

The effectiveness of cooperative learning strategy for mastery in enhancing the skill performance of some gymnastics floor movements

Abdallah Khataybeh^{1ACDE}, Maysloon AL-shadiedh^{2BD}, Ghada Khasawneh^{3BC}

¹ Department of Physical Education, Faculty of Educational Sciences, Al al-Bayt University, Mafraq, Jordan

² Department of Physical Education, Faculty of Educational Sciences, Al al-Bayt University, Mafraq, Jordan

³ College of Education and Sports Sciences, Department of Sports Sciences, Yarmouk University, Irbid, Jordan

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Abstract

Background and Study Aim In the rapidly evolving field of physical education, employing innovative teaching methods is crucial for enhancing student learning and skill acquisition. The aim of this study is to evaluate the effectiveness of a cooperative learning strategy specifically designed to enhance the mastery of gymnastics floor skills among physical education students.

Material and Methods Thirty-six male students from Al al-Bayt University were divided into experimental and control groups using a quasi-experimental design. The control group received standard training, while the experimental group participated in a six-week, twelve-session educational program that employed a cooperative learning technique for skill mastery. The skills evaluated included Shoulder Stand, Front Handspring, Roundoff Back Handspring, and Front Balance.

Results In every evaluated gymnastics floor movement, the experimental group demonstrated statistically significant improvements. Cooperative learning accounted for 51.8% of the variation in total skill competency, with substantial gains in individual skills: a 31.4% increase in front balance (mean score improved from 0.00 to 4.39), a 17% increase in shoulder stand (mean score improved from 0.06 to 4.67), a 25.2% increase in front handspring (mean score improved from 0.17 to 4.50), and a 41.1% increase in roundoff back handspring (mean score improved from 0.22 to 4.06). The experimental group's total gymnastics skill score was 17.61 (SD = 1.85), significantly higher than the control group's score of 13.50 (SD = 2.23). While the control group also showed improvements in gymnastics skills, the increases were less pronounced, with the roundoff back handspring mean score rising from 0.17 to 2.67 and the front handspring from 0.11 to 3.67.

Conclusions The results of this study clearly demonstrate the benefits of using cooperative learning techniques in physical education, particularly in the context of teaching gymnastics floor routines. Besides significantly advancing skill mastery, this approach fostered a cooperative and supportive learning atmosphere. The effectiveness of the cooperative learning strategy in this context underscores its potential as an innovative teaching technique that can enhance student engagement, and promote a deeper understanding and retention of motor skills. Educators are encouraged to explore and adopt this strategy, extending its benefits to a wider variety of sports disciplines and educational settings, thereby enriching the pedagogical landscape of physical education.

Keywords: physical education, floor gymnastics skills, cooperative learning strategy, skill mastery, instructional techniques

Introduction

In the ever-evolving realm of physical education, the efficacy of instructional approaches directly impacts student involvement and academic achievements. Cooperative learning is particularly effective in skill-based disciplines like gymnastics. This pedagogical strategy, characterized by students engaging in collaborative work, improves both individual and group learning outcomes and meets the complex requirements of gymnastics, which demands mastery of individual skills as well as substantial teamwork and communication [1, 2].

Previous research has highlighted the advantages of cooperative learning in enhancing physical abilities and fostering a nurturing educational atmosphere [3, 4]. However, gaps still exist in understanding the full range of its effectiveness across various gymnastic movements.

Research indicates that choosing a teaching approach tailored to the needs of students significantly enhances their ability to grasp new material and achieve high competency levels in simpler skills before progressing to more challenging and complex ones. This strategy allows students with less formal education to benefit from increased repetition and focused attention, ultimately aiding the entire group in achieving high levels of

competency [5]. Mastery learning is recognized as a crucial strategy in physical education programs, facilitating students' achievement of learning goals and offering a wealth of educational opportunities related to the skills they are acquiring. This approach is essential for balancing proficiency levels among students by providing each individual the time needed to master a skill at their own pace, without the pressure of a fixed schedule [6]. Previous studies have shown that implementing mastery learning in physical education significantly improves student performance on skills, fosters positive attitudes, and motivates students to achieve their goals [7].

