



## The Effect of a Game-Based Introductory Educational Program on the Development of Motor Coordination and the Acquisition of Basic Volleyball Skills Among Students

<sup>1</sup>M.M. Mustafa Abdel-Shahid Muhammad\*

\*Corresponding Author, E-mail: [mustafa-abdel-shahid@shu.edu.iq](mailto:mustafa-abdel-shahid@shu.edu.iq)

<sup>1</sup>Al-Shattra University / College of Physical Education and Sports Sciences

### Abstract

The present research focused on developing an instructional program grounded in preparatory games and examining its role in enhancing motor coordination and essential volleyball skills among students. An experimental approach was employed, involving two comparable groups: an experimental group and a control group, in accordance with the research design. The study sample included 48 second-year students from the College of Physical Education and Sports Sciences at Dhi Qar University for the academic year 2025–2026. Participants were selected from two sections (C and D), with 24 students in each section, representing 30% of the total population (160 students), and were randomly distributed between the two groups. The results demonstrated that students who participated in the preparatory games-based program outperformed those who followed the traditional teaching method in both motor coordination and basic volleyball skills. Based on these findings, it is suggested that similar programs be examined across diverse age categories and research samples, in addition to exploring their impact on other physical and skill-related variables within sports settings.

**Keywords:** Preparatory Games, Motor Coordination, Basic Volleyball Skills

### 1.Introduction

Motor learning represents a fundamental area within physical education and sport sciences, concerned with understanding the processes through which individuals acquire, refine, and stabilize

motor skills via structured practice and systematic training. It seeks to enable learners to attain optimal levels of skill performance by employing well-designed instructional strategies that align with the nature of the task, as well as the learners' abilities, age, and physical attributes. Consequently, the implementation of effective teaching methods plays a crucial role in enhancing the efficiency of motor learning and achieving mastery of motor skills.

The physical education class is one of the fundamental pillars for achieving educational and instructional goals in school, as it represents the educational environment through which students' physical, motor, psychological, and social aspects are developed. Therefore, attention to physical education classes is an essential step toward achieving the desired goals of the prescribed curriculum. Consequently, experts in the field of physical education emphasize the need to adopt modern teaching strategies and methods that align with the age characteristics of learners and contribute to improving the learning process and making it more effective.

Among the modern teaching methods that have proven effective in teaching motor skills are introductory games, which serve as an effective educational tool based on the use of simplified activities and games that lay the groundwork for learning the basic skills of various sports. These games are characterized by their ability to combine learning with fun, which increases learners' motivation to participate in educational activities and makes the learning process more engaging and enjoyable. Introductory games also contribute to the development of various motor aspects in learners through diverse motor situations that help develop motor coordination and improve the learner's ability to coordinate movements of different body parts during motor performance.

The importance of warm-up games lies in their ability to address certain challenges that may arise in physical education classes, such as large class sizes, limited resources, and time constraints, as well as the lack of excitement and competition in some traditional teaching methods. Therefore, the use of warm-up games is considered one of the educational tools that can contribute to making the lesson more effective and organized.

Volleyball is a team sport characterized by its diverse set of fundamental skills and varied motor requirements, as it relies heavily on a high level of motor coordination between the eyes and hands and various body movements during play. This coordination is a fundamental requirement for mastering basic volleyball skills such as serving, receiving, setting, spiking, and court defense, as it helps organize movements and time performance correctly; therefore, developing motor coordination is a key factor in improving students' skill performance.

The process of skill development in volleyball also aims to teach the motor skills that players use during competition and to work on mastering and consolidating them through continuous training and

practice, in order to achieve the highest level of athletic performance. Motor coordination is a fundamental factor in learning motor skills in volleyball, as there is a close relationship between the level of motor coordination and the level of skill performance; it is difficult for a learner to master basic skills if they have difficulty coordinating the movements of different body parts during performance.

