

# The Effect of Using an Innovative Device on Learning the Movement of the Feet and the Speed of Kinetic Response, and Some Badminton Skills for Female Students

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## Abstract

The purpose of this paper is to design exercises using Auxiliary in learning some badminton skills. As for the research hypotheses, there were statistically significant differences between the pre and post-tests of the control and experimental groups in learning some badminton skills in addition, there are statistically significant differences between the control and experimental groups in the post tests in learning some skills in badminton for female students, the research community represents first-stage female students in the College of Physical Education and Sports Sciences. Pre-tests and exploratory experiments were conducted on first-stage female students. After that, the researchers applied the educational curriculum, then conducted post-tests, collected the results and processed them statistically. The researchers came out with several conclusions. The most important of which are exercises designed using auxiliary tools, which had a major role in controlling the performance of some badminton skills of the experimental group.

**Keywords:** movement learning, innovative device, badminton.

## Introduction:

Kinetic learning is one of the important means that aims at learning the individual and acquiring new kinetic skills, developing his level in order to control his kinetic pathways. Kinesthetic learning, whose teaching methods and means have varied over the years, is in continuous progress to learn skills, and the sports field is one of the most important fields that need the use of educational means because of its positive and effective impact on the speed of learning through the optimal investment of time and effort of the learner. Throwing education fluid Modern education aims to make the learner an effective component in the learning process, and the teacher has an important role in determining the best means in the learning process.

The aim of using modern learning methods is to put the learner in multiple learning situations in which he is exposed to a variety of experiences, which is reflected in the development of his personality, as well as its recreational benefits, as it gives pleasure and fun and contributes to renewing vitality, activity, and achieving pleasure. "The devices and tools are among the important aspects that achieve the interaction between the scientific pillars of learning, which are the teacher, the laboratory and the educational curriculum (Ramadan and Al-Bakri, 2019, p. 78) "As the success

of the educational process depends on the availability of auxiliary learning tools and devices that facilitate the implementation of the set goal and have an important impact on learning skills and building correct kinetic perceptions of the skill." (Salman M., 2019). Specificity in kinetic learning is everything related to skill or effectiveness, in particular the game of badminton, as it is considered one of the basic principles important in raising and upgrading the level of the learner, and that working on exercises related to the basic skills of the game or effectiveness works to adjust and correct the kinetic paths of practiced effectiveness" (Ismail, 2008). Badminton is one of the individual sports and one of the racket games, which is characterized by a high degree of accuracy and difficulty due to the great speed of the badminton and the fast permanent movement within the court at one point, which made most countries compete in devising the best methods, methods and tools to assist in teaching kinetic skills of various types as they require The learner is able to move properly within the field and respond quickly to performing skills. And because the researchers are former players and specialists in the game and through their experience, they noticed that the speed of response and the movement of the feet inside the stadium is incorrect, as the students, when moving to perform a skill inside the stadium, run towards the badminton, and this

contradicts the literature of movement when performing skills, and therefore the performance of the skills is incorrect and slow. Hence the lack of continuity in playing and performing skills, as well as poor response speed, performing various skills, which affects the performance of the skill incorrectly. Therefore, the two researchers decided to delve into solving this related problem with an innovative device to teach students the skill of moving within the stadium with a quick and correct response, and to know the effect of exercises using the device on some badminton skills. Many previous studies have dealt with topics similar to the topic of the current research. These studies are: (Salman 2019) the researcher designed an innovative tool and device to learn some badminton skills, and the researcher concluded that the use of exercises using tools similar to the skill and its different locations and difficulties increased the level of excitement and suspense among the students to learn the skills and perform the most difficult exercises. (Al-Jabbar, 2016)

The researcher designed special exercises using a proposed device to learn the skill of offensive dimensional strike in badminton, and he concluded that special exercises using a proposed device in learning the skill of offensive dimensional strike in badminton (Hasan Abed and Saleem S. 2018).

The researcher designed auxiliary tools and enriched them in learning and retaining the skills of diving and the human wheel on the mat of ground movements in the artistic gymnastics for female students. (Lazem, 2018)

The researcher used auxiliary tools in teaching the skill of the front hand jump on the floor movements mat in the artistic gymnast for men, and the researcher concluded that the use of auxiliary tools increased the student's motivation to perform the skills correctly. (Altememi, and Mahawi .2018.)

