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The impact of using e-learning on cognitive and skill achievement in learning the shooting skill in futsal for female students at the Faculty of Physical Education

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Abstract
The purpose of this paper is to identify the impact of e-learning on the cognitive and skill achievement in futsal among female students at the College of Physical Education and Sports Sciences, Al-Qasim Green University. The researcher used an experimental approach with two groups: a control group and an experimental group. The research community consisted of third-year female students at the College of Education and Sports Sciences, Al-Qasim University, for the academic year 2023-2024.The research sample was selected using purposive random sampling from third-year female students. The sample consisted of (60) students, divided into two groups of (20) students each: an experimental group and a control group. The experimental group used e-learning, while the control group used the traditional method of verbal explanation and demonstration. An additional (20) students were selected as an exploratory group. One of the most important results reached by the researcher is that.
The traditional method (explanation and demonstration) had a positive impact on improving the futsal skills of the students in the control group. One of the most important recommendations recommended by the researchers is that: Using e-learning as a modern teaching method and strategy for teaching and mastering various futsal skills to students in other teams at the Faculty of Physical Education, given its positive impact on improving skill performance.

Keywords: E-learning, futsal skills, cognitive achievement, skill performance, physical education

Introduction
The researcher chose this topic because it represents a modern trend in teaching. We aim to develop our teaching methods to align with the advancements of the 21st century, moving away from traditional teaching and learning approaches such as the command-based method (explanation and demonstration). This involves applying e-learning and its impact on learning specific types of shooting in futsal, namely: shooting from a stationary position, shooting from a moving position, shooting from a stationary position, and heading the ball. These are essential skills and fundamental elements of futsal. Through his experience teaching futsal, the researcher observed a lack of diverse teaching methods and insufficient integration of technology into the educational process. Many teachers still adhere to traditional teaching methods. Researching and reviewing previous studies investigating the impact of e-learning on the overall physical education curriculum, and specifically futsal, revealed that these studies had not previously addressed the use of this approach. This highlighted the need to investigate the impact of e-learning on learning futsal shooting skills and to integrate modern methods into the curriculum. Improving communication between teachers and students inside and outside the classroom, and making the learner more active in the educational process, with a more positive role in achieving the desired educational goals, may lead to developing a positive attitude towards learning and improving the level of learning in certain futsal skills. Some previous studies, along with access to the internet and the researcher's teaching experience as a faculty member, have recommended investigating the impact of e-learning. The studies by (Ayman Yousef Alian 2017) [5], (Hanan Bint Asaad Al-Zain, 2015), (Stayer, 2008), (Naser, *et al.*, 2025), (Jerri, *et al.*, 2024), (Radi, *et al.*, 2020) [9, 12, 17, 18, 20]. Also recommended investigating the impact of e-learning on academic achievement across different age groups.

Research Importance

- Using modern educational methods and strategies that stimulate learners' interest, provide them with opportunities to play an active role in the learning process, interact with educational situations, and connect their prior knowledge.
- Using modern technology in teaching futsal within the classroom in a way that enriches the teaching and learning process.
- Meeting the needs of the educational field in the Arab world. A year by adopting a new type of education in various educational stages and for various disciplines, in a way that suits the students of the digital generation, which helps to transform the teaching process into learning.

Research objective

This research aims to identify the impact of e-learning on the cognitive and skill achievement in futsal among female students at the College of Physical Education and Sports Sciences, Al-Qasim Green University.

Research hypotheses

- There are statistically significant differences between the pre- and post-tests in the level of cognitive achievement and skill performance under investigation, favoring the post-test for the experimental group.
- There are statistically significant differences between the pre- and post-tests in the level of cognitive achievement and skill performance under investigation, favoring the post-test for the control group.
- There are statistically significant differences between the post-tests for both the control and experimental groups in the level of cognitive achievement and skill performance under investigation, favoring the experimental group.

Terminology

E-learning: (Atef Abu Hamid Al-Sharman, 2015) [4] defined it as the type of learning in which the usual lesson or lecture is transformed, through available and appropriate technology, into recorded lessons posted online. This allows students to access these lessons outside of class time, freeing up space for diverse activities, active learning, and optimal use of classroom learning time under the teacher's supervision. Examples include problem-solving, role-playing, and carrying out scientific projects, among others, to enrich student learning.

Operational Definition: It is an educational model that aims to use modern technologies and the internet in a way that allows the teacher to prepare the lesson using videos, audio files, or other media. Students can then view these materials at home or elsewhere using their computers, smartphones, or tablets before attending the lesson and share them with other students on websites or social media platforms.

Previous Studies

First: Previous Arabic Studies

A study by (Najla Youssef Hawas, 2015) [16] entitled "The Effectiveness of Using the E-Classroom Strategy in Developing Classroom Interaction Skills for Teaching Grammar to Second-Year Intermediate Students." The study aimed to reveal the effectiveness of using the e-classroom strategy in developing classroom interaction skills for teaching grammar to second-year intermediate students. It employed a quasi-experimental design and indicated statistically significant differences at the 0.05 level between the mean scores of the experimental and control groups in verbal classroom interaction skills for teaching grammar to second-year intermediate students using the e-classroom strategy, favoring the experimental group.

