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THE EFFECT OF PROBLEM-BASED LEARNING ON LEARNING THE FOREHAND STROKE SKILL IN TENNIS FOR PLAYERS AT AL-JADRIYA ACADEMY.

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Abstract
The importance of problem-based learning strategy stems from being one of the strategies based on constructivist theory, which supports the idea of active learning. Learning occurs when there is a change in the learner's previous ideas. So, problem-based learning encourages learners to engage in deeper learning, to be independent during problem-solving, and to practice various thinking skills. Tennis is racket sport and is a game with great popularity due to its enjoyable nature. It is practiced by both children and adults alike. Furthermore, it is a competitive individual sport distinguished by its excitement and thrill. The objective of the study was to investigate the impact of problem-based learning on learning the forehand stroke among players at Al-Jadriya Tennis Academy. The research hypothesized that there were statistically significant differences among pre-test and post-test scores for both experimental and control groups in learning the forehand stroke. The research sample consisted of 14 players selected randomly, representing 70% of the total research community, and two players were chosen for the exploratory study. The findings showed that problem-based learning had a positive effect on learning the forehand stroke among players at Al-Jadriya Tennis Academy. The recommendations suggest the necessity of using problem-based learning method in learning and developing other skills in tennis.

Keywords: Problem-based learning, Forehand stroke

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Introduction

The 21st century is characterized by the vast accelerating growth and development of human knowledge. Amidst this acceleration towards progress, traditional methods followed in societies, especially those of third world countries, are no longer as effective as they should be to keep up with scientific advancement. We do not say here that current methods are not useful, but the time has come to transition to a new stage to catch up with the global pace. (Mohsen, 2017, p. 287) There is currently a growing interest in self-regulated learning and its strategies in various learning domains, and it should be strengthened and developed across different stages of growth. (Lim, 2009, p. 606)**.** We are now experiencing a scientific progress, which has cast its shadow over various social and educational domains, where education becomes a means of advancing people and nations and building the present and the future. Therefore, it has become extremely necessary for those involved in the educational process to search for everything new in methods to keep up with and develop the educational process, which helps in building learners scientifically and intellectually to confront the challenges of the future. The teacher's role was previously limited to delivering information and transferring knowledge to students. However, nowadays, with modern developments and the challenges of the contemporary era, their role has evolved and been renewed through the use of modern training curricula that align with the challenges of this era. (Saleem S., 2007, p. 150)

The importance of problem-based learning strategies stems from being one of the theories based on constructivist theory, which supports the idea of active learning. Learning occurs when there is a change in the learner's previous ideas, and it enhances the learner's positivity towards the learning process. It encourages the learner to engage in deeper learning, to be independent during problem-solving, and to practice different thinking skills. (Abu Ataya, 2004, p. 44). The focus on teaching methods represents a qualitative leap in the teaching process that has contributed to the development of teaching in different objectives and contents, especially in the area of individual differences consideration and contribution to teaching behavioral decisions from the minimum to the maximum and reaching the most impactful teaching. In addition, it involves developing learning exercises, organizing them, and scheduling them to suit the learners' abilities, aligning their goals with the goals of the selected teaching methods. (Saleem, 2010, p. 194). Strategies of problem-based learning emerged from constructivist theory, which advocates for students to construct their own knowledge through their direct interaction with the educational situation and with new knowledge, linking it to their previous knowledge. This is based on the idea that learning occurs as a result of a change in the cognitive structure of the learner through exposure to real problems and finding solutions to them in a negotiated environment. (Hassan, 2003, p. 15)

There are several justifications for using a problem-based learning strategy instead of the traditional method. In this method, learners retain little of what they have learned and often do not use the knowledge they acquire correctly. Additionally, they tend to forget much of what they have learned. On the other hand, problem-based learning has three main aspects: it employs information in various real-life situations, aids in its retrieval and connection to previous knowledge, activates and reconstructs previous knowledge to align with new knowledge, and involves learners positively in acquiring knowledge through participation in problem-solving activities. Furthermore, this strategy encourages learners to innovate and think independently, helping them achieve a deeper understanding of the subject being studied through active learning. It also increases their motivation to learn and contributes to the development of critical thinking, leadership, communication, and problem-solving skills. (Abdulqadir & Khalid Fayez, 2014, p. 251)

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motivation to learn and contributes to the development of critical thinking, leadership, communication, and problem-solving skills. (Salih & Sahebb, 2023)

Problem-based learning strategy consists of three stages: tasks, cooperative groups, and participation. Teaching begins with presenting learners with a task that makes them sense the existence of a problem. Subsequently, they are encouraged to search for solutions to this problem by working in small groups. The teaching process concludes with groups sharing and discussing their findings. Researchers have pointed out the effectiveness of this strategy in achieving learning objectives, as well as in presenting content in the form of challenging educational tasks that stimulate thinking. Moreover, it reflects the idea of self-regulated learning through learners' efforts to search for solutions to the problem and develop confidence and critical thinking skills. (Zaytoun Hassan, 2003, p. 36)

