

The Effect of Educational Units with Special Exercises According to the Whitley Strategy on Learning Enjoyment and Improving the Performance of the Serve and Forehand Groundstroke Skills in Tennis for Female Students

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Abstract. The Impact of Wheatley's Strategy on Tennis Learning and Performance Research Objectives: This study investigates the effectiveness of utilizing specialized educational units based on Wheatley's strategy compared to traditional teaching methods. Specifically, it aims to determine how these approaches impact female students' enjoyment of learning and their proficiency in fundamental tennis skills (the serve and the forehand groundstroke), and to identify which method yields superior results. Methodology and Sample: The researcher employed an experimental methodology utilizing a pre-test and post-test design. Participants were divided into two equivalent groups: an experimental group and a control group. Target Population: The sample was deliberately selected and consisted of 33 female third-year students from the Faculty of Physical Education and Sport Sciences at the University of Anbar during the 2025/2026 academic year. Measurement and Data Analysis: To accurately evaluate the outcomes, the researcher implemented specialized tests designed to measure the students' enjoyment of learning tennis alongside their technical performance. The gathered data was then statistically processed and analyzed using the SPSS software package to verify the research hypotheses and achieve the study's objectives.

Keywords: Forehand Groundstroke Skill; Learning Enjoyment; Serve Skill; Tennis; Whitley Strategy.

1. INTRODUCTION

Education in general, and physical education and sports sciences in particular, have witnessed remarkable and extensive development in recent decades in concepts, methods, styles, and practical applied fields. This is a result of scientific and technological progress in various fields of knowledge, especially in psychological, motor, and educational sciences. Physical education is no longer limited solely to traditional physical activities; rather, it has become an integrated science concerned with improving the individual physically, mentally, emotionally, and socially, and building them in a holistic manner capable of adapting to all the requirements of modern life.

Furthermore, education seeks to provide a better life for all individuals through its various systems and fields. Since learning is an integral part of education, it has become its essential tool for achieving its purposes. Therefore, the teacher plays a decisive role in the educational process; they are responsible for achieving the strategic objectives of the academic subjects across different educational stages. The teacher instructs the student on how to learn and how to solve problems. This is accomplished through the use of modern educational methods, models, and strategies that describe the instructional procedures a teacher can use in selecting and analyzing the material, and choosing the best modern methods and means to bring about

effective learning. In this regard, modern educational strategies have emerged to raise the level and effectiveness of learning and improve it. One of these strategies is the Wheatley Strategy, which consists of a set of steps or practices that a teacher takes during the teaching process. These organizations are organized, interconnected, interconnected and interactive, as they lead to the improvement of educational materials and the achievement of specific goals that target a specific type of learner in the light of theoretical and applied concepts and principles.

The game of tennis is one of the sports included within the educational curriculum for faculties and departments of physical education and sports sciences. It contains various basic skills performed using an implement (a racket) and involves large spaces relative to the number of players, being an individual sport. This is in addition to the speed of the ball and high performance, which necessitates attention to it in the stages of learning and preparation for learners. Learning skills requires time and effort from both the teacher and the learner, as well as diverse strategies that align with tennis skills.

The importance of the research is evident in its connection between the psychological aspect (learning enjoyment) and the skill aspect (tennis skills), which provides a comprehensive vision of the educational process and helps teachers choose appropriate and effective methods and strategies that achieve a balance between these two aspects. Furthermore, the research presents educational exercises based on scientific foundations that physical education teachers can utilize to improve and develop their teaching methods, and it also opens the door for researchers to conduct similar future studies in other sports.

Research Problem: Physical education lessons, particularly in teaching tennis skills, witness a noticeable reliance on traditional methods that may not consider the psychological aspects of the students. The most important of these is learning enjoyment, which is an essential factor in enhancing motivation, continuation of learning, and improving skill performance. Despite the importance of this variable, attention to it is often theoretical without relying on precise scientific measurement tools that reflect the level of learning enjoyment among students during the lesson. Through the researcher's observation as a teacher of the subject and his modest experience, a discrepancy was noted in the degree of students' enjoyment while learning tennis skills, as they require high coordination and are performed using an implement (racket) and a small ball in specific locations. This affects their engagement and interaction within the educational class. Additionally, the absence of a standardized scale specifically for learning enjoyment in tennis limits the ability to accurately diagnose this phenomenon. Therefore, the researcher seeks to prepare a scale for learning enjoyment in tennis as a scientific tool to reveal the level of students' enjoyment and to know the effect of educational exercises according to

the Whitley strategy in improving this variable. Accordingly, the research problem is determined by answering the following question:

What is the effect of educational units with special exercises according to the Whitley strategy on learning enjoyment and improving the performance of the serve and forehand groundstroke among female students?