The relevance of the given study is that it aims at developing a preparatory and games-based learning program and evaluating its effect on improving motor skills, as well as learning some of the basic volleyball skills, namely the overhand pass, underhand pass, and underhand serve among students. It aims at achieving this goal by systematic designing tailor-made preparatory exercises, which are consistent with the nature of the individual skills, and their delivery in an organized instructional curriculum that enhances the motor competence and technical expertise simultaneously.

### **1-1 Research Problem**

The teaching of basic sports skills, especially in the game of volleyball, is often hampered by the barriers and challenges that interfere with the development and fine tuning of the motor skills of students. Optimal motor learning is mostly dependent on the use of appropriately chosen pedagogical strategies that aid in motor coordination and offer adequate chance for repetitive practice and application of skill.

Through direct field observations during physical education sessions at the College of Physical Education and Sports Sciences, University of Dhi Qar, revealed great heterogeneity in the level of proficiency of students related to basic volleyball skills. Furthermore, the instructional methodologies that are routinely used are mostly conventional, lacking motivational elements, and are compounded with large class sizes that limit active engagement and hands-on participation of the students.

The researcher also noted that the use of preparatory games has not received the attention it deserves, despite their importance in developing motor coordination and facilitating the learning of athletic skills.

Given that motor coordination is closely linked to skill performance in volleyball— since performing its basic skills requires a high degree of coordination between the movements of different body parts and proper timing— the researcher decided to develop an educational program based on preparatory games to determine its impact on the development of motor coordination and the learning of some basic skills (overhand pass, underhand pass, and underhand serve) in volleyball among students.

### **1-3 Research Objectives**

- 1- To design an instructional program grounded in introductory games aimed at teaching selected fundamental volleyball skills to students.

- 2- To examine the effectiveness of a preparatory games-based educational program in enhancing motor coordination and improving the acquisition of essential volleyball skills, including the overhand pass, underhand pass, and underhand serve.
- 3- To investigate the differences between pre-test and post-test results for both control and experimental groups regarding motor coordination and the learning of basic volleyball skills.
- 4- To determine which group demonstrates superior performance in post-test measurements regarding motor coordination and the acquisition of fundamental volleyball skills.

#### **1-4 Research Hypothesis**

- 1- The learning module, which is based on preparatory games, is theorized to improve the motor coordination of the students and acquire the basic volleyball skills, i.e., the overhand pass, underhand pass, and underhand serve.
- 2- It is anticipated that statistically significant differences will be found between the pre-test and post-test results in both the control and experimental groups, and therefore, indicate the positive changes in the motor coordination and the basic volleyball skill mastery; post-test scores are regarded to be at the higher levels.
- 3- It is also expected that the statistically significant differences will also occur between the control and experimental groups during the post-test with the latter having more favorable results in the development of motor coordination and learning of basic volleyball skills.

#### **1-5 Research Areas**

1.5.1 Human Dimension: The participants consisted of second-year male students enrolled in the morning program at the College of Physical Education and Sports Sciences, University of Dhi Qar, during the academic year 2025–2026.

1.5.2 Temporal Scope: The study was carried out over the period extending from October 5, 2025, to December 14, 2025.

1.5.3 Spatial Scope: The research procedures were implemented on the volleyball court of the College of Physical Education and Sports Sciences at the University of Dhi Qar.

#### **1-6 Definition of Terms**

**Introductory Games:** These are “an advanced stage of small-sided games, in which the motor skills acquired from small-sided games in their simplest form are applied to motor skills that prepare players for team games, as their rules are largely similar to those of team games and require motor and mental abilities at a higher level than small-sided games” (Faraj, 2007).

#### **2-1 Research Methodology**

The methodology of the investigation was experimental in nature as it employed a 2-group design and

consisted of a control and an experimental. This design was chosen because it was suitable in solving the research problem and achieving the study objectives.

## 2-2 Research Population and Sample

The research population consisted of 160 second-year male students who are enrolled in the morning cohort in the College of Physical Education and Sports Sciences at the University of Dhi Qar in the 2025-2026 academic year, which is allocated between four courses (C, D, E, and F).