Tennis is considered one of the sports that has captured the interest of many. It is one of the racket sports and enjoys great popularity due to its enjoyable nature, attracting both young and old alike. Tennis stands out among other competitive individual sports for its excitement and thrill. Its fundamental skills are crucial and should be developed. This sport offers a unique pleasure and strong competition, in addition to enhancing the player's physical, skillful, and strategic abilities. Scientific advancements in this field have reached their peak, evident in matches lasting up to four hours or more. Hence, we can say that tennis garners a wide following and interest from spectators, enthusiasts, and athletes alike. It is characterized by a variety of skills required as basic prerequisites for its practice; thus, learners must master them at a good level. Furthermore, tennis is one of those sports that make learners feel satisfaction and joy while learning. (Al-Musalma Ahmad, 2014)

The problem of learning through observing the training of players at Al-Jadariya Tennis Academy highlighted that many players make mistakes while learning the forehand groundstroke skill and perform the skill with very little accuracy. This leads to difficulty in learning the skills, including the forehand groundstroke. Therefore, the researcher sees the need to find new methods and approaches in the learning process to achieve a better learning method that suits the forehand groundstroke skill. In light of the above, the researchers believe that there is a need to experiment with new models and modern methods of teaching the forehand stroke. Since there is no study on the effect of adopting the problem-based learning model on the performance level of some advanced tennis skills, and considering that problem-based learning gives players the opportunity for freedom of thought and learning, the researchers conducted this research to understand the effect of problem-based learning on learning the forehand groundstroke skill among players at Al-Jadriya Tennis Academy, aiming to improve their performance."

Research Objective:

1- Identifying the effect of problem-based learning on learning the forehand stroke skill among the players of Al-Jadriya Tennis Academy.

Research Hypotheses:

1- There are statistically significant differences among pre-test and post-test scores for the experimental and control groups in learning the forehand stroke skill among the players of Al-Jadriya Tennis Academy.
2- There are statistically significant differences in the post-test scores among the experimental and control groups in learning the forehand stroke skill among the players of Al-Jadriya Tennis Academy.

Research areas:

- 1-5-1 Human: Players of Al-Jadriya Tennis Academy in Baghdad aged 12 years.
- 1-5-2 Temporal: January 23, 2024, to February 25, 2024.
- 1-5-3 Spatial: Courts of Al-Jadriya Tennis Academy.

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Research Methodology and Procedures:
2 Procedures:
2-1 Research Method:

The experimental method with both control and experimental groups and pre-test and post-test was employed due to the suitability of the problem.

2-2 Research Sample and Community:

The research community was determined intentionally, as it consisted of 20 players from the Jadriya Tennis Academy. The research sample included (14) players who were chosen by lottery and who represent (70)% of the total research community. (2) persons were chosen for the exploratory experiment from outside the research sample. They were divided into control and experimental groups by random means (by lottery), with (7) players for the experimental group and (7) persons for the control group. Table (1) shows the homogeneity of the research sample.

Standard deviation	Mean	Arithmetic mean	Measuring unit	Variables	Skewness coefficient
6.76	156.8	162.75	Cm	Height	0.38
4.55	56.5	59.71	Kg	Weight	0.36
1.02	7.00	6.75	Month	Age	-0.19

It is obviously shown from Table (1) that all the values of the skewness coefficient are within the range of (±3), indicating the symmetry of distributing the research sample's variables. This achieves homogeneity of the sample in the whole variables under research.

Table (2) illustrates the equality of the sample variables in the pre-test.

Variables	Measuring unit	Control group		Experimental Group		Calculated T value	Sig.	Real significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Forehand stroke	Degree	20.19	1.22	23.28	0.90	1.63	0.9	**Non-sig.**

Data Collection Methods, Tools, and Equipment Used:
Data Collection Methods:

- Sources and references.
- (Internet).
- Experimentation and observation.
- Personal interviews and expert opinion surveys.
- Tests and measurements.

Tools and Equipment Used:

The tools of research are the means whereby the researcher can address their problem, whether those tools are statistics, samples, or devices.

- Tennis court.
- (8) Tennis rackets.
- (20) Yellow tennis balls.

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- (1) tape of measurement.
- (4) Coloured adhesive tape to mark court areas in tests.
- (14) Signs.
- (1) Folding scale.
- A whistle.
- Video camera.
- Electronic timing watch (1).
- Laptop computer (Dell, 1).

Forehand Stroke Skill Test:

Purpose of the Test: To measure accurateness in forehand strokes.

