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The Effect of an Educational Curriculum Using Hyper-Intermediate Media and Manufactured Media on Some Motor Abilities and Skill Learning Tennis Backhand for Students

M. Mohanad Kareem Abdal Zahra[1], Rashad Tariq Youssef[2]

Abstract

The research aims to develop an educational curriculum using highly interactive media and manufactured tools in mental visualization and some motor skills to enhance tennis skills for students. The researcher selects a suitable approach dictated by the nature of the problem to be studied. Therefore, the research problem necessitated the use of the experimental approach with equivalent group design. The researcher identified the research population, represented by third-year students in the College of Physical Education and Sports Sciences at Thi Qar University for the academic year 2022-2023, totaling (163) students divided into five classes (A, B, C, D, and E). The researcher selected a sample from the original research population of (45) students divided into three experimental groups, each consisting of (15) students. The sample's percentage from the population was 27.607%. The researcher relied on random selection by lottery to determine the research variables for each group. Group (C) was taught through "hypermedia," group (D) was taught through "assistive tools," while group (E) was taught through the "interaction" between hypermedia and assistive tools. The researcher ensured homogeneity and equivalence in the research variables. The training units were applied by the subject teacher to the three groups, and each group implemented its educational units over a period of (9) weeks, with an average of one educational unit per week, totaling (9) educational units. The period extended from Sunday, March 12, 2023, to Wednesday, May 10, 2023.

Keywords: *(Ultra-overlapping media - motor abilities - tennis serve)*

1-Introduction

The significant progress in the sports field has not been a result of chance; rather, it is a natural outcome of utilizing modern sciences, concepts, and serious consideration in adopting educational methods that leverage all modern technological means. Since the student is the focal point of the educational process, and the development of their abilities is the goal of this process, comprehensive and precise attention is required to provide educational situations that rely on modern technology. This is to ensure the availability of opportunities to achieve optimal performance for the fundamental skills of each game or sports activity.

Among these sports is the game of tennis, which stands out as a game for all ages, from children to adults, and for both genders. One of the most important factors for the success of learning

[1] Department of Applied Sciences,College of Physical Education and Sport Science, University of Thi-Qar, Thi-Qar, 64001,Iraq
Email: mohanad.sport24@utq.edu.iq
[2] Department of Applied Sciences,College of Physical Education and Sport Science, University of Thi-Qar, Thi-Qar, 64001,Iraq
Email: royalrashad31@utq.edu.iq

this game is the connection between the student and the teacher. The more suitable the means of communication, the faster and better the learning process takes place, with significant savings in effort and time. This is especially true when the lesson is associated with the use of appropriate educational tools that match the student's level, abilities, and motor skills.

In the game of tennis, motor skills play a crucial role in acquiring and learning the basic skills of the game. The nature of the skills in this game, characterized by speed of performance, requires the student to possess appropriate motor skills. These skills serve as the foundation upon which mastery and proficiency in the game's skills are built.

Therefore, it was necessary to harness and employ modern technology, represented by advanced media, in addition to preparing and manufacturing educational aids to contribute to the utilization and stimulation of all cognitive processes requirements. Moreover, the development of motor skills is essential to enhance the performance level of the basic skills of tennis for students. Based on the researchers' experience and their review of most practical lessons, they observed that most lessons lack the use of modern technologies and rely solely on available resources. This may create difficulty or obstacles for students in acquiring and learning the basic skills of the game. This observation led the researchers to address this issue and find suitable solutions that could significantly contribute to its resolution

The research aimed to develop an educational curriculum using highly interactive media and manufactured tools to enhance some motor skills and teach the backhand stroke in tennis for students. Additionally, the research aimed to investigate the impact of this curriculum. The researchers assume that the educational curriculum they developed, using highly interactive media and manufactured tools, would have a positive effect on some motor skills and the learning of the backhand stroke in tennis for students. The human domain represented third-year students in the College of Physical Education and Sports Sciences at Thi Qar University. The temporal domain covered the period from November 10, 2022, to March 1, 2024. The spatial domain was the tennis court at the College of Physical Education and Sports Sciences at Thi Qar University.

2-1 Research Methodology

The researchers employed an experimental approach with an equivalent group design to align with the nature of the research problem.

