COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 17, Number 2, 2025 ‖ P.941-954

Learning Strategies in Physical Education to Improve Physical Fitness: Systematic Literature Review

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ABSTRACT

Physical fitness plays a vital role in supporting the physical development, cognitive growth, and healthy lifestyle habits of elementary school students. Nevertheless, the delivery of physical education (PE) in many schools remains predominantly conventional, often emphasising routine exercises and lacking innovative pedagogical strategies that effectively stimulate fitness improvement. This study aims to identify evidence-based learning models that significantly improve students' physical fitness through a systematic literature review (SLR). The research utilised the PICO framework (Population, Intervention, Comparison, Outcome) and adhered to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Relevant articles were retrieved using the Publish or Perish application from databases such as Google Scholar and Crossref, employing keywords including "student physical fitness," "physical education learning models," and "teaching style in physical education." From an initial pool of 1,000 articles published in the last 10 years, seven met the defined inclusion and exclusion criteria. The findings indicate that innovative instructional models such as Project-Based Learning (PjBL), circuit games, Puzzle Run, and play-based approaches are effective in improving cardiovascular endurance, muscular strength, agility, and motor coordination. These active and contextual strategies contrast significantly with traditional teacher-centred approaches, providing more engaging and meaningful physical learning experiences. The review concludes that applying learner-centred, playful, and integrated teaching models in physical education can better facilitate the development of comprehensive physical fitness among elementary students.

ARTICLE HISTORY
Received: 2025/06/04
Accepted: 2025/06/08
Published: 2025/06/15

KEYWORDS
Physical Education;
Physical Fitness;
Learning Models;
Elementary Students;
Systematic Literature Review.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Adritya, Wenny; Mashud, M. (2025). Learning Strategies in Physical Education to Improve Physical Fitness: Systematic Literature Review. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 17 (2), p.941-954

INTRODUCTION

Physical education (PE) serves as a fundamental platform to cultivate lifelong physical activity habits, enhance physical fitness, and promote holistic well-being in students (Bailey et al., 2009). Globally, educational systems have increasingly acknowledged the integral role of PE in combating the sedentary lifestyle crisis among school-aged children and adolescents (WHO, 2020). Physical inactivity has been linked to

an increased risk of chronic diseases, such as obesity, cardiovascular disease, and type 2 diabetes, highlighting the urgency for schools to integrate effective PE learning strategies (Janssen & LeBlanc, 2010; Guthold et al., 2020).

The contemporary educational landscape has shifted towards competency-based curricula that emphasise not only cognitive development but also physical literacy, motor skills, and psychosocial growth through structured physical education programs (Whitehead, 2013). Within this context, PE is no longer viewed solely as a recreational subject but as a pedagogical domain with measurable learning outcomes and transformative potential (Ennis, 2017). As students spend a considerable portion of their formative years in school, PE serves as a strategic medium to instil physical fitness awareness and healthy behavioural patterns (Mueangsom et al., 2021).

Learning strategies in PE are pedagogical techniques and frameworks designed to optimise the acquisition of physical knowledge, skills, and fitness. These strategies include approaches such as Teaching Games for Understanding (TGfU), Cooperative Learning, Sport Education, and the Tactical Games Model (Casey & Goodyear, 2015). Empirical studies have shown that these approaches not only foster engagement and motivation but also enhance cardiorespiratory endurance, muscular strength, agility, and flexibility among learners (Siedentop et al., 2019; García-Castejón et al., 2021).

TGfU, for instance, develops tactical understanding and decision-making in students while simultaneously improving their physical conditioning through active gameplay (Harvey & Pill, 2016). Cooperative Learning focuses on interpersonal relationships and collective achievement, fostering social support and perseverance, which are critical to long-term engagement in physical activities (Dyson et al., 2010). Meanwhile, Sport Education simulates authentic sports experiences, offering roles such as referees, coaches, and statisticians to cultivate leadership and comprehensive physical engagement (Hastie et al., 2011).

Recent technological integrations have also enhanced the instructional delivery of PE through blended learning, exergames, and fitness apps. These tools allow individualised learning paces and real-time feedback, contributing to improved motivation and physical fitness outcomes (Eather et al., 2020; Melguizo-Ibáñez et al., 2022). However, despite the growing body of research, variations in strategy effectiveness persist across contexts, age groups, and educational settings.