Participants were randomly assigned using a lottery system; Section C was the control group and Section D was the experimental group; Sections E and F were the pilot study cohort. So, ensuring homogeneity and equivalence between participants, the intervention was applied to a subset of 48 students from Sections, C and D, 24 in each group; this subset was 30% of the whole population.

Furthermore, exclusions were made for students who had suffered academic failure, who had presented medical conditions or who had prior experience in volleyball, thus supporting sample homogeneity and strengthening the validity of the results.

### 2-2-1 Homogeneity and Equivalence:

To reduce the effect of extraneous variables that might possibly compromise the validity of the results, and to ensure that the differences, if any were found, can be attributed conclusively to the independent variable, the researcher created homogeneity between the participants and tested for equivalence between the experimental and control groups. These procedures are described in Tables 1 and 2.

**Table (1)**

summarizes the mean, SD and CV for the study variables.

Variables	Treatments	Unit of Measure	Mean m	Standard deviation (sd $\bar{x}$ )	Coefficient of variation* %
Age		years	18.9	0.60	3.17%
Height		cm	174.5	5.80	3.32%
Weight		kg	68.36	5.40	7.90%

- The coefficients of variation for all measured variables were below 30%, reflecting a high level of sample homogeneity.

**Table (2)**

Illustrates the comparability of the two groups across the study variables, including motor coordination, overhead pass, underhand pass, and underhand throw.

Treatments  Skills	Measurement unit	Control Group		Experimental Group		Calculated t* value	Sig. level	Result
		m	sd( $\bar{x}$ )	m	sd( $\bar{x}$ )			
Kinetic compatibility	degree	7.10	1.20	7.25	1.15	0.44	0.66	Not Sig.
Scroll from top	degree	16.20	2.60	16.45	2.70	0.29	0.77	Not Sig.
Scroll from the bottom	degree	12.40	3.10	12.70	3.25	0.31	0.75	Not Sig.
Send from below	degree	14.60	3.40	14.90	3.55	1.33	0.74	Not Sig.

\* Statistical significance was determined at the 0.05 level with 46 degrees of freedom.

Table (2) indicates that all calculated t-values did not reach the level of statistical significance ( $p > 0.05$ ), suggesting no meaningful differences between the groups. Accordingly, the two groups can be considered comparable in relation to the study variables.

### **2-3 Aids and Tools**

#### **2-3-1 Supporting Materials:**

Arabic and foreign references and sources, scientific observation, tests and measurements, questionnaires, the World Wide Web (Internet).

#### **2-3-2 Auxiliary tools:**

A regulation volleyball court – a volleyball net with posts – volleyballs – a stopwatch – a measuring tape for measuring distances – adhesive tape for marking test locations on the court – Plastic training cones – Camera for documenting performance – Calculator – HP computer for running statistical software – Medical scale.

### **2-4 Field Research Procedures**

#### **2-4-1 Identification of Motor Coordination and Basic Volleyball Skills and Selection of**

## Appropriate Tests

The basic volleyball skills used in this study were chosen according to the level 2 volleyball curriculum of College of Physical Education and Sports Sciences, University of Dhi Qar, in the academic year 2025 - 2026. Accordingly, the selected skills were the overhead pass, underhand pass and underhand serve.

In relation to motor coordination, eye-hand coordination was found to be the most relevant construct for the study sample. This decision was based on both empirical experience and expert consultations in the area of physical education and sports sciences, since it is an essential element in the proper execution of the basic skills of volleyball.

To assess the research variables, suitable assessment instruments for the two research topics (motor coordination and chosen volleyball skills) based on the existing scientific literature and empirical research conducted so far were chosen. These instruments were then reviewed by a team of field specialists, who reached unanimous consensus and thus face validity was established.