2-2 Research Population and Sample

The researchers identified the research population, consisting of third-year students in the College of Physical Education and Sports Sciences at Thi Qar University for the academic year 2022-2023, totaling (163) students divided into five classes (A, B, C, D, and E). A sample of (45) students was selected, divided into three experimental groups, each containing (15) students. Group (C) was taught through hypermedia, group (D) through assistive tools, and group (E) through the interaction between hypermedia and assistive tools. The sample represented 27.607% of the population.

2-2-1 Homogeneity

To control the variables affecting the research results' accuracy, the researchers verified the homogeneity of the research sample in morphological measurements (length, mass, and chronological age). They used the coefficient of skewness to assess homogeneity, as indicated in the tables below.

Table (3): Demonstrates the Homogeneity of the Research Sample in (Age, Mass, and Length) for Experimental Group (1).

Statistical Treatments of Variables:	Measurement Unit	Mean	Standard Deviation	Standard Error	Skewness Coefficient	Significance Level
Mass	kg	69,333	6,883	0,58	0,946	Homogeneous
Length	cm	177,333	7,4	0,58	0,117	Homogeneous
Age	year	22,4	0,91	0,58	0,315-	Homogeneous

Table (4): Shows the Homogeneity of the Research Sample Individuals in (Age, Mass, and Length) for the Experimental Group (2).

Statistical Treatments of Variables:	Measurement Unit	Mean	Standard Deviation	Standard Error	Skewness Coefficient	Significance Level
Mass	kg	69,666	5,863	0,58	0,585	Homogeneous
Length	cm	174,133	8,288	0,58	0,171	Homogeneous
Age	year	22,066	0,883	0,58	0,142-	Homogeneous

Table (5): Demonstrates the Homogeneity of the Research Sample in (Age, Mass, and Length) for Experimental Group (3).

Statistical Treatments of Variables:	Measurement Unit	Mean	Standard Deviation	Standard Error	Skewness Coefficient	Significance Level
Mass	kg	69,666	4,386	0,58	0,821	Homogeneous
Length	cm	173,6	5,666	0,58	0,033	Homogeneous
Age	year	22,466	1,125	0,58	0,616	Homogeneous

* All Skewness Coefficients were between (+1), Indicating Homogeneity among the Individuals of the Group.

2-2-2 Equivalence of Research Groups

The researchers ensured the equivalence of the three research groups in dependent variables using the Analysis of Variance (ANOVA) as depicted in Table (6).

Table (6): Illustrates the Equivalence of Groups in the Research Variables.

Statistical Procedures: Variables	Measurement Unit	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	(Calculated F Value	Sig Value	Statistical Significance
Agility	Number	Between Groups	0,044	2	0,22	0,084	0,919	insignificant
		Within Groups	11,067	42	0,263			
Coordination	Degree	Between Groups	0,844	2	0,422	0,616	0,545	insignificant
		Within Groups	28,8	42	0,686			
Balance	Degree	Between Groups	1,911	2	0,956	1,06	0.356	insignificant
		Within Groups	37,876	42	0,902			
Backhand Stroke	Degree	Between Groups	6,978	2	3,489	1,119	0,336	insignificant
		Within Groups	130,933	42	3,117			

* Statistically Significant at the 0.05 Level.

2-3 Research Tools and Instruments

- Sources and References

- ❖ Scientific Observation
- ❖ Personal Interviews
- ❖ Questionnaire Forms
- ❖ Tests and Measurements

2-3-1 Devices and Tools Used

1. Laptops (Quantity: 17).
2. Nikon Cameras (Quantity: 2).
3. Software used in preparing and designing interactive media (Hypermedia): (iSpring Suite, inShot Pro, Viva Video).

- Flash drives.
- DVD discs.

4. Tennis Balls (Quantity: 30).
5. Tennis Rackets (Quantity: 20).
6. 5-meter Measuring Tape.
7. Assorted-color Adhesive Tape.
8. Stopwatch.
9. Ground-level ladder (Quantity: 1).
10. medical Balls (Quantity: 4).

2-4 Tests Used in the Research

- Agility Test (Lateral Side Shuffle) (121:3).
- Coordination Test (Throwing and Catching Balls Test) (258:5).
- Dynamic Balance Test (Standing on One Foot Test on a Comb) (343:5).
- Skill-related Fitness Test: Backhand Stroke Accuracy Test (212:4).