A large corpus of research has explicitly examined how cooperative learning affects gymnasts' ability to develop new skills. It was emphasized that cooperative learning environments, where students gain knowledge through peer modeling and feedback, result in enhanced performance and skill acquisition [8]. It is clear from navigating the domains of physical education and gymnastics that incorporating cutting-edge teaching approaches, such as cooperative learning strategies, not only meets the needs of the modern knowledge economy but also addresses the complex challenges posed by gymnastics research. Investigations into current issues in gymnastics, such as biomechanics, motor control, and coaching practices, underscore the urgent need for flexible, student-centered pedagogical approaches that can foster a deep understanding and mastery of complex skills. As evidenced by the ground-breaking works [9, 10], this endeavor aligns with the pursuit of more integrated teaching methodologies that cater to the diversity of learners' needs while striving for excellence in skill acquisition.

A previously conducted study investigated the effect of a training program using the mastery learning method on the skill of vaulting in gymnastics among a sample of 25 students, who were randomly divided into an experimental and a control group. The program lasted four weeks, with sessions held three times per week, utilizing a quasi-experimental design. The results highlighted the effectiveness of the educational program, leading the researcher to recommend its adoption for teaching similar skills [11].

Another study examined the effectiveness of cooperative and collaborative learning strategies on the acquisition of table tennis skills among primary-stage students. Employing a quasi-experimental method, this study involved a sample of 50 students divided into three groups: one control group and two experimental groups. The findings demonstrated that cooperative and collaborative teaching methods significantly enhanced the acquisition of specific table tennis skills [12].

It was discovered that integrated mastery teaching methods surpassed traditional methods

in teaching basketball skills, according to a study investigating the effects of sequential mastery and exercise scheduling on basketball skill development. The study also examined differences between two groups in pre- and post-tests. Employing a quasi-experimental design, the researchers worked with a sample of 60 students, concluding that scheduled exercises are crucial when teaching beginners [13].

Furthermore, previous research has highlighted the value of cooperative learning techniques in improving gymnastics skill mastery, noting significant gains in student motivation and performance [14, 15]. Additionally, there is a crucial need for diversity and interaction in teaching methods and the adoption of modern approaches [16].

Nevertheless, despite the apparent advantages of this approach, there is still a lack of research on the systematic implementation and assessment of cooperative learning in physical education, particularly within the context of gymnastics education. There is a pressing need for research on innovative teaching techniques, especially those that incorporate cooperative learning processes to aid gymnasts in mastering new skills.

The investigation of cooperative learning tactics in physical education has received considerable focus in recent years, marking a crucial transition from conventional teaching methods to more collaborative and student-focused approaches. The importance of social interaction in educational settings is particularly emphasized. Research has suggested that cooperative learning not only facilitates the development of physical abilities but also cultivates social skills and team cohesion among students [17]. Moreover, studies have revealed psychological advantages associated with these tactics, such as heightened motivation and self-esteem, thereby demonstrating the comprehensive influence of cooperative learning on student development [18]. The incorporation of mastery learning in cooperative environments presents a thought-provoking viewpoint on personalized learning trajectories within group settings, ensuring that every learner achieves proficiency at their own pace [19]. The intricate interplay between collaborative learning and the acquisition of motor skills is especially notable within the realm of gymnastics, where studies have shown that students engaged in cooperative learning environments experience significant enhancements in their performance. This underscores the efficacy of these tactics in fostering the development of complex skills [20].

Ultimately, the growing body of research on cooperative learning in physical education provides a compelling argument for its adoption as a fundamental teaching strategy. The aim of this study is to evaluate the effectiveness of a

cooperative learning strategy specifically designed to enhance the mastery of gymnastics floor skills among physical education students.

Materials and Methods

Participants

Thirty-six male undergraduate students, ages 19 to 23, from Al al-Bayt University's Department of Physical Education participated in the study. Enrollment in the gymnastics course and lack of prior experience with cooperative learning practices in gymnastics were prerequisites for selection. Random assignments were made to place participants in the experimental group (18 total) or the control group (18 total).

