ATENA JOURNAL OF SPORTS SCIENCES

https://atenajournals.com

Received: **01/06/2022.** Accepted: **10/08/2022.** Published: **17/08/2022**

Effect of an educational curriculum with fixed and changeable sequential methods on the accuracy of handball skills in 14-15 years old players

Samer Abdulhadi Ahmed*, Abbas Abdulhamza Kadhem

Faculty of Physical Education and Sports Sciences, University of Kerbala, Iraq.

* Correspondence: Samer Abdulhadi Ahmed; Sameer.ahmed@uokerbala.edu.iq

ABSTRACT

The aim of this study was to prepare special educational exercises using fixed and changeable sequential methods and evaluate their impact on improving the accuracy of basic handball skills in players aged 14–15 years. The researchers employed the experimental method. The research sample consisted of 24 players from the specialized handball school in the Karbala governorate, Iraq, aged 14–15 years. These players were randomly selected using the "pumpkin method" and divided equally into two experimental groups: the fixed sequential group (N=12) and the changeable sequential group (N=12). The following tests were used: passing accuracy test, shooting-from-the-jump skill test, and dribbling skill test. The application of both the fixed and changeable sequential exercise methods led to improvements in accuracy in performing basic handball skills (passing, shooting, and dribbling), as results from the pre- and post-tests for both groups showed statistically significant differences ($p<0.05$). The second experimental group, which practiced special exercises using the changeable sequential method, outperformed the first group, which practiced with the fixed sequential method ($p<0.05$). Exercises from the changeable sequential method, tailored to the capabilities and levels of learners, can be particularly effective in the early stages of initial preparation. Further studies are needed to explore various modern learning methods to enhance and develop skillful performance in handball.

KEYWORDS

Educational Curriculum; Fixed Sequential Method; Changeable Sequential Method; Handball Skills

1. INTRODUCTION

The game of handball is one of the team sports that has long been played by both men and women. It holds a significant place in the lives of people and nations worldwide. This game has reached high levels of development and is characterized by the fun, excitement, and suspense it offers, contributing to its wide popularity.

This game includes several essential skills that the practitioner must learn to improve performance. Without mastering these basic skills, it becomes difficult to implement offensive and defensive plans, whether individually or collectively. As Kamash (2000) stated, "Mastering these skills is done through continuous and consistent training over a long period of time. The more training, the higher the players' performance in applying the skills with accuracy according to the varying playing conditions" (p. 15).

Handball demands high capabilities in physical, skill, and psychological aspects. Given the importance of exercises in any sports game, preparing and organizing exercises is one of the most critical aspects of the educational process. Exercises aim to promote rapid progress in both physical and mental aspects while enhancing motor-technical learning.

The study aims to prepare special educational exercises using fixed and changeable sequential methods, apply them to learners, and evaluate their impact on improving the accuracy of basic handball skills in players aged 14–15 years.

2. METHODS

2.1. Study design and participants

The researchers employed the experimental method due to its suitability for addressing the research problem. The study population comprised 30 players from the specialized handball school in the Karbala governorate, aged 14–15 years. The research sample was randomly selected from this population using the pumpkin method, consisting of 24 players. These were divided equally into two experimental groups: the fixed sequential group (N=12) and the changeable sequential group (N=12). Table 1 presents the equivalence of the two research groups in the factors under study. It is evident from Table 1 that the calculated *t* value is less than the tabular value of 2.07 at a significance level of 0.05 and a degree of freedom of 22. This indicates that there are no significant differences between the two research groups in the skills studied ($p>0.05$).

Table 1. Equivalence of the two research groups in factors under study

Variables	Unite	Fixed sequential groups		Changeable sequential groups		T value	*p*
		Mean	SD	Mean	SD		
Passing skill test	Degree	0.98	1.58	4	1.59	2.33	>0.05
Shooting skill test	Degree	0.45	1.63	4	1.79	15.25	>0.05
Dribbling skill test	Second	1.07	0.46	12.42	0.32	12.23	>0.05

2.2. Equipment used

- Handball court
- 12 regulation handballs
- Small goal (75 × 50 cm)
- Small target (1 × 1 meter)
- Tape measure
- Chalk
- Stopwatch
- Medical scale
- Whistle
- Laptop

2.3. Field research procedures

2.3.1. Selection of tests

After a thorough review of numerous scientific sources and similar research studies, the following tests were selected:

Passing accuracy test

- Objective of the test: the accuracy of the passing skill.
- Tools: handball, smooth wall, stopwatch. Two lines parallel to the ground are drawn on the wall, the distance between them is 1 meter, and the lower wall is 120 cm above the ground. A line is drawn parallel to the wall at a distance of 2 meters (pass line).
- Performance method: The player stands with his feet behind the passing line. When the signal is heard, the player begins to pick up a stationary ball from the ground, then passes the ball with a wrist pass between the two lines on the wall and receives the maximum number of times within 30 seconds.