The researcher prepared an educational program using Auxiliary in developing some kinetic abilities and learning the skills of jumping open and close on the men's technical gymnast jump table device. Positive in raising the level of performance of students.

#### **Research objective:**

- Design exercises using Auxiliary in learning some badminton skills

#### **Research methodology and field procedures:**

##### **Research Methodology:**

The researchers used the experimental method with two groups, the experimental and the control, with a pre and post-test, to suit the nature of the problem.

##### **Community and sample research:**

The research community included the first-stage female students in the College of Physical Education and Sports Sciences - University of Baghdad for the academic year 2022-2023, intentionally, and they numbered (84), and (24) female students were selected by lottery to represent the research sample, where they were divided into two groups, each group (8) female students, The researchers relied on scientific sources and specialized references in determining the tests for the research, and skills were chosen (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed) As the most important basic skills and physical attributes that will be affected by the innovative device, where the exercises for using the innovative device were applied to the experimental group, while the control group continues to apply the vocabulary of the teacher's curriculum.

##### **Description of the innovative device and how it works**

The researcher designed a technical device as an aid to learn footwork and develop the kinetic response speed of badminton. The idea of designing the device came to the necessary need to complete the requirements of learning badminton. At the same time, the work of the device is technically designed according to the kinetic path of skills, which makes the student's performance of the skill highly technical. The device consists of an electronic circuit for control, which consists of an operating button and two buttons. The first button is done by manually entering instructions, and the other button is through which work is done randomly and volume to control the speed of response when the lamp glows and when it turns off, a button to control the performance time, a button to start, a button to stop, and buttons to restart Also, six buttons for the lights as shows in the figure (1).



**Figure (1)** shows the electronic control circuit

It also consists of (aluminum) columns with a length of (2 meters), each column carries three lamps placed behind the net at a distance of (one meter), and three lamps are spread on the sides of the stadium on each

side of the half of the stadium corresponding to the lamp-bearing columns, as it is associated with each lamp located on either side. Pitch a pressure sensor bump, as shows in the figure (2)..



**Figure (2)** shows the columns of the device that carry the luminous bump

### How to perform on the device

The student stands from the standby position facing the columns that carry the lights (spotlights) from the standby position, when one of the lights glows green, which indicates one of the sides of the stadium in which there is also a lamp, as it works in conjunction with the lamp that glows in the column, and is also associated with each lamp there are pressure-sensing bumps on the sides of the court, which were designed in a special way that does not affect the student's movement. Where the student presents the left foot first and then the right foot on the sensor bump, where when the right foot is presented on the subject of the pressure-sensing foot, the incandescent lamp associated with the sensor bump in the column will turn off, and then return to the ready-to-perform mode again according to the glow of the lamps.

After identifying some of the basic skills in badminton and some physical characteristics, the two researchers chose the tests, which is the launch towards the signal (Directions (Ali and Abdel Qader, 2011), Forefoot movement test (Al-Sayed's. 2004), back leg movement test (Al-Sayed's. 2004) and the Forehand Clear shot test (Taha, 2001) and the Forehand rise Shot test ((Medal. 2013)) and the back rise Shot test (Medal. 2013) and the rise backhand Shot test ((Medal. 2013)) the two researchers conducted the exploratory experiment, as "it is the exploration of the circumstances surrounding the phenomenon that the researchers wish to study" (Al-Kazemi. 2012). Where it was conducted on a sample consisting of (6) female students outside the research sample to ensure the possibility of applying the tests, the tools used, the exercises and the time required for their application,

and the researchers conducted the pre-tests on 19/12/2022, corresponding to Monday, on the research sample, and the assistant team, under the supervision of the two researchers, applied Exercises for using the innovative device, which included (20) exercises, and these exercises are applied for a period of (11) weeks, at a rate of one unit per week, where the

duration of applying the exercise was (1) minutes, and the rest between exercises was (2) minutes and repeated (5) times The number of groups is (2) times, and the rest between groups is (2) minutes, as the duration of applying the exercise on the tool was (30) minutes, and thus the duration of the educational unit was (60) minutes.