Second: Previous Foreign Studies

A study by (Stayer, 2008) [20] entitled "The Effects of E-Classrooms on the Learning Environment." This study aimed to identify the effects of e-classrooms on the learning environment and compare learning activity in traditional classrooms with classrooms using an intelligent learning system. The experimental design was used with 1000 female students, and the most important finding was the students' improved performance in the studied classroom environment.

Research methodology and field procedures

Research Methodology

The researcher used an experimental approach with two groups: a control group and an experimental group.

Community and sample research

The research community consisted of third-year female students at the College of Education and Sports Sciences, Al-Qasim University, for the academic year 2023-2024.

The research sample was selected using purposive random sampling from third-year female students. The sample consisted of (60) students, divided into two groups of (20) students each: an experimental group and a control group. The experimental group used e-learning, while the control group used the traditional method of verbal explanation and demonstration. An additional (20) students were selected as an exploratory group.

Experimental Treatment Materials: These included

- Data collection tools and methods.
- The proposed educational program using e-learning.
- The development of the online e-learning platform.

Data Collection Tools and Methods

Forms and Personal Interviews:

Data collection form for the research sample.

- Expert opinion survey form to identify the most relevant targeting skills for the nature of the research and to determine appropriate tests for measuring these elements.
- Skill performance evaluation form for the skills under investigation for both the experimental and control groups.
- A cognitive test (prepared by the researcher). Scientific parameters for the physical ability tests related to futsal skills under investigation:

Calculation of the scientific parameters (validity and reliability) for the tests measuring the variables under investigation as follows:

Calculation of the reliability coefficient: The reliability coefficient was calculated using the test-retest method. The first administration of the tests was conducted on February

16, 2023, and the second administration on February 19, 2023, with a three-day interval. The results of calculating the reliability coefficient for the physical ability tests under investigation are presented in Table 1.

Table 1: Arithmetic mean, standard deviation, correlation coefficient, and t-value for calculating the reliability of the physical ability measurements (n=20)

Physical abilities test		Unit of Measurement	Application 1		Application 2		R value	T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
The muscular strength of the legs for the vertical jump from a standing position.		cm	23،00	1،439	22,40	259،1	0،624	606،1
flexibility	Torso arches backward.	50،30	2،000	51،30	2،108	0،783	-2،07	-2،07
	lateral pelvic opening	19,70	1,676	19,80	1،276	0,607	0.254	0.254
Muscular strength (modified prone)		number/s	29,20	2،000	29،10	1,676	0،604	0،208
Static balance (stand on the bar)		number/s	3,840	0،903	3،412	0.632	-0.615	0,970
Coordination (hop inside the hoop)		number/s	13،50	0,833	14،09	0،727	0،605	-2،20

The critical value of "r" at a significance level of 0.05 = 0.549 * = d

Table (1) shows that all calculated correlation coefficients for the physical attributes and cognitive tests under investigation ranged from (0.783 to -0.615). These values are higher than the critical value of "r", which was 0.549 at a significance level of 0.05. This indicates the reliability of the tests used to measure the physical attributes and cognitive tests under investigation.

Calculation of the Validity Coefficient: The validity coefficient was calculated using the differential validity method. Measurements were compared between a group of high-achieving students and a group of less-achieving students, with each group consisting of (10) students. The tests were administered to them on February 20, 2022. The results of the calculated validity coefficient for the physical attributes tests under investigation are presented in Table (2).

Table 2: Arithmetic mean, standard deviation, and t-value for calculating the validity coefficient of physical abilities

Physical abilities test		Unit of Measurement	Application 1		Application 2		R value	T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
The muscular strength of the legs for the vertical jump from a standing position.		cm	29،50	1،887	23،20	2،700	6،3	6،011
Flexibility	Torso arches backward.	57،10	2،519	53،80	2،173	3،3	3،113	3،113
	lateral pelvic opening	16	2،571	19	1،390	3-	4،20	4،20
Muscular strength (modified prone)		number/s	34،30	1،339	28،60	1،327	5،7	6،475
Static balance (stand on the bar)		number/s	9،567	1،982	3،730	0،731	5،837	8،672
Coordination (hop inside the hoop)		number/s	17،50	2	13	1،01	4،5	6،200

The critical t-value at a significance level of 0.05 was 262.2, and the 9 degrees of freedom was significant.

Table (2) shows that all calculated t-values for the physical abilities tests under investigation ranged from 3.113 to 8.672. These values are greater than the critical t-value of 2.262 at a significance level of 0.05. This indicates statistically significant differences between the high-achieving students and the less-achieving students, demonstrating the validity of the tests under investigation in measuring their intended purpose.

Measuring Skill Performance Level

The researcher filmed the students' skill performance in the following skills: shooting, shooting from movement, shooting from a stationary position, and heading. The video was reviewed by a panel of three futsal judges, who assigned a performance level of 5 points. The judges recorded their scores on a skill performance evaluation form designed by the researcher.

Equipment and Tools

- Video camera for recording the students' performance (pre- and post-tests).
- Android mobile phone.
- A futsal channel on Telegram, used during the main experiment for the experimental group. (See attached document 7).
- Laptop and CDs containing photos and videos of the skills under investigation.

