



The Impact of the Gerlach and Ely Model on Learning Forehand and Backhand Strokes in Tennis for Female Students

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Abstract

The current study aimed to improve educational units based on the Girac-Ely model for teaching female students the forehand and backhand stroke skills in tennis. The researcher used an experimental design with a control group and an experimental group employing pre- and post-tests. The research population included a sample of 71 female students from Al-Fahoud High School for Gifted Students during the 2025-2026 academic year. The research sample consisted of 30 students divided into experimental and control groups of 15 students each. Four students were selected for a pilot study. A curriculum was developed incorporating the Girac-Ely model, consisting of 14 educational units. The forehand and backhand stroke test was used to measure the sample's progress. Data were statistically analyzed using SPSS. The researcher concluded that the Girac-Ely model had a positive impact on learning the selected skills and recommended its adoption for tennis players' learning and development as well as its integration into sports activities. Other.

Keywords: Gerlach and Ailey model, teaching units, forehand and backhand stroke skills, tennis.

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Introduction:

Life in general has witnessed remarkable and important development in its different fields thanks to the efforts of scientists and specialists who followed the right scientific methods and formulas for this objective.

Among these fields is sports and physical education.

The structure of the educational process is based on three main variables: the teacher, the learner and the learning objective. Each of these variables has a specific environment that connects with each other and shapes the outcome of the educational process. Therefore the focus has shifted to maximizing the use of learning environments which is vital for achieving effective learning.

The teacher's learning environment includes teaching skills, teaching style and method, assessment, teaching performance outcomes, feedback practices, etc. The learner's learning environment includes the learner's characteristics (age, gender) prior experience, abilities (individual differences), methods and techniques for scheduling and organizing exercises, skill features, motivation and spatial organizational options for the learning environment linked to organizing the learner's activity performance, etc.

It appears that the element that determines the use of a specific model over others is the educational situation, the characteristics of the students, their needs and the environment of the educational content that is intended to be achieved with the students.

"Using strategies in teaching means taking into account all the possibilities and alternatives available to achieve planned educational goals."

Tennis is one of the games that has gained popularity and a large following for playing and watching its exciting and thrilling matches. It relies on mastering motor skills given the high level of physical, technical and tactical preparation required by this game as well as psychological and educational preparation in order to reach the needed level of performance.

Therefore, it has become crucial for the teacher to choose the best methods, techniques and suitable educational models for teaching in order to reach the set goals in the fastest time and with the least effort.

From this starting point the researcher embarked on a renewed applied scientific endeavor in this field depending on expert opinions and available research and studies specializing in teaching methods and techniques. The hope is to present fruitful teaching alternatives and succeed in producing scientific output that strengthens the academic applied scientific research process. This may open new horizons in the use of teaching methods in other forms and enrich the Iraqi library with this modest effort. The significance of the current research depends in:

The model adopts a systems approach to designing the learning environment, defining inputs, processes and outputs This means emphasizing instructional design as an integrated process to achieve unified goals. The model emphasizes the teacher as a designer of the learning environment not merely a transmitter of information, lecturer or memorizer. The teacher is responsible for preparing learning situations, developing teaching strategies, organizing work groups, determining the time required for each strategy, organizing and defining the learning space, selecting learning resources and evaluating the outcomes of the learning process.

Through the researcher's presence and work in teaching in secondary schools and by benefit of her practice of tennis through the physical education and sports science curricula and her following of many sports including tennis the researcher noticed that most of the female students do not master the game and its skills as well as the difficulty of learning it in addition to the absence of time in their physical education class and the lack of use of models, methods and teaching techniques to facilitate learning it. Therefore the researcher sought to represent a new method in the field of physical education and its sciences (the Girac-Ely model) which in turn can help them to rely on themselves in setting educational goals for the backhand and forehand stroke skills in tennis for secondary school students. The issue was defined by the following question: Does the (Girac-Ely model) have a positive effect on learning to perform the forehand and backhand strokes in tennis for female students? Developing educational units using the Girac-Ely model focusing on teaching forehand and backhand strokes in tennis and applying these skills to third-year middle school students at Al-Fahoud High School for Gifted Students. Identifying the effect of the Girac-Ely model on students' learning of forehand and backhand strokes in tennis.

