ISSN (Print): 1060-6076
ISSN (Online): Applied

The Journal of African Development
2026; Vol 7: Issue 1
https://www.afea-jad.com/

Segregated and Collaborated Effect of Computer Supported and Traditional Method of Training with Small Side Games on Selected Psychomotor and Performance Parameters among School Basketball Players

Mr. R. Vijayakumar[1] , Dr. A. Mahaboobjan[2]

[1]Ph.D. Research Scholar, Department of Physical Education and Yoga, Bharathidasan University, Tiruchirappalli, India. Email: rasivijayakumar.r@gmail.com

[2]Professor and Chair, School of Education, Department of Physical Education and Yoga, Bharathidasan University, Tiruchirappalli, India.

Email: amjbdu@gmail.com

Cite This Paper as: Mr. R. Vijayakumar, Dr. A. Mahaboobjan (2026) Segregated and Collaborated Effect of Computer Supported and Traditional Method of Training with Small Side Games on Selected Psychomotor and Performance Parameters among School Basketball Players. The Journal of African Development l, Vol.7, No.1, 789-795

KEYWORDS

Computer Supported Collaborative Training (CSCT), Traditional Method, Video Demonstration, Video Analysis, Kinovea, Feedback and Basketball.

ABSTRACT

To achieve the purpose of the study was to examine the segregated and collaborated effect of computer supported and traditional methods of training with small side games on selected psychomotor and performance parameters among school basketball players. For that sixty (60) school level basketball players were selected as subjects from Municipal Boys Higher Secondary School, Salem, Salem District, Tamil Nadu, India. The age of the subjects was restricted to 14 to 18 years. The selected subjects were randomly assigned into four groups of fifteen each group I underwent Computer Supported Collaborative Training with Small Side Games Group (CSCTSSGG), group II underwent Traditional Method of Training with Small Side Games Group (TMTSSG), group III underwent Combined Computer Supported Collaborative and Traditional Method of Training with Small Side Games Group (CCSCTMTSSGG) and group IV acted as Control Group. The experimental groups underwent a six-weeks training program of three alternate days per week, ninety minutes per session. The computer supported collaborative training with small side games group received computer-based video demonstration, video analysis (kinovea) and feedback based basketball skill training integrated with small side games, while the traditional method of training with small side games group performed skill development such as demonstration and repetitive drill execution and over the progressive drill based training such as dribbling, passing and shooting. Combined Group will collaborate with the two groups. The control group did not receive any specific training apart from their regular physical activities. The pre and post test data were statistically analyzed using dependent t-tests and ANCOVA at the 0.05 level of significance. The results revealed that all the experimental groups significantly improved in psychomotor and performance parameters....

1. INTRODUCTION

With the advancement of sports science and educational technology, the concept of physical education has expanded further. Contemporary physical education programs integrate scientific training principles, biomechanics, psychology and technology-based instruction to enhance learning outcomes. Computer-assisted instruction, video analysis and performance monitoring tools have enriched teaching-learning processes, making physical education more effective, engaging and learner-centered (Wuest Deborah & Bucher, 2009). Modern sports training is interdisciplinary in nature, integrating knowledge from exercise physiology, biomechanics, sports psychology, motor learning and nutrition. Contemporary training models emphasize the interaction between physical, cognitive and perceptual systems, recognizing that performance emerges from the dynamic relationship between the athlete, the task and the environment (Renshaw, et. al., 2022). Basketball's nature is characterized by rapid directional changes, sprinting, jumping, rebounding and strategic spacing, requiring both aerobic and anaerobic energy system engagement. It is considered an intermittent sport — players alternate between high-intensity efforts and periods of lower exertion — which places complex physiological demands on athletes. Research highlights that match play and training impose greater physical loads than scrimmage and practice drills, emphasizing the importance of comprehensive conditioning for sustained competitive performance (Changjia, et. al.,...