Although these tests have been used extensively in previous studies conducted in Arab and Iraqi research, and have a documented validity, a pilot study was conducted in order to further validate the reliability and objectivity of these tests in the current study's context. The pilot sample was made up of twelve students from Division (E) that were chosen from the same population but were not included in the main sample. The tests were administered twice with an interval of five days between each test, and the stability of the tests was established through a test-retest procedure.

Furthermore, the objectivity was supported by the involvement of two independent evaluators to score performance. The correlation between their ratings was computed, and high correlation coefficients were obtained, which shows that there is a high degree of consistency and objectivity in the measurement procedures.

### 2-5 Test Specifications

#### 2-5-1 Motor Coordination Test (Majid, 1988)

- ☒ **Test Name:** Throwing and Catching Balls Against a Wall.
- ☒ **Purpose of the Test:** To measure hand-eye coordination.
- ☒ **Equipment Used:** A volleyball, a line drawn on the ground 5 meters from the wall.
- ☒ **Performance Specifications:** The subject stands behind the line drawn in front of the wall, and the sequence of performance is as follows:
  - Throw the ball at the wall 5 times with the right hand and catch it after it rebounds from the wall with the same hand
  - Throw the ball 5 times with the left hand and catch it with the same hand.

- Throw the ball 5 times with the right hand and catch it with the left hand after it rebounds.
- ☒ **Scoring Method:** Each successful attempt is awarded one point, resulting in a maximum achievable score of 15 points.

## 2-5-2 Skill Tests

### 2-5-2-1 Overhead Pass Test (Handling) (Mahjoub, 1989)

- ☒ **Test Name:** Overhead Pass Against the Wall for 30 Seconds
- ☒ **Purpose of the test:** To measure the level of performance in the skill of overhead passing with the fingers in terms of speed, accuracy, and ball control.
- ☒ **Equipment:** A regulation volleyball, a flat wall, a stopwatch, and a line drawn on the floor 1.80 m away from the wall
- ☒ **Procedure:** The participant stands behind the line drawn on the floor 1.80 m from the wall, holds the ball with both hands in front of their face, and flips the ball over their head with their fingers toward the wall. After the ball rebounds from the wall, they flip it again using the same technique. The test continues for 30 seconds.
- ☒ **Performance requirements:** The ball must be passed over the head using only the fingers; the subject must remain behind the passing line during the test; if the ball goes out of bounds, the subject continues the test until time is up.
- ☒ **Scoring Method:** The number of valid passes that touch the wall within 30 seconds is counted. Each valid pass = 1 point; the total number of passes represents the final score for the test.

### 2-5-2-2 Underhand Passing Skill Test ( Al-Dulaimi, 2015)

- ☒ **Test Name:** Underhand Passing Test (Receiving the Serve) to Specific Areas
- ☒ **Purpose of the Test:** To measure the accuracy of the underhand pass (receiving the serve) in volleyball.
- ☒ **Equipment:** A regulation volleyball court, regulation volleyballs (approximately 10), a measuring tape, chalk or tape to mark the court into scoring zones.
- ☒ **Procedure:** The test subject stands in the designated receiving zone on the court; the assistant serves the ball toward the player; the player performs an underhand pass using both forearms, attempting to direct the ball toward specific zones on the court (such as positions 2, 3, or 4); the test subject performs 10 attempts at receiving and directing the ball.

☒ **Scoring Method:**

- A ball that lands in zone (4) = 1 point.
- A ball that lands in zone (3) = two points.
- A ball that lands in zone (2) = three points.
- If the ball lands on the dividing line, the higher score is counted.
- Maximum score for the test = 30 points.

**2-5-2-3 Underhand Serve Skill Test** (Costa, Valentini, Nascimento, & Ugrinowitsch, 2024)

☒ **Test Name:** Underhand Serve Skill Test in Volleyball

☒ **Purpose of the test:** To measure the accuracy of the serve in volleyball through the player's ability to direct the ball to specific areas within the opponent's court.

