

การพัฒนาแผนการสอนแบดมินตันเพื่อพัฒนาสมรรถนะแบดมินตัน ของนักศึกษาวิทยาลัยในมณฑลเจียงซู

DEVELOPING BADMINTON TEACHING PLAN TO IMPROVE BADMINTON PERFORMANCE OF COLLEGE STUDENTS IN JIANGSU PROVINCE

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บทคัดย่อ

วัตถุประสงค์ของการวิจัยนี้คือพัฒนาแผนการสอนแบดมินตันเพื่อพัฒนาสมรรถนะแบดมินตันของนักศึกษาวิทยาลัยในมณฑลเจียงซู การวิจัยครั้งนี้เป็นการวิจัยแบบผสมผสาน ประชากรของการวิจัยครั้งนี้ประกอบด้วยนักศึกษาชั้นปีที่ 1 จำนวน 82 คนที่กำลังศึกษาอยู่ในปีการศึกษา 2025 ของวิทยาลัยพาณิชยการอู๋ซี นักศึกษาทั้งหมดจะเข้าร่วมทดสอบทักษะการเสิร์ฟเบื้องต้น จากนั้นนักศึกษาจำนวน 40 คนที่มีคะแนนการทดสอบต่ำที่สุดและสมัครใจเข้าร่วมการวิจัยจะถูกคัดเลือกเป็นกลุ่มตัวอย่าง นักศึกษาจำนวน 40 คน ถูกแบ่งออกเป็น 2 กลุ่ม โดยใช้วิธีการสุ่มแบบเป็นระบบ การจัดการเรียนการสอนดำเนินการเป็นระยะเวลา 8 สัปดาห์ โดยมีการทดสอบความแม่นยำในการเสิร์ฟ การทดสอบความแม่นยำของลูกโด่ง การทดสอบความแม่นยำของลูกหยอด และการทดสอบความเร็วการเคลื่อนที่เท้า การทดสอบทั้งหมดดำเนินการก่อนการฝึก หลังจากฝึก 4 สัปดาห์ และหลังจากฝึก 8 สัปดาห์ เพื่อประเมินสมรรถนะการเล่นแบดมินตันของนักศึกษาวิทยาลัย ในการวิเคราะห์ข้อมูลใช้ค่าเฉลี่ย ส่วนเบี่ยงเบนมาตรฐาน การวิเคราะห์ความแปรปรวนแบบวัดซ้ำทางเดียว การทดสอบความแตกต่างรายคู่ด้วยวิธีบอนเฟอโรนี และการทดสอบค่าทีแบบอิสระ ผลการวิจัยแสดงให้เห็นว่ามีความแตกต่างอย่างมีนัยสำคัญทางสถิติระหว่างกลุ่มทดลองและกลุ่มควบคุมในผลการทดสอบหลังการฝึกในตัวชี้วัดสมรรถนะการเล่นแบดมินตันทั้ง 4 รายการ ได้แก่ การทดสอบความแม่นยำในการเสิร์ฟ การทดสอบความแม่นยำของลูกโด่ง การทดสอบความแม่นยำของลูกหยอด และการทดสอบความเร็วการเคลื่อนที่เท้า ผลการวิจัยดังกล่าวบ่งชี้ว่า แผนการสอนแบดมินตันที่พัฒนาขึ้นมีประสิทธิภาพสูงกว่าวิธีการสอนแบบดั้งเดิมในการพัฒนาสมรรถนะการเล่นแบดมินตันของนักศึกษาวิทยาลัย นอกจากนี้ ผลการทดสอบสมรรถนะของนักศึกษาในกลุ่มทดลองแสดงให้เห็นถึงการพัฒนามีความสำคัญทางสถิติที่ระดับ 0.05 เมื่อเปรียบเทียบผลระหว่างก่อนการฝึก หลังการฝึก 4 สัปดาห์ และหลังสิ้นสุดการสอน 8 สัปดาห์

