Effectiveness of educational units using the Thought Acceleration Model on the learning of table tennis forehand and backhand in 13–15-year-old players

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ABSTRACT

The aim of this research was to study the effectiveness of educational units using the Thought Acceleration Model on the learning of table tennis forehand and backhand in 13–15-year-old players. The research sample consisted of 10 junior players (ages 13-15 years) from the specialized table tennis academy of the province of Kirkuk. The researcher divided the research sample into two groups, the experimental group and the control group, each consisting of 5 players. The experimental group received 8 educational units according to the Thought Acceleration Model. The results confirmed the effectiveness of the educational units using the Thought Acceleration Model on the learning of table tennis forehand and backhand in 13–15-year-old players. Therefore, the author recommends to use educational models that address the functioning of the human mind and help activate its energies along with special exercises to develop specific skills in any given sport.

1. INTRODUCTION

The sports field has gained wide importance and unremitting efforts as a result of an increase in information and expertise, which has led to a continuous development on scientific, cognitive, as well as the field itself. These advancements also include physical education and sports sciences, resulting in an abundance of attention, follow-up, and research aiming for the best means and methods to direct efforts to help change human to improve in various fields (Ali, 2001).

To increase the information acquisition rate of the learner, various educational methods have emerged with the aim to organize information in a way that better presented for the brain, suitable for the learner's level, and that provides more consistent results. Accordingly, educational methods play

an important role in increasing the connection between theoretical and applied aspects, by proving theoretical concepts. Educational models also help creating a stimuli rich educational environment and updating the learning process with cognitive and technological developments, in addition to finding methods aimed at increasing continuous brain activity to enhance the learning process.

The model to accelerate thinking is one of these models, as this model includes steps that guide the design of educational units through a sequence of stets that aim to increase knowledge acquisition by stimulating the mental processes of the learner (Al-Harthy, 1999).

Table tennis is a sport that requires active mental operations and constant information processing. Due to the small size of the playing field (playing table) and the speed of the ball, it requires that the player performs many movements and uses many skills simultaneously (Majos, 2002). During the matches, many of the skills used are derived from forehand and backhand skills, which this research aims to improve by designing educational units using the steps of the model of accelerating thinking, which aims to develop the motor capabilities related to the skill and the correct technique to perform.

Through the researcher's experience in his own educational process and as a teacher of the motor skills related to the subject, and his knowledge on educational methods in addition to his role as a table tennis teacher for players at ages between 13-15 years, he has found that most of the players have difficulties developing the correct technique, which causes inconsistencies in performance between forehand and backhand skills. This prompted the researcher to propose solutions to this problem by designing educational units following an educational model (accelerating thinking) to train the relevant motor skills in addition to the benefit of correcting the player's technique.

The research objectives were: 1. Designing educational units using the model to accelerate thinking for teaching forehand and backhand skills on table tennis for students aged between 13-15 years. 2. Assessing the effectiveness of the usage of educational units that follow the model of accelerating thinking in learning table tennis forehand and backhand skills for students aged 13-15 years. 3. Exploring the preference between using the educational units using the model of accelerating thinking and other educational units used in learning table tennis forehand and backhand skills for students aged 13-15 years.

The research hypotheses were: 1. There is a significant statistical difference between the pre- and post-tests performance on forehand and backhand skills in table tennis for students aged 13-15 years. 2. The educational units designed using the acceleration of thinking model have an advantage

on the development of forehand and backhand skills in table tennis for students aged 13-15 years in post-tests.

2. METHODS

2.1 Design and participants

The researcher applied the experimental method, using the method on two equal groups due to its suitability to the nature of the problem to be solved. The research community consisted of 10 junior players (ages 13-15 years) from the specialized table tennis academy in the province of Kirkuk. The research sample represented the entire research community. The researcher divided the research sample into two groups, the experimental group and the control group, and each group consisted of 5 players.

In order to achieve reliability between the two research groups in the dependent variables, the researcher applied the t-test, and the results showed that there were no significant differences between the two groups, as shown in Table 1.

