

The Effect Of Specialized Exercises Based On Gradual Activity Levels in Visual Tracking And The Learning Of Setting And Serve Reception Skills in Volleyball

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Abstract

Background. There exists an abundance of information that can be utilized in the learning process across various dimensions, the purpose of which is to identify learners' individual attributes and abilities.

Objectives. The aim of this study was to investigate the effect of specialized exercises based on gradual activity levels on visual tracking, as well as to examine their impact on learning the skills of setting and serve reception in volleyball. The research hypothesized that there would be statistically significant differences in visual tracking ability and in the learning of setting and serve reception skills in volleyball.

Materials and Methods. The researcher adopted the experimental method using a two-group design (experimental and control) with pre- and post-tests, as it was appropriate to the nature of the study. The research community and sample consisted of second-year students from the College of Physical Education and Sports Sciences at the University of Wasit for the academic year 2024-2025, with a total sample of 28 students. The two research groups (control and experimental) were randomly assigned in accordance with the suitable conditions for implementing the current study procedures.

Results. After conducting the pre-tests, the instructional program was implemented over eight educational units, with each session lasting 90 minutes. Upon completion of the program, post-tests were conducted.

Conclusions. The researcher concluded several findings, the most important of which was that students who achieved greater improvement in visual tracking demonstrated better skill acquisition in both setting and serve reception. Among the key recommendations was the need to utilize the instructional program applied in this study for effectively teaching students these volleyball skills.

Keywords: Specialized Exercises, Gradual Activity Levels, Visual Tracking, Setting Skill, Serve Reception, Volleyball, Skill Acquisition.

1. Introduction

The instructional methods employed by educators represent the strategic plans through which educational objectives are achieved. These methods encompass a set of activities involving the selection, organization, and repetition of information, as well as the integration of new learning with previously acquired knowledge stored in memory. Furthermore, they involve

creating and maintaining a positive learning environment by understanding the characteristics and capabilities of the learner.

There exists an abundance of information that can be utilized in the learning process across various dimensions, the purpose of which is to identify learners' individual attributes and abilities. This allows the educator to effectively achieve the intended learning outcomes. The use of gradual activity-based exercises is especially valuable as it accounts for individual differences and highlights the learner's ability to control bodily movements, interact with equipment, and express motor behavior.

With the continuous advancement of teaching tools and their integration with cognitive strategies, particularly in the field of sports - and volleyball in particular - visual tracking has emerged as a crucial factor in facilitating better learning outcomes and achieving optimal performance. In this context, the significance of the current study lies in keeping pace with the developments in learning approaches, moving away from traditional instructional methods.

Consequently, the researcher focused on adopting a gradual learning approach for students and utilizing it to develop a specialized training program aimed at enhancing the acquisition of setting and serve reception skills in volleyball.

1.1 Research Problem

The successful application and mastery of motor skills depend on a set of cognitive processes. In the sport of volleyball, the effective execution of fundamental skills — particularly setting and serve reception — requires specific abilities to achieve accuracy in performance. Through his experience as a volleyball instructor, the researcher observed a noticeable deficiency in the skill mastery levels among second-year students, despite the instructional efforts applied.

This problem was manifested in the students' limited understanding and poor motor execution of the correct movement patterns during learning. Several factors may contribute to this, notably the limited effectiveness of conventional teaching methods for volleyball skills. As a result, the need to adopt modern learning strategies aligned with contemporary instructional technologies has become imperative.

Moreover, the learners' individual characteristics have not received sufficient attention in the field of physical education, nor have they been widely applied. Accordingly, the researcher developed specialized exercises based on gradual activities to serve as an alternative to traditional instructional models. These particular volleyball skills, by virtue of their motor nature, require the performer to possess specific bodily control abilities and situational awareness when facing an opponent.

Furthermore, integrating these exercises with visual tracking demands would enable the educator to achieve a higher degree of skill mastery among learners. For these reasons, the researcher conducted this scientific study to investigate the effect of these specialized exercises on enhancing visual tracking and learning the skills of setting and serve reception in volleyball.