คำสำคัญ: แผนการสอนแบดมินตัน, สมรรถนะแบดมินตัน, นักศึกษาวิทยาลัย

Abstract

The objective of this research was to develop badminton teaching plan to improve badminton performance of college students in Jiangsu province. This research was mixed-method research. The population of this research comprises 82 first-year students enrolled in the 2025 academic year at Wuxi Vocational Institute of Commerce. All students completed in an initial serving skill test. From this group, a sample of 40 students who score the lowest on the test and volunteer to participate in the research were selected as a sample group. Through systematic sampling method, 40 students were divided into 2 group. The teaching was conducted over an 8-week period. Serving accuracy test, clear shot accuracy test, drop shot accuracy test, and footwork speed test were administered before the training, after 4 weeks, and after 8 weeks to assess the badminton performance of college students. In this research,

mean, standard deviation, one-way repeated measures ANOVA, Bonferroni post hoc tests, and independent t-tests were used to analyze the data. The results demonstrated a statistically significant difference between the experimental group and the control group in the post-test outcomes across all four badminton performance measures, including the serving accuracy test, clear shot accuracy test, drop shot accuracy test, and footwork speed (agility) test. These findings indicate that the developed badminton teaching plan was more effective than the traditional teaching approach in enhancing badminton performance among college students. Furthermore, the performance results of students in the experimental group showed statistically significant improvements at the 0.05 level when comparing measurements taken before training, after four weeks of training, and at the completion of the eight-week teaching program.

Keywords: Badminton teaching plan, Badminton performance, College students

Introduction

Badminton is one of the most popular racket sports in the world and holds particular significance in many Asian countries, including China. Badminton is a widely practiced sport in China and has been integrated into the physical education curriculum across various educational levels. In the context of Chinese colleges and universities, badminton has become an essential component of physical education programs. It is not only valued for its role in promoting health and physical fitness but also for its ability to develop agility, coordination, and strategic thinking. In addition, the sport's accessibility, low equipment cost, and suitability for both recreational and competitive play contribute to its widespread adoption within college campuses. As a result, many colleges and universities offer badminton as an elective course to enhance students' overall physical literacy and engagement in lifelong physical activity. According to research, college-level badminton courses can help students enhance their agility, coordination, endurance, and strategic thinking, all of which are transferable to other aspects of life and learning (Liu et al., 2020).

Despite its popularity, challenges remain in delivering effective badminton instruction in college settings. Many physical education programs still rely on traditional teaching methods, which tend to emphasize repetitive drills and theoretical knowledge rather than engaging, student-centered approaches that promote practical skill development and performance improvement. These outdated methods often fail to address the varying skill levels, learning needs, and motivational factors of students, resulting in limited progress in technical proficiency and game understanding (Chen et al., 2023). Moreover, performance outcomes are often not systematically measured or prioritized within physical education programs, leading to gaps between instructional content and desired learning results. Students often enter college with varied and often insufficient badminton skills, leading to a lack of confidence and reduced enthusiasm. This inconsistent skill base complicates instruction and hinders performance improvement, including badminton teaching programs commonly lack standardized performance assessments. Evaluation protocols for badminton courses are often inappropriate or inconsistent, reducing teaching effectiveness and demotivating students. They emphasize attendance and participation rather than objective measures of technical or tactical progress. To address these concerns, educational researchers and sports educators have emphasized the need for student-centered, performance-based teaching models that promote active participation, progressive skill development, and measurable learning outcomes. In particular, structured badminton teaching plans that align with pedagogical best practices and incorporate regular performance assessments are seen as effective tools for improving the badminton proficiency and overall physical literacy of college students (Bailey et al., 2009).

In Jiangsu Province, where badminton is particularly popular among college students, there is a growing demand for modernized and performance-oriented teaching plans that align with educational reforms and the national goal of promoting high-quality physical education. However, there is a lack of systematically developed teaching plans that are based on empirical research, validated by experts, and designed to improve specific aspects of student performance in badminton (Chen, 2022). Students often start with weak badminton foundations and lack motivation, posing challenges to instruction and performance improvement, and teachers don't want to adapt to the diverse skill levels and learning preferences of students, leading to reduced engagement and skill stagnation. On the other hand, some universities are beginning to incorporate big data, multimedia platforms, and online learning resources to support autonomous learning and enrich badminton instruction. Therefore, widespread participation in badminton exists, but traditional teaching methods, facility limitations, and lack of systematic evaluations hinder meaningful performance development.