2019). Computer Supported Collaborative Training (CSCT) refers to training approaches that integrate digital technologies such as computers, video analysis systems, wearable sensors, artificial intelligence (AI) and online platforms to support group learning, interaction and shared performance evaluation in sports settings (Kearney, 2024). It is derived from the principles of computer supported collaborative learning (CSCL), where learning is enhanced through interaction, communication and cooperation among learners using technological tools (Stahl, Koschmann & Suthers, 2014). Basketball is a fast-paced, decision-intensive team sport, making it highly suitable for computer-supported collaborative training (Shukla, 2024). Recent advancements in basketball training involve video-based performance analysis, AI-assisted tactical evaluation and wearable technology, which allow players and coaches to collaboratively review offensive and defensive patterns (Sampaio, McGarry & O'Donoghue, 2020). Traditional sports training methods evolved from early military conditioning systems and Eastern European sport science models that emphasized discipline, repetition and structured physical preparation

These systems were later formalized through periodization theory and systematic coaching frameworks (Bompa & Buzzichelli, 2019). Research in team sports such as soccer and basketball has demonstrated that small side games increases physiological load while simultaneously enhancing technical involvement (Owen, et. al., 2011). The approach gained prominence in the early 2000s as sports scientists recognized that traditional drill-based practice often lacked game realism and decision-making components (Hill-Haas, et. al., 2011).

2. METHODOLOGY

To achieve the purpose of the study, was to examine the segregated and collaborated effect of computer supported and traditional methods of training with small side games on selected psychomotor and performance parameters among school basketball players. For that sixty (60) school level male basketball players were selected as subjects from Municipal Boys Higher Secondary School, Salem, Salem District, Tamil Nadu, India. The age of the subjects was restricted to 14 to 18 years. The selected subjects were randomly assigned into four groups of fifteen each group I underwent Computer-Supported Collaborative Training with Small Side Games (CSCTSSG), group II underwent Traditional Method of Training with Small Side Games (TMTSSG), group III underwent Combined Computer Supported Collaborative and Traditional Method of Training with Small Side Games (CCSCTMTSSG) and group IV acted as a Control Group. The experimental groups underwent a six-week training program of three alternate days per week, ninety minutes per session. The Computer Supported Collaborative Training with Small Side Games group received computer-based video demonstration, video analysis (kinovea) and feedback based basketball skill training integrated with small side games, while the Traditional Method of Training with Small Side Games performed skill development such as demonstration and repetitive drill execution and over the progressive drill based training such as dribbling, passing and shooting. Combined Group will collaborate with the two groups. The control group did not receive any specific training apart from their regular physical activities. Psychomotor parameters such as reaction time was assessed by modified stick catching test measures in second and coordination test was assessed by alternate hand wall toss test measures in count and performances parameters were assessed using standardized Johnson Basketball Tests for passing measures in points and shooting measures in counts.

Computer Supported Collaborative Training with Small Side Games Group (CSCTSSGG) – period of the course was 6 weeks, 3 days/week – training / activity involved in the period of computer-based video demonstration, video analysis of dribbling and shooting techniques, video feedback review, slow-motion correction analysis, etc., time duration for this sessions was 90 minutes. Traditional Method of Training with Small Side Games Group (TMTSSGG) – period of the course was 6 weeks, 3 days/week – training / activity involved in the period of conventional basketball drills offensive drills - 3-man weave, give-and-go, pick & roll, defensive drills - close-out, help defense, man-to-man, shooting under movement - catch-and-shoot, fast break finish, etc., time duration for this sessions was 90 minutes. Combined Computer Supported Collaborative and Traditional Method of Training with Small Side Games Group (CCSCTMTSSGG) – period of the course was 6 weeks, 3 days/week – training / activity involved in the period of video demonstration, video analysis of dribbling and shooting techniques, video feedback review, offensive drills - 3-man weave, give-and-go, pick & roll, defensive drills - close-out, help defense, man-to-man, etc., time duration for this sessions was 90 minutes.

The collected data were analyzed using dependent t-tests to find within-group differences between pre-test and post-test means and ANCOVA to compare post-test means among groups. Whenever the obtained F-ratio was found to be statistically significant, Scheffe's Post Hoc Test was applied to identify the paired mean differences between specific groups. The significance level was fixed at $p < 0.05$.

3. RESULTS

The present study aimed to determine the segregated and collaborated effect of computer supported and traditional method of training with small side games on selected psychomotor and performance parameters among school basketball players. The results of the pre-test and post-test are presented in table 1.

