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How does cooperative learning work with students? Literature review in physical education
¿Cómo funciona el aprendizaje cooperativo con los alumnos? Revisión bibliográfica sobre educación física

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Abstract. Cooperative learning stands as a recognized educational approach with potential to facilitate desired learning outcomes. This literature review aims to examine the existing body of scientific literature concerning the effects of cooperative learning on students within the realm of physical education. While a systematic review encompassing the years 2014 to 2019 was previously undertaken (Bores-García et al., 2021), this study provides a more recent overview spanning from 2019 to 2024. Utilizing three prominent databases (ScienceDirect, PubMed, and Scopus), articles pertaining to cooperative learning in physical education were selected in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Following the application of exclusion criteria, a total of 11 articles were identified and categorized. Overall, the findings indicate that cooperative learning proves effective in enhancing students' motivation, participation, social skills, and learning achievements within the domain of physical education. Tailoring cooperative learning strategies to align with specific learning objectives and student characteristics emerges as pivotal in enriching students' educational experiences and accomplishments in this field. Despite the insights gained, limitations inherent in the review are acknowledged, warranting further global exploration through additional literature reviews or mapping studies (including bibliometric and scientometric analyses). Moreover, continued research on the application and impact of cooperative learning is deemed imperative in light of contemporary societal values emphasizing social interaction, dialogue, respect, as well as the significance of physical activity and sports.
Keyword: Learning model, cooperative learning, physical education, students

Resumen. El aprendizaje cooperativo se erige como un enfoque educativo reconocido con potencial para facilitar los resultados de aprendizaje deseados. Esta revisión bibliográfica tiene como objetivo examinar la literatura científica existente sobre los efectos del aprendizaje cooperativo en los estudiantes en el ámbito de la educación física. Mientras que una revisión sistemática que abarca los años 2014 a 2019 se llevó a cabo previamente (Bores-García et al., 2021), este estudio proporciona una visión más reciente que abarca desde 2019 hasta 2024. Utilizando tres bases de datos prominentes (ScienceDirect, PubMed y Scopus), se seleccionaron artículos relacionados con el aprendizaje cooperativo en educación física de acuerdo con las directrices de los Elementos de Información Preferidos para Revisiones Sistemáticas y Metaanálisis (PRISMA). Tras la aplicación de los criterios de exclusión, se identificaron y clasificaron un total de 11 artículos. En general, los resultados indican que el aprendizaje cooperativo resulta eficaz para mejorar la motivación, la participación, las habilidades sociales y los logros de aprendizaje de los estudiantes en el ámbito de la educación física. La adaptación de las estrategias de aprendizaje cooperativo a los objetivos de aprendizaje específicos y a las características de los alumnos resulta fundamental para enriquecer las experiencias educativas y los logros de los estudiantes en este campo. A pesar de los conocimientos adquiridos, se reconocen las limitaciones inherentes a la revisión, lo que justifica una mayor exploración global a través de revisiones adicionales de la literatura o estudios de mapeo (incluyendo análisis bibliométricos y cienciométricos). Además, se considera imperativo seguir investigando sobre la aplicación y el impacto del aprendizaje cooperativo a la luz de los valores sociales contemporáneos que hacen hincapié en la interacción social, el diálogo y el respeto, así como en la importancia de la actividad física y el deporte.
Palabras clave: Modelo de aprendizaje, aprendizaje cooperativo, educación física, alumnos.

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Introduction

Education holds a vital role in shaping a knowledgeable and competent society (Sugiarta et al., 2019). It equips individuals with the necessary skills to thrive in today's increasingly competitive global arena (Niyarci, 2022). One crucial component of education, spanning from early childhood to adulthood, is physical education (Hardinata, Yosika, et al., 2023; Rahmadi et al., 2023; Umar et al., 2023). Integrated into school curricula, physical education aims to promote physical health, motor skills, and social values through participation in physical activities and sports (Mashud, Arifin, et al., 2023; Mashud, Warni, et al., 2023; Mashud et al., 2024), serving as a continuous and developmentally appropriate program throughout all educational phases (Rahmadi et al., 2023; Umar et al., 2023).

