The effect of learning through play on developing some basic motor skills and musculoskeletal fitness among primary school students.

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Introduction and research problem:

The first cycle of basic education is the cornerstone of the educational structure, which countries focus on, as it is one of the most appropriate age stages for developing and enhancing the student's motor, health and physical abilities. Also, paying attention to them in this stage is The educational stage is one of the most important criteria by which the progress and development of societies are measured. This concern is, in fact, a concern for the future of the nation. Preparing students and caring for them in all aspects is a preparation to confront the civilizational challenges imposed by the requirements of the rapid development and change that we are experiencing today.

" **Khalil Mahmoud** " **(2022 AD)** explains the importance of play at this stage, as it is one of the basic needs necessary for them, such as food and drink, and through it, children discover their strength, weakness, abilities, and tendencies, as it plays an important role in developing all of their different aspects, whether socially, physically, intellectually,

motorically, health-wise, physically, and psychologically, It also provides them with basic visual, manual and motor skills depending on the type, form and purpose of the game. Play is considered the purest and most spiritual activity for students, in which they feel pleasure and joy and increase their motivation towards learning. **(102:4)**

" **Shaima Abdel Aziz** " **(2021)** points out the importance of developing students' basic motor skills through the play-based learning approach and the importance of its role in developing students' personalities in general and their motor and health abilities in particular, considering that movement is one of the basic motivations that work to develop basic motor skills and components of health, physical and psychological fitness and other aspects of students' personalities. **(118:9)**

" **Nesma Mohammed** " **(2018)** believes that general health fitness and musculoskeletal fitness in particular are vital requirements in our current era, due to their positive benefits on the body structure and general health, as they increase the strength and endurance of students for the physical activity imposed on them, delay the onset of fatigue, help students perform basic motor skills efficiently, and improve the general psychological state of the practitioner. **(45:21)**

Researchers see from the previous presentation that the learning-by-play method can develop basic motor skills and increase the efficiency of musculoskeletal fitness for primary school students, as it is presented in an exciting and enjoyable way, which increases the students' motivation towards learning and also works to develop their health information, enabling them to translate that information into behavioral patterns. A healthy and sound mindset qualifies them to become an effective tool for changing the health, social and economic conditions in their community, and to protect themselves and their community from numerous health

problems. Based on the above and the need for sports activities within schools to apply the learning-by-play method based on sound scientific foundations, researchers see the importance of using it in education.

This is what was indicated by the results of reference studies such as the study of " **Benny Widya et al** " (2025) (24), " **Hernan Guillermo et al** " (2025) (26), "**Xinmiao Zhang et al** " (2025) (29), " **Yue Ji et al** " (2025) (30), " **Ayoub Mansouri et al** " (2024) (23), " **Shahd Hamis** " (2024) (8), " **Muhammad Radhi** " (2024) (14), " **Wissam Muhammad** " (2024) (22), " **Ahmed Helmy** " (2023) (2), " **Sarah Al-Zubairi, Ibrahim Al-Warafi** " (2023) (5), " **Ali Raslan, Hamada Al-Janaini** " (2023 AD) (12), " **Ahmed Bin Qwaider, Karam Bashir** " (2022 AD) (1), " **Muhammad Abdel-Azim** " (2022 AD) (16), **and scientific references such as** " **Atallah Ahmed** " (2023 AD) (11), **Khalil Mahmoud**" (2022 AD) (4), " **Shaima Abdel-Aziz** " (2021 AD) (9), " **Essam El-Din Metwally** " (2021 AD) (10) , To the extent that the researchers have reviewed, they have not encountered any study that has addressed the use of learning through play in developing some basic motor skills and musculoskeletal fitness, which prompted them to conduct this research, which may achieve the development of basic motor skills and musculoskeletal fitness.

Research objective:

This research aims to try to identify the "**learning by playing method and its effect on developing some basic motor skills (walking, running, jumping, hopping) and musculoskeletal fitness (muscular strength, muscular endurance) for third-grade primary school students during the first semester of the academic year 2024/2025**

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Research hypotheses:

1- There are statistically significant differences between the mean scores of the pre- and post-tests of the experimental group in developing some basic motor skills and musculoskeletal fitness (under study), in favor of the post-test.

2- There are statistically significant differences between the mean scores of the pre- and post-tests of the control group in developing some basic motor skills and musculoskeletal fitness (under study), in favor of the post-test.

3- There are statistically significant differences between the mean scores of the post-tests of the experimental and control groups in developing some basic motor skills and musculoskeletal fitness (under study), in favor of the experimental group.

Search terms:

1-Learning by playing:

It is a set of mental or physical educational activities that the student performs and exerts effort in, according to specific rules that are explained in advance and related to the subject of the lesson, with the aim of achieving a specific educational or pedagogical goal(**15:18**) .

2- Basic motor skills:

These are the first forms of movement for children and are divided into transitional skills such as walking, running, jumping, hopping, and skipping; control skills such as throwing, catching, and kicking; and balance and stability skills. These movements are essential for participation in various individual and group games(**19:7**) .

3- usculoskeletal fitness:

This is one of the components of health fitness, which includes both muscular strength and muscular endurance. Muscular strength is considered the primary component of musculoskeletal fitness and is called strength fitness. Muscular endurance, on the other hand, is closely linked to cardiorespiratory fitness, which provides the muscles with the oxygen energy needed for muscle contraction**(35:19)** .

Research Procedures:

First: Research Methodology:

The researchers used the experimental method due to its suitability for the nature of the current research. They employed an experimental design for two equal and equivalent groups, one experimental and the other control, following pre- and post-test measurements for both groups.