2-5 Survey Experiments

2-5-1 First Survey Experiment

The researchers conducted the first survey experiment on a sample of (7) students from the research community and outside the main experimental sample. The experiment was conducted on Sunday, February 26, 2023, with the following purposes:

- Understanding the time allocated for the tests.
- Ensuring the understanding and comprehension of the test materials by the sample individuals.
- Verifying the safety of the tools used in the tests.
- Identifying obstacles and addressing them during the main experiment.
- Extracting the scientific principles of the tests.

2-5-2 Second Survey Experiment

The second survey experiment was conducted on Wednesday, March 1, 2023. It focused on applying an educational unit using interactive media and auxiliary tools. The purposes included:

- Ensuring the efficiency and safety of educational materials.
- Confirming the understanding of each method and its application by the sample individuals.
- Determining the allocated time for using each exercise within the teaching unit for time management.
- Understanding how to use interactive media within the teaching unit.

2-6 Field Research Procedures

2-6-1 Pre-Tests

The pre-tests were conducted by the researchers and the assisting team on the research sample over two days, Monday and Tuesday, March 6-7, 2023, covering the research variables on the field at the College of Physical Education and Sports Sciences at the University of Thi Qar.

2-6-2 Educational Units:

The three groups implemented their educational units over a period of (9) weeks, with one educational unit per week, led by the subject teacher from Sunday, March 12, 2023, to Wednesday, May 10, 2023. The work of the three groups was as follows:

1- First Experimental Group (Hypermedia): This group implemented its educational units using interactive media. For organizational reasons related to the teaching unit, a part of the activity time was conducted in the computer lab at the College of Physical Education and Sports Sciences. The students interacted with the program prepared by the researchers and accessed the program guide. They learned about alternative options for the backhand stroke in tennis, including written material, video material, and image material. The students chose based on their preferences within (10 minutes). Then, the preparation section (15 minutes), the main section (66 minutes, including 15 minutes of educational activity), and the concluding section (9 minutes).

2- Second Experimental Group (Using Manufactured Auxiliary Tools): This group took its educational units using auxiliary tools manufactured by the researchers. The educational unit was divided into three sections: preparatory (15 minutes), main (66 minutes, including 15 minutes of educational activity), and concluding (9 minutes).

3- Third Experimental Group (Combined - Manufactured Auxiliary Tools/Hypermedia): This group implemented its educational units using both interactive media and manufactured auxiliary tools. Similar to the first group, a part of the activity time was conducted in the computer lab. The educational unit was divided into three sections: preparatory (15 minutes), main (66 minutes, including 15 minutes of educational activity), and concluding (9 minutes).

2-6-3 Post-Tests: After completing the implementation of the educational units, post-tests were conducted by the researchers and the assisting team on the main experimental sample. The post-tests were conducted under the same conditions as the pre-tests, in terms of location and time, on Sunday, May 14, 2023.

2-7 Statistical Methods: IBM SPSS Statistics 24 was utilized for processing the results.

3- Presentation of Results

3-1 Presentation of Pre- and Post-Test Results for the Three Research Groups (Hypermedia, Auxiliary Tools, Hypermedia + Auxiliary Tools) for all Research Variables and their Analysis

Table (7): Illustrates the Significance of Differences Between Pre-Test and Post-Test Measurements in the Research Variables for the First Experimental Group - Hypermedia.

Statistical Procedures Variables	Measurement unit	Pre-tests		Post-tests		t Value	Value Significance	Significance
		Mean	Standard Deviation	Mean	Standard Deviation			
Agility	Number	3,466	0,516	4,2	0,676	4,785	0,000	significant
Coordination	Degree	13,133	0,833	14,266	0,703	5,264	0,000	significant

Balance	Degree	7,066	0,961	8,4	1,298	7,135	0,000	significant
Backhand Stroke	Degree	10,733	1,624	13,2	1,567	18,5	0,000	significant

Table (8): Illustrates the Significance of Differences Between Pre-Test and Post-Test Measurements in the Research Variables for the Second Experimental Group (Assistive Aids).