Cognitive Test Prepared by the Researcher (Attachment 6)

The researcher designed a test to measure the level of cognitive achievement of third-year female students at the College of Physical Education and Sports Sciences, Al-Qasim Green University, in the cognitive information related to futsal, after reviewing scientific references and studies such as those by (Laila Abdel-Aziz Zahran, 1997), (Yasmin Al-Bahar and Suzanne Tantawi, 2004), (Enayat Mohamed Farag, Faten Taha Al-Batal, 2004) [8, 14, 21].

Defining the Objective of the Test: The test aims to measure the achievement of the female students in the research sample in the following information: the fundamentals of futsal, the nature and importance of futsal, some basic futsal skills under investigation (shooting, shooting from movement, shooting from a stationary position, shooting with the head), and a portion of the laws of futsal.

Identifying the main axes of the cognitive achievement test and their relative importance

The researcher identified the main axes of the test, which included:

- Fundamentals of futsal.
- The importance of shooting in futsal.
- Basic futsal skills.
- Skillful performance of some shooting techniques in futsal under investigation: shooting from movement, shooting from a stationary position, and shooting with the head.
- A section on the laws of futsal.

Determining the relative importance of the cognitive test axes: The researcher prepared a form to determine the relative importance of the cognitive test axes. This form was presented to (9) experts specializing in futsal and teaching methods. To determine this, the arithmetic mean was calculated for each axis according to the experts' opinions. Table (3) shows the relative importance of each axis of the cognitive test:

Table 3: Cognitive Test Axes and Relative Importance of Each Axis (9)

No.	Cognitive Achievement Test Axes	Relative Importance
1	Fundamentals of Futsal	20%
2	The Importance and Divisions of Futsal	10%
3	Basic Futsal Skills	10%
4	Skill Performance	50%
5	Part of the Laws of Futsal	10%

Defining the Test Material: According to the behavioral objectives to be measured and the content included in the proposed program, the researcher constructed the initial version of the cognitive test based on the following main themes: "Fundamentals of Futsal - Importance of Futsal and its Basic Skill Divisions - Skill Part: Shooting - Shooting from Movement - Shooting from a Stationary Position - Shooting with the Head - Part of the Laws of Futsal."

Formulating the Test Items: The researcher initially formulated the test items, totaling (67) items divided into the five test themes. Care was taken in formulating the items to ensure that each item had a single meaning, avoiding difficult vocabulary, and that it was characterized by clarity, simplicity, ease of understanding, and scientific accuracy.

Test Instructions: The test instructions are essential for its administration. They ensure that the test's objective is clearly stated in simple, correct, clear, and concise language, avoiding unnecessary length and unclear wording that could affect the students' responses. The instructions also clarify how to answer the test items and require each student to write their information on each form, such as their name. Stage...etc.

Question Type Selection: The researcher selected the question types, ensuring variety. The questions were primarily true/false and multiple choice, designed to measure the cognitive achievement level of third-year female students at the College of Physical Education and Sports Sciences.

Initial Test Form: The initial test form, consisting of 67 items, was prepared. The researcher presented this initial form to nine experts specializing in futsal and teaching methods to obtain their feedback on the following:

- The scientific and linguistic accuracy of the test items.
- The comprehensiveness of the test in covering the information included in the e-learning program.
- The suitability of the test for implementation.
- Any comments or suggestions.

Final Form of the Futsal Cognitive Achievement Test: Based on expert feedback, 17 items were removed from the total items of the cognitive achievement test, resulting in a final version with (50) valid items.

Shooting and Correction Method: The test was scored by awarding one point for each correct answer and zero for each incorrect answer. Therefore, the total score for the futsal cognitive achievement test was 50 points. A shooting key was also developed to facilitate the shooting process.

Scientific Coefficients of the Cognitive Achievement Test: Prior to the main experiment, the test was administered to a group of (20) female students from the research population but outside the main sample (the pilot sample). The responses were scored and the scores recorded to calculate the scientific coefficients of the test.

The ease and difficulty coefficient and the discrimination coefficient for the test items: The ease coefficient for the test items was calculated using the following equation:

$$\text{Ease of Use Coefficient} = \frac{\text{Number of individuals who answered correctly for each item}}{\text{Total number of individuals}}$$

The relationship between ease and difficulty is a direct inverse relationship, meaning their sum equals one.

- Ease Coefficient = 1 - Difficulty Coefficient.
- Difficulty Coefficient = 1 - Ease Coefficient.
- As for the discrimination coefficient, the researcher calculated it using the variance equation as follows:
- Variability = Ease Coefficient × Difficulty Coefficient.

Table (4) shows the ease, difficulty, and discrimination indices for the items in the futsal cognitive achievement test under investigation.

