

# The Effectiveness of the Form Model For the Two Hemispheres of the Brain in the Technical Performance of Some Female Badminton Skills

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## Abstract

Through the presence of researchers in the field of teaching and training for most activities of racket games in general, and playing badminton in a special way in the College of Physical Education and Sports Sciences - University of Kerbala, they found that most female students in the second stage suffer from difficulty in performing badminton skills, knowing that it is one of the subjects taught at this stage, and through extensive study and investigation about finding solutions to this problem, the researchers decided to rely on the application of a teaching model aimed at investing the energies of the brain and dealing with the tendencies and desires of the learner, a research that the educational curriculum addresses all learners, this is what motivated the researchers to prepare a new educational curriculum with all its contents according to the characteristics of the two hemispheres of the brain using the format model to learn some basic skills for the female students in badminton, and the objective of the research is to prepare an educational curriculum using the (4MAT) model according to the two hemispheres of the brain to learn some skills of the badminton, and to identify the effectiveness of the educational curriculum by using the (4MAT) model according to the two hemispheres of the brain in learning some badminton skills for female students. The researchers used the experimental approach by designing (one group with pre and post- test) in order to suit the nature of the problem and achieve the research objectives. The most important conclusions were that the educational curriculum, using the (4MAT) model according to the two hemispheres of the brain, contributed to learning some basic skills for female students with badminton. The most important recommendations are the necessity of adopting educational curricula according to the (4MAT) model in learning basic skills with badminton.

**Keywords:** *hemispheres, brain, female, skills, technical performance.*

## Introduction

Brain learning is based on the fact that every person has a unique brain, and he is able to learn and acquire if the appropriate conditions are provided for him, and his learning abilities increase <sup>1</sup> by stimulating and activating his neurons by forming the largest number of nerve connections with other neurons, the brain is a complex adaptive system unique is able to handle more than one task in parallel, and brain-based learning confirms that the difference between learners in learning and thinking patterns is due to their reliance on one of the two hemispheres of the brain to receive and process information, and that the learner can learn better when both hemispheres of the brain participate in processing,

storing and retrieving information, and that the researcher agrees with this trend in the importance of integrated brain-based learning and not as parts because <sup>2</sup> it works to develop thinking and increase cognitive achievement and this has been confirmed by many studies in the field of application of this type of learning.

Some teachers used to give lectures that were specified and chosen based on the desire and style of the teacher himself, as most teachers believe that the method that he feels is suitable for learning and fixing information is presented to learners because he believes it is suitable for all, forgetting their preferences, desires and preferences in the learning process, that what distinguishes <sup>3</sup> a successful and distinguished teacher is working and

walking according to educational concepts and theories and is keen to understand the aspects and influences of the educational process and applies measures that help learners to consolidate knowledge and provide them with the skills and targeted experiences, and designing educational units and providing appropriate means for his students, not what suits him as a teacher, and among these methods and models is the (4MAT) <sup>(1)</sup>.

Badminton is one of the racket games that most of its skills are open-ocean, as each skill has its own movement program, and the main motor program for each skill contains a number of sub-motor programs that differ in (strength, speed, direction) and so there are many responses in the program the single kinesthetic for each of the badminton skills, and the motor program is an important and fundamental goal in kinetic learning to prepare the athlete and form situations similar to competition conditions that are characterized by a variety of speeds, times and distances, and here lies the importance of research in the researchers' attempt to design an educational approach according to the steps of the (4MAT) model and according to the two hemispheres of the brain to learn some skills of the badminton <sup>4</sup>.

**Research problem:** Through the presence of researchers in the field of teaching and training for most activities of racket games in general and playing badminton in a special way in the College of Physical Education and Sports Sciences - University of Karbala, it was found that most of the students in the second stage suffer from difficulty in performing badminton skills, knowing that it is one of the subjects taught at this stage, and through the extensive study and investigation on finding solutions to this problem, the researchers decided to rely on the application of a teaching model aimed at investing the energies of the brain and dealing with the tendencies and desires of the learner in a search that the educational curriculum addresses all learners, and this is what called the researchers to prepare a new educational curriculum with all its contents according to the characteristics of my two parts the brain using the (4MAT) model to learn some basic skills of badminton for female students.

**Research objectives:**

- Preparing an educational curriculum using the (4MAT) model according to the two hemispheres of the

brain to learn some badminton skills.

- Identify the effectiveness of the educational curriculum using the (4MAT) model according to the two hemispheres of the brain in learning some badminton skills for female students.

**Research hypothesis:** The educational curriculum using the (4MAT) model according to the two hemispheres of the brain has a positive effect on learning some basic skills of badminton for female students.