While various pedagogical strategies are being employed globally in PE programs, there remains considerable variability in their implementation and outcomes (Kirk, 2010). Questions linger regarding which specific strategies most effectively improve physical fitness components, especially when applied across diverse learner demographics such as primary, secondary, and high school students (Goodyear et al., 2017). Furthermore, disparities in teacher preparedness, resource availability, and curricular alignment continue to challenge the optimal integration of these strategies into standard PE instruction (Casey et al., 2021).

Notably, the educational environment in low-resource or developing regions often lacks access to updated pedagogical models or appropriate evaluation tools for fitness-

related outcomes. This has led to inconsistent delivery of effective PE interventions (Hardman & Green, 2011). In addition, existing literature often conflates motor skills development with physical fitness improvement, despite these being distinct yet interrelated domains (Lubans et al., 2010). Therefore, a refined synthesis of evidence focused explicitly on strategies aimed at improving physical fitness is warranted.

Although a substantial volume of literature explores various PE models, few systematic reviews isolate the impact of instructional strategies on physical fitness parameters such as cardiovascular endurance, muscular strength, flexibility, and body composition (Kriemler et al., 2011). Previous meta-analyses have primarily examined general physical activity promotion (Dobbins et al., 2013), motor skill acquisition (Logan et al., 2012), or psychosocial outcomes (Bailey, 2016), thereby leaving a gap in understanding the direct linkage between learning strategies and physical fitness enhancement.

Moreover, most available reviews are geographically concentrated in Western contexts, with limited consideration of cultural, infrastructural, and curricular differences present in Asian, African, and Latin American educational systems (Simonton et al., 2022). The need for a comprehensive, globally contextualised literature review focusing on PE learning strategies specifically for physical fitness improvement is thus critical to bridge theoretical knowledge and practical application in varied school environments.

This systematic literature review addresses the above gap by critically analysing and synthesising peer-reviewed research from the last decade that examines the effectiveness of learning strategies in PE on physical fitness improvement. Unlike existing studies, this review categorises learning strategies based on their theoretical frameworks (e.g., constructivist, behaviourist, socio-cultural) and maps them to measurable fitness outcomes such as VO_2 max, sit-up test scores, 20-meter shuttle runs, and flexibility indices.

In addition, the review considers variations across age, sex, school level, and regional context to provide a nuanced understanding of strategy efficacy. The novelty of this research lies in its integration of educational theory with empirical fitness outcomes, offering a framework that educators, policymakers, and curriculum designers can adapt to design PE programs with measurable physical fitness goals.

This article presents a systematic literature review of learning strategies in physical education to identify the most effective approaches for improving students' physical fitness. The review is guided by the following research questions: (1) What are the most commonly used learning strategies in PE aimed at improving physical fitness?, (2) What physical fitness components (e.g., cardiovascular endurance, muscular strength, flexibility) are most impacted by these strategies?, and (3) How do contextual factors such as age group, school environment, and teacher expertise influence the effectiveness of these strategies?

Through rigorous inclusion and exclusion criteria, the review draws from high-impact national and Scopus-indexed journals published between 2014 and 2024. The findings are expected to provide empirical guidance for optimising PE curricula and fostering lifelong fitness habits among students globally.

METHODS

The author collected data using Google Scholar and Crossref through the Publish or Perish application. They searched for relevant articles using specific keywords. To select the right literature, the author used the PICO method, which stands for Population, Intervention, Comparison, Outcome. This method helped ensure the articles matched the research's focus and goals (Kuettel & Larsen, 2020).

The author straightforwardly analyzed the data by; 1) identifying the education levels and types of studies; 2) looking at the learning models and teaching styles used; 3) assessing how these models affected students' physical fitness; and 4) gathering main themes and finding research gaps to suggest areas for future studies. More information about the PICO method can be found in Table 2 below.