Table 4: Ease, Difficulty, and Discrimination coefficient for the Futsal Cognitive Achievement Test Questions under Investigation

Number of phrases	Ease coefficient	Difficulty Coefficient	discrimination coefficient	Number of phrases	Ease coefficient	Difficulty Coefficient	discrimination coefficient
1	0٫64	0٫34	0٫22	26	0٫64	0٫34	0٫22
2	0٫44	0٫54	0٫24	27	0٫30	0٫70	0٫20
3	0٫54	0٫44	0٫24	28	0٫50	0٫50	0٫24
4	0٫34	0٫64	0٫22	29	0٫64	0٫34	0٫24
5	0٫60	0٫40	0٫23	30	0٫40	0٫60	0٫23

6	0‹50	0‹50	0‹24	31	0‹64	0‹34	0‹22
7	0‹44	0‹54	0‹24	32	0‹54	0‹44	0‹24
8	0‹50	0‹50	0‹24	33	0‹34	0‹64	0‹22
9	0‹40	0‹60	0‹23	34	0‹64	0‹34	0‹22
10	0‹44	0‹54	0‹24	35	0‹54	0‹44	0‹24
11	0‹64	0‹34	0‹22	36	0‹45	0‹54	0‹24
12	0‹50	0‹50	0‹24	37	0‹34	0‹64	0‹22
13	0‹70	0‹30	0‹22	38	0‹64	0‹34	0‹22
14	0‹64	0‹34	0‹20	39	0‹44	0‹54	0‹24
15	0‹44	0‹54	0‹24	40	0‹50	0‹50	0‹24
16	0‹70	0‹30	0‹20	41	0‹60	0‹40	0‹23
17	0‹44	0‹54	0‹24	42	0‹50	0‹50	0‹24
18	0‹34	0‹64	0‹22	43	0‹44	0‹54	0‹24
19	0‹60	0‹40	0‹24	44	0‹44	0‹54	0‹24
20	0‹54	0‹44	0‹24	45	0‹54	0‹44	0‹24
21	0‹44	0‹54	0‹24	46	0‹34	0‹64	0‹22
22	0‹34	0‹64	0‹22	47	0‹64	0‹34	0‹22
23	0‹60	0‹40	0‹23	48	0‹54	0‹44	0‹24
24	0‹34	0‹64	0‹22	49	0‹34	0‹64	0‹23
25	0‹50	0‹50	0‹24	50	0‹64	0‹34	0‹22

Table (4) shows that the cognitive test is characterized by ease indices ranging from 0.30 to 0.70 and difficulty indices ranging from 0.30 to 0.70. The discrimination indices for the cognitive achievement test are also of suitable strength, ranging from 0.20 to 0.24. Therefore, it can be used as a tool to assess the cognitive achievement related to the futsal skills under investigation. Thus, the test, in its final form, is suitable for application.

Test Time Determination: Based on the results of the pilot test for the cognitive test, the test time was determined using the following equation:

$$\text{Arithmetic Mean} = \frac{\text{Time taken by first student} + \text{Time taken by last student}}{2}$$

Thus, the test time was determined to be 30 minutes, resulting in a total test score of (50) points.

- Scientific procedures for controlling and standardizing the futsal cognitive test under investigation:
- Validity of the cognitive test: To establish the test's validity, a cross-quadrupole comparison (top quartile and bottom quartile) was used with a sample of (20) female students from the research population and outside the main sample. Table (5) shows the following:

Table 5: Significance of the differences between the means of the top quartile and bottom quartile in the futsal cognitive achievement test (n=20)

No.	Variable	Unit of Measurement	Upper quartile		Lower quartile		Arithmetic mean of difference	T value calculated
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation		
1	Cognitive Test	Degree	28‹60	1›38	18›80	1‹42	9,80	9,89

The tabulated t-value at a significance level of 0.50 = 30.2. Table (5) shows that there are statistically significant differences between the upper and lower quartiles in the cognitive test at a significance level of 0.50, indicating the test's validity.

Reliability of the Cognitive Test: The researcher established the reliability of the cognitive test by administering it and then re-administering it after (7) days to a sample of 20 female students from the research population and outside the main sample, under the same conditions as the first administration. The first administration was on Sunday, January 17, 2023, and the second administration was on Sunday, January 24, 2023. Table (6) shows the correlation coefficient:

Table 6: Correlation coefficient between the first and second administrations of the cognitive achievement test related to futsal skills under investigation, to show the reliability coefficient (n=20).

No.	Variable	Unit of Measurement	Application 1		Application 2		Correlation coefficient
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
1	Cognitive Test	Degree	22	1›82	22›70	2‹15	0‹93

The tabulated r-value at a significance level of 0.50 = 0.44. Table (7) shows a statistically significant correlation at a significance level of 0.50 between the first and second administrations of the cognitive achievement test. The correlation coefficient was 0.93, indicating the test's reliability.