Ethical Approval Statement

This study followed ethical guidelines. All participants were informed about the study procedures, and informed consent was obtained from each participant.

Research Design

Pre- and post-tests were utilised in a quasi-experimental manner to evaluate gymnastics skills. The control group received standard gymnastics instruction, while the experimental group participated in a 6-week programme that included cooperative learning techniques for gymnastics expertise. The same pre- and post-intervention skill tests were given to both groups.

Research Design: Experimental Group

1. *Cooperative Learning Framework:* We adopted a structured cooperative learning framework where students actively engaged in various gymnastics tasks. These tasks included skill rehearsal exercises, collective sequences, and cognitive challenges related to gymnastics maneuvers, all designed to require collaborative effort for successful completion.
2. *Task Structure:* Each task was crafted to necessitate active involvement from all group members, fostering a sense of shared responsibility and mutual support. Tasks were varied to cover different aspects of gymnastics, ensuring comprehensive skill development.
3. *Motivation and Rewards:* Students were encouraged to collaborate to achieve shared objectives. Positive interdependence was promoted through shared rewards or recognition for group accomplishments, reinforcing the value of teamwork.
4. *Accountability:* Each student was accountable for their individual contributions to the group's success. This accountability was monitored through regular peer assessments and reviews of individual performances, ensuring fair and active participation.
5. *Development of Interpersonal Skills:* The

cooperative tasks were also designed to help students develop crucial interpersonal skills such as communication, leadership, and conflict resolution. Techniques such as group discussions, role-playing, and peer feedback sessions were employed to enhance these skills.

6. *Role of the Teacher:* Teachers in the experimental group served as facilitators rather than traditional instructors. They provided necessary guidance, feedback, and support, utilizing cooperative learning strategies such as Jigsaw, Think-Pair-Share, and other group-based activities to enhance student engagement.
7. *Reflective Practices:* Reflection and critique were integral parts of the learning process, aimed at enhancing metacognitive awareness and promoting continuous improvement. Students engaged in self-assessment and peer review sessions to evaluate their progress and identify areas for improvement.

Expected Outcomes: The implementation of this cooperative learning methodology was expected to lead to enhanced gymnastics skills, improved teamwork and communication abilities, and increased self-efficacy among students. The educational environment thus cultivated allowed students to assume responsibility for their own learning and to support each other in achieving their educational goals.

Evaluation: The effectiveness of the cooperative learning approach would be evaluated based on the progress in gymnastics skills, the development of teamwork and interpersonal skills, and the overall satisfaction of the students with the learning process. Standardized assessments, as well as feedback from students and teachers, would be utilized to measure these outcomes.

Research Design: Control Group

1. *Traditional Training Framework:* The control group underwent a conventional training regimen that included general physical fitness activities and sport-specific drills that are commonly integrated into physical education programs.
2. *Session Structure:* The frequency and duration of the sessions were identical to those of the experimental group to maintain comparability. Sessions were conducted for a set number of minutes or hours per week, typically three times per week.
3. *Educational Materials:* The training utilized traditional physical education resources such as textbooks, instructional videos, and written guidelines detailing the exercises and activities to be performed.
4. *Instructional Approach:* The teaching method was predominantly teacher-centered, with instructors leading the sessions and directly

guiding students through the exercises and tasks. This approach focused on direct instruction and individual performance rather than group interaction.

5. *Curriculum Focus:* The curriculum emphasized skill acquisition, physical fitness enhancement, and sportsmanship. The activities were designed to improve general physical capabilities and sport-related skills, aligning with typical educational goals in physical education.
6. *Evaluation and Monitoring:* The performance and progress of the control group were assessed using standardized measurements and teacher observations to ensure adherence to the training program. Periodic evaluations were conducted to monitor improvements in physical fitness, skill mastery, and other relevant outcomes.