Table 1. Equivalence of the two research groups

Variables	Unit of measurement	t	p
Forehand	Degree	0.53	0.60
Backhand	Degree	0.51	0.61

2.2. Instruments and procedures

Tests are among the things that must be available in any scientific research, as the test is one of the "important scientific means for evaluation in the fields of life and in the field of sports, especially because of the progress it has enjoyed in recent years" (Naji & Ahmed, 1987). In order to measure the accuracy of the forehand and backstroke in table tennis, the researcher used the test presented in Figure 1. The test is applied on a regular playing table with the necessary tools including a net, rackets, balls, and a registration form. Figure 1 shows the specific measurements, the players' standing areas, and the method of conducting the test.
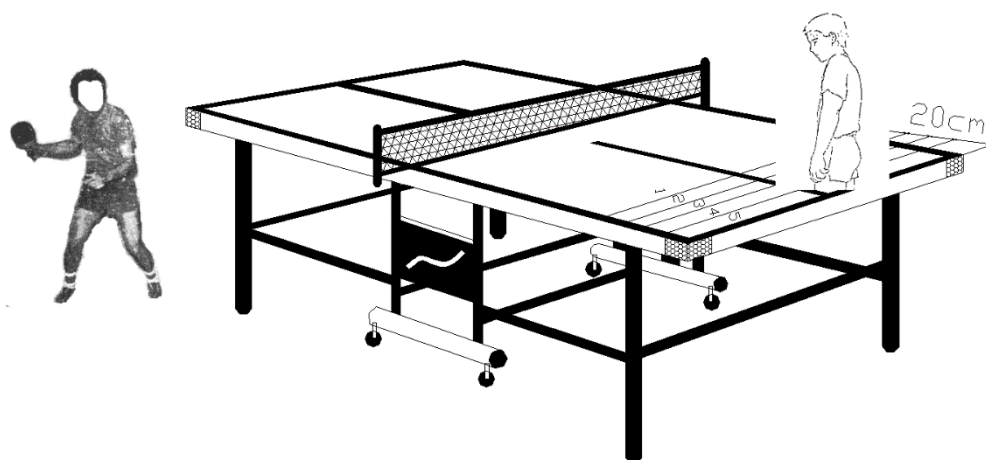
Figure 1. Test to measure the accuracy of the forehand and backhand in table tennis

Test measurements: Area 1 measures 57 x 152.5 cm and Area 2, 3, 4, and 5 measure 20 x 152.5 cm. Performance specifications: the tester to whom the test will be applied stands on one side of the playing table and makes five preliminary attempts to know the conditions for applying the test steps after taking enough time of warm-up. After providing tips and directions for applying the test to the tester, the ball is hit to the player by one of the assistants standing next to the table, as shown in the figure. The tested player begins by trying to return the ball with his racket and using both, the forehand or backhand. Each player was given 10 attempts with forehand strikes, and another 10 attempts for backhand strikes. After collecting the data, the arithmetic average of the attempts is extracted from the forehand and backhand strikes. According to this information, an ascending evaluation degree was made, ranging in value from 1 to 5 degrees. Note: If the ball falls on one of the lines, the points for the largest are calculated. In the event that the ball goes outside the boundaries of the table, the tester would score 0 points. The highest value of the test was 50 points.

The researcher proceeded to conduct a pilot study on 12/22/2022 on a sample of 4 players of the specialized table tennis center in the governorate of Kirkuk from outside the research sample. They were chosen randomly, with the intention of knowing: 1. The extent to which the players understand the conditions of the testing steps for the forehand and backhand skills in table tennis. 2. The possibility of the assistant work team and the method of recording the test data. 3. The difficulties that players may encounter during the testing process. 4. The appropriate time for applying the educational units, the nature of the exercises used, and their suitability for the research sample. 5. The time taken to conduct skill tests. 6. The suitability of the used tools and their efficiency.

The researcher conducted the pre-test on 1/2/2023 for table tennis forehand and backhand skills on the research sample at exactly three o'clock in the afternoon in the specialized centre for table tennis. Then the results were recorded in the data registration form. After the application of the educational units was completed, the researcher conducted the post-test on 2/5/2023 under the same conditions and in the same place as the pre-test.

The researcher intended to design his educational units according to the five steps of the Thought Acceleration Model, in a gradual scientific manner appropriate to the level of the sample members, and the nature of the skill learned. The five steps of this model are: 1. Preparation and sensory preparation. 2. Mental interaction. 3. Building knowledge. 4. Extra cognitive perception. 5. Formation of knowledge links. This model is based on the idea that if we can develop thinking in science, we can develop it in other disciplines.