In response to this gap, the present study aims to develop a structured, evidence-based badminton teaching plan tailored to the needs of college students and improve their badminton performance in Jiangsu Province. The plan is designed to enhance badminton performance through an 8-week intervention that incorporates principles of progressive training, student-centered instruction, and continuous performance assessment. The research also seeks to provide a validated model for badminton instruction that can be applied or adapted by physical education instructors in other regions or educational institutions.

Research Methodology

This research was mixed-method research

Population

The population of this research consists of 82 first-year students enrolled in the 2025 academic year at Wuxi Vocational Institute of Commerce, all of whom have chosen badminton as their elective course.

Sample

All 82 students were participated in a serving skill test, during which individual performance scores were recorded. Based on these test results, a 40 students who achieve the lowest scores and voluntarily agree to participate in the study were selected as a sample group. Using random assignment, the 40 students were randomly assigned into two equal groups. 20 students in the experimental group, and 20 students in the control group.

Research Instruments

1. Questionnaire for students

The researcher was developed a structured questionnaire to investigate the current status and key challenges associated with badminton teaching practices and performance outcomes within the college context. The questionnaire was designed to capture participants' perceptions, experiences, and levels of agreement using a 5-point Likert scale. To ensure that the questionnaire was both valid and aligned with the research objectives, it was subjected to expert evaluation, using the Index of Item-Objective Congruence (IOC) method. The IOC value of questionnaire for students was evaluated by 5 experts. 28 items, 6 dimensions, and IOC value was 0.89.

2. Interview outline

Following the analysis of questionnaire data collected from university students, the researcher was developed an expert interview outline consisting of open-ended questions designed to gather in-depth insights into issues related to badminton teaching practices and the performance of undergraduate students. To ensure that the interview questions were clear, relevant, and aligned with the research objectives, the draft outline was

evaluated by three experts using the Index of Item-Objective Congruence (IOC) method. The IOC value of interview outline was Evaluated by 3 experts in physical education. $IOC=0.92$.

3. Focus group outline

The researcher was designed a focus group discussion outline, evaluated by 3 experts, and IOC value was 0.90. consisting of carefully constructed open-ended questions intended to facilitate in-depth dialogue and collaborative reflection among participants. The primary objective of the focus group discussion was to develop a comprehensive badminton teaching plan aimed at enhancing the badminton performance of college students.

4. Badminton teaching plan

The badminton teaching plan was implemented with a period of 8 weeks, with three sessions per week scheduled on Monday, Wednesday, and Friday. Each session will have a duration of 2 hours. The core components of each session were included a warm-up, skill development, physical fitness training, practice drills, and a cool-down phase to ensure a well-rounded and effective learning experience.

5. Badminton performance test

5.1 Serving accuracy test (Grice, 2008).

To evaluate the student's ability to consistently and accurately serve the shuttlecock to designated target zones.

5.2 Clear shot accuracy test (Williyanto et al., 2018).

To measure the accuracy and control of the students when performing overhead clear shots to the backcourt

5.3 Drop shot accuracy test (Gazali & Cendra, 2019).

To assess the precision and control of drop shots toward the frontcourt

5.4 Footwork speed test (Agility Test) (Muthiarani et al., 2021).

To evaluate a student's agility and movement efficiency using badminton-specific footwork patterns. Six shuttlecocks are placed at six corners of the court (front left, front right, mid left, mid right, rear left, rear right). On the command "go," the player moves as quickly as possible to pick up each shuttlecock one at a time and return it to the base.

Data Collection

1. A literature review on badminton teaching, teaching method and badminton performance was conducted. This review was included textbooks, journal articles, academic thesis, and dissertations sourced from both domestic and international academic databases.

2. A structured questionnaire was administered to 82 first-year students enrolled in the 2025 academic year at Wuxi Vocational Institute of Commerce. The purpose of the questionnaire was to examine the current situation, challenges, and perceptions related to badminton learning and performance from the students' perspective.

