize a learner-centered approach, promoting enjoyment, involvement, and a deeper comprehension of games. Bunker and Thorpe (1982) highlighted the global adoption of TGfU for its comprehensive learning experience and cognitive benefits. Overall, GCAs play a crucial role in enriching PE curricula by encouraging active participation and holistic growth.

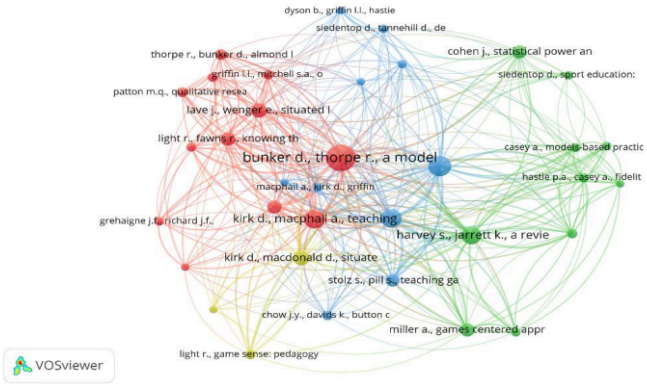

Figure 2. Network of Co-Citation Analysis

Bibliographic Coupling Analysis

Bibliographic coupling analysis is an extension of co-citation analysis. Bibliographic coupling is a technique that assumes two publications with the same references share a bibliographic relationship (Donthu et al., 2021). The degree of this relationship increases with the number of shared references (Budler et al., 2021). In this study, using a database of 207 documents, 27 cited references met the minimum citation count threshold of 59. Figure 3 shows the network visualization of the bibliographic coupling analysis results, revealing four closely related clusters. Similar to co-citation analysis, qualitative interpretation was done by labeling each cluster according to the emerging themes.

First, Cluster 1 (red) consists of 18 items labeled "implementation of MBP to optimize holistic achievement in PE learning." The implementation of MBP has a positive impact on holistic learning achievement. MBP implementations, such as TGfU, can significantly improve academic achievement and positive motivation (Hortigüela et al., 2017). Furthermore, the hybrid model (TGfU-SE) can significantly increase autonomy, competence, and enjoyment (Gil-Arias et al., 2017), and help attain the recommended moderate-to-vigorous physical activity (MVPA) time (Wang & Wang, 2018). However, teachers often face challenges in adopting the MBP approach and experience slow progress in teaching practice (Casey & MacPhail, 2018). Therefore, it is necessary to strengthen pedagogical content knowledge (PCK) to enhance teaching and improve students' knowledge and performance (Iserbyt et al., 2017).

Second, Cluster 2 (green) consists of 13 items labeled "optimizing learning through GCAs." Teaching conducted in the form of games can increase group-by-time intervention effects, decision-making, support during gameplay, and in-session activity (Miller et al., 2017). GCAs significantly benefit the understanding of the relationship between concepts and the reality of play, the internal structure of the game, and the development of motoric interventions (Martínez-Santos et al., 2020). However, the use of play as an approach must consider play as a sustainable and adaptable system (Storey & Butler, 2013). Additionally, an understanding of pedagogical principles in learning design is required to enhance student learning (Tan et al., 2012).

Third, Cluster 3 (blue) consists of 13 items labeled "improving the quality of learning through GCAs." GCAs are recommended to deliver high-quality teaching and learning across the practical PE curriculum (Light et al., 2014). While teachers are enthusiastic and hopeful about implementing TGfU in their teaching, some still experience confusion and frustration (Rossi et al., 2007). Implementing constructivist GCA principles can be challenging for teachers and trainers due to dilemmas such as a lack of understanding, difficulty in accessing material content, maintaining an appropriate constructivist focus, and tensions within the coach-player relationship. Therefore, additional resources and ongoing professional development are needed to provide the necessary support (Roberts, 2011).

Fourth, Cluster 4 (yellow) consists of 11 items labeled "optimizing sport learning with the Constraints-Led Approach (CLA)." Distinct from TGfU, the CLA can help coaches recognize areas of potential in coaching practice and promote player learning through appropriate questioning and reviewing of previous training sessions (Harvey et al., 2010). CLA provides a theoretical framework for a play-based curriculum that aims to inclusively develop 'intelligent and autonomous individuals' in sports, though its application in physical education is still limited (Roberts, 2019). CLA adopts a 'learner-environment' scale of analysis, encouraging teachers to identify and modify tasks, environments, and learners to enhance each learner's perceptual and behavioral systems during the learning process (Renshaw et al., 2016).