Statistical Procedures Variables	Measurement unit	Pre-tests		Post-tests		t Value	Value Significance	Significance
		Mean	Standard Deviation	Mean	Standard Deviation			
Agility	Number	3.466	0,516	4,133	0,516	4,183	0,001	Significance
Coordination	Degree	13,466	0,743	15,2	0,676	8,404	0,000	Significance
Balance	Degree	6,666	0,975	9,333	1,29	8,789	0,000	Significance
Backhand Stroke	Degree	10,8	1,82	15,533	1,726	9,428	0,000	Significance

Table (9): Illustrates the Significance of Differences Between Pre-Test and Post-Test Measurements in the Research Variables for the Third Experimental Group (Multimedia + Assistive Aids).

Statistical Procedures Variables	Measurement unit	Pre-tests		Post-tests		t Value	Value Significance	Significance
		Mean	Standard Deviation	Mean	Standard Deviation			
Agility	Number	3,466	0,639	5,2	0,676	6,104	0,000	Significance
Coordination	Degree	13,333	0,899	15,933	1,099	8,51	0,000	Significance
Balance	Degree	6,733	0,798	11,266	1,437	10,169	0,000	Significance
Backhand Stroke	Degree	11,533	1,807	17,666	1,543	9,713	0,000	Significance

* Statistically Significant at the 0.05 Level.

Discussion of Pre-Test and Post-Test Results for the Three Research Groups

Based on the results from Tables (7, 8, 9), it is evident that the Sig values for all variables were smaller than the significance level of (0.05). This indicates that there is a significant difference in favor of the post-tests for the research groups, consistent with the first hypothesis of the study.

The researchers attribute this improvement in the research variables to several reasons, most notably the soundness of the educational methodology. It includes scientifically selected exercises, with correct repetitions that are consistent with the level and capability of the sample individuals. Both the teacher's exercises and the exercises prepared by the researchers are based on correct practice. Teaching and practicing a specific skill within a motor duty lead to increased experience and development among students. Practice is considered a crucial variable in the learning process for both complex and simple skills (Reference 56:1).

Furthermore, progress and improvement in performance for any skill are achieved through practice, repetition, and avoiding errors. This is accomplished through the practical performance of students during the teaching units under the guidance of the teacher. This, in itself, is one of the main steps followed in teaching motor skills. As affirmed by Zafar Hashim in 2002, "It is a natural phenomenon of the learning process that there must be development in learning as long as the teacher follows the correct basic steps for learning and teaching,

practices the correct performance, and focuses on continuous repetitive attempts until the performance is well-established and stable" (Reference 102:2).

Table (10): Shows the Results of the Analysis of Variance (ANOVA) for the Post-Tests of the Three Research Groups.

Statistical Procedures: Variables	Measurement Unit	Source of Variation	Sum of Squares	Degrees of Freedom	Mean Squares	(Calculated F Value	Sig Value	Statistical Significance
Agility	Number	Between Groups	8,933	2	4,467	13,529	0,000	Significance
		Within Groups	13,867	42	0,33			
Coordination	Degree	Between Groups	16,133	2	8,067	11,656	0,000	Significance
		Within Groups	29,067	42	0,692			
Balance	Degree	Between Groups	46,711	2	23,365	9,693	0,000	Significance
		Within Groups	101,2	42	2,41			
Backhand Stroke	Degree	Between Groups	101,733	2	50,867	17,36	0,000	Significance
		Within Groups	123,067	42	2,93			

Significant at the Level < (0.05).

Table (11): Shows the Results of (D.S.L) Indicating the Least Significant Difference Between the Three Groups in the Research Variables.