**Results and discussion:**

**Table (1)** Shows the results of the arithmetic means, standard deviations, the difference of the arithmetic means and deviations, the T value and the error percentage values for the pre and post-tests of the experimental group for the skills and physical characteristics (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed

Skills	Pre-test		Post-test		arithmetic mean of difference	standard error of the mean difference	T value	level Sig	type Sig
	Mean	standard deviation	Mean	standard deviation					
kinetic response speed	1,638	0,255	0,956	0,046	0,682	0,087	7,812	0,001	Sig
front feet movement	5,625	0,517	7,5	0,534	1,875	0,125	15	0,001	Sig
back feet movement	4,5	0,534	6,125	0,640	1,625	0,182	8,881	0,001	Sig
Forehand Clear shot	19,5	5,75	34,25	2,31	14,75	2,08	7,074	0,001	Sig
rise forehand Shot	19,625	7,19	33,625	3,06	14	1,908	7,335	0,001	Sig
rise backhand Shot	12,15	2,86	31	22,20	18,25	1,16	15,717	0,001	Sig

Significant when the significance value 0.05 under degree of freedom of 7

**Table (2)** shows the results of the arithmetic mean, standard deviations, the difference of the arithmetic means and deviations, the T value and the error percentage values for the pre and post tests of the control group for the skills and physical characteristics (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed

Skills	Pre-test		Post-test		arithmetic mean of difference	standard error of the mean difference	T value	level Sig	type Sig
	Mean	standard deviation	Mean	standard deviation					
kinetic response speed	2,013	0,230	1,828	0,112	0,184	0,060	3,046	0,019	Sig

front feet movement	5,25	0,707	6	0,534	0,75	0,163	4,583	0,003	Sig
back feet movement	4,375	0,744	4,875	0,640	0,5	0,188	2,646	0,033	Sig
Forehand Clear shot	19	4,14	27,125	3,52	8,125	1,259	6,450	0,001	Sig
rise forehand Shot	19,125	7,31	22,375	6,09	3,25	1.161	2,799	0.027	Sig
rise backhand Shot	22,375	6,09	24,375	5,70	2	0,37	5,292	0,001	Sig

Significant when the significance value 0.05 under degree of freedom of 7

**Table (3)** shows the results of the arithmetic mean, standard deviations, T-value, and error percentage values for the post-tests for the experimental and control groups of skills (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed)

Skills	Experimental		Control		T value	level Sig	type Sig
	Mean	standard deviation	Mean	standard deviation			
kinetic response speed	0,956	0,046	1,828	0,112	19,42	0,001	Sig
front feet movement	7,5	0,534	6	0,534	5,612	0,001	Sig
back feet movement	6,125	0,640	4,875	0,640	3,989	0,005	Sig
Forehand Clear shot	34,25	2,314	27,12	3,52	5,06	0,001	Sig
rise forehand Shot	33,62	3,06	22,37	6,09	4,89	0,002	Sig
rise backhand Shot	31	2,20	24,37	5,70	3,69	0,008	Sig

### Discussion:

It can be seen from Table (1) that there are significant differences between the results of the pre and post-tests of the experimental group in (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed) , In favor of the post-test, and this achieves the imposition of the research, and the researchers attribute the reason for this to the innovative device,

which led to the development of the movement of the feet, the speed of the kinetic response, and some basic skills of badminton, as the innovative device helped correct the kinetic paths of the movement of the feet and developed the speed of the kinetic response, and thus, as a result of the development of these two characteristics, it led to The development of the performance of some of the main skills, As (Salman. 2014) confirms, "The use of auxiliary devices and