☒ **Equipment:** A regulation volleyball court, a volleyball net, regulation volleyballs, tape or chalk to mark the scoring zones, and a score sheet.

☒ **Procedure:** The opponent's half of the court is divided into scoring zones according to the following measurements:

- Width of the zone near the net = 1.5 meters. Width
- of the zone near the end line = 1.5 meters. Width of
- the right side zone = 4.5 meters
- Width of the center zone = 3.5 meters

The player stands behind the baseline in the service zone and serves toward the opponent's court; the ball must land within one of the scoring zones. The player is allowed 10 service attempts.

☒ **Test requirements:** The serve must be made from behind the baseline; the serve must be legal. If the ball does not clear the net or goes out of bounds, the attempt counts as zero. If the ball lands on the line separating two zones, it counts for the zone with the higher score.

☒ **Scoring:** Points are awarded based on the zone where the ball lands:

Zone 1: 1 point

Center Zone: 2 points

Side zones: 3 points

Far corner: 4 points

Final score = the sum of the scores from the ten attempts. Maximum score for the test = 40 points

### **2-5-3 Pre-tests:**

The preliminary tests were carried out on October 5, 2025 (Sunday) at the volleyball facility of the College of Physical Education and Sports Sciences, University of Dhi Qar, with the participation of the assisting research staff.

### **2-5-4 Main Experiment – Educational Program**

After reviewing a number of scientific sources and previous studies in the field of motor learning and volleyball, the researcher developed the curriculum based on introductory games aimed at teaching basic volleyball skills and improving hand-eye coordination among students. The main experiment began on Sunday, October 12, 2025, and continued until the end of the educational program.

The educational program involved the use of preparatory games to develop motor coordination and teach basic volleyball skills to members of the experimental group, while the control group was taught using the method employed by the subject teacher, which involved explaining the skills under study, demonstrating the correct performance of those skills, and conducting traditional exercises related to them.

The educational program lasted 8 weeks, with two instructional units per week for each group, for a total of 16 instructional units. These units were distributed across three basic skills: overhead pass, underhand pass, and underhand serve. Each instructional unit lasted 90 minutes, with conditions standardized between the two groups regarding location, session duration, and number of units to ensure that any differences in results were attributable to the educational program used with the experimental group.

The instructional unit was divided into the following sections:

#### **First: The preparatory section (15 minutes)**

This section aims to prepare students physically and psychologically for the educational activity and includes the following:

- **Introduction:** This includes greeting the students, taking attendance, and briefly explaining the objectives of the instructional unit.
- **General warm-up:** This includes a set of general exercises for all parts of the body, such as light running and exercises for the arms, torso, and legs.
- **Specific Warm-up:** This includes ball exercises related to volleyball skills, such as passing the ball between two students or passing the ball overhead.

#### **Second: Main Section (65 minutes)**

This section is the core of the lesson, where basic skills are taught and related exercises or games are practiced.

#### **A. Control Group:**

This includes **the instructional portion** (20 minutes), during which the teacher explains the skill being

taught and demonstrates the correct form while clarifying its technical points.

**The practical part** (45 minutes) involves performing the standard exercises for the skill to be learned according to the teacher's method, which focuses on repeated practice among students to reinforce the skill.

### **B. Experimental Group:**

**The instructional part** (20 minutes) involves explaining the skill to be taught, as well as the warm-up exercises and games that will be used during the lesson.

**The practical part** (45 minutes) involves a series of preparatory games related to the skill to be learned (Appendix 1), which help develop hand-eye coordination and reinforce the learning of basic volleyball skills. Each instructional unit included 2–3

preparatory games, with each game lasting 15–20 minutes, progressing from simple to more difficult games in accordance with the students' level and the nature of the skill being learned.

### **Third: Closing Section (10 minutes)**

This section aims to return the body to its normal state after physical activity and includes:

- Light jogging on the field.
- Cool-down, relaxation, and breathing exercises.
- Providing some general feedback on the students' performance, then ending the lesson and dismissing the class.