Table 1
PICO Method

Component	Information
Population (P)	Elementary to middle school students in the context of physical education
Intervention (I)	Learning models or teaching styles in physical education lessons at the elementary and secondary school levels
Comparison (C)	Learning models or teaching styles in physical education lessons at the tertiary level
Outcome (O)	Relevant learning models or teaching styles to improve physical fitness
Study Design (S)	Systematic Literature Review (SLR)

The PICO method is utilised by the author to search for articles that reveal new findings (Kuettel & Larsen, 2020). Article searches were conducted using search engines such as Publish or Perish, with keywords including “student physical fitness,” “learning model,” “teaching model,” “physical fitness,” “teaching style in physical education,” “cardiorespiratory endurance,” and “fitness in elementary physical education.”.

Following this, the author moved on to the data extraction stage, leveraging the defined inclusion and exclusion criteria to ensure the data was more specific. Any articles that did not meet the criteria were excluded from consideration (Ratih & Susanna, 2018). A detailed description of the inclusion and exclusion criteria can also be found in Table 2.

Table 2
Inclusion and exclusion criteria

Type	Inclusion	Exclusion
Publication Year	2015–2025	Before 2015
Language	Indonesian & English	Besides Indonesian and English
Research Focus	Learning model or teaching style in physical education	Not in the context of physical education
External	Relevant to improving students' physical fitness	The primary outcome is not physical fitness
Type Article	Research journal articles	Articles that are not available in full-text or are duplicates
Access and Validity	Full-text available, has DOI	No DOI, not fully accessible
Methodology	Using quantitative, qualitative, or mixed approaches	The research method is unclear

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RESULTS AND DISCUSSION

The author identified approximately 1,000 articles using Google Scholar, Crossref, and Scopus through the Publish or Perish application. These articles underwent a systematic filtering process based on predetermined inclusion and exclusion criteria.

In total, 1,000 articles collected from these search engines were systematically filtered through five stages: 1) In the first stage, 506 articles were excluded because their publication year was before 2015. 2) The second stage eliminated 9 articles that were written in languages other than Indonesian and English. 3) In the third stage, 338 articles were removed due to their irrelevance to the research focus on models or methods for improving physical fitness. 4) The fourth stage excluded 129 articles that were not research journal articles, such as books, reports, or theses. 5) Finally, in the fifth stage, 11 articles were dropped because they either lacked a DOI or were not available in full text. After undergoing this rigorous screening process, the author ultimately selected 7 articles that met all the inclusion criteria. These seven articles were then used as the primary sample for further analysis in this study.

For additional clarity, the article selection process is illustrated in Figure 1, the PRISMA Flowchart below.

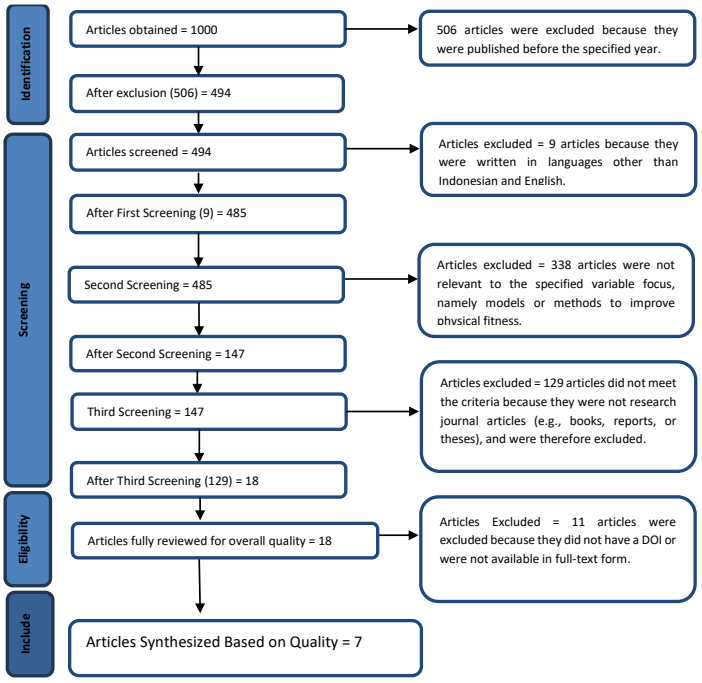

Figure 1
PRISMA Flowcart

This study reviewed seven articles relevant to learning models and teaching styles that enhance students' physical fitness in physical education. Among these, four articles were focused on elementary school levels and three on college levels.