The learning process of physical education encompasses affective, cognitive, and psychomotor aspects (Samodra et al., 2023), with a primary emphasis on the psychomotor domain, particularly in movement skill activities (Harianto et al., 2023) Participation in sports enables students to maintain physical health and fitness (Hardinata et al., 2021; Hardinata, B, et al., 2023), and enhance physical fitness, which correlates with overall health (Baek et al., 2020; González-Fernández et al., 2021; Rubiyatno et al., 2023;

Suryadi et al., 2023) In the 21st century, various teaching models and strategies have emerged to align with competency-based learning materials (Fitriyani et al., 2021).

Recent years have witnessed the emergence of diverse teaching trends in education, including learning communities, flipped classrooms, and mobile learning, signaling a shift from traditional didactic teaching to more innovative methods. Cooperative learning and problem-solving skills have garnered international attention amidst this evolution (Chien et al., 2016). The application of creativity or alternative learning approaches, in response to criticisms of conventional pedagogical frameworks, such as teaching games for understanding, underscores the need for adaptable teaching methodologies (Harvey et al., 2020). In this context, cooperative learning has emerged as a focal point for research aimed at enhancing learning effectiveness in physical education.

One study says that the literature review in physical education on cooperative learning dates back seventeen years and was written by (Barrett, 2005; Goodyear & Casey, 2015). Since then there has been an increase in empirical research on various aspects of using cooperative learning as a pedagogical model in physical education practice (Casey & Goodyear, 2015). In cooperative learning, students work in small, structured, heterogeneous groups to master subject content (Dyson & Casey, 2016). In cooperative learning, students work in small, structured, heterogeneous groups to master course content, and students are not only responsible for learning the content themselves, but also helping peers in their learning process (Bjørke & Mordal Moen, 2020)

A previous study highlighted the extensive history of literature on cooperative learning in physical education, dating back seventeen years to the works of (Goodyear & Casey, 2015) and (Barrett, 2005). Subsequently, empirical research has expanded across various aspects of cooperative learning as a pedagogical model in physical education practice (Casey & Goodyear, 2015). Cooperative learning involves students collaborating in small, structured, heterogeneous groups to master course content, with an emphasis on both individual learning and peer assistance (Bjørke & Mordal Moen, 2020; Dyson & Casey, 2016).

Cooperative learning is recognized as a pedagogical model capable of achieving various learning outcomes, including physical, affective, social, and cognitive domains (Casey & Goodyear, 2015). It has been instrumental in enhancing classroom climate, fostering intrinsic motivation, nurturing social relationships, and improving learning and physical skills (Sivrikaya, 2019; Zhang et al., 2017), developing good social relationships between peers (Goodyear et al., 2014), as well as improving learning skills, especially movement skills (Suryadi, Nasrulloh, et al., 2024), and physical skills (Mashud et al., 2024).

The literature review on cooperative learning in physical education in learning highlights various important aspects. First, cooperative learning can increase students' active participation in physical activities, reduce their fear or anxiety towards exercise, and increase their confidence in their physical abilities (Perdana et al., 2023). In addition, this approach can also improve social interaction between students, teach collaboration skills, and strengthen mutual respect and tolerance. Based on previous research, literature review and mapping focusing on achieving physical education learning outcomes (Casey & Goodyear, 2015), and cooperative learning interventions on intrinsic motivation (Fernández-Espínola et al., 2020) Although a systematic review of cooperative learning research in physical education has previously been conducted in the last five years (2014-2019) (Bores-García et al., 2021)), and conducted a systematic review on this topic in China (Dyson et al., 2022).

Over the past decade, previous researchers have been encouraged to conduct in-depth studies on cooperative learning in physical education. These studies include empirical methods that address sustained cooperative learning interventions on student motivation (Fernandez-Rio et al., 2017), designing and implementing sustained cooperative learning (Legrain et al., 2021), investigating students' problem-solving skills (Alpaslan, 2016), the relationship between cooperative learning and emotional intelligence (Rivera-Pérez et al., 2020). Nevertheless, several obstacles must be addressed when incorporating cooperative learning into physical education. These include constraints related to space and equipment, the proficiency level of teachers, and the management of student groups. Hence, substantial support from schools and relevant stakeholders is crucial to facilitate the effective adoption of this methodology. This underscores the importance of conducting further research on cooperative learning in physical education, paving the way for more comprehensive investigations into learning methodologies.