- Test conditions: Passing should be in a straight line and at shoulder level; Counts the number of correct passes made from behind the starting line and between the two lines on the wall; If the ball touches one of the two lines on the wall, it counts as correct; Passing is not counted within the number of passing and receiving times if the student crosses the starting line or passes above or below the two lines, if the ball falls to the ground; Each player has only one attempt, except in the event of losing the ball, the attempt shall be re-tried.
- Register: Register the number of passes in a time of 30 seconds. A pass is not counted within the number of passes and receiving times when any of the aforementioned performance conditions are violated.

Shooting from the jump skill test

- Objective: To measure the accuracy of shooting from the jump.
- Tools: 8 handballs, 4 squares attached to the four corners of the goal, square in shape, sides length 60 x 60 cm.
- Performance method: The shooting is done at a distance of 7 m. The player catches the ball and stands on the starting point. When the signal is heard, he takes the steps of approaching and shooting by jumping up on each square.
- Test conditions: The shooting should be with the high jump - that it does not touch the rise line - observing the legal conditions for the approaching steps.
- Register: The ball is considered a target if it passes its entire circumference inside the designated box for shooting or if it hits one of its ribs. For each correct shot, 1 point.

Dribbling Skill Test

- Objective: To measure the accuracy of the skill of dribbling.
- Tools: 5 flags 1.5 m high - handball – stopwatch.
- Performance method: Flags are placed straight and the distance between them is 3 m. The player stands holding the ball at the starting line and at the start signal, the player pats the ball around the flags.
- Test conditions: One correct attempt is given, the ball does not touch the foot, and the drum is not higher than the level of the pelvis.
- Register: Calculates the time taken from start to finish.

2.4. Testing Phases

The research process began with the pre-test, which was conducted on 10/8/2021 for the two experimental groups in a closed hall in Al-Hassan, Kerbala governorate.

Following the pre-test, the main experiment commenced on 15/10/2021. The experiment lasted for 8 weeks, during which exercises were applied in both fixed and variable sequential methods. Each week, one educational unit was conducted, with a total of 16 educational units, 8 for each group. The exercises were incorporated into the main section of each educational unit, with a duration of 90 minutes per unit.

After completing the 8 weeks of the main experiment, the post-test was conducted on 5/1/2022, under the same conditions as the pre-test.

3. RESULTS

Table 2 presents the results of the pre- and post-test for the first experimental group (fixed sequential exercise method). The table shows that the differences between pre-test and post-test scores for all the skill tests are statistically significant ($p<0.05$) suggesting that the fixed sequential exercise method had a positive impact on improving the skills tested.

Table 2. Results of the pre- and post-test for the first experimental group (fixed sequential exercise method)

Variables	Unite	Pre-test		Post-test		T value	*p*
		Mean	SD	Mean	SD		
Passing skill test	Degree	4.9	1.84	5.5	1.59	3.33	<0.05
Shooting skill test	Degree	4.58	2.59	16.91	4.47	15.25	<0.05
Dribbling skill test	Second	3.75	0.45	11.8	0.32	12.23	<0.05

Table 3 displays the pre- and post-test results for the second experimental group (changeable sequential exercise method). The data indicates that the differences between the pre-test and post-test scores for all skill tests are statistically significant ($p<0.05$), implying that the changeable sequential exercise method effectively improved the tested skills.

Table 3. Results of the pre- and post-test for the second experimental group (changeable sequential exercise method)

Variables	Unite	Pre-test		Post-test		T value	*p*
		Mean	SD	Mean	SD		
Passing skill test	Degree	8.29	0.95	6.83	1.58	4	<0.05
Shooting skill test	Degree	5.51	4.80	20.91	3.14	14.66	<0.05
Dribbling skill test	Second	8.15	0.66	10.92	0.49	12.42	<0.05

Table 4 shows the differences between the two research groups in the post-tests. It shows that there are significant differences in the post-test results between the two research groups ($p<0.05$), with the second experimental group (changeable sequential method) showing better results.

Table 4. Differences between the two study groups in the post-tests

Variables	Unite	Fixed sequential groups		Changeable sequential groups		T value	*p*
		Mean	SD	Mean	SD		
Passing skill test	Degree	2.26	0.95	6.83	1.84	5.5	<0.05
Shooting skill test	Degree	2.43	4.80	20.91	2.59	16.91	<0.05
Dribbling skill test	Second	2.21	0.66	10.92	0.45	11.8	<0.05

Through the data presented in Table 5, it is evident that there is noticeable development in the skill variables for both experimental groups, with a greater percentage of improvement observed in the second experimental group.