After screening 1,000 articles through a five-stage selection process, seven were selected based on inclusion criteria for (Physical Education, Sports, and Health) learning interventions. The four articles from elementary and middle schools were the main focus, while three from higher education served as a comparison.

The learning models used in elementary and secondary education included Physical Fitness Gymnastics (SKJ) 2018, Circuit Games, Play Methods, Project-Based Learning (PjBL), and Puzzle Run. Tertiary-level models included the Differentiation Model and BBC Exercise, which were analysed for effectiveness against lower levels.

The review found that models in elementary and secondary schools prioritised active and enjoyable learning, leading to significant improvements in muscle strength, cardiorespiratory endurance, and motor coordination. In contrast, higher education focused more on maintaining fitness and motivation. Most articles indicated physical fitness improvements, while others noted increased motivation and participation as vital for fitness development.

Table 3
Presentation of Review Results

No	Author & Year	Article Title	Learning Model /Style	Subjects	School Level	Key Findings
1	(Ramadhan & Priyono, 2022)	The Effectiveness of the 2018 United Indonesia Physical Fitness Gymnastics on Improving Students' Physical Fitness at Mintaragen 2 Elementary School, Tegal City	Physical Fitness Gymnastics (SKJ) 2018	Physical Education	SD	SKJ 2018 effectively improved students' physical fitness, with an increase of 13.1% for male students and 16% for female students.
2	(Beauty et al., 2020)	The Influence of Circuit Game Learning Model on Increasing Physical Fitness and Student Learning Motivation in Physical Education Learning	Circuit Game	Physical Education	Junior High School	The circuit game model increases physical fitness by 11% and learning motivation by 10%.
3	(Indah Atifah Anwar & Akbar Syafruddin, 2024)	The Effectiveness of Differentiated Learning Models to Increase Student Motivation in Physical Fitness Courses	Differentiation Model	Physical Fitness	College	The differentiation model is quite effective in increasing student motivation, with an average motivation score of 75.6 out of 100.
4	(Bile & Suharjana, 2019)	Effectiveness of Using the "BBC Exercise" Fitness Training Model for Maintaining Physical Fitness in Students	BBC Exercise	Physical Fitness	College	BBC Exercise effectively improves students' physical fitness based on pretest-posttest ($p < 0.05$).
5	(Hakim et al., 2018)	Efforts to Increase Student Activity in Physical Education Learning Using Play Methods for Grade V Students of SDN 2 Pagelaran	Playing Method	Physical Education	SD	Effective play methods increase student activity in physical fitness learning.

No	Author & Year	Article Title	Learning Model /Style	Subjects	School Level	Key Findings
6	(Febriyanti et al., 2024)	The influence of the project-based learning model on learning outcomes of physical fitness activities	Project-Based Learning (PjBL)	Physical Education (Physical Fitness Activities)	Junior High School (grade VIII)	The PjBL model has a significant effect on learning outcomes in physical fitness knowledge and skills, with a moderate increase in the category.
7	(Khamami & Sudarmono, 2023)	Physical Fitness Activity Learning Model through Puzzle Run Game	Development of game-based learning media (Puzzle Run)	Physical Education(Physical Fitness Activities)	Elementary School (grade IV)	Puzzle Run media is very suitable for use and is effective in increasing student involvement in physical fitness learning (average value of the grand test is 89.38%).

Based on a review of seven articles that satisfied the inclusion criteria, various physical education learning models and styles have been identified as effective in improving students' physical fitness. These articles highlight a structured gymnastics approach, a game-based learning model (including Puzzle Run, play method, and circuit games), a differentiated approach combined with programmed physical exercise (BBC Exercise), and a project-based model (Project-Based Learning). Each approach plays a significant role in enhancing students' physical attributes, such as cardiovascular fitness, muscular strength, agility, and motivation to engage in physical activities. Below is a table summarising the outcomes of each learning model/style:

Table 4

Outcome Model and Physical Education Learning Style that Can Improve Physical Fitness