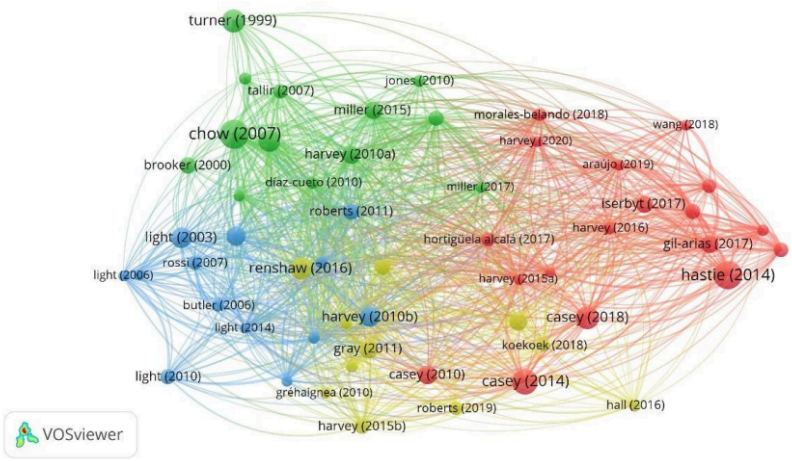

Figure 3. Network Visualisation of Bibliographic Coupling in Gcas

Co-word analysis

The co-word analysis is performed by deciphering the keywords of each thematic cluster and providing a forecast of future research (Donthu et al., 2021). The co-word analysis uses the same document as the bibliographic coupling analysis, consisting of 207 documents. Of these, 47 meet the threshold of 742 keywords with a minimum co-occurrence of 5. The results identified 15 keywords with the highest co-occurrence (Table 2), three closely related clusters (Figure 4) namely 1 (red), 2 (green), and 3 (blue), and representative keywords for each cluster (Table 5). The description of each cluster is as follows;

Based on the presented table, Cluster 1 (Red) consists of 17 items labeled "Harnessing GCAs to Foster Student Engagement in Physical Activity." This cluster emphasizes that teaching PE through the GCAs approach can encourage the achievement of holistic learning outcomes. Additionally, GCAs are believed to encourage students to engage in learning outcomes related to an active lifestyle. Several studies have revealed that GCAs with a thematic invasion approach through game sense are effective in promoting PA levels in elementary school classrooms (Breed et al., 2024). Furthermore, teaching GCAs has positive effects on student engagement, academic achievement, and improved levels of health and physical fitness (Mercan & Varol Selçuk, 2024). In addition, teaching GCAs significantly increases learning engagement (LE) and game performance (GP) (Mahardhika et al., 2024), and improves learning outcomes (Molina-Torres et al., 2021).

Cluster 2 (Green) consists of 16 items labeled "Enhancing Children's Motor Performance and Decision-Making through Games." Developing technique, understanding, tactical knowledge, and decision-making can be achieved through tactical approaches (Robles et al., 2020). The application of games can be done by modifying the rules and tools to manipulate the player's behavior, thereby forming the expected skills (Ashford et al., 2020). On the other hand, it can be implemented to identify talented players and assess perceptual-cognitive-motor skills (Piggott et al., 2019). Furthermore, a study conducted by Lucia et al. (2022) revealed that games have clear efficacy in cognitive-motor training (CMT) protocols on sports performance and increased

anticipatory brain processing in the prefrontal cortex. For this reason, teachers and coaches are required to make changes in play behavior that can develop skills and cognition by manipulating certain boundaries (Timmerman et al., 2019).

On the other hand, Cluster 3 (Blue) consists of 14 items labeled "Professional Development in PE to Enhance Tactics and Motor Skills in Primary School." Teachers are the determinants of the success of teaching because the implementation of a model or theoretical construct depends on how the teacher applies it (Casey et al., 2021). Therefore, it is very important to make efforts to develop teacher professionalism. Development can be achieved through Continuing Professional Development (CPD), which supports teachers in having a sense of ownership and responsibility, allowing for change through a sustainable community of practice (Kahts-Kramer & Wood, 2023). This can broaden teachers' understanding of inclusive pedagogy (Makopoulou et al., 2022), and improve knowledge and practice related to physical literacy (Edwards et al., 2019). CPD can be effectively implemented by being multidimensional, integrated, adaptable, modeled, collaborative, supported by school leadership, and valued (Otten et al., 2022).

