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Transfer of Learning Between Selected Defensive Skills in Handball Among Third-Year Students

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Abstract

This research objectives to study the transfer of learning between some basic defensive skills in handball among third-year students at the College of Physical Education and Sports Sciences. The researcher implemented an experimental design with two groups (control and experimental), where the sample comprised of (40) students randomly assigned to (20) groups. An educational program was implemented over (8) weeks, with one training unit per week. The defensive block in one direction and various defensive movements were tested before and after the experiment. The results showed the superiority of the experimental group, which applied targeted training, in achieving positive transfer of learning between the two defensive skills. This demonstrates the prospective for leveraging skill integration to accelerate the learning process. The research recommends adopting educational strategies based on the principle of transfer of learning in teaching and instructing defensive skills in handball, and employing them to develop students' performance more effectively.

Keywords: Handball, transfer of learning, defensive skills, third-year student

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Introduction:

Handball is a fast-paced team sport that necessitates the integration of offensive and defensive skills to ensure optimal team performance. The defensive aspect is regarded as one of the most significant elements of success in matches, as it helps to limit the effectiveness of the opponent's attack and increases the chances of controlling the ball and organizing counter-attacks (Schmidt & Lee, 2020). Among the most crucial defensive skills in handball are the defensive block and varied defensive movement. Achievement in executing these skills relies on speed of response, the ability to position correctly, and motor coordination between different parts of the body. Modern scientific research in physical education focuses on understanding how motor skills are acquired and enhanced using scientific principles such as the principle of transfer of learning, which refers to the impact of learning a specific skill on learning other associated skills (Gillet, Leroy, & Calmels, 2021). Positive transfer of learning is a vital tool for teachers and coaches to accelerate the process of acquiring skills and developing athletic performance, while negative transfer can hinder learning and lead to repeated errors during training and competition (Raab & Araújo, 2022).

Studies show a kinematic correlation between certain defensive skills, such as the defensive block and varied defensive movement, where learning and training in one skill can enhance performance in the other (Wagner, Finkenzeller, & Würth, 2023). This underscores the importance of understanding and incorporating transfer of learning into the design of educational programs for university students, especially since this age group is characterized by its ability to learn quickly and adapt to modern teaching and training methods. Furthermore, studies have shown that learning and training defensive skills in a structured and guided manner can facilitate increasing players' efficiency and improving their performance in matches (Fasold, Houseman, Noël, & Klatt, 2021). On the other hand, some university students exhibit an associated weakness in mastering basic defensive skills despite regular practice, indicating a knowledge gap that requires scientific research to explain and improve practical solutions to address it.

Therefore, it is necessary to study the transfer of learning impacts between defensive skills in handball scientifically and systematically to establish the extent to which learning a specific skill benefits the development of another skill, and how to design educational programs that attain the highest possible efficiency for students. Hence lies the importance of research into the effect of learning transfer between defensive skills for the selected sample.

Modern literature in motor learning reveals that the transfer of learning is a fundamental principle contributing to improved acquisition of athletic skills. Learning a specific skill influences the speed and efficiency with which other skills with similar motor characteristics are learned. This principle is specifically important in team sports like handball, which depend on the integration of defensive and

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offensive skills during a match. Current studies have established that using educational programs based on the motor connection between skills contributes to faster performance improvement and development of motor abilities in students and players compared to traditional learning and training methods (Schmidt & Lee, 2020; Raab & Araújo, 2022). Notwithstanding the significant importance of defensive skills in handball, university students often struggle to master specific defensive skills, such as the defensive block and varied defensive movement. This is attributable to several factors, one of them a lack of scientific understanding of how to learn several skills, poor motor coordination, and the use of traditional teaching methods that do not utilize the principles of transfer of learning (Schmidt & Lee, 2020). Field observations by the researcher, a handball instructor, indicate that some students require a significant amount of time to master defensive skills despite regular attendance at classes. This reflects a gap between practical application and desired outcomes. Moreover, current educational programs often focus on teaching each skill individually, neglecting the potential for transferring learning between related motor skills. This approach can lead to wasted time and effort and reduce learning effectiveness. Therefore, the research problem lies in the need to study the impact of transferring learning between defensive skills in handball and to determine whether learning and training in one skill can positively contribute to learning another. This will support the design of more effective educational and training programs for university students. The research also helps in designing effective educational and training programs that leverage the transfer of learning between defensive skills, thus shortening the time and effort spent on learning and training and increasing student efficiency during lessons. It also contributes to reducing motor errors and improving coordination between different defensive skills.