Abilities	Groups	Means	Mean Differences	Sig	Significance	Group Superiority
Agility	Experimental Group 1 - Experimental Group 2	4,2-4,133	0,333	0,120	Insignificant	Significant in favor of the third experimental group.
	Experimental Group 1 - Experimental Group 3	4,2 -5,2	-0,733	0,001	Significant	
	Experimental Group 2 - Experimental Group 1	4,133 – 4,2	-0,333	0,120	Insignificant	
	Experimental Group 2 - Experimental Group 3	4,133 – 5,2	-1,066	0,000	Significant	
	Experimental Group 3 - Experimental Group 1	5,2 -4,2	0,733	0,001	Significant	
	Experimental Group 3 - Experimental Group 2	5,2 – 4, 133	1,066	0,000	Significant	
Coordination	Experimental Group 1 - Experimental Group 2	14,266 -15, 2	-0,733	0,020	Insignificant	Significant in favor of the third experimental group.
	Experimental Group 1 - Experimental Group 3	14,266– 15,933	-1,466	0,000	Significant	
	Experimental Group 2 - Experimental Group 1	15,2 -14, 266	0,733	0,020	Insignificant	
	Experimental Group 2 - Experimental Group 3	15,2 -15, 933	- 0,733	0,020	Insignificant	
	Experimental Group 3 - Experimental Group 1	15,933-14, 266	1,466	0,000	Significant	
	Experimental Group 3 - Experimental Group 2	15,933 -15, 2	0,733	0,020	Insignificant	
Balance	Experimental Group 1 - Experimental Group 2	8,4 – 9,333	-0,400	0,484	Insignificant	Significant in favor of the third experimental group.
	Experimental Group 1 - Experimental Group 3	8,4 – 11,266	-2,333	0,000	Significant	
	Experimental Group 2 - Experimental Group 1	9,333 – 8,4	0,400	0,484	Insignificant	
	Experimental Group 2 - Experimental Group 3	9,333 – 11,266	-1,933	0,001	Significant	
	Experimental Group 3 - Experimental Group 1	11,266 - 8,4	2,333	0,000	Significant	
	Experimental Group 3 - Experimental Group 2	11,266- 9, 333	1,933	0,001	Significant	
Backhand Stroke	Experimental Group 1 - Experimental Group 2	13,2-15,533	-1,533	0,018	Insignificant	Significant in favor of the third experimental group.
	Experimental Group 1 - Experimental Group 3	13,2-17,666	-3,666	0,000	Significant	
	Experimental Group 2 - Experimental Group 1	15,533-13,2	1,533	0,018	Insignificant	
	Experimental Group 2 - Experimental Group 3	15,533-17,666	-2,133	0,001	Significant	
	Experimental Group 3 - Experimental Group 1	17,666-13,2	3,666	0,000	Significant	
	Experimental Group 3 - Experimental Group 2	17,666-15,533	2,133	0,001	Significant	

3-3 Discussion of the Results of the Post-Tests for the Two Experimental and Control Groups

Through the results of Table (10), it is found that the value of (sig) for all variables was less than the significance level of (0.05), indicating that the difference is significant. To determine the superiority of the groups, the (D.S.L) law was used, and according to Table (11), it is shown that the third group achieved superiority over the other groups. The researchers attribute this superiority to the effectiveness of the hypermedia interactive media (HyperMedia) prepared by the researchers and the use of educational aids manufactured by the researchers.

The researchers attribute the progress of the third experimental group in performance to the effectiveness of the hypermedia interactive media (HyperMedia) prepared by the researchers and the use of educational aids manufactured by the researchers. The students witnessed during the instructional units the precision of skill presentations, as well as the slow presentation pace, providing a good opportunity to understand the movement details and quickly absorb them.

The researchers believe that creating suitable educational conditions and environments, along with introducing modern technology and employing it in the process of learning basic tennis

skills under study, had a significant and positive impact on the development of performance for these skills in the third experimental group. The group learned according to hypermedia interactive media (HyperMedia) and auxiliary means. The use of video clips specifically for basic skills, showing the skills from all aspects and illustrating all parts of them, made the skill stabilize in the player's motor memory.

The video clips help integrate the senses in the learner, making the learning process easier, more attractive, and more exciting due to the association of sound and image in the presented film.

Conclusion

1. The educational curriculum prepared by the researchers had a positive and effective impact on developing the skill of the backhand stroke in tennis.
2. The third experimental group, which relied on the use of manufactured educational aids and common hypermedia, demonstrated a clear superiority in the post-test in some motor abilities and the backhand stroke skill in tennis compared to the other experimental groups.

Recommendations

1. Emphasize the use of modern hypermedia in the learning process of the backhand stroke skill in tennis.
2. Conduct further research and studies similar to the current ones on the remaining tennis skills, investigating the extent of the impact of modern media on these skills.

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