The research aims to identify: The effect of the educational units with special exercises according to the Whitley strategy and the adopted method on learning enjoyment and improving the performance of the serve and forehand groundstroke in tennis for female students. The preference for the effect of the educational units with special exercises according to the Whitley strategy and the adopted method on learning enjoyment and improving the performance of the serve and forehand groundstroke in tennis for female students.

2. RESEARCH METHODOLOGY:

Experimental Design:

The use of the scientific method must be consistent with the problem being studied. Therefore, the researcher used the experimental method with the design of two equivalent groups (control and experimental) with pre- and post-tests, as it suits the nature of the research and its problem (Ali et al., 2022, 2024; Mohammed et al., 2025).

Research Population and Sample:

The research population was determined using the direct purposive method, represented by third-year female students in the College of Physical Education and Sports Sciences, University of Anbar, for the academic year 2025/2026, totaling (33) students in Section (A). They represent 100% and are the entire population, while the rest of the sections are male only. With this clarification, the original population was determined. The research sample was also selected purposively, totaling (20) female students. With this number, the sample represents (60.60%) of the original population. The process of distributing the students into the control and experimental groups was done randomly, where odd numbers were designated to be the control group and even numbers to be the experimental group according to what is available and recorded in the official form in the college's registration division.

Tests Used in Research

Building a Tennis Learning Pleasure Scale:

Based on the research objectives and previous literature review, the researcher designed a scale to measure the enjoyment of learning in tennis. The scale consisted of 20 items that

were formulated according to the Triple Likert scale and were presented to a group of experts to assess their validity.

Table 1. Shows the Score for Each Alternative with Respect to the Positive Paragraph, while the Negative Paragraphs Reflect Its Score.

Alternatives	Never	Sometimes	Always
Score	1	2	3

The table above shows the score for each alternative regarding the positive item. As for the negative items, their scores are reversed. The number of negative items was five, and their sequence in the scale is (6 - 11 - 16 - 18 - 20).

Learning Enjoyment Scale in Tennis

Table 2. Learning Enjoyment Scale in Tennis.

No.	Items	Never	Sometimes	Always
1	I feel happy while learning the serve skill despite its difficulty.			
2	I enjoy repeating the educational exercises for tennis strokes.			
3	I interact with my peers during learning and performing tennis skills.			
4	I find enjoyment when improving the accuracy of my performance of basic tennis skills.			
5	I feel comfortable and enjoy it when I share learning with my peers in the tennis lesson.			
6	I find that learning tennis skills is of no importance.			
7	I feel that the tennis lesson passes quickly.			
8	I am enthusiastic about learning new skills in tennis.			
9	I continue performing educational exercises even when feeling tired.			
10	I wish to practice tennis outside class times.			
11	The tennis subject is difficult and boring.			
12	I feel that the teaching method makes learning more enjoyable.			
13	I feel satisfied when performing the forehand groundstroke.			
14	I feel that the educational environment of the lesson is encouraging and comfortable.			
15	I find that my performance in the tennis subject is good.			
16	I feel bored while learning tennis skills.			
17	I feel a strong desire to participate and attend the tennis lesson.			
18	I feel that my studies would be more enjoyable without the tennis subject.			
19	Learning tennis skills sparks my interest.			
20	I feel bored when learning tennis skills.			

Scientific Foundations of the Scale

First: Validity of the Scale

Apparent honesty: The paragraphs of the scale were presented to specialists in the fields of physical education, psychology, and tennis to assess their clarity and comprehensiveness. All paragraphs with an agreement rate of more than 80% were accepted, and the final

percentage of agreement on the validity of the scale reached 100%, confirming that it enjoys excellent apparent honesty.