To address the research problem, the researcher establishes multiple objectives: to ascertain the effect of the training program on the transfer of learning between the two skills; and to contrast the two groups (control and experimental) in the post-test.

The research hypotheses state that there are statistically significant differences between the pre-test and post-test scores in favor of the post-test scores in the experimental group. There are also statistically significant differences in the post-test scores between the two groups, favoring the experimental group.

Methodology and Tools:

The research employed an experimental design with two groups (experimental and control). The educational program was implemented with the experimental group, while the control group continued with its traditional program. This approach was chosen for its ability to measure the impact of the educational program on the transfer of defensive skills with scientific accuracy (Schmidt & Lee, 2020).

Sample and Research Population:

The research cohort was intentionally recruited from students of the College of Physical Education and Sports Sciences. A random sample was then selected from third-year students at the College of

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Physical Education and Sports Sciences, University of Baghdad, for the 2024-2025 academic year. This sample comprised students from sections (K) and (L), aged between 22 and 24 years. Twenty students from section (K) were selected as the experimental group, and the same number from section (L) as the control group, using a lottery system to guarantee equal opportunities. It should be noted that randomness in sample selection does not imply spontaneity or accidental selection, but rather relies on meticulous organization and deliberate procedures aimed at attaining a realistic representation of the research population and ensuring the neutrality of the outcomes (Allam, 2010, p. 19).

The researcher administered a pilot study with six students outside the sample to administer the specific tests. The sample was selected based on student availability and willingness to participate, ensuring that all students had basic experience in handball to guarantee that the results reflected the effect of the educational program rather than prior experience. Afterwards, the researcher verified the homogeneity of the research sample in some basic variables (age, height, weight) before starting the experiment by calculating the arithmetic mean, standard deviation, and skewness coefficient to ensure that the sample followed a normal dispersion and that there were no significant differences between its members.

Methods of data collection and the equipment and tools used in the research:

-Methods of data collection:

1. Observation and experimentation.
2. Personal interviews.
3. Tests and measurements.
4. The internet.

- Tools and equipment used in the search:

1. Measuring tape.
2. Whistle.
3. Beacons.
4. Stopwatch.
5. Laptop calculator (Dell brand).
6. Handball court

Tests Used in the Research:

- Selected Defensive Skills: (Abd, 2009)

1- One-Way Defensive Block Test:

- Purpose of the Test: To evaluate the player's ability to perform the block frequently and consistently.

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- Equipment Used: Handball court, handball suspended from a post at a height of 260 cm, measuring tape, tape, timer.

- Performance Specifications: A mark is placed with tape on the 6-meter line. The test subject stands above the mark, facing the suspended ball, which is fixed to the post at the 9-meter line. Upon receiving the signal, the test subject moves forward, jumps upwards, and performs the block, touching the suspended ball with both hands. The test subject replicates the action as many times as possible for ten seconds.

- Performance Requirements: Each time the test subject jumps to perform the defensive block, they must touch the ball with both hands. The test subject must start from the mark above the 6-meter mark and repeat the action until signaled to end the allocated time for the test. The test subject's movement must be equivalent to the defensive movement for blocking shots on goal from a jump, especially the arm position, the distance between them, the hands, and the forward direction of the palms to face the ball.

-Scoring: The number of effective attempts made by the test subject within the allocated 10 seconds is recorded.