### **2-5-5 Post-tests:**

After the completion of the instructional units, post-intervention tests were carried out in order to determine the research variables, i.e., motor coordination and the basic volleyball skills, on Monday, December 8, 2025. The tests were also applied to the study group in similar conditions as the pre-tests such as the consistency of the testing environment, schedule and the procedure. The identical assisting team was involved in the performance of the tests to ensure the overall uniformity of the procedures and increase the accuracy of results retrieved.

### **2-6 Statistical Methods**

The collected data were processed using the SPSS statistical package. A range of statistical measures was employed, including the mean, standard deviation, coefficient of variation, Pearson's correlation coefficient, in addition to both paired-sample and independent-sample t-tests.

## **3-Presentation, Analysis, and Discussion of Results**

### **3-1 Presentation, analysis, and discussion of the results of the motor coordination and basic volleyball skills tests under study in the pre- and post- tests for the control group:**

Table (3)

shows the significance of the differences between the pre- and post-test results for the research variables in the control group

Statistical Variables	Meas urement unit	Pre-tests		Post-tests		t- value Calculated	Sig.Level	Result
		m	Sd( $\bar{X}$ )	m	Sd( $\bar{X}$ )			
Kinetic compatibility	degree	7.10	1.20	8.10	1.30	2.34	0.02	Sig.
Scroll from top	degree	16.20	2.60	18.00	2.70	2.41	0.01	Sig.
Scroll from the bottom	degree	12.40	3.10	14.10	3.20	2.29	0.02	Sig.
Send from below	degree	14.60	3.40	16.80	3.55	2.38	0.01	Sig.

\* Significant at a significance level of  $\leq 0.05$  and with 23 degrees of freedom.

Table (3) shows the arithmetic means, standard deviations, and t-values calculated on the pre- and post-test results with regards to the motor coordination and basic volleyball skill improvement in the participants of the control group. The tests indicated cheap p-values, which was lower than the traditional 0.05  $\alpha$ , implying statistically significant changes between the pre- and post-test.

**The researcher attributes** this progress and improvement among the control group participants in the post-tests to the teaching method employed by the instructor, which relies on verbal explanation of the motor skill followed by a demonstration of correct performance. This helps students form a clear initial mental image of how to perform the skill correctly. Furthermore, the repetition of the skill by students during practical exercises contributes to improving their motor performance, in addition to the role of regularity and consistency in the learning process throughout the duration of the educational program. This was confirmed by Yarub Khayoun (2002), who stated that “organized practice and continuous training lead to positive changes in learners’ motor performance” (Khayoun. 2002).

Furthermore, the feedback provided by the teacher to students during performance helps them correct mistakes

and gradually improve their skill level, which positively impacts the development of motor coordination and the learning of basic volleyball skills. Repeating skill performance with continuous guidance from the teacher contributes to consolidating motor learning and improving performance levels, as “repeating skill performance while receiving appropriate feedback helps the learner correct errors and improve motor performance” (Mahjoub, 2001). This is consistent with what the educational literature indicates in the field of motor learning: “The use of any teaching method over a specific period of time leads to the achievement of a set of educational objectives and contributes to the development of learners’ motor and skill performance levels” (Ashworth & Mosston, 1991).

### 3-2 Presentation, analysis, and discussion of the results of the motor coordination and basic volleyball skills tests under study in the pre- and post- tests of the experimental group:

Table (4)

shows the statistical significance of the differences between the pre- and post-test results for the research variables of the experimental group

Statistical Variables	Measurement unit	Pre-tests		Post-tests		t-value Calculated	Sig. Level	Result
		m	S.d ±	m	S.d ±			
Kinetic compatibility	degree	7.25	1.15	9.20	1.18	3.01	0.004	Sig.
Scroll from top	degree	16.45	2.70	19.60	2.65	3.18	0.003	Sig.
Scroll from the bottom	degree	12.70	3.25	15.70	3.15	3.05	0.004	Sig.
Send from below	degree	14.90	3.55	18.20	3.40	3.22	0.003	Sig.