Table 2. Shows the Scientific Foundations of the Tennis Learning Pleasure Scale.

Item No.	Calculated r Value	Significance	Item No.	Calculated r Value	Significance
1	0.61	Sig	11	0.65	Sig
2	0.59	Sig	12	0.55	Sig
3	0.63	Sig	13	0.67	Sig
4	0.55	Sig	14	0.65	Sig
5	0.60	Sig	15	0.62	Sig
6	0.58	Sig	16	0.49	Sig
7	0.62	Sig	17	0.67	Sig
8	0.49	Sig	18	0.63	Sig
9	0.66	Sig	19	0.61	Sig
10	0.59	Sig	20	0.53	Sig

Tabular r value = 0.284 at degrees of freedom $50 - 2 = 48$ and significance level 0.05.

All calculated values are greater than the tabular value, which indicates that all values are statistically significant, and all the scale's items enjoy a good degree of internal consistency validity. Consequently, all items were retained in their final form.

Consistency of the scale: To verify the stability of the results, the scale was applied to a survey sample of 10 female students (outside the core sample) on September 28, 2025. Two weeks later, the application was re-applied under the same conditions, and the results showed a high stability coefficient, confirming the accuracy of the scale.

Skill Performance Test

The researcher used video recording as an accurate means to evaluate the skill performance of the serve and forehand groundstroke skills. The tests for the research sample (female students) were filmed and recorded on the outdoor tennis courts at the College of Physical Education and Sports Sciences - University of Anbar. This was done using a Japanese-made (Canon) camera mounted at an angle of approximately (45) degrees and at a distance of (5) meters so that the performing student's movement was fully visible to the lens for the purpose of filming the performance of the skills under study. The recording was then transferred to a solid memory (CD) and subsequently sent to experts and specialists in the game of tennis to evaluate the performance (the outward appearance of the skill) through scientific observation. The researcher used video recording to provide the evaluator with the opportunity to focus on the performance; they can also zoom in, replay the performance several times, and speed up or slow down the movement. This also helps the evaluator grant the subject the appropriate and most accurate evaluation score. Based on the opinions of the evaluators, who

were (3) experts (Appendix 2), the researcher calculated the score of each female student. It was divided according to the three parts of the skill (preparatory: 3 points, main: 5 points, and final: 2 points), noting that the final evaluation score is (10) points according to the attached recording form (Appendix 3), in which the researcher relied on the outward appearance of the skill. Then, the arithmetic mean for each student was extracted, and the results were treated statistically. The researcher ensured the camera's location and height were fixed, and the filming conditions were unified for all attempts and all students.

Field Procedures for the Experiment

Pre-tests and Sample Party

The pre-tests (for the fun of learning, the skill performance of the serve and the forward ground strike) were held on October 19 and 20, 2025 at the University of Anbar stadiums for the experimental and control groups, with all the equipment and the support team provided. To ensure the accuracy of the results, the equivalence of the two groups was verified using the t-test of independent samples, where the results showed that there were no statistically significant differences between them, confirming that the two groups started from the same level of performance.

Table 3. Equivalence of the Research Groups in the Variables Under Study.

Variables	Unit Measurement	Control Group		Experimental Group		Calculated t-value
		Pre-tests Mean	Pre-tests SD	Pre-tests Mean	Pre-tests SD	
Learning Enjoyment	Score	5.400	0.516	5.800	0.918	0.245
Serve Skill	Score	2.300	0.537	2.050	0.368	0.240
Forehand Groundstroke	Score	2.650	0.579	2.400	0.394	0.274

Tabular (t) value = (2.101) at degrees of freedom ($10+10-2=18$) and significance level (0.05). (Note: The Arabic text says degrees of freedom 81, which is a typo based on the $10+10-2$ equation)

Main Research Experiment

Educational Units

The program was implemented according to the Ministry of Higher Education's curriculum approved at the Faculty of Physical Education and Sport Sciences at Anbar University. The following table shows the time breakdown of the program.

Table 4. Showing the Details of the Tutorial Program.