Materials and Methods

Search Strategy

The search in this study used databases that were used were Science Direct, Pubmed and Scopus. The search started using the Science Direct database then Pubmed and then Scopus which is considered as one of the leading indexing systems for citations. (Suryadi, Komaini, et al., 2024; Suryadi, Nasrulloh, et al., 2024). Where the source is most frequently visited by previous researchers around the world. The search strategy included a combination of keyword variations ("cooperative learning AND collaborative learning AND physical education AND sport education AND sport pedagogy AND school children AND elementary school").

The search was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Mohamed Shaffril et al., 2019). In addition, PRISMA emphasizes review reports that evaluate randomized trials which can also be used as a

basis in reporting systematic reviews for other types of research.

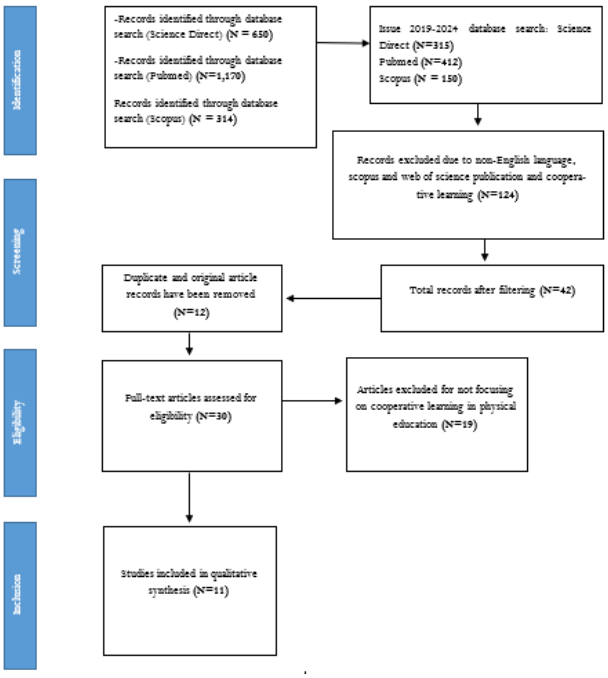

Figure 1. Prisma for chart.

Exclusion Criteria

The exclusion criteria used were as follows: (1) Articles that were not published in journals indexed in Scopus and Web of Science, (2) Articles in languages other than English, (3) Articles published in other than the last 5 years, namely 2019-2024. (4) Articles that do not explicitly mention cooperative learning.

Procedure

Initially, 2,134 publications were identified through database searches (ScienceDirect: 650 articles) and (Pubmed: 1,170 articles) and (Scopus: 314 articles). After following the exclusion criteria, only 11 articles remained. Most of the items were discarded because the articles did not mention cooperative learning in physical education. All articles were extracted from the sources and analyzed through Mendeley software to remove duplicate articles. More details are shown in figure 1.

Results

The five categories (Author and Year excluded) listed in Table 1 were described and discussed in 1 article compiled. The country category is not shown, the article search focused on cooperative learning in physical education.results can be seen in table 1.

Table 1.
Summary of Articles on Cooperative Learning in Physical Education

Author and Year	Research Methods and Types	Content	Research Objectives	Research Results
(Rivera-Pérez et al., 2021)	Experimental Research (one group, pre-test-post-test)	Cooperative learning 8 weeks	To assess the relationship between cooperative learning, task goals and self-approach, and emotional intelligence in physical education classes	The results showed that the 8-week cooperative learning framework helped improve students' self-approach goals and emotional control and regulation, and empathy.
(Aslan et al., 2020)	Quantitative, experimental research	TGT type cooperative learning model, long jump	To obtain a general description of the TGT-type cooperative learning model used by physical education teachers in an effort to improve stylistic abilities in the long jump.	1) The TGT cooperative learning model has participation in the learning outcomes of the new style long jump, (2) The magnitude of the influence of the TGT cooperative learning model on the learning outcomes of the long jump.
(Engels & Freund, 2020)	Experimental Research (two-group design)	Game-based cooperative learning	To investigate whether cooperative games in physical education classes (grades 6-9) can increase students' enjoyment of physical activity.	Results show that systematically designed cooperative games can help foster fun in physical education classes.
(Suwiwa et al., 2022)	Quantitative research, action research, observation, interviews, and questionnaires	Jigsaw cooperative learning, breakout room features	To investigate the feasibility and challenges associated with implementing the jigsaw learning strategy using the group workspace feature in zoom meetings.	(1) The jigsaw learning strategy for conducting breakout room features in zoom meetings is feasible and easy to implement in online learning, (2) the jigsaw learning strategy can be used as a reference for implementing meaningful online learning.
(Juliantine et al., 2019)	Experimental Research (questionnaire)	Peer teaching model, cooperative learning model confidence, cooperation, volleyball	To find out how the peer teaching model and cooperative learning model affect students' self-confidence and teamwork in volleyball games.	(1) Peer teaching learning model affects students' self-confidence. (2) Peer teaching model affects students' teamwork. (3) Cooperative learning model affects students' self-confidence. (4) Cooperative learning model affects students' teamwork. (5) Cooperative learning model has more effect on students' self-confidence. (6) Cooperative learning model has more effect on students' teamwork.
(Luo et al.,	Experimental Research	Cooperative	(1) Analyzing the impact of	Results After a 12-week basketball teaching