Table 1: Mean, Standard Deviation and Dependent 't' - Values on Experimental and Control Groups

Variables	Group	Pre-Test Mean	SD	Post-Test Mean	SD	't'-Value
Reaction Time	CSCTSSGG	18.20	1.80	15.80	1.65	**5.42***
	TMTSSGG	18.00	1.75	14.40	1.60	**7.10***
	CCSCTMTSSGG	18.10	1.70	13.20	1.55	**9.35***
	CG	18.30	1.85	17.95	1.82	1.05
Coordination	CSCTSSGG	21.30	2.20	26.80	2.28	**7.85***
	TMTSSGG	21.50	2.10	28.40	2.25	**9.60***
	CCSCTMTSSGG	21.40	2.15	29.90	2.22	**11.85***
	CG	21.20	2.05	22.00	2.08	1.18
Passing	CSCTSSGG	19.80	2.10	22.60	2.18	**5.40***
	TMTSSGG	20.10	2.05	24.30	2.22	**7.15***
	CCSCTMTSSGG	19.90	2.15	25.80	2.16	**8.95***
	CG	19.70	2.00	20.30	2.03	1.18
Shooting	CSCTSSGG	12.80	1.95	14.80	2.02	**4.85***
	TMTSSGG	13.10	2.00	16.30	2.08	**6.90***
	CCSCTMTSSGG	12.90	1.90	17.90	2.05	**8.75***
	CG	12.70	1.85	13.10	1.88	1.20

*Table value for significance at $p < 0.05$ with df = 14 is 2.14.

Table 1 presents the mean scores, standard deviations and dependent t-test values of the pre-test and post-test for selected psychomotor and performance parameters, namely reaction time, coordination, passing and shooting performance of the Computer-Supported Collaborative Training with Small Side Games Group (CSCTSSGG), Traditional Method of Training with Small Side Games Group (TMTSSGG), Combined Computer Supported Collaborative and Traditional Method Training with Small Side Games Group (CCSCTMTSSGG) and the Control Group (CG).

The experimental groups, namely CSCTSSGG, TMTSSGG and CCSCTMTSSGG, showed a noticeable improvement in reaction time from pre-test to post-test. The mean values increased from 18.20 to 15.80, 18.00 to 14.40 and 18.10 to 13.20 respectively. The obtained t-values (5.42, 7.10 and 9.35) were greater than the required table value at 0.05 level of significance, indicating significant improvement. Among the groups, CCSCTMTSSGG showed the highest improvement. In contrast, the control group showed only a marginal increase (18.30 to 17.95) with a t-value of 1.05, which was not significant.

The experimental groups, namely CSCTSSGG, TMTSSGG and CCSCTMTSSGG, showed a noticeable improvement in coordination from pre-test to post-test. The mean values increased from 21.30 to 26.80, 21.50 to 28.40 and 21.40 to 29.90 respectively. The obtained t-values (7.85, 9.60 and 11.85) were greater than the required table value at 0.05 level of significance, indicating significant improvement. Among the groups, CCSCTMTSSGG showed the highest improvement. In contrast, the control group showed only a marginal increase (21.20 to 22.00) with a t-value of 1.18, which was not significant.

The experimental groups, namely CSCTSSGG, TMTSSGG and CCSCTMTSSGG, showed a noticeable improvement in passing from pre-test to post-test. The mean values increased from 19.80 to 22.60, 20.10 to 24.30 and 19.90 to 25.80 respectively. The obtained t-values (5.40, 7.15 and 8.95) were greater than the required table value at 0.05 level of significance, indicating significant improvement. Among the groups, CCSCTMTSSGG showed the highest improvement. In contrast, the control group showed only a marginal increase (19.70 to 20.30) with a t-value of 1.18, which was not significant.

The experimental groups, namely CSCTSSGG, TMTSSGG and CCSCTMTSSGG, showed a noticeable improvement in shooting from pre-test to post-test. The mean values increased from 12.80 to 14.80, 13.10 to 16.30 and 12.90 to 17.90

respectively. The obtained t-values (4.85, 6.90 and 8.75) were greater than the required table value at 0.05 level of significance, indicating significant improvement. Among the groups, CCSCTMTSSGG showed the highest improvement. In contrast, the control group showed only a marginal increase (12.70 to 13.10) with a t-value of 1.20, which was not significant.

Table 2: Analysis of Covariance on Experimental Groups and Control Group on Psychomotor and Skill Performance Parameters among School Basketball Players

Variables	Adjusted Post Test Mean				SOV	SS	Df	MS	'F'-Value
	CSCTSSGG	TMTSSGG	CCSCTMTSSGG	CG					
Reaction Time	15.70	14.30	13.10	18.00	BG	96.40	3	32.13	**7.88***
					WG	215.20	55	4.08	
Coordination	26.70	28.20	29.70	22.10	BG	216.80	3	72.27	**13.90***
					WG	286.00	55	5.20	
Passing	22.50	24.10	25.60	20.40	BG	393.10	3	7.02	**10.78***
					WG	168.30	55	56.10	
Shooting	14.70	16.20	17.80	13.20	BG	102.80	3	34.27	**6.58***
					WG	286.00	55	5.20	