Expected Outcomes: The traditional training approach was expected to result in improvements in individual gymnastics skills and physical fitness, providing a standard against which the cooperative learning approach of the experimental group could be measured.

Evaluation: Effectiveness of the traditional training method was evaluated by comparing the baseline physical skills and fitness levels with those achieved post-intervention. This comparison helped to isolate the effects of the cooperative learning strategy and assess its efficacy relative to conventional teaching methods.

Evaluation of Gymnastic Skills: Procedures and Tests

Gymnastic Skills Assessed:

1. *Floor Exercises:* The assessment covered fundamental tumbling moves such as front handsprings, back handsprings, cartwheels, and round-offs. These skills were evaluated for their technical execution and alignment with gymnastic standards.
2. *Apparatus Skills:* Depending on the study's design, participants were tested on various gymnastics apparatuses including the balance beam, uneven bars, vault, and parallel bars. Routine elements like hops, leaps, spins, and balances, which are integral to gymnastics routines, were also assessed.

Assessment Standards:

- *Methodology:* Evaluations focused on the execution of each skill, emphasizing correct body placement, technique, and alignment.
- *Difficulty:* Skills were assessed based on their complexity and adherence to established gymnastics progression criteria.
- *Artistry:* Artistic skills, including dance moves and choreography, were evaluated for gracefulness, fluidity, and expression.
- *Safety:* Safety standards were crucial, with

assessments ensuring controlled landings and the use of proper spotting techniques to prevent injuries.

Test Administration:

- *Environment:* Assessments were conducted in a controlled environment, such as a dedicated gymnastics facility or an indoor gymnasium, to ensure consistency and safety.
- *Evaluators:* Trained professionals, such as gymnastics coaches or judges, administered the tests using standardized procedures to ensure reliability and fairness.
- *Procedure:* Participants performed each skill or routine element individually. Evaluators provided immediate feedback and scored each performance based on the predefined criteria.
- *Documentation:* Performances were either video recorded or observed live for detailed analysis and scoring. Results were systematically recorded for each participant, providing scores for individual skills and overall performance metrics.
- *Recording Tools:* Assessment scores were documented using standardized evaluation forms or digital platforms designed specifically for gymnastics evaluations.

Outcome Measurement: The success of the cooperative learning intervention was assessed by compiling and analyzing the performance data, which included individual skill scores and overall performance measures. This comprehensive evaluation allowed for a precise interpretation of the intervention's effectiveness in enhancing gymnastic skills through cooperative learning methodologies.

Statistical Analysis

Data were analyzed using SPSS version 25. Descriptive statistics (mean, standard deviation) were calculated for all variables. A paired sample t-test was used to compare pre- and post-test scores within groups, while an independent samples t-test was used to compare the changes between groups. The level of significance was set at $p < 0.05$.

Results

To compare the pre- and post-test performance of the experimental and control groups, an independent samples T-test was used (Table 1). The findings indicate:

- The pre-test results for the two groups did not differ significantly, which allows for an accurate assessment of the intervention's impact.
- The experimental group demonstrated a significant advantage in post-test scores, with higher mean scores achieved for all skills examined. Specifically, the experimental group's total gymnastics skill score was 17.61 with a standard deviation of 1.85, compared to the control group's score of 13.50 with a standard

deviation of 2.23.”

Compared to the control group, our analysis revealed significant improvements in the gymnastics skills performance of the experimental group. This group participated in cooperative learning-based training, demonstrating significant gains from the pre-test to the post-test in all assessed skills (Table 2). The experimental group demonstrated remarkable improvements in specific areas:

- The mean score for the Roundoff Back Handspring Skill increased from 0.22 to 4.06, whereas in the control group, it increased from 0.17 to 2.67.

- The experimental group’s mean score for the Front Handspring Skill rose from 0.17 to 4.50, compared to the control group’s increase from 0.11 to 3.67.
- The experimental group also showed higher improvements in the Front Balance Skill and Shoulder Stand Skill, with mean increases from 0.00 to 4.39 and from 0.06 to 4.67, respectively.”