Second: Research Community and Sample:

The research community included third-grade primary school students at Al-Resala Private School in Fayoum Governorate for the first semester **(2024-2025),** numbering **(184)** one hundred and eighty-four students. The researcher randomly selected the research sample, which consisted of **(40)** forty students, representing a percentage of **(21.73%)** of the total research community. The sample was divided into two equal groups, each consisting of **(20)** twenty students. One group was experimental, with the learning-by-play strategy applied, and the other was a control group, with the traditional method applied. A survey sample was also selected from the same original research community and from outside the primary sample, numbering **(16)** sixteen students, to conduct the survey study and calculate the scientific coefficients of validity and reliability of the tests used in the research.

Table(1)

Description of the research community and sample

Primary research sample				Survey sample		Total sample of the research		Native Community	
experimental group		control group							
Ratio	Number	ratio	Number	ratio	Number	ratio	Number	ratio	Number
%10.86	20	%10.86	20	%8.69	16	%21.73	40	%100	184

The sample individuals are distributed in a moderate distribution:

The researcher verified the extent of the moderation of the frequency distribution between the experimental and control groups in light of the following variables: growth variables "age, height, weight", intelligence, physical abilities, basic motor skills "walking, running, jumping, hopping", "musculoskeletal fitness" under investigation, and **Tables (2)** illustrate this:

Table(2)

Arithmetic mean, median, standard deviation, variance, and skewness coefficient for the research sample as a whole (primary and exploratory) on the variables under study (n = 56)

Coefficient of skewness	standard deviation	The mediator	Average	Unit of measurement	Variables				
-0.68	0.31	8.10	8.03	Yr	Age			Growth variables	
1.08	1.39	130.00	130.50	Cm	Height				
0.88	0.77	35.30	35.53	Kg	the weight				
0.28	1.20	43.50	43.39	Degree	Intelligence				
0.51	0.18	9.00	9.03	Kg	Right	Hand grip strength		power	physical abilities
0.49	0.17	8.60	8.63	Kg	The left				
-1.00	0.16	9.40	9.35	Sec	Enemy 30 from high start			Speed	
0.45-	1.31	133.00	132.80	Cm	Long jump from standing			Ability	
0.23-	0.21	14.00	13.98	Cm	Forward trunk bend from standing			Flexibility	
0.45	0.23	11.10	11.13	Sec	Hanging from a bent arm position			Endurance	
1.58-	0.16	2.70	2.61	No	Balanced walking on a Swedish bench			Balance	
0.51	0.18	9.00	9.03	Kg	Right	Hand grip strength	Ower	Muscular skeletal fitness	
0.49	0.17	8.60	8.63	Kg	The left				
0.45	0.23	11.10	11.13	Sec	Hanging from a bent arm position		Endurance		
1.45-	0.13	5.40	5.34	Degree	Walking			Basic Motor Skills Assessment Form	
0.30-	0.13	5.80	5.79	degree	Running				
0.14-	0.15	4.50	4. 49	degree	Leap forward				
0.61-	0.10	5.10	5.08	degree	Partridge				
0.00	0.42	20.70	20.70	Degree	Total score				

The results of Table (2) show the following:

The values of the skewness coefficients for the following variables: growth variables "age, height, weight", intelligence, physical abilities, basic motor skills, musculoskeletal fitness for the study sample as a whole "basic and exploratory" ranged between **(−1.58: 1.08)** and all of them were between **(+3, −3)** which indicates the moderate distribution of the sample in the variables under study.

Equivalence of the two research groups:

The researcher found equivalence between the experimental and control groups in light of the following variables: growth variables "age, height, weight", intelligence, physical abilities, transitional skills "walking, running, jumping, hopping", musculoskeletal fitness under investigation, and **Table (3)** shows this:

Table(3)

Statistical differences between the average pre-test scores of the experimental and control groups on the variables under study (n1 = n2 = 20)

sig.	Value "T"	The difference between the two averages	control group			experimental group			Unit of measurement	Variables			
			mean deviation error	standard deviation	Average	mean deviation error	standard deviation	Average					
0.88	0.15	0.02-	0.07	0.32	8.04	0.07	0.31	8.03	Yr	Age		Growth variables	
0.82	0.22	0.10-	0.32	1.43	130.60	0.31	1.40	130.50	Cm	Height			
0.70	0.39	0.10	0.18	0.81	35.47	0.18	0.81	35.57	Kg	the weight			
0.81	0.24	0.10	0.28	1.28	43.50	0.29	1.32	43.60	degree	Intelligence			
0.44	1.44	0.10	0.03	0.27	9.01	0.03	0.14	9.11	Kg	Right	Hand grip strength	Power	physical abilities
0.85	0.19	0.01-	0.04	0.18	8.62	0.03	0.14	8.61	Kg	The left			
0.88	0.15	0.01-	0.04	0.18	9.34	0.03	0.12	9.33	Sec	Enemy 30 from high start		Speed	
0.19	1.66	0.70-	0.29	1.38	133.05	0.28	1.26	132.35	Cm	Long jump from standing		Ability	
0.76	0.30	0.02-	0.05	0.22	13.99	0.04	0.19	13.97	Cm	Forward trunk bend from standing		Flexibility	
0.20	1.29	0.09	0.05	0.23	11.11	0.05	0.21	11.20	Sec	Hanging from a bent arm position		Endurance	
0.84	0.20	0.01	0.04	0.17	2.62	0.03	0.15	2.63	No	Balanced walking on a Swedish bench		Balance	
0.44	1.44	0.10	0.03	0.27	9.01	0.03	0.14	9.11	Kg	Right	Hand grip strength	Muscular skeletal fitness	
0.85	0.19	0.01-	0.04	0.18	8.62	0.03	0.14	8.61	Kg	The left			
0.20	1.29	0.09	0.05	0.23	11.11	0.05	0.21	11.20	Sec	Hanging from a bent arm position			
0.72	0.36	0.01	0.03	0.12	5.34	0.03	0.14	5.35	degree	Walking		Basic Motor Skills Assessment Form	
0.71	0.37	0.02-	0.03	0.14	5.80	0.03	0.12	5.78	degree	Running			
0.83	0.21	0.01-	0.04	0.17	4.50	0.03	0.12	4.49	degree	Leap forward			
1.00	0.00	0.00	0.02	0.08	5.09	0.03	0.12	5.09	degree	Partridge			
0.94	0.79	0.01	0.01	0.30	20.71	0.11	0.48	20.70	degree	Total score			

The tabular "t" value at a degree of freedom of (38) at a significance level of 0.05 = 2.021

Table (3) shows the following:

There are statistically insignificant differences between the experimental and control groups in the variables under investigation, as all calculated "**t**" values are **less** than the tabular "**t**" value at a significance level of **0.05**, which indicates the equivalence of the two research groups in the variables under investigation.