***Significant at. 0.05 level of confidence (The table value required for significance at 0.05 level with degrees of freedom is 3 and 55 is 2.78).**

The results of the study were analysed using Analysis of Covariance (ANCOVA) to determine the effect of different training interventions on selected performance variables, namely reaction time, coordination, passing and shooting. The adjusted post-test means along with the F-ratios are presented in the table. The adjusted post-test mean values for reaction time revealed that the CCSCTMTSSGG group (13.10) recorded the highest mean, followed by CSCTSSGG (15.70) and TMTSSGG (14.30), while the control group (18.00) showed the lowest mean. The obtained F-ratio (7.88) was greater than the table value required for significance at the 0.05 level, indicating a significant difference among the groups after adjusting for pre-test scores. In coordination, the adjusted post-test means showed a similar pattern. The CCSCTMTSSGG group (27.70) demonstrated superior performance compared to TMTSSGG (28.20) and CSCTSSGG (26.70) whereas the control group (22.10) recorded the lowest score. The F-ratio (13.90) was found to be statistically significant at the 0.05 level, confirming the presence of significant differences among the groups. The adjusted post-test mean scores for passing indicated that the CCSCTMTSSGG group (25.60) achieved the highest improvement, followed by TMTSSGG (24.10) and CSCTSSGG (22.50). The control group (20.40) remained considerably lower than the experimental groups. The calculated F-value (10.78) exceeded the critical value at the 0.05 level, indicating significant differences among the groups. In shooting performance, the CCSCTMTSSGG group (17.80) once again recorded the highest adjusted mean, followed by TMTSSGG (16.20) and CSCTSSGG (14.70), while the control group (13.20) showed the least improvement. The obtained F-ratio (6.58) was significant at the 0.05 level, indicating meaningful differences among the groups.

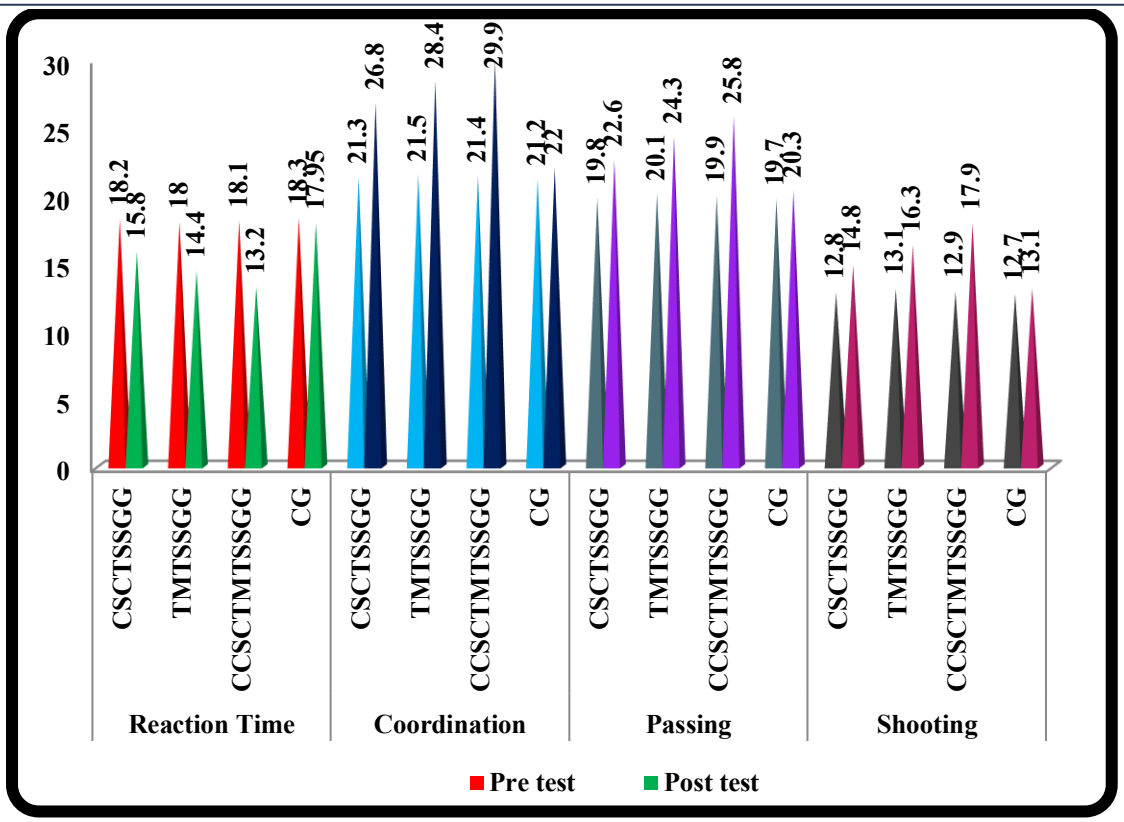

Figure 1: Pre and Post Test Mean Value of Experimental Groups and Control Group on Psychomotor and Skill Performance Parameters among School Basketball Players