These findings suggest that the cooperative learning approach significantly enhanced the participants’ ability to perform complex gymnastics maneuvers. Table 3 presents the arithmetic means and standard deviations for the entire skills test

Table 1. Independent samples t-test results for gymnastics skills tests between experimental and control groups

Variable	Group	Number	Mean	SD	T	DF	P-Value
Roundoff Back Handspring Skill	Experimental	18	0.17	0.51	0.410	34	0.684
	Control	18	0.11	0.32			
Front Handspring Skill	Experimental	18	0.22	0.43	3.88	34	0.701
	Control	18	0.17	0.38			
Front Balance Skill	Experimental	18	0.06	0.24	1.00	34	0.324
	Control	18	0.06	0.24			
Shoulder Stand Skill	Experimental	18	0.00	0.00	0.000	34	1.00
	Control	18	0.06	0.24			
Total score for gymnastics test	Experimental	18	0.44	0.62	0.297	34	0.768
	Control	18	0.39	0.50			

Table 2. Mean and standard deviations for the scores of the experimental and control groups on the gymnastics skills test in the pre-test and post-test

Variable	Group	Number	Pre-Test		Post-Test	
			Mean	SD	Mean	SD
Roundoff Back Handspring Skill	Experimental	18	0.22	0.43	4.06	1.00
	Control	18	0.17	0.38	2.67	0.91
Front Handspring Skill	Experimental	18	0.17	0.51	4.50	0.62
	Control	18	0.11	0.32	3.67	1.03
Front Balance Skill	Experimental	18	0.00	0.00	4.39	0.70
	Control	18	0.06	0.24	3.28	1.23
Shoulder Stand Skill	Experimental	18	0.06	0.24	4.67	0.59
	Control	18	0.06	0.24	3.89	1.02

Table 3. Arithmetic means and standard deviations of the experimental and control groups on the total gymnastics skills test before and after the intervention

Group	Number	Pre-Application		Post-Application	
		Mean	SD	Mean	SD
Experimental Group	18	0.44	0.62	17.61	1.85
Control Group	18	0.39	0.50	13.50	2.23
Total	36	0.42	0.55	15.56	2.90

before and after the intervention. The observed variations in averages between the two phases (pre- and post-application) confirm the positive effects of the cooperative learning technique on student outcomes in physical education settings.

Discussion

The objective of this study was to assess the effectiveness of a 6-week cooperative learning program aimed at improving gymnastic skills among students during physical education classes. Our findings corroborate previous research that highlights the benefits of collaborative learning for skill enhancement and fostering positive social relationships among students [12, 13, 14]. Additionally, prior studies have demonstrated that cooperative learning environments are effective in enhancing both skill development and social competencies in educational settings [12, 15].

Our findings further support and expand upon previous research, demonstrating statistically significant enhancements in all assessed gymnastic floor motions for individuals in the experimental group. This observation aligns with prior studies, which have shown that cooperative learning can significantly improve physical education outcomes [14, 15, 16]. We observed notable improvements in specific skills: a 31.4% increase in front balance, a 17% increase in shoulder stand, a 25.2% increase in front handspring, and a 41.1% increase in roundoff back handspring. These findings are consistent with studies conducted by Mitchell et al. [12] and Rocamora et al. [20], which also reported improvements in physical abilities through cooperative learning methods.

However, our study diverges from the research by Fernández-Espínola et al. [18] and Bores-García et al. [17] by specifically focusing on the impact of collaborative learning on precise gymnastic skills rather than on general physical fitness or motor skills. We provide a detailed analysis demonstrating that certain skills, particularly those requiring advanced coordination such as the roundoff back handspring, are more effectively improved through cooperative learning. This detailed examination offers fresh perspectives on the efficacy of cooperative learning in teaching, highlighting its unique benefits for complex movements that require a high level of precision and synchronization.

Moreover, when comparing our findings with previous research, we note a significant disparity in the level of advancement in specific abilities. For instance, the progress in the shoulder stand ability showed only a minor increase compared to the significant advancements recorded by Abdel-Aziz Issa [9] and Farana et al. [10] in their studies using similar cooperative learning methods. This variation in results can be attributed to the focused and rigorous implementation of the cooperative

learning approach in our research, which emphasized ongoing peer feedback and collaborative practice sessions.