No	Learning Models / Styles	Author & Year	Level	Subjects	Summary of Findings
1	Physical Fitness Gymnastics (SKJ) 2018	(Ramadhan & Priyono, 2022)	SD	Physical Education	SKJ 2018 effectively improved students' physical fitness, with an increase of 13.1% (male) and 16% (female).
2	Circuit Game	(Beauty et al., 2020)	Junior High School	Physical Education	The circuit game model increases physical fitness by 11% and learning motivation by 10%.
3	Differentiation Model	(Indah Atifah Anwar & Akbar Syafruddin, 2024)	College	Physical Fitness	The differentiation model is quite effective in increasing student motivation, with an average motivation score of 75.6 out of 100.
4	BBC Exercise	(Bile & Suharjana, 2019)	College	Physical Fitness	BBC Exercise is effective in maintaining the physical fitness of students based

No	Learning Models / Styles	Author & Year	Level	Subjects	Summary of Findings
					on pretest-posttest ($p < 0.05$).
5	Playing Method	(Hakim et al., 2018)	SD	Physical Education	Effective play methods increase student activity, which has an impact on increasing physical activity and physical fitness.
6	Project-Based Learning (PjBL)	(Febriyanti et al., 2024)	Junior High School (grade VIII)	Physical Education (Physical Fitness)	PjBL has a significant effect on learning outcomes of physical fitness knowledge and skills, with an increase in the moderate category.
7	Puzzle Run Game Media	(Khamami & Sudarmono, 2023)	Elementary School (grade IV)	Physical Education (Physical Fitness)	Puzzle Run media is very feasible and effective to use, increasing student involvement and cognitive, psychomotor, and affective aspects (89.38%).

The SLR findings reveal differing approaches and impacts of Physical Education learning models across educational levels, particularly between elementary-secondary and higher education. At the elementary and junior high levels, models are designed to effectively stimulate physical activity, as evidenced by the success of Project-Based Learning (PjBL) in improving cardio-pulmonary fitness (Febriyanti et al., 2024) and the positive effects of methods like play and Puzzle Run on coordination and motivation (Hakim et al., 2018; Khamami & Sudarmono, 2023).

In contrast, tertiary-level models such as BBC Exercise and the Differentiation Model focus more on maintaining fitness and adapting to adult learners' needs. While they produce positive results, their impact on physical development is limited, as the emphasis shifts towards professional and theoretical growth (Bile & Suharjana, 2019).

This highlights that active physical learning interventions are more effective at the elementary and secondary levels, where students are more responsive to movement stimuli. Therefore, this study affirms that strategies like PjBL, circuit games, and game-based creative media should be continuously refined within Physical Education learning to enhance physical fitness outcomes for students.

Table 5.
Article Analysis Details

Learning Model/Style	Key Benefits of Improving Physical Fitness	Disadvantages/Limitations	Development Strategy Recommendations	Reference
Physical Fitness Gymnastics (SKJ) 2018	Improve overall physical fitness (aerobics, strength, flexibility) with a structured exercise	Monotonous movements can reduce motivation if done repeatedly without variation.	Vary the music and gymnastics formations; involve students as instructors to	(Ramadhan & Priyono, 2022)

Learning Model/Style	Key Benefits of Improving Physical Fitness	Disadvantages/Limitations	Development Strategy Recommendations	Reference
	pattern.		increase participation.	
Circuit Game	Train physical fitness in a fun way with a combination of speed, endurance, and strength.	Requires adequate equipment and space, as well as close supervision.	Simplify the tools and design a circuit station with available materials at school.	(Beauty et al., 2020)
Differentiation Model	Adapting students' needs and abilities to maintain optimal physical activity.	Teachers need to have a good mastery of differentiation strategies for effective implementation.	Teacher training in designing differentiated physical activities based on students' physical ability levels.	(Indah Atifah Anwar & Akbar Syafruddin, 2024)
BBC Exercise	Effective for maintaining or improving physical fitness with simple and structured exercises.	Focus on maintenance, not significant improvement in students with low initial conditions.	Used as a basic exercise and complemented by a progressive program.	(Bile & Suharjana, 2019)
Playing Method	Increase students' physical activity naturally and enhance social engagement.	Students can be too focused on the game, so that the physical fitness element can be neglected.	Teachers need to direct the physical goals of each game to keep it structured.	(Hakim et al., 2018)
Project-Based Learning (PjBL)	Increasing physical activity through the integration of real projects and students' involvement in fitness activities.	It takes time and teacher control so that physical activities are not replaced by non-physical tasks.	Provide project guidelines that include explicit physical indicators and monitoring of physical activity progress.	(Febriyanti et al., 2024)
Puzzle Run (Game Media)	Improving physical fitness as well as psychomotor and affective aspects in an integrated and enjoyable way.	Requires more facilities and preparation time.	Use the mini and portable version so that it can be used more flexibly in various schools.	(Khamami & Sudarmono, 2023)