Testing various defensive moves:

- The purpose of the test:

To assess the speed of performing defensive movements to the side, backwards with a tilt, and forwards with a tilt.

Tools used:

Handball court, adhesive tape, measuring tape, stopwatch.

Performance specifications:

Three marks are drawn on the ground with adhesive tape, two of them (A, B) on the (6m) line, and one of them on the (9m) line, so that the three marks form an isosceles triangle with a side length of (3m).

Method of performance:

The examiner stands above mark (A), and when the start signal is given, he moves to the side to mark (B), then he moves to mark (C), and finally returns to point (A) by moving backwards at an angle. The performance is repeated as many times as possible for (30) seconds.

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The student's movement is identical to what he does throughout the competition in terms of the position of the arms and legs. He must reach the drawn marks (A, B, C) and touch them with his feet. The examiner must repeat the performance until he is given a signal to end the time specified for the test. Any performance contrary to the previous circumstances will not be counted as part of the number performed by the tester during the time specified for the test.

Recording grades:

Each correct attempt is valuable three points, one point for reaching any mark, meaning a total of 3 points.

The number of correct attempts made by the tester within (30) seconds is recorded. If the tester does not follow any of the test variables when moving on the drawn marks, one mark is subtracted for each mistake he makes in reaching the drawn marks and touching them with his feet.

- If the time allotted for the test expires and the test-taker does not complete the attempt, i.e., does not reach one of the marks, such as reaching (A, B) and not reaching (C), the marks are collected and added to the marks of the correct attempt.

Pilot Study:

On Monday, January 20, 2025, the researcher administered a pilot study with (6) students from outside the sample to administer the special tests. The aim of the pilot study was to identify the testing methods used by the support team, the effectiveness and validity of the tests, and the time required to administer them.

Pre-tests:

The researcher administered pre-tests on (40) students on Tuesday, January 21, 2025. The defensive stance test and the defensive lateral movements test were administered to students in sections (K) and (L), whose ages ranged between (22 and 24) years. (20) students from section (K) were selected as the experimental group, and the same number from section (L) as the control group, and the tests were administered to them.

The main experiment:

The educational curriculum that contains defensive skills was implemented, and the researcher developed a set of exercises for defensive skills from Tuesday, January 28, 2025, until Tuesday, March 25, 2025, for a period of (8) weeks. One lecture was conducted per week for each group (experimental and control), and the total lecture time was (90) minutes. The experimental group, section (K), implemented the educational curriculum for defensive skills

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within the main section of the educational unit, while the control group, section (L), implemented the curriculum followed by the subject teacher.

-Post-tests:

The researcher conducted the post-tests on the sample on Tuesday, April 1, 2025, using the same procedures as the pre-tests for the experimental and control groups.

-Statistical methods:

Statistical computer programs (SPSS) were used to process the data and test the hypotheses to ensure the accuracy of the findings and reduce statistical biases during the analysis (Gillet, Leroy, & Calmels, 2021).

- The arithmetic mean.
- Standard deviation.
- T-test for correlated samples.
- Independent samples t-test.
- Pearson's correlation coefficient.

Torsion coefficient

Results: - Presentation, analysis, and discussion of the research sample results:

Table 1. shows the differences between the pre-test and the post-test for the experimental group.

Test	Experimental group				Value T	significance
	mean Pre	sd Pre	mean post	sd pre		
Test wall	6.92	0.74	8.45	0.62	6.42	0.000
Variety of movement test	7.18	0.70	9.10	0.58	7.15	0.000

At a degree of freedom of (19), and a significance level of (Sig = 0.000), which is less than the significance level of(0.05) .

Table No2. shows the differences between the pre-test and post-test for the control group

Test	Control group				T Value	Significance
	mean Pre	sd Pre	mean post	sd pre		
Wall test	6.80	0.76	7.12	0.71	2.11	0.041
ting the variety of movement	7.05	0.72	7.68	0.65	2.34	0.030

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At a degree of freedom of (19), and a significance level of (Sig = 0.000), which is less than the significance level of(0.05) .