Establishing the online classroom via the educational channel on Telegram

- The number of female students in the third year of the College of Physical Education at Al-Qasim Green University for the academic year 2023-2024 who own Android phones was determined to be 89.6%, while the number of female students who do not own Android phones was 10.4%, indicating a high percentage of female students who own Android phones.
- An educational channel for futsal was created on Telegram on October 23, 2022.
- The presence of the sample as members of the educational channel created on Telegram and the ability to send and receive educational materials through the channel were confirmed.
- A WhatsApp group was created for discussion, in addition to the educational channel created on Telegram, which is dedicated solely to broadcasting.
- The curriculum for teaching some basic futsal skills was selected and presented in the online class via Telegram to provide students with the knowledge, experience, and skills related to the educational content.
- The educational text for the online class was selected and written.
- Theoretical information related to the technical aspects of the skill was broadcast through instructional videos and images of the skills being studied on the educational channel on Telegram.
- In case of errors in performance, feedback is provided during the lecture via the instructor's mobile phone, by broadcasting additional videos, and by giving students the opportunity to review and re-perform the skill. Feedback on the knowledge gained from the unit being learned is also provided in the form of assessment questions at the end of each unit to reinforce the knowledge presented to the students before the lecture. Students are asked to share their understanding of the material they learned via the WhatsApp group.

Proposed Educational Program Using E-Learning

First: General Program Objective

To identify the impact of using e-learning on the cognitive and skill-based achievement in futsal for female students at the Faculty of Physical Education.

Second: Program Development Principles

- The program content should align with the stated objective.
- The program should facilitate interaction among students.
- The program should be simple, diverse, flexible, and applicable.
- The program content should be suitable for the students' level and abilities, taking into account individual differences.
- The program should adhere to general teaching principles (progressing from easy to difficult, from simple to complex, and from known to unknown).
- The necessary tools and resources should be provided for program implementation.
- Safety and security measures should be observed during program implementation.
- Feedback should be provided to students, as it shapes their understanding of the material.
- The researcher developed a cognitive test to assess the students' level at the end of each learning unit.

Third: Content of the E-Learning Program

- Fundamentals of Futsal
- The nature and importance of shooting in futsal.
- Basic futsal skills.
- Skill performance.
- Part of the Laws of Futsal.

The researcher compiled the above content into text, images, and videos illustrating the performance related to the skills under study, and these were broadcast on the Telegram channel.

Table 7: Content of the Educational Program

Educational Unit	Main part
Unit 1	An introduction to the fundamentals of futsal, including shooting from movement.
Unit 2	An introduction to the nature and importance of futsal and its divisions, including shooting from a stationary position.
Unit 3	An overview of basic futsal skills - application to shooting from a stationary position
Unit 4	Teaching shooting from a stationary position and understanding the cognitive aspects related to shooting: the jump phase - the flight phase - the landing phase. Instructional steps and drills to improve shooting accuracy.
Unit 5	Teaching shooting from a stationary position and understanding the cognitive aspects related to shooting, along with the educational steps and exercises to improve shooting.
Unit 6	Teaching shooting from movement and identifying the cognitive aspects related to shooting "the take-off phase - the flight phase - the landing phase" and the educational steps and exercises to improve shooting.
Unit 7	Teaching heading skills and understanding the cognitive aspects related to heading, educational steps, and exercises to improve heading ability.
Unit 8	Part of the Futsal Laws - Application to shooting with the head

The program's educational material was defined to include instructional steps, skills training, and information related to the technical aspects, as well as the teaching aids and cognitive components to be used.

Determining the resources needed to implement the program

Based on the program's content and the educational material for each unit, the following will be broadcast on the Telegram channel:

- Technical points for each of the identified basic skills.
- The skills under study within the educational unit will be presented according to the e-learning method.
- The unit will include a large number of images and videos that are easy to use.
- The unit will include a breakdown of the learned skill and how to integrate it to help students learn the technical points and knowledge related to the skills under study.

The teaching method used in implementing the program

The educational unit was taught using the e-learning method by sending the educational material to the channel via the Futsal Telegram channel, along with the videos and the illustrated guide to the skills (under study).

- Ensuring the functionality of the devices and tools used in the research. Assessing the suitability of the e-learning method for the research sample, gathering feedback, and implementing modifications.
- Selecting and training assistants to conduct the measurements.
- Determining the time required for the measurement process for the tests.
- Identifying the difficulties encountered by the researcher during implementation.
- Determining the program duration, the number of weekly units, and the duration of each learning unit.
- Evaluating the suitability of the platform used to implement the program.
- Calculating the validity coefficients for both the physical abilities tests and the cognitive test under investigation.

Experimental Procedure Steps

Pre-tests

The researcher conducted pre-tests from Monday, January 5, 2023, to Thursday, February 5, 2023, on the students in both groups. These pre-tests covered the variables of growth, physical abilities, cognitive test scores, and performance. The pre-tests were administered by a panel of three futsal experts.

Statistical Description of the Research Sample

Normal Distribution of the Research Sample

The researcher recorded a video of the students' performance in futsal skills (shooting, shooting from movement, shooting from a stationary position, shooting with the head, and shooting with the head) and presented it to the panel.

The researcher verified that the total student sample fell under the normal distribution curve in the variables of growth, physical abilities, cognitive test scores, and skill performance, as shown in Tables (8), (9), and (10).

Table 8: Normal Distribution of the Research Sample in Growth Variables (n = 60)

Variables	Unit of measurement	Arithmetic mean	Medium	Standard deviation	Skewness
Chronological Age	Year	19,147	19,100	0‹616	0‹123
Height	cm	163.433	164	5,259	0‹251
Weight	kg	64,619	64	7,543	0‹507

Table (8) shows that all skewness coefficients fall between +3 and 0.3, indicating that the entire research sample falls within the normal distribution curve for all growth variables.