2020)	(quasi-experimental pre-test-post-test)	learning based on team-game-tournaments (TGT)	TGT units on learning motivation and motor skills. (2) Comparing the learning motivation and motor skill development obtained through traditional teaching methods and TGT units.	session, the TGT teaching strategy significantly increased student motivation but did not increase motor skill acquisition. However, competency level had no significant effect on motivation but was significantly related to motor skill acquisition. The interaction effect between teaching strategy and competency level was not significant.
(Pérez et al., 2021)	Experimental Research (ex post facto transversal research design)	Cooperative learning and the goal approach	(1) To analyze whether cooperative learning (CL) factors differentiate different approach goals from the 3 × 2 achievement goal model. (2) To assess the role that the educational stage can play.	The discriminant analysis results show that the cooperative learning factor is a predictor of approach goals, highlighting the individual responsibility factor for task approach goals (TAG) and self-directed approach goals (SAG), it is the least discriminant for other approach goals (OAG). In addition, the results of the decision tree analysis showed that in primary education, secondary education, and baccalaureate, students with the highest TAG and SAG levels were those with the highest individual responsibility scores.
(Gunawan et al., 2021)	Quantitative, experimental research	TGT, STAD, Jigsaw type methods, motivation, soccer	To see the effectiveness of TGT, STAD and Jigsaw type methods in improving learning outcomes of soccer skills.	TGT cooperative method is better in improving learning outcomes of soccer skills compared to STAD and Jigsaw methods.
(Yang et al., 2021)	Experimental Research (quasi experiment)	Cooperative Learning with S-type heterogeneous grouping and "free" grouping	To explore the impact of different cooperative learning grouping methods in relation to action skill learning and learning motivation.	The results showed that the overall skills, dribbling and passing among the action skill group and the "free" group improved significantly, but the results for shooting were not significant; the motivation level for both grouping methods improved significantly overall, and no significant difference was found in learning motivation and learning effectiveness between different grouping methods. It is clear that teachers must first establish a good relationship between and with students, and the free grouping method can be used to obtain good results. Teachers who use cooperative learning should intervene at the right time and choose a grouping method that suits the teaching objectives.
(Wijaya et al., 2019)	Mixed research (quantitative and qualitative), experiments, questionnaires and interviews	Fundamental skills (FS) card-based cooperative learning model	To determine the effect of basic skills card-based cooperative learning (FS) model on elementary school students.	(1) The effectiveness of the FS card-based cooperative learning model is very good. (2) Students think positively about the FS card media. (3) The FS card-based cooperative learning model can improve school students' elementary basic skills.
(Winarni & Lutan, 2020)	Quantitative research, experiment, Baron-Cohen scale and UNESCO instrument (REF).	Cooperative learning, classical learning, moral values	To examine the effectiveness of two learning methods commonly used in physical education, namely cooperative and classical learning to instill moral values.	Cooperative learning is significantly more effective than classical learning.

Based on the review of the category of methods and types of research, there were nine articles exclusively using experimental research (Aslan et al., 2020; Gunawan et al., 2021; Juliantine et al., 2019; Winarni & Lutan, 2020), quasi-experimental pre-test-post-test (Engels & Freund, 2020; Luo et al., 2020; Yang et al., 2021), ex post facto transversal research design (Pérez et al., 2021), one group, pre-test-post-test (Rivera-Pérez et al., 2021). Furthermore, there is one article using a quantitative approach of class action research (Suwiwa et al., 2022), and finally one article using mixed research (quantitative and qualitative) (Wijaya et al., 2019). The average article uses experimental research and measurement instruments in collecting research data.