Third: Data Collection Methods:

1- Devices and Tools.
2- Tests.
A- Intelligence Test.
B- Physical Abilities Tests.
3- Skill Performance Assessment Form for the Basic Motor Skills Under Study.
4- Musculoskeletal Fitness Component Tests.

1-Equipment and Tools:

A- Equipment:

(1)A rhestometer to measure height in centimeters.

(2) An electronic scale to measure weight in kilograms.

(3)A stopwatch to measure and record time.

(4) An electronic dynamometer to measure grip strength.

B- Tools:

(1)Balloons. (2) Hoops of different sizes.

(3)Plastic baskets of different sizes and colors. (4) Tennis balls.

(5)Wooden boxes. (6) Medicine balls.

(7)Plastic cones of different sizes. (8) Volleyballs.

(9)Plastic plates of different sizes. (10) Plastic balls.

(11)Colored plastic bottles. (12) Swedish chairs.

(13)Whistle. (14) Plastic cups.

(15)Foam mattresses. (16) Sandbags.

(17)Lime. (18) Wooden chairs.

(19)Plastic dumbbells of different weights. (20) Adhesive tape.

2- Tests:

A- Intelligence Test: Appendix(3)

The researchers used the Progressive Matrices Test **(John Raven),** which consists of five groups **(A, B, C, D, E),** each group containing **(12)** items. Thus, the test as a whole consists of **(60)** sixty items, with one score given to each part of the test, meaning the total score for the test items is **(60)** sixty points

(1) .Scientific coefficients for the intelligence test under study:

The researchers calculated the scientific coefficients of validity and reliability for the intelligence test during the period from Sunday, **October 13, 2024**, to Sunday, **October 20, 2024,** as follows:

-Validity:

The validity of the intelligence test under investigation was calculated by means of the validity of the peripheral comparison on a survey sample similar to the study community and outside the main research sample, whose number reached **(16)** sixteen students. The students' scores were arranged in ascending order to determine the lower quartiles, which numbered **(4)** four students, and the upper quartiles, which numbered **(4)** four students. The significance of the differences between them in the test was calculated, and **Table (4)** shows the result.

Table(4)

Significance of the differences between the lower and upper quartiles in the intelligence test under study. (N1 = N2 = 4)

Sig.	Z	W	U	upper quarters				Lower quarters				Unit of measurement	The test
				Total ranks	Average rank	standard deviation	Average	Total ranks	Average rank	standard deviation	Average		
0.015	2.43	10.00	0.00	26.00	6.50	1.22	44.25	10.00	2.50	0.78	40.25	Degree	Intelligence

The value of (z) at a significance level of (0.05) = 1.96

It is clear from **Table (4)** that there are statistically significant differences between the lower and upper quarters groups in the intelligence test under study, in favor of the upper quarters group, as the calculated "z" value is greater than the tabular "**z**" value at a significance level of **(0.05)**, which indicates the validity of the test and its ability to distinguish between different groups.

- **Reliability:**

To calculate the reliability of the test, the researchers used the method of applying the test and re-applying it to the survey sample, which numbered **(16)** sixteen students from the research community and from outside the original sample, with a time difference of **(7)** seven days between the two applications. Then, the correlation coefficient between the two applications was found, and Table **(5)** shows the result.

Table(5)

Correlation coefficient between application and reapplication for the intelligence test under study. (n = 16)

value of "r"	Re-apply		Application		Unit of measurement	The test
	standard deviation	Average	standard deviation	Average		
0.980	1.59	42.88	1.69	42.75	Degree	Intelligence

The tabular value of (r) at a degree of freedom of (14) and a significance level of (0.05) = 0.497

Table (5) shows the following:

The correlation coefficient between the application and re-application of the intelligence test under study reached **(0.980),** which is a statistically significant correlation coefficient, as the calculated **(r)** value is **greater** than the tabular **(r)** value at the significance level **(0.05),** which indicates the test's reliability.

B-Physical Abilities Tests: Appendix(4)

The researchers surveyed the opinions of experts in the field of curricula, teaching methods, and sports training Appendix **(1).** They also consulted scientific references such as "Muhammad Issam" **(2022) (17)**, "Mufti Ibrahim" **(2020) (19),** "Salem Al-Najjar" **(2020) (6),** and reference studies such as "Benny Widya et al" **(2025) (24),** "Hernan Guillermo et al" **(2025) (26)**, "Xinmiao Zhang et al" **(2025) (29),** "Shahd Hamis" **(2024) (8),** "Muhammad Radhi" **(2024) (14),** "Wissam Muhammad" **(2024) (22),** "Ahmed Helmy" **(2023) (2)**, "Ali Raslan, Hamada Al-Janaini" **(2023 AD) (12),** "Muhammad Abdel-Azim" **(2022 AD).(16)**

(1) Scientific coefficients for the physical ability tests under study:

The researchers calculated the scientific coefficients of validity and reliability for the **physical ability tests** during the period from Sunday, **October 13, 2024,** to Wednesday, **October 16, 2024,** as follows:

- Validity:

The validity of the physical ability tests under investigation was calculated using the validity of the one-way comparison on a survey sample similar to the study community and outside the primary research sample, whose number reached **(16)** sixteen students. The students' scores were arranged in ascending order to determine the lower quartiles, which numbered **(4)** four students, and the upper quartiles, which numbered **(4)** four students. The significance of the differences between them in the tests was calculated, and Table **(6)** shows the results.