**Research fields:**

**The human field:** Second stage female students of the College of Physical Education and Sports Sciences - Karbala University for the academic year 2018-2019.

**Time field:** from 1-11-2018 to 30-1-2019.

**Spatial field:** The closed hall in the College of Physical Education and Sports Sciences - Karbala University.

Theoretical studies:

**The concept of the (4MAT) model <sup>(2)</sup>:** This system was developed by Bernice McCarthy in 1987 and its name (4mat) is based on the individual learning style and on the way of thinking according to the left and right hemispheres of the brain. This system was known by a set of definitions, including the following:

- It is a practical system for communicating information in a way that fits all students' learning styles and allows them to practice and make good use of all learning materials during the educational units. The format system encouraged teachers to pay attention to (why) and how the learner learns and not just what he learns.

- It is an educational system that translates the concepts of learning styles into an educational strategy, running in a quadruple learning cycle of successive stages, namely (contemplative observation, conceptual crystallization, active experimentation, and tangible material experiences.

- An educational system based on motivating learners and mastering scientific concepts and their applications, and creative synthesis.

The (4MAT) model was developed by the scientist McCarthy, based on Kolb's classification of learning styles, and the four learning styles are based on different approaches to receiving and processing information. According to the learning cycle that begins with direct experience, then interpretation of experience, formation of special concepts, then acting towards experience, reaching a new experience.

**The (4MAT) model and its relationship to the two hemispheres of the brain <sup>(3)</sup>:**

Each style of learning is linked to the two sides of the brain, and the (4MAT) model is designed so that each learner is provided with his favorite task during each lesson, so it can be said that despite the brain being divided into two halves, they work in harmony and complementarity, as each performs its own functions with which it integrates with the other half, one of the assured assumptions according to the principle of individual differences is that learners vary between those who possess higher capabilities in the right hemisphere, and some of them possess higher capabilities in the left hemisphere or those who possess distinct abilities for both halves, and from here the educational curricula must be presented through their goals, scientific content and activities the methods of evaluating them satisfy the two hemispheres of the learner's brain, likewise, the teacher must use teaching methods and strategies that work to develop and refine the capabilities of the spherical hemispheres. The teacher must take into account that the brain is not affected or developed by meaningless information, but rather develops according to an integrated system over time, and that its nature depends on the link between the old and the modern, and that it is genetically characterized as social and cooperative. In light of the foregoing, the term learning and thinking styles appeared, meaning the use of one or both of the spherical hemispheres of the right or left brain, or both (integrated) in the treatment of mental or behavioral processes, after applying the cerebral mastery of the two hemispheres of the brain over its learning role in the (4MAT) model, we have an eight-stage model, as follows:

The (4MAT) form steps <sup>(4)</sup>:

First Stage : Connect (First Quarter / Right Side):

This step is designed to encourage learners to acquire sensory experiences that lead them to research their previous experiences and knowledge, and in it a collective interactive dialogue takes place that leads to a link between the knowledge and beliefs of the learners and what teachers intend to acquire them from knowledge, and there are no correct answers in this dialogue, the teacher should encourage learners to diversify ideas, dialogue, participation, present concepts from a personal perspective, and attract their attention, depending on solving problems, starting with similar situations among learners, building in light of their previous knowledge and facilitating the work of cooperative teams, and at this stage, encouragement, collective participation and idea generation can be evaluated.

Second stage : Attend (First Quarter / Left Side):

In this stage, the participation and dialogue that took place in the first stage is judged (evaluation), and in it the teacher also encourages the learners to reflect on their knowledge and personal experiences to decide whether they are compatible with the experiences presented to them, and here either the merging or lack thereof between the new knowledge and what they have of Experiences in their cognitive structure.

**Third Stage : Image (Second Quarter / Right Side):**

This stage aims to expand the representation of meaning among the learners through integration with their personal experiences to understand the concept, and to link the relationship between what the learner knows and what he has reached, using media other than reading and writing to convey knowledge to learners such as literature, music, and movement, and assisting them in shifting to a broader view of the concept, deepening the connection between the concept and its relationship to the lives of the learners, and linking what they already know and what the experience has created, as well as assisting them in the contemplative production that merges between emotion and knowledge, and at this stage the efficiency of the learners is evaluated from their cognitive achievement and meditation.

Fourth Stage : Inform (Second Quarter / Left Side) :

That the goal of this step is to integrate learners into

meaningful thinking, and to emphasize the analysis of concepts, facts, generalizations and theories, and that the proposals submitted to teachers towards their learners at this stage are (confirming that the concept is organized and original, and providing information in a sequential order so that continuity occurs, and pushing them towards important and distinctive details and not drowning them with a huge number of facts, and using various methods such as interactive lectures, texts, hosting speakers, films and visual aids whenever available), and at this stage the written or verbal lists that express the understanding of the learners are evaluated.