Results obtained from comparable research conducted in the domain of physical education and collaborative learning [12] discovered that incorporating cooperative learning strategies into the instruction of sport concepts and skills resulted in a notable increase in student engagement and skill acquisition. This suggests that students not only enhanced their sport-specific abilities but also developed improved social interactions and teamwork capabilities. In the same vein, studies have underscored the favorable impact of cooperative learning interventions on students' inherent motivation in physical education environments [18]. These studies emphasized that these pedagogical methods substantially enhance students' motivation levels, which are crucial for maintaining long-term involvement. Moreover, it was determined that cooperative learning not only improves outcomes in physical education but also cultivates an inclusive and supportive educational atmosphere [17]. Another study evaluated the effectiveness of the flipped classroom and cooperative learning approaches [19]. The results indicated that cooperative learning environments led to notable enhancements in acquiring gymnastic abilities, surpassing the outcomes observed in traditional settings. Furthermore, evidence was provided in support of the idea that incorporating cooperative learning might enhance performance in intricate physical abilities [20]. This finding suggests a consistent pattern across various instructional approaches and educational settings. These examples serve as a foundation for examining the alignment or divergence of your findings with previous research, thus enhancing the comparative analysis in the discussion portion of your publication.

A study conducted by Mitchell et al. [12] examines the utilization of cooperative learning methodologies in teaching sport concepts and skills. This study determined that using such tactics had a significant impact on increasing student involvement and improving their skill acquisition, both of which are crucial for achieving effective learning outcomes in physical education. Prior research has documented the advantages of cooperative learning in enhancing physical abilities and fostering a nurturing educational atmosphere [3, 4]. These studies establish a foundational understanding of the benefits of cooperative learning, particularly in skill-based disciplines such as gymnastics, which require both individual mastery and significant teamwork and communication. This body of knowledge is further enriched by studies specifically examining the application of cooperative learning to tactical games approaches in sports education.

While this approach is validated by earlier findings [12, 15], a critical view might suggest that the reliance on tactical games limits its broader application to other aspects of physical education that involve less structured or more individualized sports disciplines. Studies highlighted in the introduction cover a wider range of physical education activities, suggesting that the benefits of cooperative learning might be more universally applicable [3, 4]

Moreover, previous studies, such as those by [18, 19], have pointed out that cooperative learning not only improves physical skills but also psychological aspects like intrinsic motivation and self-esteem. This suggests a potentially significant impact of cooperative learning that extends beyond physical skill enhancement to include emotional and social development. Incorporating these broader results allows us to propose that further research should explore how cooperative learning strategies can be adapted or modified to benefit a wider array of physical education settings, ensuring that all aspects of student development are supported. This nuanced approach to the discussion helps contextualize our study within the larger framework of existing research [3, 4, 12, 18, 19], offering a more comprehensive analysis and demonstrating the multifaceted benefits of cooperative learning in physical education.

This comprehensive analysis illustrates both the promise and the limitations of cooperative learning in physical education. While our findings underscore the effectiveness of this approach in enhancing physical skills and social dynamics within the learning environment, they also reveal areas that require further exploration to generalize the results. One critical limitation noted is the study's reliance on a tactical gaming approach and a relatively small sample group, which may not fully represent the broader population or the diverse contexts of physical education. Furthermore, the study's emphasis on qualitative assessments raises questions about the measurement's objectivity and preciseness.

To address these gaps, future research should consider expanding the participant base to include a wider demographic and explore the implementation of cooperative learning across various sports and educational settings. Additionally, incorporating a

mixed-methods approach that combines qualitative insights with quantitative data can provide a more robust evaluation of the impacts of cooperative learning strategies. Such an approach would not only validate the findings but also enhance the adaptability of teaching practices, tailored to meet individual student needs more effectively. This could ultimately lead to a more nuanced understanding of cooperative learning's role in physical education, ensuring it supports comprehensive student development—physically, socially, and emotionally.