Table 1. Top 15 Keywords in the Co-Occurrence of Keywords Analysis

Rank	Keywords	Occurrences	Total Link Strength
1.	Physical Education	115	472
2.	Teaching Games for Understanding	55	148
3.	Humans	35	415
4.	Teaching	31	293
5.	Sports	27	272
6.	Female	25	326
7.	Article	24	303
8.	Male	21	293
9.	Physical Education and Training	20	252
10.	Children	19	223
11.	Pedagogy	19	144
12.	Learning	17	193
13.	Physical Activity	17	127
14.	Students	17	184
15.	Human Experiment	16	219

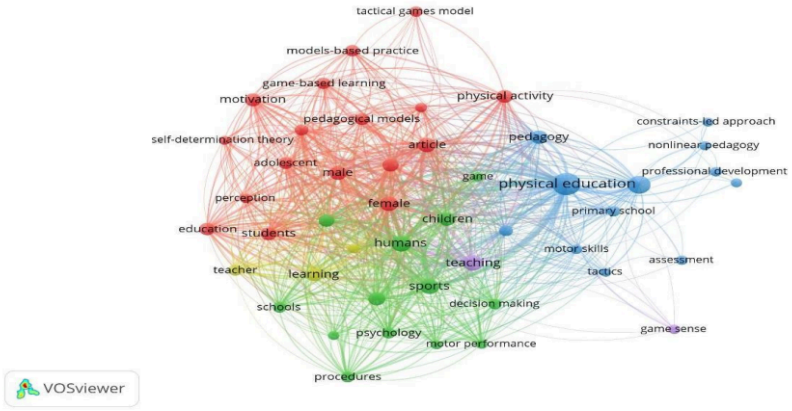

Figure 4. Network Visualisation Co-Occurrence Analysis of Gcas

Table 2. Co-Word Analysis on GCAs

Cluster number and color	Cluster label	Number of keywords	Representative Keywords
1 (Red)	"Harnessing GCAs to Foster Student Engagement in Physical Activity"	17	Pedagogical models, game-based learning,education, students, motivation, perception, physical activity
2 (Green)	"Enhancing Children's Motor Performance and Decision-Making through games"	16	Teacher, curriculum, physical education andtraining, children, games, motor performance, decision making
3 (Blue)	"Professional Development in PE to Enhance Tactics andMotor Skills in Primary School"	14	Physical education, sport pedagogy, teaching games for understanding, tactics, motor skills, primary school, professional development

The co-citation analysis revealed that the three clusters discussed efforts to create a comprehensive approach to PE. This is illustrated by the results of the analysis of each cluster. Cluster one emphasized game approaches such as TGfU and Game Sense to develop skills, tactics, and decision-making within a realistic game context, creating a holistic learning experience that encompasses cognitive, affective, social, and physical aspects. Furthermore, cluster two encourages skill development and long-term engagement through pedagogical models that integrate curriculum, learning, and teaching elements to promote an inclusive and sustainable sport culture. Cluster three relates to the use of model-based instruction and nonlinear pedagogies to provide more holistic and adaptive learning tailored to the different abilities of students. Finally, Cluster four relates to the integration of GCAs in physical education represents a shift towards student-centered learning that enhances active learning outcomes.

The comprehensive teaching model is an effective pedagogical approach because it stimulates students to achieve higher overall development (Portillo et al., 2023). This is supported by Castelli and Mitchell (2021), who state that teaching practices and programs should be specialized and pedagogically focused on an integrative approach designed to achieve national physical education standards. Furthermore, teachers believe that implementing a comprehensive approach, such as the comprehensive school physical activity programme (CSPAP), contributes to the physical, cognitive, and affective domains of physical literacy (Lee et al., 2019). The development of such an approach should be learner-centered, focusing on the overall development and evaluation of learning in a holistic manner, addressing physical, cognitive, social, and emotional aspects (Kim, 2024). Consequently, recent research trends emphasize a comprehensive approach in physical education for the holistic and sustainable development of students' skills in a dynamic and adaptive environment.

The bibliographic coupling analysis revealed the formation of clusters focused on optimizing holistic learning in physical education through the implementation of MBP and GCAs. Cluster one illustrates that implementing MBP, such as TGfU, can significantly enhance students' academic achievement, motivation, autonomy, competence, and enjoyment. This aligns with research findings Yan et al. (2023) that indicate TGfU use increases children's physical perception of themselves, intrinsic motivation, physical fitness, and psychological results. Cluster two emphasizes optimizing learning through a play-based approach, which enhances students' group interventions, decision-making, and motor skills. According to Miller et al. (2015), students' PA and FMS object control proficiency in the classroom improved at the same time when given the intervention using a game-centred approach. Cluster three and four discusses improving the quality of learning through GCAs and applied to the the optimization of sports learning using the CLA.