Procedures:

- The court is laid out as illustrated in Figure (3).
- The rope shall be fixed at both ends to both posts of the net, parallel to them and at a height of (7) feet from the ground and (4) feet from the net.
- Five parallel lines are drawn among the service line and the baseline, each line being 4.5 feet apart.
- Numbers (1-2-3-4-5) indicate the grades specified to each area where the ball falls.
- The player shall stand on the midline mark at point (A) between the baseline and the centerline, while the coach stands at point (B) opposite the player with a basket filled with tennis balls and a tennis racket.
- In an attempt to get the highest score in area number five, the coach shall hit the ball with the racket to the player standing beyond the service line. The player then positions themselves to hit the ball with forehand strokes to pass over the net and under the rope and fall into the designated areas in the middle of the court.
- The player repeats the previous performance for (10) attempts consecutively for training purposes.
- The test starts once the player executes the performance (10 times), meaning (10) balls in the same manner.
- In entire attempts, the coach hits the ball in a consistent and legal manner as much as possible to simulate actual court positions.
- The player has the right to start with either forehand or backhand strokes.
- Score Calculation: The returning ball passing over the rope is not counted as an attempt.
- The player's score is the total points obtained from correctly hitting ten balls (Alawi Mohammed Hassan, Mohammed Nasrl-Din, 1987, page 256).

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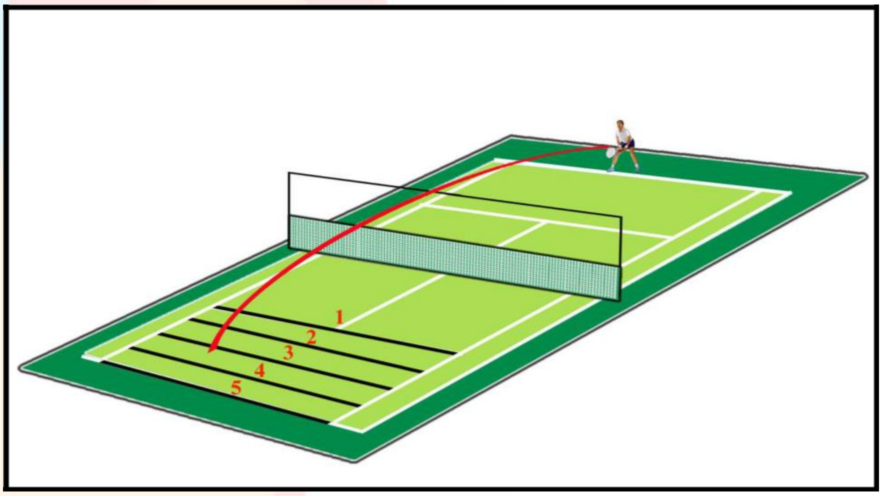

2-4 Exploratory Experiment:
Experts in scientific research stress the need to conduct exploratory experiments for the tests adopted in research because they are preliminary studies conducted by the researcher on few sample members before making their main research. This is done to attain reliable results and the necessary information to be used when carrying out the main experiment. Based on this principle, the researchers applied an exploratory experiment to (2) players with the following objectives:

- Identifying work obstacles that the experiment might face.
- Determining the time needed to execute the experiment and tests.
- Familiarizing the assisting team with the nature of the tests and assessing their competency.
- Ensuring the validity of tools and equipment.
- Assessing the understanding and responsiveness of the sample to the tests.
- Planning and dividing the tests.

2-5 Pre-Tests:
Pre-tests were made on Sunday, January 21st, 2024, at 4:00 PM on the outside tennis courts with the sample before initiating the application of exercise routines and organizing the test tools. The researchers gave a brief description of how to perform the tests and their sequence, and the arrangements for the tests, such as location, time, and execution method were fixed to achieve the same situations as much as possible during the subsequent post-tests.

2-6 Main Experiment:
The test was applied to the research sample using the problem-based learning method in the experimental group. The program lasted for 6 weeks, starting from January 23, 2024, to February 25, 2024. The training sessions were conducted twice a week on Sunday and Tuesday, with each session lasting for 90 minutes. The program was designed to consider individual differences among players and to prioritize safety factors. The exercises used were graded from easy to difficult, and the educational program included three stages: tasks, cooperative groups, and participation. The experimental group used the problem-based learning approach, whereas the control group followed the method traditionally adopted by the coach.

2-7 Post-Tests:
After ending up the exercise application for the sample, the researchers carried out post-tests on February 27, 2024, at 4:00 PM on the experimental group. The same conditions and procedures followed in the pre-tests were maintained to ensure more precise results. The data were then statistically analyzed to

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determine the impact of the approach by comparing the results with those of the pre-tests for the variables under research.

2-8 Statistical Methods:

Data processing was carried out using the (SPSS).