#### **Fifth Stage : Application (Practice) (Third Quarter / Left Side):**

The learner at this stage moves from the stage of acquiring and representing knowledge to applying what he has learned, and the main goal in it is reinforcement and treatment, and the teacher's role towards his learners is to provide them with manual activities that help them to apply and master, and to test their understanding of concepts through relevant materials such as worksheets and exercises and texts that contain problems and written work, and giving them the opportunity to practice new learning through multiple methods such as learning centers and play skills, setting high expectations for skill mastery, and using the concept of learning for mastery to determine if there is a need for re-teaching and how it will be implemented, and at this stage the quality of learners' work is evaluated based on short questions .

#### **Sixth Stage: Extend (Third Quarter / Right Side):**

This step confirms John Dewey's ideas about learners as students as scientists, and in this step the learner tests the limits and contradictions of his understanding, and the teacher's role is to encourage learners to develop their practical ideas and their personal levels, and to encourage non-skilled learners to present their ideas and provide multiple experiences for learners so that they can plan Individually for their learning, learners are also encouraged to produce personal applications that are consistent with the learned experiences, and at this stage the behavior and treatment of learners while carrying out the tasks are evaluated in light of their goodness. Finding information that is not ready within the framework of the study - giving an opportunity to the learner to design suggested personal discoveries - giving multiple options

to the learner that enable him to be creative - helping the learner to organize his learning in a personal way).

#### **Seventh stage : Refine (Fourth Quarter / Left side):**

At this stage, the learner is required to locate new experiences and knowledge from his point of view, and ideas must be refined and contradictions confronted, and the overarching goal of this stage is to evaluate the benefit and application, the proposals presented to teachers are represented in (the necessity to provide feedback and guidance to learners' plans, encourage them and help them to be responsible for their learning and help them to analyze their use of meaningful learning and help them convert mistakes into real learning opportunities), and the evaluation at this stage is through the ability and desire of learners to edit and purify and rework and the extent of analysis and completeness of their work.

#### **Eighth Stage : Perform (Fourth Quarter / Right Side):**

The essence of this stage is integration, celebration and closure, and at this stage the learner returns to where he started, and the ultimate goal of learners in this stage is to do things themselves and share what they have done with others, among the proposals presented to teachers are (encouraging them to teach, learn, and participate with others, create a classroom environment that includes various stimuli, give them the opportunity to share new learning, and make learning available to a large number of society by sharing their writings with other classes and displaying their work through the school), and in these the stage assesses the ability of the learners to write reports and present what they have learned and the quality of the final product to them.

#### **Basic skills of badminton:**

The main duty of the coach is to learn his players to perform the basic skills of the game from their understanding and awareness of the skills and to reach them to the best technical performance. The following are the basic skills in the game of badminton:

**Serve:** Serving is the first key to the beginning of the game or after scoring the point, which is a stroke used to place the shuttlecock in play, so that the shuttlecock is sent to the place where it is difficult for the opponent

to force it back or score a point directly from it, and the service is distinguished without the rest of the strokes as the only one that the player can train on. on his own, the player must perform the serve strikes with a great deal of concentration, stability, balance and accuracy. Therefore, the player must avoid tension and nervous tension and relax relatively to his performance<sup>(5)</sup>. Peter Roper (1995) believes that there are two main types of serve:

- The long high serve.
- The short low serve.

**Forehand stroke:** It is the basic skill of any of the different racquet games and the most used in training and is performed in many ways, and the front hit is that which is performed on the front face of the racket in response to the shuttlecock coming to the right from the player's body at most (not the left-hand side) and its goal is according to the shape of the front hit<sup>(6)</sup>.

- stroke over the front head.
- The drive front stroke.
- The stroke net front.

**Backhand stroke:** It is one of the basic skills of any racquet game, as in the front kick, it is performed in many ways and forms according to the positions of the game<sup>(7)</sup>. And it is a set of strikes that are taken with the racket from the opposite side of the striking arm, so if the player is right-handed then the feathers coming to his left must be played with the back of the racket (the outer surface) and on the left side, and it is considered one of the important and difficult strikes as it takes some time to master it.

- Clear backhand stroke.
- Drive front stroke.
- The drop net stroke back.

Research methodology and field procedures:

**Research Methodology:**

The researchers used the experimental approach by designing (one group with pre and post- test) in order to suit the nature of the problem and achieve the research

objectives.