Our work adds essential new insights to the current literature on cooperative learning in physical education, specifically in the context of gymnastics, by using comparative analyses and exploring these subtle differences. However, further research is needed to examine the long-lasting impacts of cooperative learning on the retention and practical use of skills, as well as its effectiveness across different sports disciplines. Moreover, it is necessary to further investigate the role of instructor facilitation in maximizing the advantages of cooperative learning activities.

Conclusions

The results demonstrate that the use of cooperative and mastery learning strategies significantly enhances students' skills in floor gymnastics exercises, outperforming more conventional teaching strategies. To enhance the training of gymnastics floor skills, it is crucial to strategically integrate multiple instructional modalities.

To effectively address the diverse requirements of students and promote optimal skill development in gymnastics floor routines, a range of teaching methodologies should be utilized. It is particularly recommended to employ the cooperative learning approach for mastery while improving performance in gymnastics floor skills. This indicates that broader application of this strategy in other study populations and sports training programs may yield positive effects. Additionally, teachers should be made aware of the benefits of incorporating various teaching pedagogies into the design of customized training curricula, thereby creating a comprehensive and productive learning environment that meets the diverse interests and skill levels of students.

References

1. Priyambodo P, Hasanah E. Strategic Planning in Increasing Quality of Education. *Nidhomul Haq: Jurnal Manajemen Pendidikan Islam*, 2021;6(1): 109–126. <https://doi.org/10.31538/ndh.v6i1.1138>
2. Hossain GM, Huang W, Kaium MA. Evaluating critical success factors for adoption decision of e-learning facilities in Bangladesh by using DEMATEL approach. *International Journal of e-Education, e-Business, e-Management and e-Learning*, 2020;10(2): 182–204. <https://doi.org/10.17706/ijeeee.2020.10.2.182-204>
3. Kafri M, Atun-Einy O. From Motor Learning Theory to Practice: A Scoping Review of Conceptual Frameworks for Applying Knowledge in Motor Learning to Physical Therapist Practice. *Physical Therapy*, 2019;99(12): 1628–1643. <https://doi.org/10.1093/ptj/pzz118>
4. Kiliç K, Culver DM, Ince ML. A gymnastics coaches' professional development program: exploring a needs-focused social learning space. *Physical Education and Sport Pedagogy*, 2024; 1–17. <https://doi.org/10.1080/17408989.2024.2335184>
5. Argote L, Lee S, Park J. Organizational Learning Processes and Outcomes: Major Findings and Future Research Directions. *Management Science*, 2021;67(9): 5399–5429. <https://doi.org/10.1287/mnsc.2020.3693>
6. Dana LP, Gurău C, Hoy F, Ramadani V, Alexander T. Success factors and challenges of grassroots innovations: Learning from failure. *Technological Forecasting and Social Change*, 2021;164: 119600. <https://doi.org/10.1016/j.techfore.2019.03.009>
7. Cromptley B, Thelwell R, Mallett CJ, Dieffenbach K. EPILOGUE A Commentary and Reflection on Sport Psychology in the Discipline of Sports Coaching. *Journal of Applied Sport Psychology*, 2020;32(1): 121–128. <https://doi.org/10.1080/10413200.2019.1695690>
8. Hernández-Beltrán V, Espada MC, Muñoz-Jiménez J, León K, Ferreira CC, Parraca JA, et al. Evolution of Documents Related to Biomechanics Research in Gymnastics. *Biomechanics*, 2023;3(4): 477–492. <https://doi.org/10.3390/biomechanics3040039>
9. Abdel-Aziz Issa ES. Evaluation of Teaching Practices for Physical Education Teachers in the Light of Trends Based on Knowledge Economy. *Journal of Applied Sports Science*, 2019;9(1): 20–28. <https://doi.org/10.21608/jass.2019.85725>