Table 5. Development ratio between pre- and post-tests for the first and second groups

Groups	Variables	Unite	Mean for pre-test	Mean for post-test	Development rate
Fixed sequential	Passing skill	Degree	5,5	3,33	65,01
	Shooting skill	Degree	16,91	15,25	10,92
	Dribbling skill	Second	11,8	12,23	- 3.5
Changeable sequential	Passing skill	Degree	6,83	4	72,9
	Shooting skill	Degree	20,91	14,66	42,61
	Dribbling skill	Second	10,92	12,42	- 12,07

4. DISCUSSION

Tables 2 and 3 showed statistically significant differences ($p<0.05$) between pre-test and post-test scores for both experimental groups. The results suggest that both the fixed sequential and changeable sequential exercise methods had a positive impact on improving the tested skills.

The objective of any educational curriculum, through the application of its didactic units, is to improve and enhance performance levels, as well as to help players acquire skills and abilities that enable them to reach a high level of performance. Al-Heila (1999) stated that when curricula are applied effectively, learners' overall performance improves considerably, allowing them to gain additional benefits, such as the development of new strategies for acquiring skills.

Continuing to practice new methods and maximizing the time spent on skill performance to enhance the actual time of practice leads to an improvement in the fluidity of movements and their

retention, which, in turn, increases the players' experience and accuracy in their performance. These methods serve as both a motivator and an incentive. “Motivation is one of the key factors that facilitate learning motor skills and improving their performance" (Allawi, 1971, p. 158).

Table 4 showed significant differences in the post-test results between the two research groups, with the second experimental group (which applied the variable sequential method) showing superior performance ($p<0.05$) The researchers attribute this to the positive learning effects of the variable sequential method, as learners are exposed to multiple variables simultaneously. This includes regulating repetitions, varying each attempt, and providing the learner with diverse experiences, such as changes in angle, speed, and distance. Teachers or trainers are supposed to encourage learners to perform as many rehearsals as possible (Schmidt, 1991).

The skills analyzed in this research require practice through various exercises to help students improve their performance and master the skills, preparing them to adapt to changing conditions, as these are open-ended skills. El-Din (2006) stated that practicing open skills demands ongoing variety in the experiences the learner encounters during training. The practice of open skills requires continuous diversity in the experiences that the learner is exposed to during practice.

This approach was implemented by organizing exercise repetitions and ensuring continuous change in each performance attempt, with diversity in the exercises and frequent feedback. This strategy was designed to engage and motivate the learner, making the process enjoyable and preventing boredom. “Any work without excitement and suspense does not succeed, so the results of the educational process will be negative if it lacks elements of suspense and excitement. On the other hand, learning will be more positive when it provides fun for the learner” (Sabr, 2012, p. 58).

The current study results showed that there is noticeable development in the skill variables for both experimental groups, with a greater percentage of improvement observed in the second experimental group. This development is attributed to the preparation and use of specialized exercises based on a sound scientific method, which takes into account the aspects of the exercises and their alignment with the research sample's skill levels. As noted by Hamza (2019), the effectiveness of scientifically designed exercises, tailored to the players' abilities, is crucial for improving motor performance accuracy and skill in handball.

5. CONCLUSIONS

The application of both the fixed and changeable sequential exercise methods led to the development of accuracy in performing the basic handball skills (passing, shooting, and dribbling). The second experimental group, which practiced special exercises using the changeable sequential style, outperformed the first group, which practiced with the fixed sequential style, in developing the basic skills in handball.

6. RECOMMENDATIONS

Based on the results of the current study, it is recommended to use exercises from the changeable sequential method, tailored to the capabilities and levels of learners, particularly in the early stages of initial preparation. Additionally, there is a need for further studies that explore various modern learning methods to enhance and develop skillful performance in handball.

7. REFERENCES

1. Al-Heila, M. M. (1999). *Instructional design theory and practice*. Al-Masira Publishing House.
2. Allawi, M. H. (1971). *An introduction to sports educational psychology*. Dar Al Maaref.
3. El-Din, T. H., & others. (2006). *Motor learning and motor control*. Al-Kitab Center for Publishing.
4. Hamza, M. (2019). *The effect of a curriculum for the bronze level of the Danish school in teaching the basic skills of handball players in specialized schools* (Unpublished master's thesis). College of Physical Education and Sports Sciences, University of Kufa.
5. Kamash, Y. L. (2000). *Basic skills in football (education - training)*. Gulf House for Printing.
6. Sabr, Q. L. (2012). *Topics in kinetic learning*. Dar Al-Raq for Printing. (Original work published 1971)
7. Schmidt, A. R. (1991). *Motor learning and performance*. Human Kinetics.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

FUNDING

This research received no external funding

COPYRIGHT