This finding aligns with Akbar's (2024) perspective that education is not just about transferring knowledge but also about developing children's overall potential. In the context of Physical Education, improving students' physical abilities is essential for fostering a balanced character and refining motor skills.

Salasiah et al. (2020) highlighted the importance of addressing cognitive, affective, and psychomotor aspects in physical education. This study focuses on the psychomotor aspect, which relates to fitness components like muscle strength, endurance, agility, and motor coordination. Unfortunately, many Physical Education implementations remain teacher-centred, limiting students' movement exploration and motivation (Fauzi

et al., 2021).

To address this, active, student-centred learning models, such as Project-Based Learning (PjBL) (Febriyanti et al., 2024), play methods (Hakim et al., 2018), circuit games (Beauty et al., 2020), and Puzzle Run (Khamami & Sudarmono, 2023), can increase participation and improve physical fitness. For example, PjBL encourages real projects that promote continuous physical activity and enhance cardio-respiratory endurance.

Models like Puzzle Run and circuit games provide enjoyable challenges, improving muscle strength, agility, and motor coordination. Additionally, the differentiation learning model (Indah Atifah Anwar & Akbar Syafruddin, 2024) shows that tailored strategies boost physical activity motivation, highlighting the need for inclusive approaches.

Structured exercises like Physical Fitness Gymnastics (SKJ) 2018 (Ramadhan & Priyono, 2022) and the BBC Exercise model (Bile & Suharjana, 2019) remain effective for developing measurable physical fitness, showing significant improvements in muscle endurance and overall fitness, particularly in elementary and higher education.

The SLR results indicate that the most improved physical fitness components include cardio-pulmonary fitness from continuous activities like PjBL, muscle strength and endurance from game-based learning, and agility and motor coordination through models like Puzzle Run. This supports Mashud's (2021) view of elementary and middle school as critical phases for motor development.

Ultimately, this study confirms that no single learning model is superior. A combination of approaches, known as multi-model teaching, is more effective in meeting diverse student needs. Each model has its strengths, with active and contextual learning proving more effective than traditional methods. This underscores that learning strategies are essential not only for content delivery but also for fostering meaningful and development-oriented experiences.

CONCLUSION

A Systematic Literature Review of seven articles concluded that the most effective learning model for improving physical fitness in elementary school students is one that is active, varied, and student-centred. Models such as Project-Based Learning (PjBL), circuit games, and media like Puzzle Run showed significant improvements in cardio-pulmonary endurance, muscle strength, agility, and motor coordination. Structured gymnastics and BBC Exercise are also effective, particularly for maintaining basic fitness.

The differentiation model enhances student motivation by adapting to individual abilities. Thus, a combination of various approaches (multi-model teaching) is more effective than relying on a single model.

Contextual, enjoyable, and physically challenging learning methods have proven to be more effective than traditional, teacher-centred approaches. It is recommended that Physical Education teachers embrace active learning strategies suited to student needs. Schools and policymakers should support this with training and resources. Additionally,

further research using quasi-experimental methods is encouraged to better measure the impact of these models on physical fitness. This study can guide the development of a Physical Education curriculum that focuses on improving physical fitness as part of character building and student health.

ACKNOWLEDGMENT

Addressed to the MPJ study program and the lecturers of the journal analysis course, namely Dr. Mashud, S. Pd., M. Pd, comrades in the MPJ study program, and my family who always support me.

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