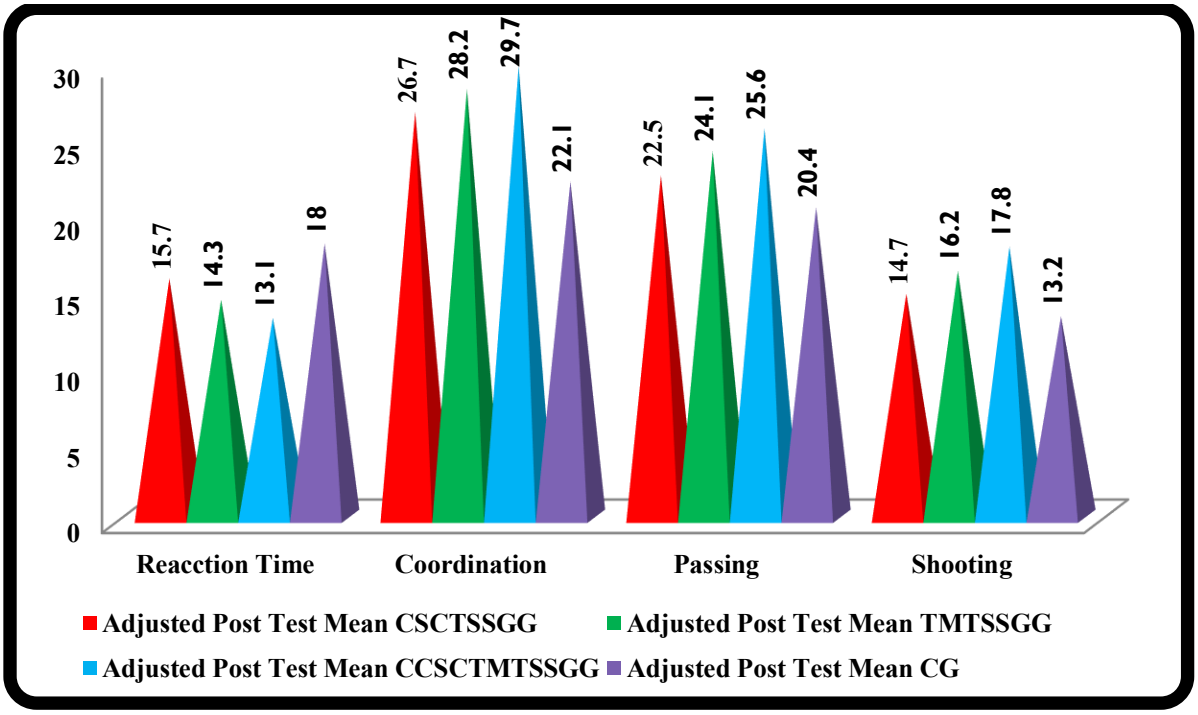

Figure 2: Adjusted Post Test Mean Value of Experimental Groups and Control Group on Psychomotor and Performance Parameters among School Basketball Players

4. DISCUSSION ON FINDINGS

The findings of the present study revealed that the Computer Supported Collaborative Training with Small Side Games Group (CSCTSSGG), Traditional Method of Training with Small Side Games Group (TMTSSGG) and Combined Computer Supported Collaborative and Traditional Method of Training with Small Side Games Group (CCSCTMTSSGG) significantly improved on selected psychomotor and performance parameters such as reaction time, coordination, passing and shooting performance when compared with the Control Group (CG). Among the experimental groups, the CCSCTMTSSGG group showed the highest improvement, followed by the TMTSSG group, while the CSCTSSGG group also demonstrated improvement but comparatively lower than the other experimental groups. The control group did not show any significant improvement, indicating that structured basketball training programmes are essential for enhancing technical skill performance. These findings are corroborated by previous studies and are also supported by the research findings of Hussain, et. al., (2024), Rahmadani, Okicandra and Parulian (2024), Souza and Clemente (2024) and Rusmana, et. al., (2023), who reported that combined computer supported collaborative and traditional method of training with small side games significantly improve psychomotor parameters such as reaction time and coordination and basketball skill performances parameters such as passing and shooting.