3. 7 experts were invited to participate in face-to-face interviews. The aim of the expert interviews was to gain in-depth insights into the current issues, instructional gaps, and performance barriers in college-level badminton teaching. The qualitative findings were also informed the identification of key components required for designing an effective badminton teaching plan.

4. 10 experts were invited to participate in focus group discussion. The purpose of this session is to collaboratively develop a structured badminton teaching plan specifically tailored to improve the badminton performance of college students.

5. The developed badminton teaching plan was implemented over a period of 8 weeks, with teaching sessions scheduled three times per week (Monday, Wednesday, and Friday). Each session was last 2 hours,

including warm-up, skill development, physical fitness, practice drills, and cool-down. The experimental group was received instruction based on the newly developed teaching plan, while the control group was followed the traditional teaching method currently used by the college.

6. Both the experimental and control groups were underwent badminton performance testing at three stages as pre-test (before the intervention), mid-test (after 4 weeks), and post-test (after 8 weeks). The test was assessed key performance indicators such as serving accuracy, shot control, and footwork efficiency. The resulting data was statistically analyzed and compared between groups to evaluate the effectiveness of the developed badminton teaching plan in enhancing the performance outcomes of college students.

Data Analysis

This research primarily employed a statistical software package to analyze both quantitative and qualitative data collected throughout the study. The data analysis procedures were conducted as follows:

1. Descriptive statistics, including mean ($\bar{X}$) and standard deviation (SD), were used to analyze the responses obtained from the questionnaire administered to 82 students.
2. Qualitative data derived from expert interviews and the focus group discussion were analyzed using content analysis.
3. The independent t-test was applied to compare the badminton performance test results between the experimental group and the control group, assessing the statistical significance of performance differences after the intervention.
4. To examine the progression of badminton performance within the experimental group, test results from three time points as pre-test (before teaching), mid-test (after 4 weeks), and post-test (after 8 weeks) were analyzed using one-way repeated measures ANOVA. Where significant differences were found, post hoc comparisons were conducted to identify the specific stages at which performance improvements occurred.
5. To ensure the content validity of the research instruments, the questionnaire for student and expert interview outline were assessed using the Index of Item-Objective Congruence (IOC).
6. This study employed a five-point Likert scale to assess the responses obtained from questionnaires administered to athletes and coaches. The collected data were analyzed by computing the mean score for each indicator, reflecting the overall level of agreement and evaluation provided by the respondents. The scale was defined as follows: 1 = Very Low, 2 = Low, 3 = Moderate, 4 = High, and 5 = Very High. The interpretation of the mean scores was conducted in accordance with the evaluation criteria proposed by Boone & Boone (2012).

Average score range	Meaning
4.20 – 5.00	Highest
3.40 – 4.19	High
2.60 – 3.39	Moderate
1.80 – 2.59	Poor
1.00 – 1.79	Very Poor

Results

Part 1: Drafting badminton teaching plan to improve badminton performance of college students in Jiangsu province

The focus group discussion reached a strong consensus that current college badminton teaching practices are constrained by uniform instructional approaches, limited practice time, and insufficient integration of technical training, physical conditioning, and footwork development. The experts agreed that common

problems among college students include low shot accuracy, inefficient movement patterns, inadequate physical fitness, and weak performance transfer from practice to actual play. To address these issues, the experts emphasized the necessity of developing a scientifically structured and performance-oriented badminton teaching plan that follows principles of progressive content sequencing, appropriate training intensity, and differentiation based on students' skill levels and physical abilities. They further agreed that effective teaching sessions should balance technical instruction with applied practice through targeted drills focusing on shot accuracy and footwork efficiency. Finally, the experts consistently recommended that the effectiveness of the teaching plan be evaluated through objective and systematic performance assessments, particularly serving accuracy, clear shot accuracy, drop shot accuracy, and footwork speed tests, as these indicators provide reliable and direct evidence of improvements in badminton performance among college students. The details of the framework of badminton teaching plan aimed at enhancing the badminton performance of college students in Jiangsu Province was as follows:

Table 1. Framework of badminton teaching plan to enhance badminton performance for college students in Jiangsu province.