The research hypothesized that instructional design using the Girac-Willi model had a positive effect on students' learning of the forehand and backhand strokes in tennis compared to the control group as demonstrated in both the pre-test and post-test.

Methods and Instruments:

The researcher used an experimental approach with two groups (control and experimental) because it was suitable for the nature of the problem and the research objectives. As Ibrahim Raouf (2021) states, "The experimental approach is distinguished from other scientific approaches by its ability to control and regulate many factors that may influence the studied behavior. It also allows for the discovery of methods and results leading to the formulation of the theory and the law." The research population was defined as third-year intermediate school students at Al-Fahoud High School for Gifted Students affiliated with the Dhi Qar Education Directorate, for the 2025-2026 academic year. The total number of students was (71). A lottery method was used to select the sample with (15) students chosen for the

control group (15) for the experimental group, and (4) for the pilot study. Thus the percentage of the research sample was (42.25%) of the original research population. The sample was homogenized by conducting homogenization procedures for the research sample members based on the variables of age height and body mass index.

Table1. shows the Homogeneity of the Research Sample in the Variables (Height, Age and Body Mass)

No	Variables	Unit	Mean	Standard deviation	Median	Coefficient
1	Height	Cm	20.01	0.02	19	0.65
2	Age	Year	171.32	2.69	168	0.07
3	Body mass	Kg	66.53	3.21	64	0.45

Tests Used in the Research

The researcher used suitable skill tests for the research sample in tennis, particularly for the forehand and backhand strokes.

The White test for both forehand and backhand strokes.

Test Objective: To measure the accuracy of the forehand and backhand strokes.

Test Description:

-This test is carried out on a standard tennis court. A racket, a tennis ball, a scoring form and a rope are provided as shown in the diagram, illustrating the test subject's positioning, the test procedure and the scoring system.

- A rope is attached to two posts at the top and bottom of the net, parallel to the net at a height of 7 feet from the ground and 4 feet from the net.

- Three parallel lines are drawn between the service line and the baseline, with a distance of 4.5 feet between the lines. The player stands at the center mark, located at the midpoint of the baseline and is given five practice attempts to assess their performance This is done after receiving instructions from the coach provided the ball is thrown directly over the service line using a pitcher (if available) or the coach. The player then attempts to return the ball with their racket using either a forehand or backhand stroke. Each player is allotted ten forehand and ten backhand stroke attempts. The player's score is the sum of the points earned from these ten attempts. The ball must pass through the net and under the rope. The player receives progressively higher scores from 1 to 5. If the ball passes over the rope half the score is awarded for the correct area it lands in.