Table(6)

Significance of the differences between the lower and upper quartiles in the physical ability tests under study (N1 = N2 = 4)

Sig.	Z	W	U	upper quarters				Lower quarters				Unit of measurement	Tests		physical abilities
				Total ranks	Average rank	standard deviation	Average	Total ranks	Average rank	standard deviation	Average				
0.02	2.38	10.00	0.00	26.00	6.50	0.05	9.23	10.00	2.50	0.13	8.68	Kg	Right	Hand grip strength	Power
0.02	2.38	10.00	0.00	26.00	6.50	0.14	8.90	10.00	2.50	0.15	8.43	Kg	The left		
0.02	2.38	10.00	0.00	26.00	6.50	0.10	9.58	10.00	2.50	0.05	9.18	Sec	Enemy 30 from high start		Speed
0.02	2.37	10.00	0.00	26.00	6.50	0.58	134.50	10.00	2.50	0.58	131.50	Cm	Long jump from standing		Ability
0.02	2.32	10.00	0.00	26.00	6.50	0.08	14.20	10.00	2.50	0.13	13.65	Cm	Forward trunk bend from standing		Flexibility
0.02	2.34	10.00	0.00	26.00	6.50	0.22	11.43	10.00	2.50	0.06	10.85	Sec	Hanging from a bent arm position		Endurance
0.04	2.08	11.00	1.00	25.00	6.25	0.96	2.73	11.00	2.75	0.21	2.43	No	Balanced walking on a Swedish bench		Balance

The value of (z) at a significance level of (0.05) = 1.96

It is clear from **Table (6)** that there are statistically significant differences between the lower and upper quarters groups in the physical ability tests under investigation, in favor of the upper quarters group, as all the calculated "**z**" values are **greater** than the tabular "**z**" value at a significance level of **(0.05),** which indicates the validity of the tests and their ability to distinguish between the different groups.

- Reliability:

To calculate the reliability of the physical ability tests, the researchers used the method of applying the test and re-applying it to the survey sample, which numbered **(16)** sixteen students from the research community and from outside the original sample, with a time difference of **(3)** three days between the two applications. Then, the correlation coefficient between the two applications was found, and **Table (7)** shows the result.

Table(7)

Correlation coefficient between application and reapplication in the physical ability tests under investigation. (n = 16)

value of "r"	Re-apply		Application		Unit of measurement	The test		physical abilities
	standard deviation	Average	standard deviation	Average				
0.981	0.20	8.94	0.22	8.96	Kg	Right	Hand grip strength	Power
0.858	0.22	8.67	0.20	8.66	Kg	The left		
0.983	0.17	9.40	0.17	9.38	Sec	Enemy 30 from high start		Speed
0.934	1.21	133.56	1.29	133.06	Cm	Long jump from standing		Ability
0.968	0.22	14.01	0.23	13.99	Cm	Forward trunk bend from standing		Flexibility
0.788	0.24	11.10	0.24	11.09	Sec	Hanging from a bent arm position		Endurance
0.990	0.25	2.63	0.18	2.60	No	Balanced walking on a Swedish bench		Balance

The tabular value of (r) at a degree of freedom of (14) and a significance level of (0.05) = 0.497

Table (7) shows the following:

The correlation coefficients between the application and reapplication of the physical ability tests under study ranged between (**0.788**: **0.990**), which are statistically significant correlation coefficients, as all calculated (**r**) values are greater than the tabular (**r**) value at the significance level of (**0.05**), indicating the stability of these tests.

3-Skill Performance Evaluation Form for the Basic Motor Skills Under Study:

The researchers designed a skill performance evaluation form for the basic motor skills (walking, running, broad jump, hopping) under study, **Appendix** (**7**), after consulting **scientific references** such as: "Atallah Ahmed" (**2023 AD**) (**11**), "Shaimaa Abdel Aziz" (**2021 AD**) (**9**), "Essam El-Din Metwally" (**2021 AD**) (**10**), as well as **reference studies** such as the study of "Yue Ji et al" (**2025 AD**) (**30**), "Mohamed Shukry" (**2024 AD**) (**15**), "Ahmed Helmy" (**2023 AD**) (**2**), "Gamila Amir, Gamal Marazqa" (**2023 AD**) (**3**), "Nariman Mahmoud" (**2023 AD**) (**20**), "Ahmed Bin Qwaider" (**2022 AD**) (**1**), "Pranoto, N.W. et al" (**2021 AD**) (**28**) In light of this, the following was done:

A- Objective Determination: In light of the research objective, the questionnaire was defined as evaluating skill performance and measuring the extent of learning of the basic motor skills under study.

B- Define and analyze the technical performance of motor performance: Identify the most important technical points that should be noted and focused on during performance.

C- The identified steps were developed into a questionnaire to evaluate the form of skill performance for the skills under study.

D- The initial version was presented to experts in the field of curricula and physical education teaching methods, with no less than **(10)** years of experience **Appendix (1)**, Some of the wording was modified.

E- Determine the score for each skill out of **(10)** points. The evaluation was conducted by a committee of **(3)** expert judges, with the final score being derived from the average of the three judges' scores **Appendix (2)**.

(1) Scientific coefficients for the skill performance evaluation form for the skills under study:

The researchers calculated the scientific coefficients for validity and reliability during the period from Wednesday, **October 16, 2024**, to Sunday, **October 20, 2024**, as follows:

- Validity:

The validity of the performance evaluation form under study was calculated by means of the validity of the side comparison on a survey sample similar to the research community and outside the primary research sample, whose number reached **(16)** sixteen students. The students' scores were arranged in ascending order to determine the lower quartiles, which numbered **(4)** four students, and the upper quartiles, which numbered **(4)** four students. The significance of the differences between them in the test was calculated, and **Table (8)** shows the results.