Week	Training Focus	Skill Development	Physical Fitness & Footwork	Practice Drills	Evaluation Focus
1	Basic fundamentals	Grip, ready position, basic serve	Basic agility, coordination drills	Isolated technique drills	4 tests
2	Serving technique	High serve & short serve accuracy	Linear footwork, balance drills	Target-based serving drills	Serving accuracy
3	Overhead clear	Clear shot technique & control	Multi-directional footwork	Clear shot placement drills	Clear shot accuracy
4	Frontcourt control	Drop shot technique & precision	Reaction speed, split-step drills	Net drop shot drills	Drop shot accuracy
5	Footwork efficiency	Skill combination practice	Badminton-specific agility training	Footwork + shot combination drills	Footwork speed
6	Skill integration	Serve-clear-drop combinations	Endurance & movement efficiency	Continuous rally drills	Skill consistency
7	Performance application	Match-related skill execution	High-intensity footwork drills	Game-like situational drills	Performance stability
8	Performance consolidation	Technique refinement	Movement speed & coordination	Performance simulation drills	Post-test (4 tests)

Part 2: Experiment badminton teaching plan to improve badminton performance of college students in Jiangsu province

To examine the effectiveness of the developed teaching plan in enhancing college students' badminton performance, an experimental research design was employed. Badminton performance was assessed using a set of badminton performance tests, including the serving accuracy test, clear shot accuracy test, drop shot accuracy test, and footwork speed test.

Table 2. Mean and standard deviation of the results of badminton performance tests of the experimental group

Variables	Experimental Group					
	Pre-test		Mid-test		Post-test	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Serving accuracy (score)	12.00	1.86	14.70	1.52	17.95	1.35
Clear shot accuracy (score)	17.55	1.60	21.55	2.41	25.85	2.32
Drop shot accuracy (score)	13.75	1.55	18.35	3.40	25.05	2.21
Footwork speed test (score)	5.40	1.18	6.90	1.16	8.45	0.94

From table 2 showed the results of badminton performance tests of experimental group were 1) Serving accuracy was pre-test $\bar{X}$ = 12.00 and SD = 1.86, mid-test $\bar{X}$ = 14.70 and SD = 1.52, and post-test $\bar{X}$ = 17.95 and SD = 1.35. 2) Clear shot accuracy was pre-test $\bar{X}$ = 17.55 and SD = 1.60, mid-test $\bar{X}$ = 21.55 and SD = 2.41, and post-test $\bar{X}$ = 25.85 and SD = 2.32. 3) Drop shot accuracy was pre-test $\bar{X}$ = 13.75 and SD = 1.55, mid-test $\bar{X}$ = 18.35 and SD = 3.40, and post-test $\bar{X}$ = 25.05 and SD = 2.21. 4) Footwork speed test was pre-test $\bar{X}$ = 5.40 and SD = 1.18, mid-test $\bar{X}$ = 6.90 and SD = 1.16, and post-test $\bar{X}$ = 8.45 and SD = 0.94.

Table 3. Mean and standard deviation of the results of badminton performance tests of the control group

Variables	Control Group					
	Pre-test		Mid-test		Post-test	
	$\bar{X}$	SD	$\bar{X}$	SD	$\bar{X}$	SD
Serving accuracy (score)	11.90	1.94	13.30	2.25	14.70	2.29
Clear shot accuracy (score)	17.35	1.81	18.80	2.33	21.80	2.70
Drop shot accuracy (score)	13.55	1.46	16.50	1.93	20.10	2.57
Footwork speed test (time)	4.90	1.41	5.40	1.53	6.80	1.54

From table 3 showed the results of badminton performance tests of the control group were 1) Serving accuracy was pre-test $\bar{X}$ = 11.90 and SD = 1.94, mid-test $\bar{X}$ = 13.30 and SD = 2.25, and post-test $\bar{X}$ = 14.70 and SD = 2.29. 2) Clear shot accuracy was pre-test $\bar{X}$ = 17.35 and SD = 1.81, mid-test $\bar{X}$ = 18.80 and SD = 2.33, and post-test $\bar{X}$ = 21.80 and SD = 2.70. 3) Drop shot accuracy was pre-test $\bar{X}$ = 13.55 and SD = 1.46, mid-test $\bar{X}$ = 16.50 and SD = 1.93, and post-test $\bar{X}$ = 20.10 and SD = 2.57. 4) Footwork speed test was pre-test $\bar{X}$ = 4.90 and SD = 1.41, mid-test $\bar{X}$ = 5.40 and SD = 1.53, and post-test $\bar{X}$ = 6.80 and SD = 1.54.