Table 9: Normality of the research sample distribution in physical abilities

Physical abilities test		Unit of Measurement	Arithmetic mean	Medium	Standard deviation	Skewness
The muscular strength of the legs for the vertical jump from a standing position.		cm	23‹224	23	2‹00	0.458
Flexibility	Torso arches backward.	52‹824	53	2,766	0,081-	0,081-
	lateral pelvic opening	19‹6	19,3	1,316	0,628	0,628
Muscular strength (modified prone)		number/s	29,021	29	1,764	0‹031
Static balance (stand on the bar)		number/s	3‹422	3,185	0‹655	0,835
Coordination (hop inside the hoop)		number/s	14‹120	14	1‹032	0›336

Table (9) shows that all skewness coefficients fall between +3 and -3, indicating that the entire research sample falls within the normal distribution curve across all physical abilities.

Table 10: Normality of the research sample distribution in the cognitive and skill performance test (n = 60)

Cognitive and skill performance testing		Unit of Measurement	Arithmetic mean	Medium	Standard deviation	Skewness
Cognitive test		degree	21‹84	21	2‹12	1›22
Skillful performance	Shooting from movement	0‹330	0‹315	0›018	0,109	0,109
	Shooting from a stationary position	0‹419	0‹414	0‹01	1.461	1.461
	Shooting with a header	0‹324	0‹315	0‹015	0,775	0,775
	Free shooting	0‹323	0,314	0‹020	0‹857-	0‹857-

Table (10) shows that all skewness coefficients fall between +3 and 3, indicating that the entire research sample falls under the normal distribution curve in the cognitive and skill performance tests.

Equivalence of the two research groups

The researcher used the t-test to determine the significance of differences and to verify the equivalence between the two research groups (experimental and control) in the variables of growth, physical abilities, cognitive test, and skill performance, as shown in Tables (11), (12), and (13).

Table 11: Equivalence between the two research groups (experimental and control) in the growth variables: n1 = n2 = 20

Variables	Unit of measurement	experimental		control		T value
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
Chronological Age	Year	19،128	0.669	19‹176	547‹0	0،375
Height	cm	219‹163	5‹435	163.647	6.645	0،328
Weight	kg	64,517	8,428	65	5,146	0‹408

The tabulated t-value at a significance level of 5... = 2.025

Table (11) shows that the differences between the experimental and control groups are not statistically significant because all calculated t-values are less than the tabulated t-value, indicating the equivalence of the two research groups in these variables.

Table 12: Shows the equivalence between the two research groups (experimental and control) in physical abilities: n1 = n2 = 20

Physical abilities test		Unit of Measurement	Experimental		Control		T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
The muscular strength of the legs for the vertical jump from a standing position.		cm	23‹50	1,857	23،02	2‹153	0,833
Flexibility	Torso arches backward.	53,50	3,057	52‹15	20562	0,824	0,824
	lateral pelvic opening	19‹60	1‹549	19,80	1،283	0‹431	0‹431
Muscular strength (modified prone)		number/s	29‹02	2,028	28,99	1،737	0,072
Static balance (stand on the bar)		number/s	3‹30	0‹803	3.46	0،703	0‹225-
Coordination (hop inside the hoop)		number/s	14‹10	1‹100	14	1،737	0‹440

Table (12) shows that the differences between the experimental and control groups are not statistically significant because all calculated t-values are less than the critical t-value, indicating the equivalence of the two research groups in these abilities.

Table 13: shows the equivalence of the two research groups (experimental and control) in the cognitive and skill performance test. n1 = 20 = 20

Cognitive and skill performance testing		Unit of Measurement	Experimental		Control		T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
Cognitive test		degree	22،19	1،88	21.47	2‹32	1,19-
Skillful performance	Shooting from movement	0.334	0‹050	0,325	0‹016	0‹756	0‹756
	Shooting from a stationary position	0‹419	0‹014	0.409	0‹014	0‹062	0‹062
	Shooting with a header	0،322	0‹015	0‹326	0‹016	0‹517	0‹517
	Free shooting	0‹325	0‹016	0‹322	0‹023	0.482	0.482

The tabulated t-value at a significance level of 0.5 = 2.020.

Table (13) shows that the differences between the experimental and control groups are not statistically significant because all calculated t-values are less than the tabulated t-value, indicating the equivalence of the two research groups in the cognitive and skill performance tests.

Implementation of the Experiment: The researcher implemented the research experiment for eight consecutive weeks, from Sunday, March 3, 2023, to Thursday, April 18, 2023, with one lecture per week for each group as follows:

- The control group used the traditional method (explanation and demonstration of the model).
- The experimental group used the e-learning method. Post-test measurements:

Post-test measurements: were conducted for both the control and experimental groups on physical variables, cognitive tests, and skill performance in futsal skills (shooting, shooting from movement, shooting from a stationary position, heading, and free shootings) from Sunday, April 21, 2023, to Monday, April 22, 2023.