\* Significant at a significance level of  $\leq (0.05)$  and with 23 degrees of freedom.

Table 4 shows the mean, standard deviation, and calculated t-values of motor coordination and basic volleyball skills of the experimental group in comparison of the pre- and post-test results. The analysis shows that the calculated significance values are less than the 0.05 criterion, hence, showing statistically significant changes in the results of the post-test.

**The researcher attributes** this development and improvement among the experimental group members in the post-tests to the use of the preparatory games approach, which is considered the primary means of exerting a significant positive influence on raising the level of motor coordination and basic volleyball skills among students. Furthermore, the use of preparatory games contributes significantly to the learning and mastery of these skills in a more engaging manner, as the learner, while performing them, is placed in situations similar to those encountered in matches. Al-Yin and Wadi (2007) note "Warm-up games aim

to achieve numerous educational objectives due to the diverse and varied situations they present when used; through their practice, learners acquire motor coordination appropriate to their developmental stages and individual characteristics" (Faraj, 2007). Emad Al-Baili (2001) also notes that "through preparatory games, any learner can achieve success in the activity being practiced, which increases their enthusiasm and inclination toward practice, thereby improving their skill level in the activity" (Al-Baili, 2001).

### 3-3 Presentation, analysis, and discussion of the results of the post-tests on the development of motor coordination and basic volleyball skills in the control and experimental groups:

Table (5)

shows the significance of the differences between the post-tests for the control and experimental groups in the tests of the research variables

Statistical Variables	Measurement unit	Control Group		Experimental Group		t-value Calculated	Sig. Level	Result
		m	S.d ±	m	S.d ±			
Kinetic compatibility	degree	8.10	1.30	9.20	1.18	3.10	0.003	Sig.
Scroll from top	degree	18.00	2.70	19.60	2.65	2.58	0.013	Sig.
Scroll from the bottom	degree	14.10	3.20	15.70	3.15	2.12	0.039	Sig.
Send from below	degree	16.80	3.55	18.20	3.40	2.02	0.049	Sig.

\* Significant at a significance level of < (0.05) and with 46 degrees of freedom

Table 5 shows the mean, SD, and calculated t-values of the results of the post-test regarding motor coordination and basic volleyball skills of both the control and experimental groups. Analysis of the table shows that all the skill measures gave a p-value less than 0.05, thus supporting statistically significant differences in the post-test results of the two groups, with the experimental group showing higher scores.

The observed improved results of the experimental group on post-assessment instruments of motor coordination and simple volleyball skills can be explained by the effect of the preparatory games intervention. These activities facilitated a more effective growth of co-ordination and skill execution as compared to the traditional approach used on the control group. These results are in line with those of Al -Dahleb (2002) who has reported that, preparation games enhance coordination and acquisition of skills in specific sporting situations.

**The researcher also believes** that preparatory games increase motivation toward learning and participation in practice, which positively affects skill performance levels. Munir Abdeen (2002) emphasizes that "The use of introductory games in physical education classes creates an atmosphere filled with joy, excitement, and competition among students, which contributes to their enthusiasm for

the activity and their willingness to demonstrate their abilities and skills. It also helps prevent boredom, thereby increasing motivation to practice and improving the learning outcomes of the lesson, and consequently promotes the development and improvement of motor skills in various sports activities. (Abdeen, 2002).

Nichols (1994) notes that “Through the use of introductory games, it is possible to develop and master basic skills, physical and motor abilities, and the coordination between them by employing them in the form of games with simplified rules that align with the levels of different age groups, in addition to their competitive nature, which leads to rapid learning and the consolidation of acquired skills” (Nichols, 1994).