1.2 Research Objectives

1. To identify the effect of specialized exercises based on gradual activity levels on visual tracking ability.
2. To examine the effect of these exercises on the learning of setting and serve reception skills in volleyball. **1.3 Research Hypothesis:** There are statistically significant differences in visual tracking and in the learning of setting and serve reception skills in volleyball.

2. Methods and Matrials

The nature of the problem the researcher was studying determined the appropriate methodology for it. The researcher used an experimental method with an experimental design using the equivalent groups method, which was appropriate for the nature of the problem and for the purpose of arriving at the research results.

Research Community and Sample:

The research community was defined as second-year students at the College of Physical Education and Sports Sciences at University of Wasit for the academic year (2024-2025), numbering (186) students. A random method was used to select the research sample, "ensuring each individual had equal opportunities to be selected into either group." (Ikhlas Muhammad and Mustafa Hussein, 2000) The sample numbered (24) students. The researcher selected two groups from among five groups using a lottery method. The researcher excluded the female students' groups because the research scope was limited to male students only. The researcher also excluded the female students' groups, as well as the students practicing volleyball, and the students of the first and second exploratory experiments. Section (C) was chosen to represent the control group with (12) students, and Section (E) was chosen to represent the experimental group with (12) students as well. Thus, the percentage of the research sample was (25.53%), which is an appropriate percentage to represent the research community in a true and real manner.

Table (1) shows the research community, its sample, and the percentage

Variables	Number	Total number of research community	Number of selected sample	Total number of the original community	Percentage%
Students playing the game	12	186	24	94	25.53
Female students	68				
Exploratory sample	12				

Sample Homogeneity and Equivalence of the Research Groups:

Sample Homogeneity:

The researcher conducted a homogeneity process for the research sample members in the variables (age, height, and weight) as shown in Table (2).

Table (2) show statistical Parameters

Variables	Arithmetic mean	Standard deviation	Mode	Coefficient of skewness
Age/year	20.15	0.778	20	0.192
Height/cm	176.76	5.25	175	0.33
Mass/kg	68.92	8.44	66.50	0.28

Table (2) shows that the skewness coefficient

values were less than (+1), indicating the homogeneity of the research sample members in the variables (age, height, and weight), i.e., their normal distribution.

Tools and Methods Used in the Research

- Arabic and Foreign Sources and References
- Test Results Registration Forms
- A Legal Volleyball Court
- (12) Legal Volleyballs
- A (20) m Metal Measuring Tape
- A Sharp Scientific Handheld Calculator
- (1) Acer Laptop
- Colors for outdoor courts

Determine the study variables:

Visual tracking test

Test name: Colored balls test (Ihab Salman Jawad , 2019)

Test objective: Measure visual tracking accuracy

Equipment used: Volleyball court, three 2x5-meter-long (red, black, blue) stickered balls, a 3x4-meter-long (see-through) curtain, and a pre-prepared registration form

Performance Method:

- The examinee stands four meters behind the covered net, ready to determine the color of the ball being served.
- The ball is sent to the opposite end of the court, over the net, and in the direction the examinee is standing.
- The examinee must determine the color of the tape placed on the ball before it crosses the net.

Test Conditions: The test is performed by changing balls each time.

Scoring Method: The examinee is given six attempts. Two points are awarded for each correct attempt and zero for each incorrect attempt. The total score for the test is (12).

Determining the Technical Performance Tests for the Setting and Receiving Skills in Volleyball:

The researcher relied on sources, references, and previous studies to select the technical performance tests for the setting and receiving skills in volleyball, in line with the study objectives.

Technical Performance Test for the Setting Skills:

The researcher relied on a standardized test used in previous research (Nahida Abdul Zaid Al-Dulaimi (et al.), 2008). This test relied on the apparent structure of the skill in the evaluation process, according to the three skill categories and the scores for each category, as shown below:

- Preparatory section (3) marks.
- Main section (5) marks.
- Final section (2) marks.