Statistical analysis

The data underwent the following statistical analyses: (arithmetic mean, standard deviation, tests for statistical significance of differences, correlation coefficient, and difficulty and ease indices).

Results presentation

Table 14: shows the significance of the differences between the pre-test and post-test means for the control group in the cognitive and skill performance tests (n = 20).

Cognitive and skill performance testing		Unit of Measurement	Pre		Post		T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
Cognitive test		degree	22‹19	1،88	35,75	3‹32	11.47
Skillful performance	Shooting from movement	0‹334	0‹050	2‹10	0‹560	12،912	12،912
	Shooting from a stationary position	0.419	0‹014	2,62	0‹540	14,079	14,079
	Shooting with a header	0‹323	0‹015	2,151	0.490	14‹010	14‹010
	Free shooting	0,325	0‹016	1,990	0‹530	10‹550	10‹550

* The tabulated t-value at the (0.05) level = 2.093

Table (14) shows a statistically significant difference between the pre- and post-test means of the control group in skill performance, and the calculated t-value is significant.

Table 15: Shows the significance of the differences between the pre- and post-test means of the experimental group in the cognitive test and skill performance. n = 20

Cognitive and skill performance testing		Unit of Measurement	Pre		Post		T value
			Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
Cognitive test		degree	21،47	2،32	44،71	2،84	18,33
Skillful performance	Shooting from movement	0،334	0،016	3,770	0،454	23،940	23،940
	Shooting from a stationary position	0،409	0،014	4،320	0،340	36,66	36,66
	Shooting with a header	0،323	0،016	3.940	0،580	24،314	24،314
	Free shooting	0،325	0،023	3،870	0،580	21,790	21,790

* The tabulated t-value at the (0.05) level = 2.093

Table (15) shows statistically significant differences between the pre- and post-test means of the experimental group in the cognitive and skill performance test, and the calculated t-value is significant.

Table 16: Shows the significance of the differences between the post-test means of the control and experimental groups in the cognitive and skill performance test. n1 = 20 = 20

Cognitive and skill performance testing		Control		Experimental		T value
		Arithmetic mean	Standard deviation	Arithmetic mean	Standard deviation	
Cognitive test		35،77	3،32	44،71	2،84	10،00
Skillful performance	2،10	0،560	3،770	0،454	10،00	10،00
	2،62	0،540	4،320	0،340	8،25	8،25
	2،151	0،490	3،940	0،580	8،82	8،82
	1،990	0،530	3،870	0،580	8،86	8،86

* The tabulated t-value at the (0.05) level = 2.093

Table (16) shows statistically significant differences between the post-test means of the control and experimental groups in the cognitive and skill performance tests, favoring the experimental group.

Discussion of Results

Discussion of the results of the first hypothesis

Table (14) shows the significance of the differences between the pre-test and post-test means of the control group in the cognitive and skill performance tests for the skills under investigation in futsal. The calculated t-value is significant.

The researcher attributes these significant differences in the control group to the teaching method, which consisted of the traditional approach (verbal explanation and demonstration) of the basic futsal skills to be learned. This was achieved through the teacher's success in providing a clear and accurate understanding of the teaching steps and technical points, demonstrating the skills practically several times to illustrate how to perform them, providing guidance and supervision, and gradually progressing the students in the control group from easy to difficult. Furthermore, the teacher corrected the learners' technical errors immediately upon their performance, which had a positive impact and facilitated proper learning. The collaborative nature of this learning method also stimulates the students' motivation among themselves, thus positively influencing their performance of the futsal skills under investigation. This result aligns with the findings of (Joyce Harrison, 1996) [13], (Samia Farghali and Nadia Abdel Qader, 2002), and Mahmoud Abdel Al-Halim (2006) [6, 19]: In the traditional teaching method (verbal explanation and modeling), the teacher presents the educational material in a logical form, enabling learners to remember it and quickly apply it by imitating what they have seen. This method allows a large portion of the curriculum to be completed in a short time and provides a minimum level of scientific material for learners, which each learner can then add to according to their effort, abilities, and capabilities. Afterward, learners are evaluated, errors are identified and corrected, and the teacher becomes the one who sets the content of the educational units, makes the decisions, and controls the main course of the educational process, thus increasing the chances of its success. According to the above, the researcher believes that the students in the control group learning in the traditional way, teaching (explanation and model performance), has positively affected the skill performance of the skills under investigation in futsal, and thus the first hypothesis has been confirmed, which states: "There are statistically significant differences between the pre-test and post-test of the control group in favor of the post-test in the cognitive test and skill performance of the skills under investigation in futsal."

Discussion of the results of the second hypothesis

Table (15) shows the significance of the differences between the pre-test and post-test means for the experimental group in the cognitive and skill performance tests for the futsal skills under investigation. The calculated t-value is significant.

The researcher attributes these significant differences in the experimental group to the effectiveness of the proposed educational program content using e-learning. A Telegram channel was created using multiple media (text, images, and video), which led to excitement and engagement, and presented information in a structured and attractive manner. This fostered the students' desire to interact with this modern technology, which allows them the freedom to learn, engage with modern technological tools, and progress

through the educational process at their own pace and according to their abilities.