***The highest score for the test is 50, and the lowest is 0.**

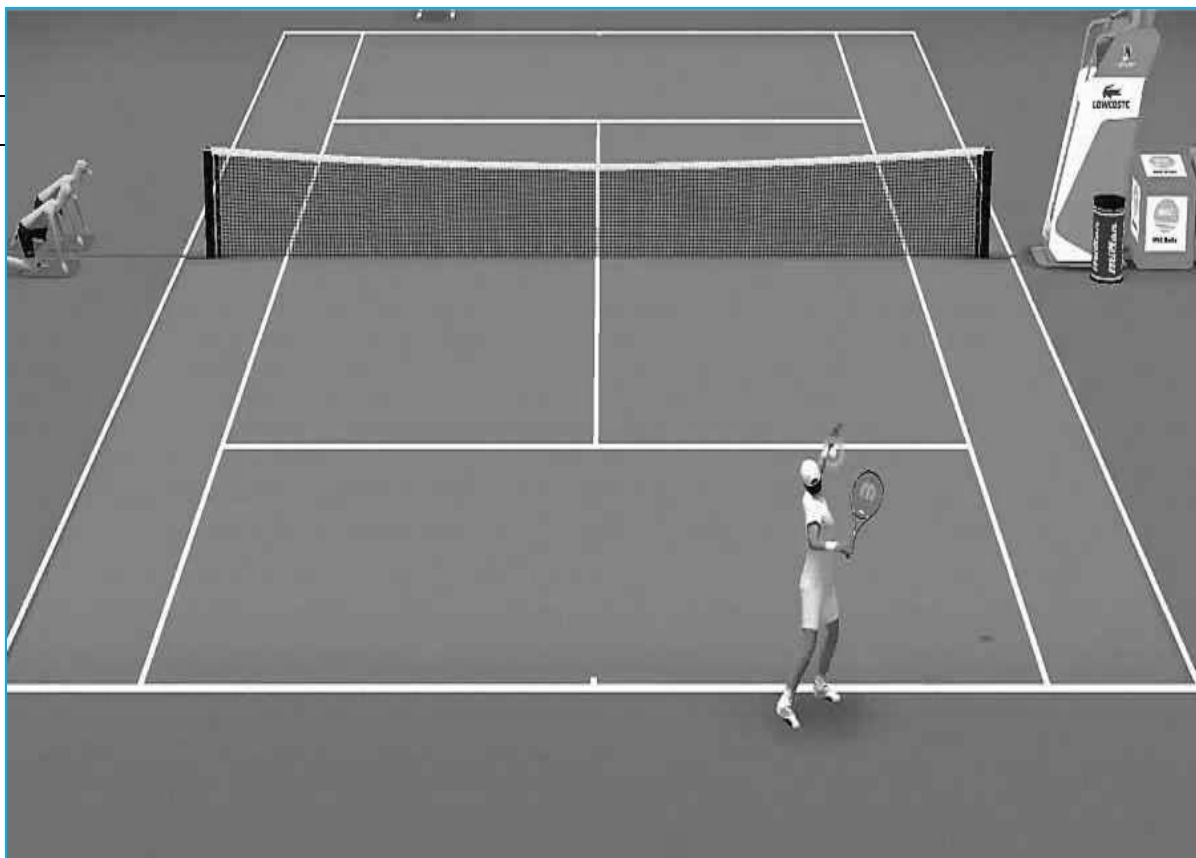


Figure (8) illustrates the front and back stroke test.

Scoring: The player's score is the sum of the points he gets from hitting (10) balls with a front or back stroke and the maximum score for the test is (50) points.

Exploratory experiment

Exploratory research means "exploring the surrounding circumstances of the phenomenon that the researcher wishes to study".

The exploratory experiment was carried out on Sunday, (12/10/2025) at (9:00) AM on (4) female students from the research community and lasted (1:30) hours in the tennis court of the school / Dhi Qar Education.

Objective of the exploratory study

- Identifying the obstacles that may occur during the implementation of the study and working to solve them and avoid their occurrence.
- Preparing training facilities and guaranteeing the suitability and organization of tools and equipment

- Ensuring the competence of assistants and training them to execute tests in a standardized scientific manner
- Calculation and estimation of the total time in carrying out the tests for each player to establish the total time for the players and the learning unit during the application of the current study on the research sample.
- Conducting the scientific procedures for the tests used.

Field research procedures :**Pre-tests:**

The researcher conducted pre-tests for the research sample from 15-01-2025 to 18-10-2025 All the conditions for the test were fixed and the tests were explained before application so that the research sample could understand the test. The assisting team was present and all test results were recorded.