Table 3. shows the differences between the experimental group and the control group in the post-test for both groups.

Test	Number	mean experim	SD experim	mean Control	SD Control	T	Significance
Wall test	20	8.45	0.62	7.12	0.71	3.87	0.000
Variety of movement test	20	9.10	0.58	7.68	0.65	4.26	0.000

At a degree of freedom of (38), and a significance level of (Sig = 0.000), which is less than the significance level of.(0.05)

Discussion:

The research findings demonstrate that the tailored educational program considerably contributed to enhancing students' defensive skills. This reflects a positive transfer of learning between the two studied defensive skills: the defensive block and various defensive movements. This corresponds with the findings of Schmidt (2020) regarding the ability of kinesthetically associated skills to positively affect each other's learning, as well as with recent studies that have confirmed the effectiveness of targeted teaching and training in enhancing the defensive performance of handball players (Gillet B., 2021) (Wagner, 2023). The significant superiority of the experimental group is attributed to the educational program's focus on strengthening the connection between defensive skills through repetition in match-like contexts. This support improves reaction speed, correct positioning, and consistency in executing defensive skills. The results also indicate that the control group, which continued with the traditional program, achieved relatively limited improvement. This highlights the importance of using scientifically based educational programs that utilize the principle of transfer of learning to reduce the time needed to master skills and attain optimal results.

These results also indicate that learning defensive skills holistically, rather than in isolation, enhances overall team performance. This can be practically implemented in designing educational and training units for students and sports teams over several age groups. Furthermore, the present study confirms that adopting the principle of transfer of learning in teaching defensive handball skills promotes faster skill acquisition and improved motor performance among students. Integrated training that connects similar motor skills also helps create additional effective educational programs compared to traditional training methods that rely on learning skills distinctly.

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Conclusions:

1. The customized educational program facilitated supporting students' performance in the selected defensive skills.

2. An effective transfer of learning occurred between the blocking skill and various defensive movements, reflecting the efficacy of the targeted training.

3. The experimental group significantly surpassed the control group in all post-tests.

4. Utilizing the principles of transfer of learning in designing educational and training programs to contribute to increased learning and training efficiency and reduce the time needed to master skills.

5. Implementing educational strategies according to the principle of transfer of learning to enhance defensive and offensive skills in handball.

6. Implementing the same educational programs among different age groups, grade levels, and teams to verify the effectiveness of the results.

7. Designing multi-skill educational programs that include all components of the game to enhance the overall performance of teams.

8. Conducting ahead studies to evaluate the effect of transfer between defensive and offensive skills in handball.

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Appendix (1)

Sample learning unit

Learning unit duration : 90 minutes — Week 1and 2

Unite objective: to learn the blocking wall — Educational units one and two

And various blocking movement

Unit sections	Time	Details of the learning unit and exercises	Duplicates	Notes
section: Educational aspect	60د 20 د	iation and demonstration of defensive skills, specifically .the blocking wall and various defensive movements		sis should be placed on ing, demonstrating, and ..applying skills to learners

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Practical aspect	40	alls on stands one meter high. Assign colors to each .1 he learner is asked to jump and hit the ball over the stand, then return and repeat the exercise.	3×5 sis on explaining and - trating the exercises by the and practicing the exercises by all learners.
		rner takes lateral steps for 3 meters, then moves .2 l with short, quick steps. They stop and take lateral steps After another 3 meters, they step back to begin the defensive movement again.	3×4 ng feedback during and - fter practicing the exercises eriods should be taken - n repetitions and between sets.
		rner moves laterally from the wing area to touch the .3 ie ball, then moves forward, jumps, and performs a ve block. They then step back and then to the side, g the medicine ball each time they move forward and then fter completing the set, the learner runs to stand behind the set on the other side.	3×4
		rner moves forward to touch the medicine ball with .4 ands, then steps back diagonally to touch a ball licular to the circumference of the circle. They then move laterally and repeat the exercise.	3×5

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