Table 4. The comparison between the experiment and control groups with the pre-test results of the badminton performance tests, by t-test independent.

Variables	Exp. G		Cont. G		95% Confidence Interval of the Difference		t	p
	$\bar{x}$	SD	$\bar{x}$	SD	Lower	Upper		
Serving accuracy (score)	12.00	1.86	11.90	1.94	-0.071	0.91	0.25	0.80
Clear shot accuracy (score)	17.55	1.60	17.35	1.81	-0.15	-0.55	1.16	0.25
Drop shot accuracy (score)	13.75	1.55	13.55	1.46	-0.47	0.87	0.62	0.54
Footwork speed test (time)	5.40	1.18	4.90	1.41	-0.09	1.09	1.75	0.09

*p<0.05

From table 4 showed that the pre-test results of badminton performance pairwise were not significant difference.

Table 5. The comparison between the experiment and control groups with the mid-test results of the badminton performance tests, by t-test independent.

Variables	Exp. G		Cont. G		95% Confidence Interval of the Difference		t	p
	$\bar{x}$	SD	$\bar{x}$	SD	Lower	Upper		
Serving accuracy (score)	14.70	1.52	13.30	2.25	0.49	2.30	3.24	0.00*
Clear shot accuracy (score)	21.55	2.41	18.80	2.33	1.73	3.76	5.65	0.00*
Drop shot accuracy (score)	18.35	3.40	16.50	1.93	0.24	3.45	2.40	0.02*
Footwork speed test (time)	6.90	1.16	5.40	1.53	0.94	2.05	5.62	0.00*

*p<0.05

From table 5 showed that the mid-test results of badminton performance pairwise were significant difference p<0.05.

Table 6. The comparison between the experiment and control groups with the post-test results of the badminton performance tests, by t-test independent.

Variables	Exp. G		Cont. G		95% Confidence Interval of the Difference		t	p
	$\bar{x}$	SD	$\bar{x}$	SD	Lower	Upper		
Serving accuracy (score)	17.95	1.35	14.70	2.29	2.36	4.13	7.69	0.00*
Clear shot accuracy (score)	25.85	2.32	21.80	2.70	2.72	5.37	6.38	0.00*
Drop shot accuracy (score)	25.05	2.21	20.10	2.57	3.46	6.43	6.98	0.00*
Footwork speed test (time)	8.45	0.94	6.80	1.54	1.07	2.22	6.02	0.00*

*p<0.05

From table 6 showed that the post-test results of badminton performance pairwise were significant difference $p < 0.05$.

Summary

Badminton performance requires a high level of technical precision, coordination, and physical capacity, particularly in serving accuracy, shot control, and efficient footwork movement. For college students in the early stages of systematic badminton training, performance improvement depends on the development of technical consistency, lower-limb strength, agility, and coordinated movement patterns. Effective badminton play involves accurate shot execution, stable body control, and rapid directional changes on court. This study aimed to develop a scientifically designed badminton teaching plan to enhance badminton performance among college students.

To evaluate the effectiveness of the developed badminton teaching plan, badminton performance was assessed using four standardized performance indicators: the serving accuracy test, clear shot accuracy test, drop shot accuracy test, and footwork speed (agility) test. An experimental research design was adopted, and independent t-tests were conducted to compare pre-test results between the experimental and control groups. The analysis revealed no statistically significant differences between the two groups across all four performance tests, indicating that both groups demonstrated comparable levels of badminton performance prior to the intervention.