Objective of the test: To evaluate the technical performance of the test participants across the three skill sections (preparatory, main, and final).

Equipment used: A legal volleyball court, (3) volleyballs, a pre-prepared evaluation form, a video camera, and CDs.

Performance method: The test student performs the setting skill in the designated setting area, i.e., from center (3), attempting to perform the setting skill correctly.

Recording: The researcher photographed the three attempts of each test student and then presented them to three evaluators to evaluate each student's three attempts. Each evaluator is awarded three marks, noting that the final evaluation score for each attempt is (10) marks, divided across the three skill sections: (3) marks for the preparatory section, (5) marks for the main section, and (2) marks for the final section. The best score is then selected for each evaluator. The arithmetic mean of the three best scores is then extracted, and the final score for each student is calculated.

Technical Performance Test for the Two Receiving Skills

Purpose of the Test:

To evaluate the technical performance of the serve receiving skill for each test subject in its three stages (preparatory, main, and final).

Equipment Used: Volleyball court, (10) volleyballs.

Test Description: The student undergoing the test performs three attempts at the serve receiving skill according to its legal conditions, with the movement parts (preparatory, main, and final) clearly visible when photographed for evaluation purposes.

Scoring Method: Evaluation is done using the technical performance evaluation form for the serve receiving skill for each part of the skill (preparatory: 3 points, main: 4 points, final: 3 points). The total score of the evaluator indicated for each part is the final score for the test, which is (10 points).

Exploratory Experiment

In order to control the study variables and verify the curriculum components, the researcher must conduct an exploratory experiment prior to the main research experiment to identify work constraints. Accordingly, the researcher conducted a special exploratory experiment on a sample of (10) students from the research community who did not participate in the main experiment for the setting and receiving skills on September 22, 2024. The experiment was repeated on September 29, 2024.

Pre-tests

Pretests were conducted for the research sample for the variables under study on October 2, 2024.

Educational Curriculum

The educational curriculum lasted (8) weeks, with each educational unit lasting (90) minutes, according to the college's curriculum. The researcher relied on developing specific exercises for the variables under study for the experimental group within the curriculum followed and approved by the Colleges of Physical Education and Sports Sciences. The curriculum was implemented on October 3, 2024.

Post-Tests

After the specified period for the educational curriculum had ended and the specific exercises for the experimental group had been implemented, and the curriculum followed by the teacher for the control group, the post-tests for the research variables were conducted on December 1, 2024, under the same conditions as the pre-tests.

Statistical Methods

The researcher used the statistical package (SPSS) to process the data.

3. Results

According to the data obtained by the researcher after conducting the pre- and post-tests for the control group and analyzing them, the results shown were obtained as in Table (1)

Presentation of the results of the pre- and post-tests of technical performance in the skills of receiving, serving, and visual tracking in volleyball.

Presentation and analysis of the results of the differences between the pre- and post-tests of the skills of receiving, serving, and visual tracking in volleyball for the control group.

Table (3) shows the arithmetic means, standard deviations, calculated t-value, and significance level for the pre- and post-tests of the receiving, serving, and visual tracking tests for the control group.

Control group	Pre-tests		Post-tests		Calculated value of (t)	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
Receiving	4.01	1.13	6.72	0.52	2.95	0.03	Sig
Serving	2.63	0.91	5.63	0.98	1.13	0.16	Non.sig
Visual tracking	4.52	1.8	5.411	1.974	1.06	0.22	Non.sig

Table (3) shows the arithmetic means, standard deviations, calculated t-value, and significance level between the pre- and post-tests for the control group in the research tests. The results showed a significant difference for the receiving test only.

Presentation and analysis of the results of the differences between the pre- and post-tests for the skills of receiving, serving, and visual tracking in volleyball for the experimental group.

Table (4) shows the arithmetic means, standard deviations, calculated t-value, and significance level for the pre- and post-tests for the receiving, serving, and visual tracking tests for the experimental group.