The results showed a wide range of content related to cooperative learning in physical education. The first group deals with cooperative learning with games, namely: Cooperative learning based on team-game-tournaments (TGT) (Luo et al., 2020), TGT-type cooperative learning model, long jump (Aslan et al., 2020), game-based cooperative learning (Engels & Freund, 2020), TGT, STAD, Jigsaw, motivation, soccer (Gunawan et al., 2021), cooperative learning with S-type heterogeneous grouping and "free" grouping (Yang et al., 2021). Furthermore, in the second group, cooperative learning with a goal approach: 8-week cooperative learning (Rivera-Pérez et al., 2021), jigsaw learning, breakout room features (Suwiwa et al., 2022), peer teaching model, cooperative learning model of self-confidence, cooperation, volleyball (Juliantine et al., 2019), cooperative learning and goal approach (Pérez et al., 2021), fundamental skills (FS) card-based cooperative learning model (Wijaya et al., 2019), and cooperative learning, classical learning, moral values

(Winarni & Lutan, 2020). In sports, educators use heterogeneous groups with different roles that alternate throughout the session of the learning unit, with a predominance of non-competitive contexts where all students participate in the pursuit of a common goal (Aziz, Okilanda, Permadi, et al., 2023; Aziz, Okilanda, Rozi, et al., 2023)

Discussion

Based on this review, the objectives and outcomes of the research they developed can be divided into two groups:

In the first group related to cooperative learning with games there are five articles, the research discusses cooperative learning based on team-game-tournaments (TGT) (Luo et al., 2020), TGT type cooperative learning model, long jump (Aslan et al., 2020), game-based cooperative learning (Engels & Freund, 2020), TGT, STAD, Jigsaw, motivation, soccer (Gunawan et al., 2021), cooperative learning with S-type heterogeneous grouping and "free" grouping (Yang et al., 2021). The first study aims to assess the impact of TGT (Teams-Games-Tournaments) units on learning motivation and motor skills, and compare them with traditional teaching methods. Results indicate that following a 12-week basketball teaching session, the TGT strategy significantly increased student motivation but did not enhance motor skill acquisition. However, competency level showed no significant effect on motivation but was notably associated with motor skill acquisition. The interaction effect between teaching strategy and competency level was not significant (Luo et al., 2020). The second study seeks to provide an overview of the TGT cooperative learning model's utilization by physical education teachers to enhance stylistic abilities in long jump. Findings suggest that the TGT cooperative learning model positively influences the learning outcomes of the new style long jump, with the TGT model's impact being significant (Aslan et al., 2020).

In the third study, the goal is to explore whether cooperative games in physical education classes for grades 6-9 can increase students' enjoyment of physical activity. Results indicate that systematically designed cooperative games can indeed foster enjoyment in physical education classes (Engels & Freund, 2020). The fourth study aims to evaluate the effectiveness of TGT, STAD (Student Teams-Achievement Divisions), and Jigsaw methods in improving soccer skills' learning outcomes. Results demonstrate that the TGT cooperative method outperforms STAD and Jigsaw methods in enhancing soccer skills learning outcomes (Gunawan et al., 2021). Lastly, the fifth study aims to examine the impact of different cooperative learning grouping methods on action skills learning and learning motivation. Findings reveal significant improvements in overall skills, dribbling, passing, and motivation levels for both action skills and "free" groups. However, no significant difference was observed in learning motivation and effectiveness between the various grouping methods (Yang et al., 2021). It underscores the importance of establishing positive relationships between teachers and students, with the "free" grouping method yielding promising results. Teachers employing cooperative learning should intervene appropriately and select grouping methods aligned with teaching objectives.