Following the training intervention, comparisons of post-test results between the experimental and control groups showed statistically significant differences ($p < 0.05$) in all four performance measures. These findings demonstrate that students who participated in the developed badminton teaching plan achieved greater improvements in technical accuracy and footwork speed compared to those who followed the traditional teaching approach, confirming the effectiveness of the developed program in enhancing badminton performance.

Discussion

In this study, badminton performance among college students was evaluated across two primary dimensions: technical accuracy and movement efficiency. Technical performance was assessed through three accuracy-based skill tests, serving accuracy, clear shot accuracy, and drop shot accuracy, while movement efficiency was evaluated using the footwork speed (agility) test. Following the eight-week implementation of the developed badminton teaching plan, the experimental group demonstrated significant improvements across all four performance indicators, confirming the effectiveness of the program in enhancing badminton performance.

Regarding technical performance, serving accuracy, clear shot accuracy, and drop shot accuracy are fundamental skills that directly influence rally control, scoring opportunities, and overall match performance. After the eight-week teaching period, the experimental group achieved significantly higher post-test scores in all three technical skill tests compared to the control group, with statistically significant differences observed at the 0.05 level. These findings suggest that the structured and progressive nature of the developed teaching plan effectively enhanced students' technical execution and shot consistency. Once students improved key technical elements such as stroke mechanics, body posture, racket control, and timing of contact, they were able to perform shots with greater accuracy and stability. This result aligns with previous research indicating that precise technical execution is a decisive factor in badminton performance, particularly in accuracy-based strokes that determine tactical advantage during play (Phomsoupha & Laffaye, 2015).

Furthermore, the improvement in technical accuracy observed in this study can be attributed to the systematic integration of isolated drills, combination practice, and game-like situations within the teaching plan. This approach allowed students to transfer learned techniques from controlled practice environments to dynamic performance contexts. These findings are consistent with the work of Gawin, Beyer, and Seidler (2015), who emphasized that progressive skill training combined with contextual practice enhances motor learning and shot precision in racket sports. Additionally, accurate serving and shot placement reduce unforced errors and enable players to dictate rally tempo, thereby contributing to improved overall performance.

Footwork speed and agility represent another critical determinant of badminton performance, as efficient movement enables players to reach optimal hitting positions and maintain balance during stroke execution. The results of this study showed that the time required to complete the footwork speed (agility) test significantly decreased in the experimental group across the pre-test, mid-test, and post-test measurements. This indicates continuous improvement in movement efficiency as a result of the developed teaching plan. Effective footwork training enhances lower-limb strength, coordination, and reaction speed, all of which are essential for rapid directional changes on the badminton court. These findings are supported by the research of Faude et al. (2007), who reported that agility and explosive movement are key performance predictors in badminton and are closely associated with successful shot execution.

Conclusion and Suggestion

The results confirmed that the developed badminton teaching plan effectively enhanced both technical accuracy and movement efficiency among college students. The significant improvements observed in serving accuracy, clear shot accuracy, drop shot accuracy, and footwork speed demonstrate the superiority of the developed teaching plan over traditional instructional methods. By integrating technical training, physical conditioning, and footwork practice within a scientifically structured framework, the teaching plan successfully addressed key limitations identified in current badminton instruction. These findings provide strong empirical support for the application of systematic, performance-oriented badminton teaching plans in college physical education settings.

Recommendations from the Research Findings

1. The developed badminton teaching plan should be applied in college physical education and badminton training programs, as it has demonstrated effectiveness in improving students' technical accuracy and footwork speed.
2. Objective performance-based assessments, including serving accuracy, clear shot accuracy, drop shot accuracy, and footwork speed tests, should be systematically used to evaluate badminton learning outcomes and guide instructional improvement.

Recommendations for Future Research

1. Future studies should investigate the long-term effects of the developed badminton teaching plan on skill retention and sustained performance improvement beyond the eight-week training period.
2. Further research could examine the effectiveness of the teaching plan across different populations, such as students with varying skill levels, ages, or competitive backgrounds.
3. Additional studies are recommended to explore the integration of psychological factors, such as motivation and self-efficacy, with technical and physical training to gain a more comprehensive understanding of badminton performance development.

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