Therefore, the findings of the present investigation clearly indicate that computer supported collaborative training combined with traditional training and small side games is more effective than traditional training alone in improving psychomotor and performance parameters among school players. The results of this study are consistent with previous research highlighting the importance of technology-assisted coaching and game based training methods in enhancing psychomotor and performance parameters on basketball technical skills and overall performance.

5. CONCLUSIONS

It was concluded that the six weeks of computer supported collaborative training with small side games group had significantly improved on selected psychomotor and performance parameters such as reaction time, coordination, passing and shooting among school basketball players.

It was concluded that the six weeks of traditional method of training with small side games group had significantly improved on selected psychomotor and performance parameters such as reaction time, coordination, passing and shooting among school basketball players.

It was concluded that the six weeks of combined computer supported collaborative and traditional method of training with small side games group had significantly improved on selected psychomotor and performance parameters such as reaction time, coordination, passing and shooting among school basketball players.

When compare to all the experimental groups, combined computer supported collaborative and traditional method of training with small side games group proved to be more effective than computer supported collaborative training group with small side games and traditional method of training with small side games group in improving psychomotor and performance parameters such as reaction time, coordination, passing and shooting due to its visual demonstration, video analytical and feedback-based nature, conventional basketball drills among school basketball players.

The control group did not show any significant changes on selected psychomotor and performances parameters.

.

References

1. Bompa, T. O. & Buzzichelli, C. (2019). Periodization: Theory and methodology of training (6th ed.). Human Kinetics.
2. Changjia, T., De Silva, V., Caine, M. & Swanson, S. (2019). Use of machine learning to automate the identification of basketball strategies using whole team player tracking data. Applied Sciences, 9(23), 1–15.
3. Hill-Haas, S. V., Dawson, B., Impellizzeri, F. M. & Coutts, A. J. (2011). Physiology of small-sided games training in team sports. Sports Medicine, 41(3), 199–220.
4. Hussain, A., Rahman, M. & Khan, S. (2024). Effect of video-based performance analysis on basketball skill development among school athletes. Journal of Physical Education and Sport Studies, 15(2), 45–52.
5. Kearney, M., Schuck, S., Burden, K. & Aubusson, P. (2024). Mobile learning in sports education: Collaborative digital environments for performance analysis. Australasian Journal of Educational Technology, 40(1), 35–48.
6. Renshaw, I., Davids, K., O'Sullivan, M., Maloney, M. A., Crowther, R. & McCosker, C. (2022). An ecological dynamics approach to motor learning in practice: Reframing the learning and performing relationship in high performance sport. Asian Journal of Sport and Exercise Psychology, 2(1), 18–26. https://doi.org/10.1016/j.ajsep.2022.04.003
7. Owen, A. L., Wong, D. P., McKenna, M., & Dellal, A. (2011). Heart rate responses and technical comparison between

small- vs. large-sided games in elite professional soccer. Journal of Strength and Conditioning Research, 25(8), 2104–2110.

8. Rahmadani, R., Okicandra, I., & Parulian, B. (2024). The effectiveness of video-based basketball learning in improving fundamental skills among school students. Journal of Physical Education and Sports Science, 12(1), 60–68.
9. Rusmana, R., Syafrial, S., & Sugiyanto, S. (2023). Effect of small-sided games on basketball technical skills among adolescent players. Journal of Sports Science & Coaching, 18(3), 502–510.
10. Sampaio, J., McGarry, T., & O'Donoghue, P. (2020). Performance analysis of basketball teams. International Journal of Performance Analysis in Sport, 20(1), 1–15.
11. Shukla, A. (2024). Digital transformation in sports training: Applications of performance analytics and video technology. International Journal of Sports Science, 14(1), 10–18.
12. Souza, P. R., & Clemente, F. M. (2024). Technical and tactical performance in basketball small-sided games: A systematic review. Sports, 12(3), 85. https://doi.org/10.3390/sports12030085
13. Stahl, G., Koschmann, T., & Suthers, D. (2014). Computer-supported collaborative learning: An historical perspective. In R. K. Sawyer (Ed.), The Cambridge handbook of the learning sciences (pp. 409–426). Cambridge University Press.
14. Wuest, D. A., & Bucher, C. A. (2009). Foundations of physical education, exercise science, and sport. McGraw-Hill.