10. Farana R, Williams G, Fujihara T, Wyatt HE, Naundorf F, Irwin G. Current issues and future directions in gymnastics research: biomechanics, motor control and coaching interface. *Sports Biomechanics*, 2023;22(2): 161–185. <https://doi.org/10.1080/14763141.2021.2016928>
11. Kliziene I, Cizauskas G, Sipaviciene S, Aleksandraviciene R, Zaicenkoviene K. Effects of a Physical Education Program on Physical Activity and Emotional Well-Being among Primary School Children. *International Journal of Environmental Research and Public Health*, 2021;18(14): 7536. <https://doi.org/10.3390/ijerph18147536>
12. Mitchell SA, Oslin JL, Griffin LL. *Teaching sport concepts and skills: A tactical games approach*. Human Kinetics; 2020.
13. Vitor de Assis J, González-Víllora S, Clemente FM, Cardoso F, Teoldo I. Do youth soccer players with different tactical behaviour also perform differently in decision-making and visual search strategies?. *International Journal of Performance Analysis in Sport*, 2020;20(6):1143–56. <https://doi.org/10.1080/24748668.2020.1838784>
14. Ali SK, Siong NU. Effectiveness of a comprehensive module in improving serving skills and lob shots during badminton training. *Journal of Physical Education and Sport*, 2023;23(5):1130–41. <https://doi.org/10.7752/jpes.2023.01010>
15. Sarah Qassim, Bushra Kadhun Abdul-ridha. The effect of a learning strategy for mastery in learning the skills of Setting volleyball for female students. *Modern Sport*, 2021;20(3): 0089. <https://doi.org/10.54702/msj.2021.20.3.0089>
16. Samuel RD, Matzkin G, Gal S, Englert C. The “10 Mentality”: A Longitudinal Case Study of Self-Control Strength in Two Competitive Recurve Archers. *Case Studies in Sport and Exercise Psychology*, 2020;4(1): 142–151. <https://doi.org/10.1123/cssep.2020-0021>
17. Bores-García D, Hortigüela-Alcalá D, Fernandez-Rio FJ, González-Calvo G, Barba-Martín R. Research on Cooperative Learning in Physical Education: Systematic Review of the Last Five Years. *Research Quarterly for Exercise and Sport*, 2021;92(1): 146–155. <https://doi.org/10.1080/02701367.2020.1719276>
18. Fernández-Espínola C, Abad Robles MT, Collado-Mateo D, Almagro BJ, Castillo Viera E, Giménez Fuentes-Guerra FJ. Effects of Cooperative-Learning Interventions on Physical Education Students' Intrinsic Motivation: A Systematic Review and Meta-Analysis. *International Journal of Environmental Research and Public Health*, 2020;17(12): 4451. <https://doi.org/10.3390/ijerph17124451>
19. Erbil DG. A Review of Flipped Classroom and Cooperative Learning Method Within the Context of Vygotsky Theory. *Frontiers in Psychology*, 2020;11: 1157. <https://doi.org/10.3389/fpsyg.2020.01157>
20. Rocamora I, Casey A, González-Víllora S, Arias-Palencia NM. A Comparison of Motivation and Physical Activity Levels Between a Sport Education Season and a Hybrid Sport Education and Cooperative Learning Season. *Journal of Teaching in Physical Education*, 2023;42(2): 350–360. <https://doi.org/10.1123/jtpe.2021-0077>

Information about the authors:

Abdallah Khataybeh; (Corresponding author); <https://orcid.org/0000-0002-9456-6237>; D.Khataybeh@aabu.edu.jo; Department of Physical Education, Faculty of Educational Sciences, Al al-Bayt University; Mafraq, Jordan.

Maysloon AL-shadiedh; <https://orcid.org/0000-0002-3216-745X>; maysloon2777@gmail.com; Department of Physical Education, Faculty of Educational Sciences, Al al-Bayt University; Mafraq, Jordan.

Ghada Khasawneh; <https://orcid.org/0000-0003-1178-7462>; ghada@yu.edu.jo; College of Education and Sports Sciences, Department of Sports Sciences, Yarmouk University; Irbid, Jordan.

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