Discussion of Results

Table (3) illustrates the arithmetic means, standard deviations, and calculated t-value among the pre-test and post-test for the experimental group in the forehand stroke.

Variables	Measuring unit	Pre-test		Post test		Calculated T value	Sig.	Real significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Forehand stroke	Degree	**23.85**	**3.80**	**33.71**	**2.75**	**9.87**	**0.000**	**Sig.**

Less than the sig. level (0.05) and with 6 degrees of freedom.

The arithmetic mean in the pre-test for the forehand stroke was 23.85, with a standard deviation of 3.804. In contrast, the arithmetic mean in the post-test was 33.71, with a standard deviation of 2.751. The average mean difference among the pre-test and post-test scores was 10.86, with a standard deviation of 2.911. The calculated t-value was 9.872, whereas the calculated t-value was 1.942 at a significance level of 0.05 with 6 degrees of freedom. Since the calculated t-value is higher than the calculated t-value, this indicates that there are statistically significant differences among the pre and post-test scores, in favor of the post-test.

Table (3) demonstrates statistically significant differences among the pre-tests and post-tests, favoring the post-test for the experimental group in the forehand stroke. The researcher attributes the observed development in the experimental group to problem-based learning, which facilitated diverse activities leading to skill acquisition. This learning approach allowed players to comprehend, interpret, and draw conclusions by themselves. Additionally, it helped them understand the execution of the skill by presenting the problem, engaging players in discussions, dialogues, and listened to their peers within the group. Moreover, they contemplated the presented model and attempted to realize the components of the skill and devise solutions to solve the issue. This approach took into account the individual differences among players. This finding aligns with Abu Jadou and Noufal (2017), who suggest that problem-based learning provides players with cues and resources to develop problem-solving skills.

Table (4) illustrates the arithmetic means, standard deviations, and calculated t-value among the pre-test and post-test for the control group in the variables under research.

Variables	Measuring unit	Pre-test		Post test		Calculated T value	Statistical significance	Real significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation			
Forehand stroke	Degree	**25.14**	**3.83**	**26.71**	**2.058**	**3.16**	**0.000**	**Sig.**

Less than the sig. (0.05) and with 6 degrees of freedom.
The arithmetic mean in the pre-test for the forehand stroke was 25.14 with a standard deviation of 3.83. In contrast, the arithmetic mean in the post-test was 26.71 with a standard deviation of 2.058. The average of the arithmetic means for the differences was 2.57, whereas the standard deviation for the differences was 2.149. The calculated t-value was 3.165, whereas the tabulated t-value at the significance level of 0.05 and 6 degrees of freedom was 1.942. Since the calculated t-value is higher than the tabulated t-value, it indicates statistically significant differences among the pre-test and post-test, in favor of the post-test. This suggests an enhancement in the experimental group due to adopting the coach's method, which included skill explanation, model demonstration, technical error correction, and feedback provision.
Table (5) illustrates the arithmetic means, standard deviations, and calculated t-value among the experimental and control groups in the post-test for the forehand stroke.

Variables	Measuring unit	Experimental group		Control group		Calculated T value	Statistical significance
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
Forehand stroke	Degree	35.71	2.75	27.71	2.056	5.70	Sig.

Below the level of sig 0.05 and with 12 degrees of freedom.
The arithmetic mean for the experimental group in the forehand stroke post-test was 35.71 with a standard deviation of 2.751, whereas the mean for the control group was 27.71 with a standard deviation of 2.056. The calculated t-value was 5.706, whereas the tabulated t-value at the 0.05 significance level and 12 degrees of freedom was 1.782. Since the calculated t-value is greater than the tabulated t-value, it indicates statistically significant differences among the pre-test and post-test, in favor of the experimental group.
Table (5) reveals significant statistical differences among the experimental and control groups in the post-test for the forehand stroke, favoring the experimental group. The researchers ascribe this superiority to problem-based learning exercises conducted with the experimental group, which is considered one of the best methods for learning basic skills such as the forehand stroke. This method places the learner at the core of the educational process, catering to individual differences and providing excitement and variety in exercises, enabling understanding, interpretation, and problem-solving. Additionally, the use of assistive devices is fundamental for effective learning and training, as they alleviate the learning burden (Susan Salim Dawood, 2019, p. 573).
Based on these findings, the researchers concluded:

1. Problem-based learning has a positive impact on learning the forehand stroke skill in tennis for players at Al-Jadriya Academy.
2. The experimental group, which adopted problem-based learning, outperformed the control group.

Recommendations:

1. The problem-based learning approach should be adopted in learning and developing other tennis skills.
2. Conducting similar research on various samples, educational stages, and various skills.
3. The importance of further studies to understand the significance of problem-based learning.

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