#### **4-Conclusions and Recommendations**

##### **4-1 Conclusions**

- 1- The findings indicate that the adopted instructional approach, which is grounded in preparatory games, contributes effectively to enhancing motor coordination and facilitating the acquisition of fundamental volleyball skills among students.
- 2- The experimental group that implemented the educational program using preparatory games outperformed the control group that learned according to the conventional method in developing motor coordination and basic volleyball skills.
- 3- The use of preparatory games in teaching volleyball skills adds an element of excitement and engagement to the lesson, thereby increasing students’ interaction and motivation to learn.
- 4- The incorporation of warm-up games into the instructional program helps improve skill performance and consolidate the learning of basic volleyball skills among students.

##### **4-2 Recommendations**

- 1- Introduction of the instructional programmes, which are based on preparatory games is recommended in teaching the motor coordination and the basic skills of volleyball due to the previous empirical results that have indicated their effectiveness in improving the performance of the learners.
- 2- Organize training and educational courses for volleyball teachers and coaches to highlight the importance of preparatory games and how to incorporate them into the educational process, while clarifying the difference between them and small- sided games.
- 3- It is essential to ensure that warm-up activities are simple to organize and that the use of teaching aids is not overly complicated, thereby contributing to the effective achievement of learning objectives.

- 4- Teachers are urged to incorporate various teaching methods, and they need to incorporate warm-up activities in lesson plans to enhance student interest and improve motivation during learning.
- 5- Future studies should be conducted using warm-up games on different samples and other age groups to examine their impact on physical and skill-related variables in sports.

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## Appendix (1)

### Some warm-up games used in the program

- 1- Circular Passing Game
  - a. Objective: To develop motor coordination and accuracy in overhead passing.
  - b. **Equipment:** One volleyball per group.
  - c. **Procedure:** Students stand in a circle. One player passes the ball overhead to the player next to them. The ball continues to be passed between players at a steady pace. If the ball drops, the passing

sequence starts over from the beginning.

- d. **Increasing the difficulty:** Use two balls at the same time; increase the passing speed.

## 2- Passing to the Goal Game

- a. **Objective:** To develop accuracy in overhead passing.
- b. **Equipment:** Volleyballs – hoops or designated areas on the court.
- c. **How to play:** The player stands 3–4 m from the target and passes the ball overhead toward the ring or designated area; the player scores a point when the target is hit.
- d. **Increase the game's difficulty:** increase the distance, reduce the target size.

## 3- Passing Game

- a. **Objective:** To improve hand-eye coordination.
- b. **Equipment:** One ball per pair of students.
- c. **How to play:** Two students stand facing each other and continuously pass the ball overhead between them, trying to keep the ball in the air as long as possible without dropping it.
- d. **Increasing the difficulty of the game:** Passing while moving, increasing the distance between players.

## 4- Moving Ball Catch Game

- a. **Objective:** To learn the skill of passing from below.
- b. **Equipment:** Volleyballs.
- c. **How to play:** Students stand in two facing rows. One student throws the ball toward a teammate, and the other student uses the underhand pass to return the ball.
- d. **Increasing the difficulty of the game:** Change the direction of the ball, increase the speed of the throw.

## 5- Target Passing Game

- a. **Objective:** To develop accuracy in underhand serves.
- b. **Equipment:** Volleyballs – cones or designated areas on the court.
- c. **How to play:** The student stands behind the serve line and serves from below toward designated areas on the court; the student scores a point when the target is hit.
- d. **Increasing the difficulty of the game:** Make the target smaller, increase the distance.

## 6- Ball Control Game

- a. **Objective:** To improve motor coordination and ball control.
- b. **Equipment:** One volleyball per student.  
**How to play:** The student passes the ball upward using an overhead pass and tries to keep the ball in the air for as long as possible without letting it fall.  
 Increase the difficulty of the game: Pass while moving; use an underhand pass.

**7- Mini-Match Game**

- a. **Objective:** To apply skills in a game-like situation.
- b. **Equipment:** Net – Volleyball.
- c. **Procedure:** Divide students into small teams (3 vs. 3); play using overhead and underhand passes; allow three touches before sending the ball to the other side of the court.