Main experiment procedures:

After finalizing the pre-tests on the research sample and before explaining the educational units to the students an educational unit was given to the sample on 16-10-2026. After that the special educational units (Girac and Elly model) were implemented for the academic year 2025-2026 for the period from 19-10-2025 until 6-2-2026. The curriculum contain (14) educational units to be implemented during the time of the physical education lesson for the students. They were distributed as (7) educational units to learn the front stroke and (7) educational units to learn the back stroke. After that, (2) educational units were prepared to combine the two skills at a rate of (2) units per week and a time of (45) minutes. The time was divided as follows: (Preparation section (5) minutes main section (35) minutes, and final section (5) minutes. The main section (the educational aspect of the model and the practical aspect of the two skills) was select to be used to apply the Girac-Willi model.

Post-tests:

The researcher conducted the post-tests on the research sample on 14-2-2026, after completing the implementation of the educational units of the curriculum (Girac-Willi model) with (14) educational units. The researcher provided the same conditions under which the pre-tests were conducted.

Statistical methods

The researcher used the Statistical Package for the Social Sciences (SPSS) to procedure the test depending according to the following rules:

- ✓ Arithmetic mean.
- ✓ Standard deviation.
- ✓ The mediator.

- ✓ Percentage.
- ✓ Torsion coefficient.
- ✓ (T.test) for related samples.
- ✓ (T.test) for independent samples.
- ✓ Pearson's simple correlation coefficient.

Presenting, analyzing and discussing the results

Presenting the results of the arithmetic means, standard deviation and calculated (t) value for the pre-test and post-test for the experimental group.

The arithmetic means and standard deviation of the pre- and post-tests of research skills for the experimental group are shown.

Table2. Shows the Arithmetic Means and Standard Deviations of the Pre-test and Post-test for the Research Skills of the Experimental Group

No.	Variables	Unit measurement	Pre test		Post test	
			س	ع	س	ع
1	Forehand stroke	Degree	1.62	0.18	2.72	0.26
2	Backhand stroke	Degree	1.14	0.27	2.70	0.11

Table3. Shows the Mean Differences (MD), Standard Error (SE) and Calculated t-Values for the Pre-test and Post-test Results of the Skill Variables in the Experimental Group.

No.	Variables	Differences	Differences deviation	Calculated t-Values	Standard Error	Significance
1	Forehand stroke	0.69	0.28	5.75	0.001	Significant
2	Backhand stroke	1.09	0.29	9.72	0.000	Significant

Presentation and Analysis of the Arithmetic Means, Standard Deviations, and t-Values for the Pre-test and Post-test of the Control Group.

Table4. Shows the Arithmetic Means and Standard Deviations of the Pre-test and Post-test Results for the Forehand and Backhand Tennis Skills of the Control Group.

No	Variables	Unit measurement	Pre test		Post test	
			Mean	Deviation	Mean	Deviation
1	Forehand stroke	Degree	1.66	0.42	2.52	0.33
2	Backhand stroke	Degree	1.34	0.24	1.70	0.21

Table 5. Shows the Mean Differences (D), Standard Error, and Calculated t-Values Between the Pre-test and Post-test Results for the Skill Variables of the Control Group

ت	Variables	Differences	Differences deviation	Calculated t-Values	Standard Error	Significance
1	Forehand stroke	0.93	0.40	4.45	0.000	Significant
2	Backhand stroke	1.48	0.44	2.76	0.003	Significant

3-4Presentation, Analysis, and Discussion of the Arithmetic Means, Standard Deviations, and Calculated t-Values for the Pre-test and Post-test Results of the Control and Experimental Groups.

Table6. Shows the differences between the experimental and control groups in the post-tests of the research variables.

ت	Variables	Unit measurement	Experimental Group		Control Group		Calculated t-Values	sig	significance
			س	ع	س	ع			
1	Forehand stroke	Degree	2.79	0.22	2.47	0.32	1.93	0.000	Significant
2	Backhand stroke	Degree	1.79	0.13	1.81	0.23	1.87	0.000	Significant

Discussion:

The current study goal to explain the impact of the systems approach model (the Girac-Ely model) on the achievement and scientific thinking of fifth-grade science students. The Girac-Ely model is based on the premise that the teacher is not merely a transmitter of knowledge a carrier of information, a lecturer, or a memorizer. Rather the teacher is the organizer of the educational process and is responsible for preparing the learning situation, improving teaching strategies, organizing work groups and determining and allocating time.