tools that are commensurate with skills leads to a significant improvement in performance if these devices and tools are used correctly and scientifically." Teaching Auxiliary have a major role in controlling kinetic performance and kinetic paths of skills as they stimulate learner to perform skills (Lazem, 2018) The researchers also attribute the significant differences in (foot movement and kinetic response speed) and some skills to the exercises designed using the innovative device, where the researchers took into account individual differences and the gradation of exercises from easy to difficult and their suitability for the sample members, as the exercises were similar to the kinetic performance of the skill and this This improved skill performance this was confirmed by (Al-Rubaie, 2012) , the exercise is a kinetic performance known in time and repetition, and it is not possible to learn except through it, which leads to learning the kinetic performance of the skill. Here, (Mahgoub, 2001) explains by saying, "Exercises have a role in stabilizing performance relatively or for learning, and this leads to constant changes in kinetic performance, which leads to a performance in the future for the learner." The researchers also attribute the significant differences to the increase in Repetitions when progressing in giving units using auxiliary tools, and this is confirmed by (Khion.2002) from the process of diversifying training will generate a general and flexible program that the learner can invest in the changing conditions of skillful performance. The researchers believe that increasing repetitions and correcting errors gave a positive impact on skills.

It appears from Table (3) that there is a difference in the calculated values of the arithmetic mean and standard deviations between the pre and post-test in (Forehand Clear shot , rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed) for the control group, and this indicates There are significant differences between the results of the pre and post-tests and in favor of the post test, and the researchers attribute the reason for this to the fact that the control group has been affected by the educational curriculum prepared by the subject teacher and their rush towards learning skills, as indicated (Mahgoub, 2002) " It is important for individuals to be motivated to learn skills in order to get the best learning." In addition, the reason for the improvement in the level of the students is due to the exercises that the teacher sets according to the repetitions regulated by the teacher, and the students' rush towards the badminton lesson and the continuity of performance (Hashem et al. 2022).

It is clear from Table (3) that there are significant differences between the two groups and in favor of the experimental group in the post-test, and this is what achieves the research hypothesis, and the researchers attribute this learning and development to the commitment to the correct implementation of the exercises. Learning the movement of the feet, the speed of kinetic response, and some basic skills with minimal effort and time, and this in turn increased the impulse towards learning and playing this is what they confirmed (Hawas and Halil, M. 2022). "Introducing auxiliary educational devices increases the suspense and excitement of participation." learn a lot, and also (Abdul-Hussein and Mutaib, 2014) confirmed that learning by devices and tools has an important role in learning in terms of speed and keep the learner away from boredom and increase the memory of mathematical skills and impulsiveness and desire to learn and perform, and the use of diversity in the implementation of exercises and in multiple forms and different situations have a major role in the rush towards learning, as the improvement of the two control groups And the experimental (Jibad, A., & Hassan, A. 2019) but the improvement that appeared on the experimental group is greater than the control group, and this indicates the effectiveness of the exercises using the innovative device according to the nature of the skill and how to perform the skills in their correct paths, as the device had a great impact on the students of the experimental group. This was confirmed by (Al-Hadithi. 2013) "The devices and tools help to facilitate and complete the learning procedures by making it more interesting and exciting and transforming the movements that the learner goes through into vivid and meaningful experiences, saving time, effort and cost, and reaching a better learning level."

#### **Conclusions:**

- The innovative device during the study was suitable for the abilities of the students, and this led to learning the (Forehand Clear shot, rise forehand Shot, rise backhand Shot) and (front and back feet movement and kinetic response speed).
- Increasing the repetitions according to the progress of the students using the innovative device led to a significant improvement in performance.
- The use of exercises by the two researchers using the innovative device had a preference over the traditional method, and this led to learning the movement of the feet, the speed of kinetic response, and some badminton skills significantly.

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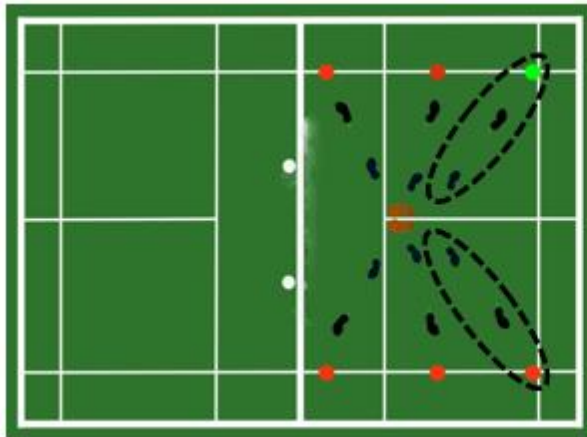
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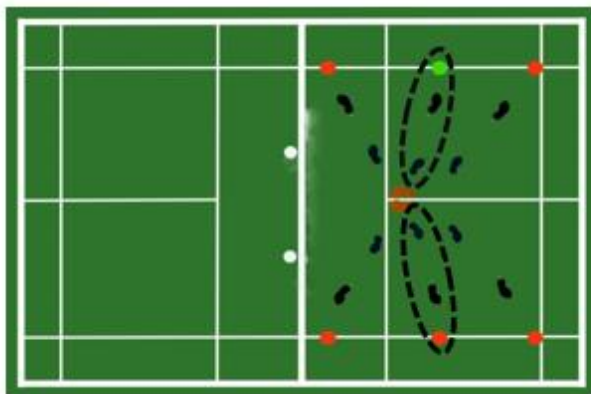
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**Appendix (1)**