Table(8)

Significance of differences between the lower and upper quartiles in the skill performance assessment form for the skills under study. (N1 = N2 = 4)

Sig.	Z	W	U	upper quarters				Lower quarters				Unit of measurement	Variables	
				Total ranks	Average rank	standard deviation	Average	Total ranks	Average rank	standard deviation	Average			
0.01	2.53	10.00	0.00	26.00	6.50	0.05	5.48	10.00	2.50	0.00	5.20	degree	Walking	Basic Motor Skills Assessment Form
0.02	2.40	10.00	0.00	26.00	6.50	0.06	5.95	10.00	2.50	0.05	5.63	degree	Running	
0.02	2.43	10.00	0.00	26.00	6.50	0.05	4.68	10.00	2.50	0.05	4.28	degree	Leap forward	
0.01	2.53	10.00	0.00	26.00	6.50	0.05	5.18	10.00	2.50	0.00	5.00	degree	Partridge	
0.02	2.34	10.00	0.00	26.00	6.50	0.27	21.28	10.00	2.50	0.12	20.1	degree	Total score	

The value of (z) at a significance level of (0.05) = 1.96

It is clear from **Table (8)** that there are statistically significant differences between the lower and upper quarters groups in the skill performance evaluation form for the skills under study, in favor of the upper quarters group, as all the calculated "**z**" values are **greater** than the tabular "**z**" value at a significance level of **(0.05),** which indicates the validity of the form and its ability to distinguish between the different groups.

- Reliability:

To calculate the reliability of the physical ability tests, the researcher used the method of applying the test and re-applying it to a survey sample of **(16)** sixteen students from the research community and from outside the original sample, with a time interval of **(3)** three days between the two applications. Then, the correlation coefficient between the two applications was found, and **Table (9)** shows the result.

Table(9)

Correlation coefficient between application and reapplication in the skill performance assessment form for the skills under study. (n = 16)

value of "r"	Re-apply		Application		Unit of measurement	Variables	
	standard deviation	Average	standard deviation	Average			
0.982	0.12	5.35	0.12	5.33	Degree	Walking	Basic Motor Skills Assessment Form
0.729	0.14	5.79	0.13	5.79	Degree	Running	
0.942	0.15	4.51	0.16	4.50	Degree	Leap forward	
0.926	0.12	5.13	0.08	5.07	Degree	Partridge	
0.903	0.47	20.78	0.48	20.69	Degree	Total score	

The tabular value of (r) at a degree of freedom of (14) and a significance level of (0.05) = 0.497

Table (9) shows the following:

The correlation coefficients between the application and reapplication of the performance evaluation form under study ranged between **(0.729: 0.982),** which are statistically significant correlation coefficients, as all calculated **(r)** values are greater than the tabular **(r)** value at the significance level **(0.05),** indicating the reliability of this form.

4- Musculoskeletal Fitness:

A- Scientific coefficients for tests and measurements of the components of musculoskeletal fitness under study:

The researchers calculated the scientific coefficients of validity and reliability for the tests and measurements of the components of musculoskeletal fitness under study during the period from Wednesday, **October 16, 2024**, to Tuesday, **October 22, 2024,** as follows:

(1)Validity:

The validity of the tests and measurements of the components of musculoskeletal fitness under study was calculated by means of one-way comparison validity on a survey sample similar to the research community and outside the primary research sample, whose number reached **(16)** sixteen students. The students' scores were arranged in ascending order to determine the lower quartiles, which numbered **(4)** four students, and the upper quartiles, which numbered **(4)** four students. The significance of the differences between them in the tests was calculated, and Table **(10)** shows the results.

Table(10)

Significance of differences between the lower and upper quartiles in the components of musculoskeletal fitness under study. (N1 = N2 = 4)

Sig.	Z	W	U	upper quarters				Lower quarters				Unit of measurement	Variables			
				Total ranks	Average rank	standard deviation	Average	Total ranks	Average rank	standard deviation	Average					
0.02	2.38	10.00	0.00	26.00	6.50	0.05	9.23	10.00	2.50	0.13	8.68	Kg	right	Grip strength of the hand	Power	Muscular fitness
0.02	2.38	10.00	0.00	26.00	6.50	0.14	8.90	10.00	2.50	0.15	8.43	Kg	Left			
0.02	2.34	10.00	0.00	26.00	6.50	0.22	11.43	10.00	2.50	0.06	10.85	Sec	Hanging from a bent arm position		Endurance	

The value of (z) at a significance level of (0.05) = 1.96

It is clear from Table **(10)** that there are statistically significant differences between the lower and upper quarters groups in the tests and measurements of the components of musculoskeletal fitness under study, in favor of the upper quarters group, as all the calculated "**z**" values are greater than the tabular "**z**" value at a significance level of (0.05), which indicates the validity of the tests and measurements and their ability to distinguish between the different groups.

(2)Reliability:

To calculate the reliability of the musculoskeletal fitness component tests, the researcher used the method of applying the test and reapplying it to the exploratory sample, which numbered **(16)** sixteen students from the research community and from outside the original sample, with a time interval of **(4)** four days between the two applications. Then, the correlation coefficient between the two applications was found, and **Table (11)** shows the result.