Community and sample research:

The sample of the research represented the entire research community, they are the 24 students of the second stage in the College of Physical Education and Sports Sciences, this means that the researchers used the method of comprehensive enumeration of all members of society.

Devices, tools and methods used in the research:

Tools and devices used:

- A terrace at a height of 1 m, counting (2) homemade.
- Badminton court, number (2).
- 10 homemade signs.
- Two (2) Chinese-made electronic stopwatch.
- (14) badminton rackets, type (Yonex).
- Badminton balls, count (40) plastic boxes and natural feathers (Yonex).
- 15 hammer strings .
- 10 yonex jumping ropes.
- Plastic columns at heights (170-180 cm cm).
- (2 m) count (2) for each size.
- Homemade ropes of 10 m in length

Skills under study:

Researchers have studied the basic skills of badminton: Front and back stroke skill and front drop skill.

Determination tests used and their description:

A- Clear Forehand stroke test<sup>(8)</sup> :

**Name of the test:** Clear forehand stroke.

**Test purpose:** To measure the accuracy of the clear forehand stroke performance.

**Required tools:** feather bats, rope, additional legs (244 cm) high, information form, playground test design

scheme.

**Performance description:**

- After the test is explained to the players, the testers are given a suitable time to warm up and then each player is given (5) experimental attempts.

- The player stands in the area marked (x).

- At the moment the coach sends the shuttlecock, he can move if this move is necessary for the success of the attempt, and he must hit the shuttlecock with a forward sweep (from above the head) to send it over the net and then the rope towards the area specified by degrees.

- The player gives (12) attempts only for the best (10) attempts.

Performance evaluation:

- The player gives (3) points if the shuttlecock falls in the specified area at a distance of (50 cm) after the back line of the court.

- The player gives (5) points in case the shuttlecock falls in the specified area with a distance of (76 cm) between the back line of the court and the beginning of the distant doubles serve line.

- The player gives (4) points if the blade falls in the specified area at a distance of (70 cm) after the distant doubles serve line.

- The player is given two points in case the feather falls in the specified area with a distance of (124 cm) that starts from the end of point (4) and ends with an imaginary line extending down the rope.

- The highest score is given in case the shuttlecock falls on a line between two points, and no point is given for the shuttlecock that falls outside the boundaries of the playing field or gets stuck on the net.

- The upper limit of the points that the player can score is (50) points.

B- Clear back stroke test<sup>(9)</sup>:

**Test name:** Clear back stroke.

**Test purpose:** To measure the accuracy of clear

back stroke performance.

**Required tools:** Badminton court, badminton rackets, tape, tape measure, information form, cone.

**Performance description:**

- After the test is explained to the players, the testers are given a suitable time to warm up, then each player is given (5) experimental attempts.

- The players stands in the area marked (x).

- The trainer serves so that it reaches the left side of the player (if he is holding his racket with the right arm and vice versa) so that he can hit it with a back stroke.

- The player gives (12) attempts, and the best (10) attempts are calculated for it.

- The player can move to make the attempt successful and can also leave any feather whose response does not result in a successful attempt, and if the trainer believes that its sending is incorrect, he calls (re).

- The maximum number of points that the player can score is (40) points.

Performance evaluation :

- The player gives (1) a point in case the blade falls in the specified area with a distance of (198 cm) extending from the center line of the square under the net to the near serve line.

- The player is given two and three points in case the blade falls in the specified area at a distance of (198 cm), which starts from the near serve line and ends with the distant even line.

- The player gives (4) points in case the feather falls in the specified area with a distance of (76 cm) extending beyond the end line of the arena.

- The player is given two points in case the blade falls in the specified area at a distance of (80 cm) which separates the distant doubles serve line from the remote single serve line.

- The shuttlecock that is attached to the net or outside the boundaries of the playing field is not given

any point.

**The drop net stroke back test :**

**Purpose of the test:** To measure the skill of the drop net stroke back.

**Required tools:** Badminton racket, cone, playground test design diagra.

**Description of the performance:** After the test is explained to the testers, each player is given (5) experimental attempts to warm up, after which the player stands in the place specified for him (x) and at a distance of 5 m from the net and is holding his racket by holding him in front to receive the shuttlecock serve to him from the opposite court to cross the net trying to drop it in the area The highest grade and listed (3, 2, 1).

**Performance evaluation:**

- The player makes (12) attempts and gets his (10) best attempts.
- The score is given according to where the shuttlecock.
- The shuttlecock that falls on a line between two regions gives the highest score.
- The highest points a player can get is (30) points.