Exercise (1) From the standby position, standing in front of the equipment columns, and when the lamp glows in green, the student performs the distance kick move (front and back) through backward movements according to the movements placed on the playing field that senses the movement of the feet, and returns again to the standby pause, where the movements are once to the right and once to the left according to the glow of the lamps.

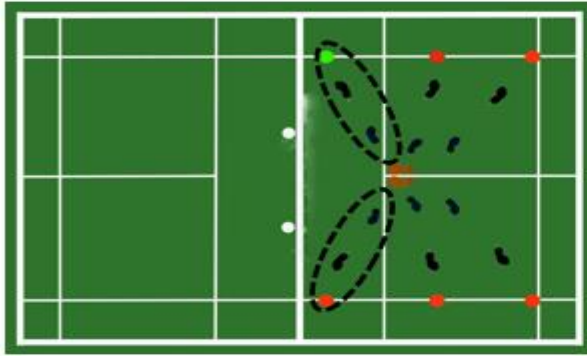


Exercise (2) From the standby position, standing in front of the apparatus's columns, and when the lamp glows green, the student performs the rise ed stroke move (front and back) through movements to the side according to the movements placed on the playing field that senses the movement of the feet and according to the glowing lamp on the side of the playing field and back again for a pause Standby where there are movements once to the right and once to the left according to the glow of the lamps.

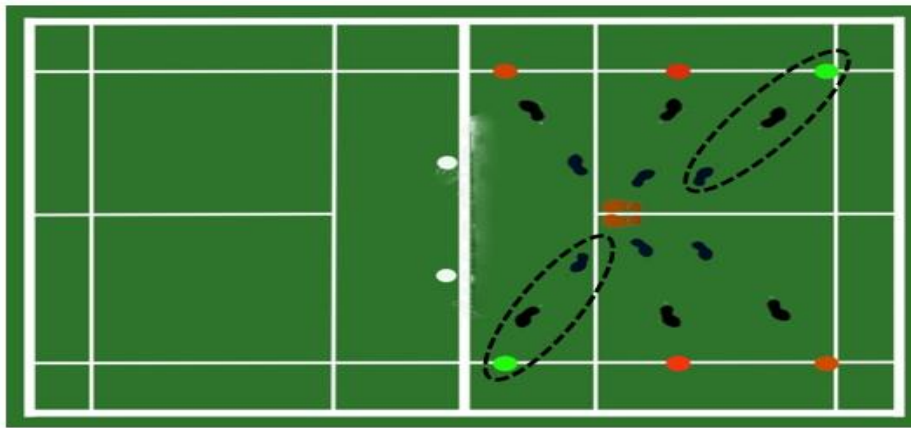


Exercise (3) From the position of readiness, standing in front of the columns of the device, and when the lamp glows in green, the student performs the movement of the raised kick (front back) through movements to the side according to the movements placed on the floor of the playing field that senses the movement of the feet, and returns again to the standby pause, where it is movements once to the right and once to the left according to the glow of the lamps.





Exercise (4) From the standby position, standing in front of the columns of the device, and when the lamp glows in green, the student performs the forward rise move, returns to the standby position, and then performs the backhand rise move.



Exercise (5) From the standby position, standing in front of the columns of the device, and when the lamp glows in green, the student performs the backhand kick move, returns to the standby position, and then performs the front overhand kick move.