What is crucial for each strategy is allocating the space, equipping its facilities and organizing it as well as

The selection of learning resources as well as the evaluation, whether preliminary or final and in light of the latter

The extent to which the objectives of this situation have been attained can be inferred from feedback.

His analysis of the results acquired from the final assessment

By presenting and analyzing the post-test results for the (forehand stroke, backhand stroke) tests in Table (4) for the control and experimental research groups it became clear that there were significant differences between the tests in favor of the experimental group. The researcher attributes this to several reasons including:

The educational units in the experimental group and the teaching mechanism using the Girac-Willi model for learning the two skills of the forehand and backhand stroke in tennis and through what was presented in presentations and explanations of the two skills in an illustrative manner as this model used in the educational curriculum for the students has clearly contributed to organizing the work and stimulating thinking among the learners in the experimental group. This is what was verified by (McGown, 2000) when she said, “The successful completion of learning and the learner’s attainment of experience and a good degree of the mechanism takes place before moving on to learning another skill.”

The researcher indicates that the superiority that accompanied the experimental group in performing skills over progress in educational units is due to the correct use of educational units. This is what Naheda Al-Dulaimi (2016) indicated: the great variety in exercises and the difference in their conditions which are based on scientific foundations and educational principles which aim to enable the learner to reach the best possible performance in the various activities and events.

The researcher also characteristics these significant differences to the fact that the elements of repetition and variety in the prepared exercises have a great effect on expanding the players' perceptions and concepts in order to understand the skill its ease and clarity as practice and effort in training and continuous repetition are necessary in the learning process.

Practice is a helpful and necessary factor in the process of the individual's interaction with the skill controlling his movements and achieving coordination between the movements that make up the skill in a correct sequential performance and appropriate time. The researcher attributes this superiority in skill performance and its accuracy to the similarity of the prepared particular exercises with the nature of protective skills performance which led to the improvement and development of technical performance its accuracy and clarity of the educational objectives of each educational unit and its harmony with the athlete's level.

The researcher also sees that the experiences and information that learners acquired during the educational units came as a result of the learners' desire and incentive and diversity since the generation of desire and motivation in the learner makes him reach a level of good performance.

The researcher also attributes this superiority in learning to perform the skill of the front and back ground stroke to the suitable application of the vocabulary of the educational units as well as introducing the learner to the type of skill and how to perform each of its forms and the purpose of using it with a description of the conditions under which the learner will perform the motor behavior and providing the learner with skills to deal with the tool and focusing on the mechanics of movement to ensure economy of time and effort.

Conclusions and Recommendations

Conclusions

- 1- The (Girac-Ely model) is one of the modern models that contribute to resolving many problems during the learning process.
- 2- The model contributes to attracting students' attention and engaging them with the needed information and following up on requirements through their awareness of the findings of their responses (feedback).
- 3- The collaborative teamwork among the students contributed effectively to learning the two skills of the forehand and backhand strokes in tennis for the female students.
- 4- The method used by the teacher using the (Girac-Willi model) contributed to the speed of the students' learning of the two skills, the forehand and hidden stroke in women's tennis.
- 5- The use of the (Girac-Ely model) had a good impact on the experimental group which achieved a greater rate of improvement than the control group which works on the traditional method of the teacher.



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Recommendations

- 1- Adopting the Girac-Willi model in teaching some other sports skills and different skills (volleyball, badminton, basketball etc.).
- 2- The need to introduce assistive tools (visual presentations) in physical education lessons in order to view the parts of the skill in detail to speed up the learning process.
- 3- administer a similar study using the Girac-Ely model and other teaching models to determine the level of performance and learning in tennis skills.
- 4- The need to hold training and educational courses for physical education teachers in secondary schools to use the most important models methods and modern techniques that have been introduced into physical education and sports science.



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