Experimental group	Pre-tests		Post-tests		T value calculated	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
Receiving	3.74	1.45	8.78	0.41	3.21	0.02	Sig
Serving	2.83	0.83	7.83	0.53	5.74	0.01	Sig
Visual tracking	4.58	2.2	8.23	1.74	7.54	0.01	Sig

Table (4) shows the arithmetic means, standard deviations, calculated t-value, and significance level between the pre- and post-tests for the experimental group in the research tests. The results showed significant differences in all tests.

Presentation and analysis of the results of the differences between the post-tests for the skills of receiving, sending, and visual tracking in volleyball for the control and experimental groups.

Table (5) shows the arithmetic means, standard deviations, calculated t-value, and significance level for the post-tests for the skills of receiving, sending, and visual tracking for the control and experimental groups.

Group Test	Control		experimental		T value calculated	Level Sig	Type Sig
	Mean	Standard deviation	Mean	Standard deviation			
Receive	6.72	0.52	8.78	0.41	3.45	0.01	Sig
Transmit	5.63	0.98	7.83	0.53	6.12	0.01	Sig
Visual tracking	5.411	1.974	8.23	1.74	4.23	0.03	Sig

Table (5) shows the arithmetic means, standard deviations, calculated t-value, and significance level between the post-tests for the control and experimental groups in the research tests. The results showed significant differences between the tests, in favor of the experimental group.

4. Discussion

From the results presented in Tables (3, 4, and 5), we can see statistically significant differences in the pre- and post-tests for the two research groups in most of the tests for the variables under study, in favor of the post-test, with the exception of the transmission and visual tracking tests for the control group. The researcher attributes these differences to the use of graded activities for the experimental group.

By reviewing Table (5), the superiority of the experimental group in the post-tests over the control group is evident in all research variables due to its use of graded activities according to visual tracking, which led to better skill learning, as this model increases cognitive and skill information and helps in building correct motor programs for learning skills among learners, in addition to developing the abilities to search and investigate the correct information about skill performance, as well as conveying information between the learners themselves and the educator, as well as taking into account individual differences in all aspects for learners in learning the skill. (Mervat Wael Hassan Sawalma, 2017) "This helps to consolidate the information acquired for the longest possible period. What students obtain is through their own efforts and the efforts of their colleagues, and this helps learning quickly and perfectly, in addition to the fact that they will not forget what they acquired easily." The effective contribution in posing questions and information by the educator and assigning intellectual duties to learners for the purpose of developing the process of searching for information themselves, which leads to creating a suitable educational environment for them, by increasing their motivation to make an additional effort, whether skill-based or physical, without feeling bored due to the pleasure and change in training through research. Scientific thinking is used to obtain accurate and useful information related to the required skills. Furthermore, the most important reason for the experimental group's superiority was the positive collaborative approach between the instructor and the learners. This approach provided theoretical material related to the skills and information related to the game, leading to a correct, natural, smooth, and problem-free application of the material, while linking the theoretical material with the practical aspect during performance. Practice and mastery alone do not facilitate learning; learners must be provided with information and knowledge related to the skills practiced in volleyball. This is emphasized by the "importance of the cognitive aspect in order to integrate the fulfillment of the needs that complement the individual's physiological, psychological, organic, and social development." (Amin Anwar Al-Kholi and Mahmoud Adnan, 1990) This also helped link the conclusions of mental processes with skill performance through self-research, asking questions, and gathering sufficient information to build a complete picture or idea of the skill presented by the instructor. This model also demonstrates clear learning and cooperation between instructors and learners, and this feature encourages and facilitates progress and development in skill performance.

5. Conclusions

- The use of graded activities is appropriate for the research sample.
- The research revealed that most of the research sample members had average visual tracking skills.
- The results showed that the higher the visual tracking score, the better the skill development.

Recommendations:

- The researcher recommends using the graded activities method in learning the remaining skills.
- Using the visual tracking test to determine learners' scores and levels for use in developing the educational curriculum.

- Emphasizing the importance of visual tracking for skill development among educators.

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