Table(11)

Correlation coefficients between application and reapplication in the components of musculoskeletal fitness under study. (n = 16)

value of "r"	Re-apply		Application		Unit of measurement	Variables			
	standard deviation	Average	standard deviation	Average					
0.981	0.20	8.94	0.22	8.96	Kg	Right	Grip strength of the hand	Power	Muscular fitness
0.858	0.22	8.67	0.20	8.66	Kg	left			
0.788	0.24	11.10	0.24	11.09	Sec	Hanging from a bent arm position		Endurance	Skeletal

The tabular value of (r) at a degree of freedom of (14) and a significance level of (0.05) = 0.497

Table (11) shows the following:

The correlation coefficients between application and reapplication in the tests and measurements of the health fitness components under study ranged between **(0.788: 0.981),** which are statistically significant correlation coefficients, as all calculated **(r)** values are **greater** than the tabular **(r)** value at the significance level of **(0.05),** indicating the stability of these tests and measurements

Fourth: Steps for Implementing the Study:

1- The First Exploratory Study:

The researchers conducted the survey from Sunday, **October 13, 2024**, to Tuesday, **October 22, 2024**, on **(16)** sixteen students from within the original community and outside the original research sample. The study aimed to identify:

A. Identify the available devices and tools and their suitability.

B. Test some measurement tools to determine the extent to which the research sample understood these tools.

C. Identify the problems and difficulties encountered by the researcher during the measurement process and how to overcome them.

D. Conduct scientific procedures (validity and reliability) for the data collection tools used in the research.

2- The Second Exploratory Study:

The researchers conducted the study on Wednesday, **October 23, 2024**, and Thursday, **October 24, 2024**, on a sample similar to the research sample and outside the original sample, consisting of **(16)** sixteen students. The study aimed to identify:

A- The extent of students' understanding and comprehension of the required work through the learning-by-play method and how to implement it.

B- The problems that may hinder the implementation process and how to overcome them.

C- The suitability of the selected games for the research sample and how to use them.

1- Pre-test:

Pre-tests were conducted on the two research groups on Sunday, **October 27, 2024,** and Monday**, October 28, 2024**, for the variables under study.

2- The main experiment:

After completing the pre-test, the researcher applied the game-based learning method to the experimental group and the traditional method to the control group. This was during the period from Wednesday, **October 30, 2024 AD**, to Thursday, **January 2, 2025** AD, for a period of **(10)** ten **weeks** (two and a half months), with one lesson per week and a lesson duration of **(90)** ninety minutes. The

researchers taught the experimental group on Wednesdays and the control group on Thursdays of each week.

A- The researchers took the following into account during the implementation of the experiment:

(1) Teaching the experimental and control groups throughout the experiment. The introductory and concluding sections were taught to each group using the same content and a single teaching method, the traditional method, **Appendix (6)** details the educational units for both groups.

(2) Adherence to the play-based learning approach with the experimental group.

(3) Use of the traditional method with the control group.

(4) Adherence to the timeline for each educational unit for the entire implementation period.

5- Post-test:

The researchers conducted post-tests for the experimental and control groups on the variables under study on Sunday, **January 5, 2025**, and Monday, **January 6, 2025**, in the same manner as the pre-test.

Fifth: Statistical Processes Used:

The researchers used the following statistical processes:

arithmetic mean - median - standard deviation - skewness coefficient - correlation coefficient - t-test for significance of differences between two similar groups - non-barometric Mann-Williams test.

The researcher accepted a significance level of 0.05 for all statistical processes to accept and interpret the research results. The researchers also used the SPSS v22 statistical program to calculate statistical coefficients.

Sixth: Presentation, Interpretation, and Discussion of the Results

1- Presentation of the Results:

To achieve the research objective and hypothesis, the researchers presented the results as follows:

(a) Significance of the differences between the mean scores of the pre- and post-tests of the experimental group in developing basic motor skills and musculoskeletal fitness (under study).

(b) Significance of the differences between the mean scores of the pre- and post-tests of the control group in developing basic motor skills and musculoskeletal fitness (under study).

(c) Significance of the differences between the mean scores of the post-tests of the experimental and control groups in developing basic motor skills and musculoskeletal fitness (under study).

Table(12)

Sig.	%95confidence interval		t-value	The difference between the two averages.	Dimensional measurement		Pre-measurement		Unit of measurement	Variables			
	The highest	The lowest			Standard deviation	Average	Standard deviation	Average					
0.001	2.10-	2.39-	32.71	2.25-	0.36	7.60	0.14	5.35	Degree	Walking		Basic Motor Skills Assessment Form	
0.001	1.79-	2.26-	17.87	2.03-	0.49	7.81	0.12	5.78	Degree	Running			
0.001	2.50-	2.99-	23.09	2.75-	0.53	7.23	0.12	4.49	Degree	Leap forward			
0.001	2.11-	2.32-	43.49	2.22-	0.18	7.30	0.12	5.09	Degree	Partridge			
0.001	8.81-	9.65-	45.70	9.23	0.90	29.93	0.48	20.70	Degree	Total score			
0.001	0.91-	1.37-	10.56	1.14-	0.44	10.25	0.14	9.11	Kg	Right	Grip strength of the hand	Power	Muscular fitness skeletal
0.001	1.24-	1.60-	16.75	1.42-	0.38	10.03	0.14	8.61	Kg	left			
0.001	3.04-	3.31-	49.79	3.18-	0.22	14.37	0.21	11.20	Sec	Hanging from a bent arm position		Endurance	

Significance of differences between the average scores of the pre- and post-tests for the experimental group in developing basic motor skills and musculoskeletal fitness (under investigation). (N = 20)

The tabular value of (t) at a degree of freedom of (19) and a significance level of (0.05) = 1.729

Table (12) shows the following:

There are statistically significant differences between the averages of the pre- and post-measurements of the experimental group in developing basic motor skills and musculoskeletal fitness under study, and in the direction of the post-measurement, as all calculated **(t)** values are **greater than** the tabular **(t)** value at the significance level.**(0.05)**

Table(13)

Significance of the differences between the mean scores of the pre- and post-tests of the control group in developing basic motor skills and musculoskeletal fitness (under investigation). (N = 20)