**Exploratory experience:**

- Date of the experiment: on 1/11/2019 at ten o'clock morning.
- The place of the experiment: the sports hall at the University of Karbala.
- The sample: The survey sample consisted of the second stage students and the same research sample, which is (6) students

**Objectives of the experiment:**

- The auxiliary team knows the nature of work and its requirements.
- Avoiding the obstacles that face the researcher during the execution of the tests.
- Knowing the approximate time taken for each

test and the time taken to conduct the tests.

- Ensure the scientific parameters of the tests.
- Knowing the appropriate time for the training unit.
- Identify the suitability of exercises for the sample.

**Pre-tests:**

Researchers conducted pre-tests on 7/11/2019 in the closed hall of the Faculty of Physical Education and Sports Sciences - Karbala University at ten in the morning for the skills studied.

**The main experience:**

Through the field experience of researchers in the field of badminton, and depending on Arab and foreign sources, an educational curriculum was prepared according to the steps of the (4MAT) model and according to the idea of the two hemispheres of the brain, where the exercises were organized to suit the members of the sample and their educational level, depending on the principle of changing the skill forms of one skill for the purpose of building a general movement program, as the curriculum included 7 weeks every week as an educational unit, and the time of the educational unit was 90 minutes.

**Post – tests:**

Researchers conducted the post- tests on 29/12/2019 in the closed hall of the Faculty of Physical Education and Sports Sciences - Karbala University at ten in the morning, during which the basic skills of badminton that were the subject of the study were tested.

**Statistical means:**

The statistical package (spss) <sup>(10)</sup> was used in the analysis of the research data as follows:

**Presentation and analysis of the pre and post test results of the two skill test research groups:**

After collecting the pre and post data for the skill tests of the experimental group, and for the purpose of describing the results of the sample members, the researchers processed the data statistically using

measures of central tendency and measures of dispersion, and for the purpose of knowing the significant differences between the pre and post- tests, the researchers used the following methods.

**Table (1) Shows the mean, standard deviation, and t-values calculated for the pre and post -test for experimental group.**

Skill	Pre-test		Post-test		T test value	Sig level	Sig Type
	Mean	Std. deviation	Mean	Std. deviation			
Clear fronthand stroke	19.3	2.35	31.2	2.2	6.22	0.02	Sig
Clear backhand stroke	16.8	2.25	26.9	3.53	7.30	0.01	Sig
Drop net stroke back	19.1	1.35	24.5	1.43	6.89	0.01	Sig

The degree of freedom = 24 at the level of significance (0.05).

Discussing the results of the pre and the post- test for the research groups in the skill tests:

Researchers attribute the difference between the pre-test and the post-test of the experimental and control group to the exercises used in the educational units and the use of learning methods and training methods that are commensurate with the type of the skill learned, the explanation, presentation, giving guidance, instructions, and feedback had a great impact on the development of the two groups in the post-test, as the correct organization of the exercises used, which took all skill forms and different and different parameters (strength - speed - distance - time) helped the members of the experimental group to form programs varied mobility of one skill, which increases the chances of success of the skill when performing it on the playground, as the teacher or trainer is the designer of the learning environment, as he is the one who creates educational systems, achieves the goals of the educational unit and prepares educational situations<sup>(11)</sup>, the organization of educational units according to the steps of the format model, as it works to provide a fertile learning environment through the use of colored feathers and educational rackets of different weights and different heights for the network, providing safe educational places, as well as providing good ventilation in the workplace of learners in addition to the need to pay attention to feedback and increase stimuli in terms display posters (pictures) of movement parts and music use, as this approach is considered one of the most effective means of highlighting the energies,

maintaining the level and achieving the goals. The reason for the development of the experimental group is due to the educational curriculum that was appropriate in terms of the theory of brain-based learning that relied on providing a fertile educational environment, providing suitable devices and tools, using musical tunes and presenting Explanatory films, as well as the use of information processing in linking theoretical and practical aspects, as this theory had a positive effect on progress in learning some basic skills in tennis, and that each student, by virtue of his cognitive style, is able to perform certain tasks and act positively to different stimuli produced by the educational environment.

## Conclusions

Based on the research results reached within the limits of the research community, the following conclusions have been reached:

4- The educational curriculum, using the (4MAT) model according to the two hemispheres of the brain, contributed to learning some basic skills of badminton for female students.

5- The educational curriculum, using the (4MAT) model, contributed to activating the energies of the brain, investing most of its energies, and stimulating excitement and pleasure.

6- The educational curriculum, using the (4MAT) model according to the two hemispheres of the brain, contributed to the superiority of the experimental group

in the post-tests, which contributed to learning the studied skills clearly.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Ministry of Education and all experiments were carried out in accordance with approved guidelines.

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