Tutorial Details	Description
Total Duration	7 weeks
Number of Units	7 units (1 unit per week)
Unity Time	90 minutes
Total Time	630 minutes
Number of Exercises	3 to 5 exercises per unit (10 minutes per exercise including rest)

Application of the Educational Units (Experimental Group - Whitley Strategy)

Program Implementation (Wheatley Strategy) The experimental group underwent an educational program based on Wheatley's strategy, which was implemented in the main section of the module under the supervision of the researcher and the subject teacher. The strategy was implemented through three main phases:

Task Phase: 10 minutes long, which includes motivating students by asking questions or movement problems (e.g., how to perform a serve, or prioritizing power vs. accuracy).

Collaborative Group Stage: Students are divided into groups of five to think together and find solutions, followed by presentation of answers and application of exercises under the guidance of the teacher.

Participation Phase: Opening the door for dialogue to discuss the solutions discovered and consolidate learning, before moving on to the final section, which includes recreational games and relaxation exercises.

Note: The control group continued to receive education according to the traditional method followed by the subject teacher and with the same lesson plan.

Post-tests and Statistical Means

After the end of the program, the post-tests were conducted on December 7 and 8, 2025, under the same conditions and timings as the pre-tests to control for extraneous variables. The researcher relied on the statistical package (SPSS) to process the data and draw conclusions (Abdullateef AbdulJabbar et al., 2025; Fayyad et al., 2026; Hammood et al., 2024).

3. RESULTS

Presentation of the Pre- and Post-test Results for Learning Enjoyment and the Skills Under Study for the Control Group

Table 5. Shows the Arithmetic Means, Standard Deviations, Calculated t-Value, and the Significance of the Differences Between the Results of the Pre- and Post-Tests for the Control Group in the Variables Under Study.

Variables	Unit of Measurement	Control Group				Calculated (t) Value	Significance
		Pre-tests	Post-tests	Pre-tests	Post-tests		
		Mean	SD	Mean	SD		
Learning Enjoyment	Score	5.400	0.516	12.500	0.971	6.830	Moral
Serve Skill	Score	2.300	0.537	4.500	0.408	5.590	Moral
Forehand Groundstroke	Score	2.650	0.579	4.600	0.394	6.210	Moral

The tabular value (t) = (2.262) with degrees of freedom (1-10 = 9) and the significance level (0.05).

Presentation of the Pre- and Post-test Results for Learning Enjoyment and the Skills Under Study for the Experimental Group

Table 6. Shows the Arithmetic Means, Standard Deviations, Calculated t-Value, and the Significance of the Differences Between the Results of the Pre- and Post-Tests for the Experimental Group in the Variables Under Study.

Variables	Unit of Measurement	Experimental Group				Calculated (t) Value	Significance
		Pre-tests	Post-tests	Pre-tests	Post-tests		
		Mean	SD	Mean	SD		
Learning Enjoyment	Score	5.800	0.918	14.700	0.948	3.220	Moral
Serve Skill	Score	2.050	0.368	6.300	0.483	1.690	Moral
Forehand Groundstroke	Score	2.400	0.394	5.600	0.459	2.090	Moral

The tabular value (t) = (2.262) with degrees of freedom (1-10 = 9) and the significance level (0.05).

Presentation of the Post-test Results for Learning Enjoyment and the Skills Under Study for the Control and Experimental Groups

Table 7. Shows the Arithmetic Means, Standard Deviations, the Difference of Arithmetic Means and Their Standard Deviations, t and Sig Values, and the Significance of the Differences Between the Post-Test Results for the Control and Experimental Groups in the Variables Under Study.

Variables	Unit of Measurement	Control Group Post-tests Mean	Control Group Post-tests SD	Experimental Group Post-tests Mean	Experimental Group Post-tests SD	Calculated t-value	Significance
Learning Enjoyment	Score	12.500	0.971	14.700	0.948	7.130	Moral
Serve Skill	Score	4.500	0.408	6.300	0.483	4.400	Moral
Forehand Groundstroke	Score	4.600	0.394	5.600	0.459	5.750	Moral

Tabular t-value = (2.101) at degrees of freedom (10+10-2=18) and significance level (0.05).