In the second group related to cooperative learning with a goal approach there are six articles, 8 weeks of cooperative learning (Rivera-Pérez et al., 2021), jigsaw learning, breakout room features (Suwiwa et al., 2022), peer teaching model, cooperative learning model of confidence, cooperation, volleyball (Juliantine et al., 2019), cooperative learning and goal approach (Pérez et al., 2021), fundamental skills (FS) card-based cooperative learning model (Wijaya et al., 2019), and cooperative learning, classical learning, moral values (Winarni & Lutan, 2020). The first study aimed to evaluate how cooperative learning, task goals, self-approach, and emotional intelligence intersect in physical education classes. Results indicated that an 8-week cooperative learning program led to improvements in students' self-approach goals, emotional regulation, and empathy (Rivera-Pérez et al., 2021). In the second study, researchers explored the practicality and challenges of implementing the jigsaw learning strategy using Zoom's group workspace feature. Findings demonstrated the feasibility and ease of implementing the jigsaw learning strategy via Zoom's breakout room feature for online learning, suggesting its potential for facilitating meaningful online learning experiences (Suwiwa et al., 2022). The third article sought to understand how peer teaching and cooperative learning models influence students' self-confidence and teamwork in volleyball. Results indicated that both the peer teaching and cooperative learning models positively impacted students' self-confidence and teamwork, with the cooperative learning model exhibiting a greater effect on both aspects (Juliantine et al., 2019).

The following fourth article aims (1) to analyze whether cooperative learning (CL) factors differentiate the objectives of different approaches from the 3×2 achievement goal model. (2) to assess the role that educational stage can play. The results of the discriminant analysis show that the cooperative learning factor is a predictor of the approach objectives, highlighting the individual responsibility factor for the task approach objective (TAG) and the self-directed approach objective (SAG), it is the least discriminant for the other approach objective (OAG). In addition, the results of the decision tree analysis showed that in primary education, secondary education, and undergraduate education, the individual responsibility factor was the least discriminant for other approach goals (OAG) (Pérez et al., 2021). In the fifth study, researchers examined the impact of a fundamental skills (FS) card-based cooperative learning model on elementary school students. Results indicated the model's high effectiveness in improving students' basic skills, with students expressing positive perceptions of the FS card media (Wijaya et al., 2019). Finally, the sixth article aimed to compare the effectiveness of cooperative and

classical learning methods in imparting moral values in physical education. Findings revealed that cooperative learning significantly outperformed classical learning in this aspect (Winarni & Lutan, 2020).

From the findings above, it can be seen that cooperative learning is very well applied in physical education learning. Other researchers have also explained in their research findings that cooperative learning can also develop motor skills (Altınkök, 2017), physical skills (Lee, 2014), and problem-solving skills (Alpaslan, 2016). Another study also revealed for the development of basic motor skills and physical abilities, cooperative learning is more effective than traditional learning models (Nopembri et al., 2019). Cooperative learning also helps children with special needs, and improves their creativity, cooperation and skills in playing soccer. (Perdana et al., 2023).

Conclusions

Based on this literature review, cooperative learning in physical education shows a number of significant results, which can be grouped into two main categories: cooperative learning with a game approach and cooperative learning with a goal approach. Within the first group, these studies highlight the importance of using games as a tool in cooperative learning. These articles show that: Cooperative learning strategies, such as the TGT model, have a positive impact on student motivation, although not necessarily a direct impact on improving motor skills. Systematically designed cooperative games can increase students' enjoyment and participation in physical activity, creating a positive and fun learning environment. Cooperative methods, such as TGT, are more effective in improving learning outcomes of specific skills, such as in soccer games. Meanwhile, the second group highlighted the importance of cooperative learning with a goal approach, which involves setting clear learning objectives. Findings from these articles include: Cooperative learning with a goal approach can assist in the development of various emotional and social aspects of students, including increased self-confidence, teamwork and emotional control. The use of online learning strategies, such as group workspaces in Zoom meetings, can facilitate the implementation of cooperative methods in a distance learning environment. Cooperative learning models, such as peer teaching and basic skills card-based learning, have a positive impact on improving students' basic skills and understanding.

Overall, the findings suggest that cooperative learning is effective in improving students' motivation, participation, social skills and learning achievement in the context of physical education. In contrast, the results of the previous study focus more on secondary education, especially on short-term interventions. However, they both discuss cooperative learning in physical education. The application of cooperative learning strategies that are appropriate to the learning objectives and student characteristics can be key in improving students' learning experience and achievement in these areas. Future researchers can enhance their search by including additional keywords and exploring various databases such as ERIC, EBSCO (SPORTDiscus and Psychology & Behavioral Sciences Collection), and other relevant resources.

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Conflict of interests

There is no conflict of interest.

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