Sig.	%95confidence interval		t-value	The difference between the two averages.	Dimensional measurement		Pre-measurement		Unit of measurement	Variables			
	The highest	The lowest			Standard deviation	Average	Standard deviation	Average					
0.001	0.46-	0.54-	28.14	0.50-	0.17	5.84	0.12	5.34	Degree	Walking		Basic Motor Skills Assessment Form	
0.001	0.48-	0.55-	34.33	0.52-	0.13	6.31	0.14	5.80	Degree	Running			
0.001	0.50-	0.70-	12.92	0.60-	0.08	5.10	0.17	4.50	Degree	Leap forward			
0.001	0.55-	0.67-	21.78	0.61-	0.14	5.70	0.08	5.09	Degree	Partridge			
0.001	2.10-	2.35-	37.79	2.23	0.36	22.94	0.30	20.71	Degree	Total score			
0.001	0.43-	0.50-	25.59	0.47-	0.20	9.48	0.27	9.01	Kg	Right	Grip strength of the hand	Power	Musculoskeletal fitness
0.001	0.48-	0.73-	10.39	0.60-	0.22	9.23	0.18	8.62	Kg	Left			
0.001	0.75-	1.43-	6.75	1.09-	0.83	12.20	0.23	11.11	Sec	Hanging from a bent arm position		Endurance	

The tabular value of (t) at a degree of freedom of (19) and a significance level of (0.05) = 1.729

Table (13) shows the following:

There are statistically significant differences between the averages of the pre- and post-measurements of the control group in developing basic motor skills and musculoskeletal fitness under study, in the direction of the post-measurement, as all calculated **(t)** values are **greater than** the tabular **(t)** value at the significance level.**(0.05)**

Table(14)

Significance of the differences between the average scores of the two post-tests for the experimental and control study groups in developing basic motor skills and musculoskeletal fitness

%95confidence interval		sig.	t-value	The officer		empiricism		Unit of measurement	Variables			
The highest	The lowest			Standard deviation	Average	Standard deviation	Average					
1.942	1.578	0.001	19.63	0.17	5.84	0.36	7.60	Degree	Walking		Basic Motor Skills Assessment Form	
1.726	1.264	0.001	13.10	0.13	6.31	0.49	7.81	Degree	Running			
2.377	1.893	0.001	17.83	0.08	5.10	0.53	7.23	Degree	Leap forward			
1.708	1.502	0.001	31.45	0.14	5.70	0.18	7.30	Degree	Partridge			
7.43	6.56	0.001	32.19	0.36	22.94	0.90	29.93	Degree	Total score			
0.996	0.554	0.001	7.10	0.20	9.48	0.44	10.25	Kg	Right	Grip strength of the hand	Power	Muscular fitness Musculoskeletal
1.004	0.606	0.001	8.18	0.22	9.23	0.38	10.03	Kg	Left			
2.568	1.788	0.001	11.30	0.83	12.20	0.22	14.37	Sec	Hanging from a bent arm position		Endurance	

(under study). (N1 = N2 = 20)

The tabular value of (t) at a degree of freedom of (38) and a significance level of (0.05) = 2.021

Table (14) shows the following:

There are statistically significant differences between the averages of the two post-test scores of the experimental and control study groups in developing the basic motor skills and musculoskeletal fitness under investigation, in favor of the experimental group, as all calculated **t-values** are **greater than** the tabular **t-value** at the significance level of.**(0.05)**

2-Interpretation and discussion of the results:

Table (12) shows that there are statistically significant differences between the average scores of the pre- and post-tests for the experimental group in developing basic motor skills and musculoskeletal fitness under study, and in the direction of the post-test. All calculated **t-values** are **greater than** the tabular **t-value** at the significance level of **(0.05),** indicating the positive impact of the learning-through-play approach.

The researchers attribute the reason for the progress of the students in the experimental group in developing the basic motor skills and musculoskeletal fitness under study in favor of the post-measurement to the use of the learning-by-play method, as it is a method that depends on the effectiveness and activity of the learner and is presented in an interesting and exciting way that stimulates the students' motivation and challenges their abilities, which contributes to their acquisition of cognitive, physical, health and motor aspects and broadens their horizons. Also, playing, including running, jumping and hopping, contributes to strengthening the muscles, and the result of regular and continuous movement during play helps in the growth of bones and increases their density, and it also improves balance and motor coordination, which makes play a basic factor in building musculoskeletal fitness and improving basic motor skills, and thus had a positive impact on the variables under study.

In this regard **Khalil Mahmoud**" **(2022)** emphasizes the role of play in developing basic motor skills and musculoskeletal fitness, pointing out that play is one of the basic needs of students, such as food and drink, and through it, children discover their strengths, weaknesses, abilities and tendencies, as it plays an important role in developing all different aspects of them, whether socially, physically, intellectually, motorically, health-wise, physically and psychologically. It also provides them with basic visual,

manual and motor skills depending on the type, form and purpose of the game. Play is considered the purest and most spiritual activity for students, making them feel happy, enjoy and excited, thus increasing their motivation towards learning **(102:4)** .

This is consistent with the results of the studies of Benny Widya et al **(2025) (24),** Hernan Guillermo et al **(2025) (26),** Carli Gericke et al **(2024) (25),** Lotfi Qara, Abdul Qader Nasser **(2024) (13),** Muhammad Shukri **(2024) (15),** Wissam Muhammad **(2024) (22),** Jamila Amir, Jamal Marazqa **(2023) (3),** Sarah Al-Zubairi, Ibrahim Al-Warafi **(2023) (5),** as the results of their study indicated an improvement in the post-measurements compared to the pre-measurements of the experimental group in the variables of basic motor skills and musculoskeletal fitness under their study.

Thus, the validity of the **first hypothesis** is achieved, which states: "**There are statistically significant differences between the average scores of the pre- and post-measurements of the experimental group in developing basic motor skills and musculoskeletal fitness (under study), in favor of the post-measurement**".

It is clear from the results of **Table (13)** that there are statistically significant differences between the average pre- and post-measurement scores of the control group in developing basic motor skills and musculoskeletal fitness under investigation, and in the direction of the post-measurement, as all the calculated **(t)** values are **greater than** the tabular **(t)** value at the significance level **(0.05),** which indicates the positivity of the traditional method followed (explanation and model) among the students of the control group.