The number of educational units reached 8, at the rate of two educational units per week, and the time of each educational unit reached 90 minutes, in which the theoretical side and the practical side were included. Most of the exercises that were applied in the educational units relied on the principle of repetition, practice, and giving continuous feedback, in addition to applying the five steps by bridging theoretical and cognitive information in order to build a good motor path and scientific knowledge of the rationale of the learned skill, knowing that the educational units were applied from the date of 4/2/2023.

The steps of the model were gradually applied, so that in the first units two steps were merged, and as we progressed in the application of the program, we merged a trace of two steps until we reach the end of the program. In this way, we integrated all the steps within the educational unit, so that the learner had more information and a movement program in his recent memory.

2.3. Statistical analyses

The statistical analyses were carried out with the Statistical Package for the Social Sciences (SPSS), version 23. With SPSS, the researcher calculated arithmetic means, standard deviations, and t tests (Al-Kinani, 2009).

3. RESULTS AND DISCUSSION

Through the results shown in tables 2 and 3, which showed the differences between the pre and post-tests of the experimental and control groups, it is revealed that a great advantage and development was achieved for the experimental group shown by the result comparison between the

pre- and post-tests. The researcher attributes this to the nature of the educational units that were applied according to the model in addition to the type of exercises; its suitability for the level of the sample, which had a significant impact on the group's superiority in the post-test; and the variety of exercises and giving continuous feedback, which helped the members of this group to draw ideal motor programs. These findings were confirmed by Schmidt & Weisberg (2000), who mention that the learning that occurs among learners who practice several skill form variations will have the ability to perceive the stimuli they face and thus engage actively in the learning process for these skills.

Table 2. Differences between the pre- and post-tests of the forehand and backhand skills of the experimental group.

Variables	Pre-test		Post-test		t	p
	Mean	SD	Mean	SD		
Forehand	13	1.22	29.60	2.1	12.88	0.00
Backhand	12.60	0.89	26	2.9	9.33	0.01

Table 3. Differences between the pre- and post-tests of the forehand and backhand skills of the control group.

Variables	Pre-test		Post-test		t	p
	Mean	SD	Mean	SD		
Forehand	12.40	1.1	24.80	2.9	20.12	0.01
Backhand	11.60	0.89	21	1.5	23.50	0.00

Through the information presented in Table 4, it was found that there were statistically significant differences in the post-tests between the two groups in favour of the experimental group to which the educational units were applied according to the model of accelerated thinking. The researcher believes that the main reason behind this superiority is due to the method that guided the design of the educational units and what they included.

Table 4. Differences between the post-tests of the forehand and backhand skills

Variables	Experimental group		Control group		t	p
	Mean	SD	Mean	SD		
Forehand	29.60	2.1	24.80	2.9	9.17	0.00
Backhand	26	2.9	21	1.5	8.22	0.00

The contents of the units ranged from exercises and information on the theoretical and practical side. These units were prepared within a basic concept, to make the player think and process information in a professional way, where the preparation process was taken into account through the practical side, the way of presenting information and increasing questions in order to form mental struggles to reach desired results. This was done by forming links and extending bridges between the theoretical and practical aspects and giving theoretical questions to find practical solutions to them through the performance of the forehand and backhand skills.

The educational units prepared according to this model included suspenseful methods and stimuli, and the process of conveying information according to the different sensory systems helped the occurrence of learning as there is a fact that learning and training are more effective the more senses used (Haidar, 2019). Also, the variety of exercises within the educational units, according to the model used, helped the participants in the experimental group to develop large motor memory that enhanced their forehand and backhand skills. Since these two skills are classified as open skills, whose environment is unexpected, the educational units helped them to develop a higher speed in motor response. This is one of the learning requirements necessary for fast-paced games according to previously unknown determinants (Ali, 2020).

All what has been mentioned mainly contributed to the formation of a motor program for each skill. These programs had the purpose of improving playing conditions, and since exercise is the basis that characterizes the educational unit, it is through it that the amount of learning or performance can be measured and developed, in addition to giving the learner fluidity and aesthetic performance. This was one of the most important features of the educational units that had a clear impact on the superiority of the experimental group over the control group.

4. CONCLUSIONS

The results confirmed the effectiveness of the educational units using the Thought Acceleration Model on the learning of table tennis forehand and backhand in 13−15-year-old players. Therefore, the author recommends to use educational models that address the functioning of the human mind and help activate its energies along with special exercises to develop specific skills in any given sport.

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AUTHOR CONTRIBUTIONS

CONFLICTS OF INTEREST

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