4. DISCUSSION

Through the results obtained by the researcher, presented in Table (5) of the tests before and after the experimental group that evaluated learning enjoyment, transmission skills, and forehand strike on the ground, statistically significant differences were observed in favor of the subsequent tests. The researcher attributes the reasons for these differences to the fact that the learning modules, especially the main section, which were prepared according to Wheatley's strategy, included learning exercises similar to match situations. They were characterized by gradual progression and were developed scientifically to align with the students' capabilities, increasing their abilities to adapt and control performance to reach the best execution. What makes achieving the motor objective difficult is obtaining the correct skill performance for tennis skills. (Abdelfattah & Nasr El-Din, 1994) believe that using exercises that align with the nature of their performance and the general shape of the specialized skill performance leads to better results.

Furthermore, (Magill, 1998) affirms that "varying experiences in exercises, organizing them, and variety in movement will increase the student's acquisition and ability to perform the skill better." Thus, the researcher indicates that these differences in using the prepared (Whitley) strategy enhanced the psychological aspect of the desire and enjoyment in the process of learning tennis skills. It also provided motivation for the student and, through her positive and active role, led to the acquisition of skills by applying the strategy's stages (the

tasks stage - the groups stage - the sharing stage) and achieving a good level in learning enjoyment and performing the skills to be taught.

In addition, the results obtained and presented in Table 6 of the pre- and post-test control group, which assesses learning pleasure, submission skills, and skill in practice, show significant differences in favor of post-tests. This shows that the control group, which learned according to the method followed by the subject teacher, also experienced positive learning. The researcher attributes this learning achieved by the group of two officers to the method followed by the teacher, which is represented by the number of educational units specified in the curriculum. It contains exercises that showed an effect in terms of organization, time, and execution in improving the serve and forehand groundstroke skills, focusing on them by the subject teacher in the educational units through transfer of learning, progression in learning, exercise, repetition, readiness, arousal, feedback, and considering the individual differences among learners provided by the teacher to the control group. This is confirmed by (Abdelmajeed, 2014) that the continuous and relative change process in an individual's motor behavior is a result of experience and practice, just as the principle of learning is achieved through gradual acquisition reaching stability in learning, which is an important principle of motor learning.

From the previous results presented in Table 7 of the post-tests to the test groups and experiments that assessed learning pleasure and improved serve performance presented in tennis, there appeared to be significant differences in favor of the post-tests of the experimental group. Hence, the researcher attributes the progress and preference in the learning results between the experimental and control groups in favor of the experimental group in learning enjoyment and the serve and forehand groundstroke skills to the educational units that used the Whitley strategy due to its effective role, direct and distinct impact on the students of the research sample, and clear progress in the psychological (learning enjoyment) and behavioral skill aspect (serve and forehand groundstroke). This strategy emphasizes meaningful active learning through the role played by the students and participation in all activities and exercises within the educational unit, and also through the cooperative groups formed as one of its steps. This led to the effectiveness of education among them, which reflects positively on learning outcomes. This is confirmed by (Hanna, 2018) that programs and educational units that used the Whitley strategy work to achieve advanced results in the level of learned motor skills.

(Saad, 2015) believes that using the Whitley strategy with its stages and steps provides an ideal way to process information for learners and employs their capabilities to receive information and learning stimuli to perceive the educational material, as it relies on activating

memory, which is the primary stimulus for achievement, and that learning styles focus on thinking style.

The problem-based learning strategy or model leads to mastery and quality of the educational process, as the information and knowledge obtained by the learner remain in their mind permanently, retrieving and using them in different situations and thus benefiting from them.

5. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The educational units according to the Whitley strategy have a positive and effective impact on learning enjoyment and improving the performance of the serve and forehand groundstroke skills among the students of the experimental group. The followed method has a positive and effective role in learning enjoyment and improving the performance of the serve and forehand groundstroke skills among the students of the control group. The experimental group that applied the Whitley strategy outperformed the control group that applied the followed method in learning enjoyment and improving the performance of the serve and forehand groundstroke skills.

Recommendations

Recommendations Based on the results of the experiment, the researcher recommends the following: Wheatley's strategy is embraced in tennis lessons due to its great impact on raising the motivation and pleasure of learning. Continuous diversification in the use of modern educational models and strategies to teach basic skills. Holding workshops and training courses to develop teachers' abilities to apply contemporary techniques and strategies. Conduct more similar studies on different samples and other sports within the faculties of physical education and sports sciences.

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