The researchers attribute the progress of the control group members in developing basic motor skills and musculoskeletal fitness to the traditional method followed, which includes a set of activities that contributed to improving those basic motor skills and musculoskeletal fitness among the students in the control group. This is due to the students' repetition of the followed activities, which contributes to increasing their motor experience and increasing their motivation to practice these activities provided, which leads to improvement in the control group members in the variables under study in favor of the dimensional measurement.

In this regard " **L.C. & Gashaj, V.**" **(2021)** emphasize that developing basic motor skills is not difficult if there are activities to practice, these activities are repeated, feedback is provided, and errors are corrected during performance and practice. He also points out that motor skills have a crucial aspect in student development because they lay the foundation for various physical, health, motor, and cognitive abilities that students will use throughout their lives, such as walking, running, jumping, hopscotching, throwing, and other skills that may be the basis for other sports activities. Thus, they become normal students with a balanced, comprehensive development in all aspects of their personality, motor, health, and physical . **(44:27)**

his is consistent with the results of the study of "Shahd Hamis" **(2024 AD) (8),** "Ahmed Helmy" **(2023 AD) (2),** "Jamila Amir, Jamal Marazqa" **(2023 AD) (3),** "Sara Al-Zubairi, Ibrahim Al-Warafi" **(2023 AD) (5),** "Ali Raslan, Hamada Al-Janaini" **(2023 AD) (12),** "Yue Ji et al" **(2025 AD) (30),** "Ayoub Mansouri et al" **(2024 AD) (23),** as the results of their study indicated an improvement in the post-measurements compared to the pre-measurements of the control group in the variables of basic motor skills and musculoskeletal fitness under their study.

Thus, the validity of the **second hypothesis** is achieved, which states: "**There are statistically significant differences between the average scores of the pre- and post-measurements of the control group in developing basic motor skills and musculoskeletal fitness (under study), in favor of the post-measurement**".

It is clear from **Table (14)** that there are statistically significant differences between the average scores of the two post-tests for the experimental and control research groups in developing the basic motor skills and musculoskeletal fitness under investigation, in the direction of the experimental group, as all the calculated **(t) values** are greater than the tabular **(t) value** at the significance level **(0.05),** which indicates the positive effect of the learning-by-play method .

The researchers attribute the improvement in post-measurements of the experimental group students compared to the control group in developing basic motor skills and musculoskeletal fitness to the use of the play-based learning method for the experimental group. This is a result of presenting the play-based learning method content (games) based on sound scientific foundations and presented in an exciting and engaging manner appropriate to the students' tendencies, abilities, and potentials, which stimulates and increases their motivation to practice. The clarity of the games used in terms of how to properly perform the game and skills, and the provision of continuous feedback and correction of errors during the game implementation leads to good learning that matches the technical performance of the chosen skill and game. It also encourages students to interact and participate, helps them communicate with others and cooperate, enhances their memory, increases learners' enthusiasm and engagement in the game, and reduces the likelihood of obesity and muscle weakness resulting from lack of movement. Play is not only a means of entertainment, but it is an effective

educational tool that contributes to building students' personalities from all aspects and developing their basic motor skills and musculoskeletal fitness. This explains the reason for the positive impact of the experimental group and its superiority over the control group in the post-measurement.

In this regard, "**Essam El-Din Metwally**" **(2020)** explains that the method of learning through play is learning through motor activity and play in its various forms. It is one of the most important means of modern education, and it has an effective role in developing all aspects of students: physically, mentally, psychologically, health-wise and motor-wise. It is important in improving and developing basic motor skills in children, developing their strength and endurance, and building their bodies in a healthy way. The variety and multiplicity of games also have a clear role in choosing what suits the inclinations and abilities of each student**(54:10)** .

This is consistent with the study of "Benny Widya et al" **(2025) (24),** "Hernan Guillermo et al" **(2025) (26),** "Xinmiao Zhang et al" **(2025) (29),** "Yue Ji et al" **(2025) (30),** "Shahd Hamis" **(2024) (8),** "Lotfi Qara, Abdul Qader Nasser" **(2024) (13),** "Muhammad Shukry" **(2024) (15),** "Sarah Al-Zubairi, Ibrahim Al-Warafi" **(2023) (5),** "Ali Raslan, Hamada Al-Janaini" **(2023) (12),** as the results of their study indicated the presence of statistically significant differences in the two post-measurements between the experimental and control groups in the variables of basic motor skills and musculoskeletal fitness under their study in favor of the post-measurement of the group Experimental.

Thus, the validity of the **third hypothesis** is achieved, which states that "**there are statistically significant differences between the average scores of the two post-measurements of the experimental and control research groups in developing basic motor skills and musculoskeletal fitness (under study), in favor of the experimental group**".

Seventh: Conclusions and Recommendations:

1- Conclusions:

In light of the research results, the researcher reached the following conclusions:

(1) The play-based learning method used with the experimental group contributed positively to the development of basic motor skills and musculoskeletal fitness.

(2) The traditional method used (explanation and modeling) contributed positively to the development of basic motor skills and musculoskeletal fitness.

(3) The play-based learning method used with the experimental group students had a more effective impact than the method used (explanation and modeling) used with the control group students in developing basic motor skills and musculoskeletal fitness.

2- Recommendations:

In light of the conclusions, the researchers recommend the following:

1- The necessity of using the play-based learning method in physical education lessons for primary school students, given its effective impact on developing basic motor skills and musculoskeletal fitness.

2- The necessity of developing basic motor skills and musculoskeletal fitness using various strategies and methods.

3-Holding training courses for teachers to teach them how to employ the learning-by-play approach in physical education lessons.

4-Diversifying the games used and selecting the best ones increases the excitement and enjoyment for students, developing basic motor skills and musculoskeletal fitness on the one hand, and releasing excess energy on the other send.

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