(Atef Abu Hamid Al-Sharman, 2013) [3] indicates that the importance of e-learning can be defined by its individualization and independence of learning, and by activating the role of students. Students take responsibility for their own learning, and each learner learns in a way and at a time, that suits them. All learners participate in the learning process, which increases discussion time, allowing for focus on mastering skills, dialogue with the teacher, and providing the necessary opportunity for assessment and remediation. (10:24). This finding is consistent with the results of studies by (Ayman Yousef Alian, 2002), (Al-Tayeb Ahmed Harawi, Muhammad Omar Sarhan, 2015) (21) [2], whose results indicated that the use of e-learning effectively impacts the learning of various skills.

According to the above, the researcher believes that the application of the proposed educational program using e-learning by the experimental group has positively affected the level of skill performance and cognitive achievement under investigation in futsal. Thus, the second hypothesis has been confirmed, which states: "There are statistically significant differences between the pre-test and post-test of the experimental group in favor of the post-test in the cognitive test and skill performance of the skills under investigation in futsal."

Discussion of the Results of the Third Hypothesis

The results in Table (16) clearly show the significant differences between the post-test scores of the experimental and control groups, favoring the experimental group in the cognitive and skill performance tests for the futsal skills under investigation. The calculated t-value is significant. The researcher attributes the experimental group's superiority over the control group in the skill performance measurements for the futsal skills under investigation to the proposed educational program using e-learning. This program helped capture the students' attention, making the learning process more attractive, exciting, and engaging for them by positively stimulating their thinking. Furthermore, the method of presenting the "educational video, images, and written text" helped the students learn and master the skills under investigation quickly due to the interactive nature of the program. Additionally, increased learner interaction led to greater motivation, excitement, and a greater ability to understand movement, which in turn positively impacted the level of skill performance in the basic futsal skills under investigation. (Afaf Abdel-Karim 1990) [1] believes that no single teaching method can contribute to the comprehensive development of the learner. Therefore, a competent teacher must continuously learn and introduce new teaching methods that enhance the learning experience. The learner is an active participant, not a passive recipient, in achieving specific goals.

In this regard, (Jaber Abdel Hamid Jaber, 2000) [10] points out that following the traditional teaching method does not guarantee success in teaching skills that require extensive training and time. This is because, regardless of the teacher's competence, this method does not guarantee the completion of the learning process. The teacher merely provides a model and does not specify teaching aids in the lesson. Thus, while it attracts the learner's attention, it does not encourage thinking and discovery. This contradicts modern educational concepts, which advocate that each learner has their own unique individuality that must be respected and nurtured, and that opportunities should be provided for the learning situation to allow the learner to express their personality.

(Ball, 2013) [6] emphasizes that students have become active participants instead of simply sitting and listening to the teacher's explanation, with all the negative aspects that entails. The online classroom activates the students' role and makes learning more enjoyable and engaging. The online classroom relates to the methodology of the educational process, in which the roles of both the teacher and the students change in order to achieve better learning. Consequently, roles in the educational process are redistributed and... The focus is on the students' role in assuming responsibility.

This result aligns with the findings of studies by (Ayman Yousef Alian, 2002) and (Hanan Bint Asaad Al-Zain, 2013) (Enayat Ali Labib, Berksan Othman Hussein, 2001) [7, 9], which demonstrate the positive impact of e-learning on learning various skills.

According to the above, the researcher believes that the control group's use of the educational program employing the traditional method (explanation and demonstration) led to improved skill performance in the futsal skills under investigation. Furthermore, the experimental group's use of e-learning positively impacted the improvement of these futsal skills. Comparing the measurement results of both groups revealed significant differences favoring the experimental group. This is attributed to the proposed educational program's use of e-learning for this group, as it indicated the experimental group's superiority over the control group in post-test results for futsal skills under investigation. This contributed to refining, improving, and developing the learned skills, increasing their comprehension, and further enhancing the program's content. Stimulating, competing, and attracting attention among learners, thus fulfilling the third hypothesis, which states that there are statistically significant differences between the post-test measurements of the control and experimental groups in favor of the experimental group in the skills under investigation in futsal.

Conclusions and Recommendations

Conclusions

- The traditional method (explanation and demonstration) had a positive impact on improving the futsal skills of the students in the control group.
- The e-learning method positively contributes to improving the futsal skills of the students in the experimental group.
- The students in the experimental group, who used the e-learning method, outperformed the students in the control group, who used the traditional method, in the futsal skills.

Recommendations

According to the research findings, the researcher recommends the following:

- Using e-learning as a modern teaching method and strategy for teaching and mastering various futsal skills to students in other teams at the Faculty of Physical Education, given its positive impact on improving skill performance.

- Using e-learning in teaching sports demonstrations and futsal using tools, given its effective role in providing students with the knowledge and information related to skill performance.
- The importance of encouraging faculty members and their assistants involved in the educational process to adopt teaching methods and strategies that empower the learner to play an active role, in line with educational modernization and development, including e-learning.
- The practical application of the results of these research studies to improve the performance of female students in various sports in general, and futsal in particular.
- Conducting further scientific studies and research on female students in the College of Physical Education across various other academic courses using e-learning methods.

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