However, the implementation process is often constrained by teachers' established teaching habits, which can be difficult to change (Casey & MacPhail, 2018). Furthermore, teachers may be less familiar with technology and may struggle with collaboration among colleagues (Bodsworth & Goodyear, 2017). Therefore, ongoing teacher training and concrete efforts from researchers are needed to generate more scientific evidence on the application of MBP in the classroom (Hernando-Garijo et al., 2021). Hordvik et al. (2021) suggest a collaborative approach to facilitate both individual and collective MBP teaching. Addressing these challenges is a current research trend, focusing on strategies for implementing MBP and GCAs to achieve holistic student development.

The co-word analysis provided a clear picture of the main themes and key findings from each research cluster. Cluster one focused on utilizing GCAs to increase student engagement in physical activity. Cluster two emphasized improving children's motor performance and decision-making through game. Cluster three concentrated on enhancing physical education in primary schools through teacher professional development. GCAs are recommended for teaching PE (Barba-Martín et al., 2020), and are part of a PE philosophy that centers on play as a core objective (Garcia-Puchades & Chiva-Bartoll, 2020).

However, achieving desired teaching outcomes requires strengthening teacher professionalism through Continuing Professional Development (CPD). CPD encourages teachers to apply teaching principles effectively by setting clear learning outcomes and promoting differentiation and inclusion (Morgan et al., 2019). Furthermore, the implementation of CPD requires an understanding of the need for both general content knowledge and specialized content knowledge as fundamental components of pedagogical content knowledge (Montoya, 2023).

Future Research Implication

The bibliographic coupling analysis highlights the formation of clusters aimed at optimizing holistic learning in physical education through the implementation of MBP and GCAs. This is as the streams that appear in each cluster, cluster One focuses on the significant benefits of implementing MBP. Cluster Two emphasizes optimizing learning through a play-based approach. Cluster Three discusses improving the quality of learning through GCAs, which prioritize a learner-centered and engaging educational experience. Cluster Four examines the optimization of sports learning using the Constraints-Led Approach (CLA). Based on these clusters underscore the value of innovative and student-centered methodologies in advancing the holistic development of students in physical education. For this reason, the current research trend relates to the implementation of innovative and student-centered curriculum or learning models to promote holistic student development in physical education.

The co-word analysis elucidates the primary themes and key findings from various research clusters. Cluster one highlights the use of GCAs to boost student participation in physical activities. Cluster two emphasizes improving children's motor skills and decision-making through game-based learning. Cluster three underscores the importance of enhancing PE in primary schools through CPD for teachers. To achieve desired teaching outcomes, it is crucial to strengthen teacher professionalism through ongoing CPD. Overall, these clusters illustrate a comprehensive approach to improving PE by integrating GCAs and CPD, fostering a well-rounded and effective learning environment for students. Therefore, future research trends are encouraged to focus on teachers' professional development to create a more effective and holistic PE learning environment, particularly through the utilization of GCAs.

CONCLUSION

This study has provided academics and practitioners with an in-depth analysis and understanding of GCAs and identified various aspects related to their implementation. The analysis revealed that implementing GCAs in PE is effective in improving student engagement, tactical understanding, and motor skills. Additionally, GCAs assist in promoting active lifestyles and achieving holistic learning. However, effective implementation requires continuous teacher professional development through Continuing Professional Development (CPD) programs aimed at strengthening pedagogical understanding and the ability to adapt innovative teaching models.

The study revealed that through the GCAs, PE teaching can provide a richer and more sustainable learning experience, contributing to students' overall health and well-being. Furthermore, the study highlighted that the research trend began with the all-round and sustainable development of students' skills in a dynamic and adaptive environment, which can be achieved with a comprehensive approach in PE. Current research trends focus on achieving holistic student development through implementing MBP and GCAs. Additionally, this study also revealed trends and predictions of future themes related to teachers' professional development through sustainable programs to achieve PE teaching goals.

The current study has limitations associated with this review. First, the qualitative analyses conducted by the authors allow for an element of subjectivity in determining the results achieved. Therefore, inter-rater and/or inter-author reliability is needed to reduce the possibility of subjectivity in qualitative interpretation. The second limitation of this study is that the analysis was conducted using the Scopus database only. In this regard, it is recommended to conduct the same bibliometric analysis using different databases such as Web of Science (WoS) or a combination of the Scopus and WoS databases, following the analysis steps recommended by Lim et al. (2024). Additionally, the authors strongly recommend a systematic review of the implementation of GCAs in PE teaching in primary schools.

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CONFLICT OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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