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Effect of an educational curriculum according to the strategy of mental maps on kinetic abilities and offensive game plans in football in university students

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ABSTRACT

The purpose of this paper was to identify the effect of an educational curriculum according to the strategy of mental maps on kinetic abilities and offensive game plans in football in university students. The present study had an experimental design. The present study was conducted on the students of the fourth stage of the College of Physical Education and Sports Sciences at the University of Babylon for the academic year 2020-2021, within the time frame of October 2021 to January 2022. The study was conducted in the stadium of the Faculty of Physical Education and Sports Sciences at the University of Kufa. A total of 40 students were recruited as the participants of the study. Participants were allocated into two groups, experimental group and control group, by simple random allocation method (raffle) with n=20 in each group. Based on the findings of the study, the researchers concluded that the educational curriculum, according to the mental maps strategy, significantly contributed to the development of the kinetic abilities under discussion.

KEYWORDS

Education; mental maps; kinetic abilities; game plans; football

1. INTRODUCTION

The process of organizing the curricula in the form of mind maps helps the learners to increase their comprehension and understanding of the educational content effectively. The educational process aims to establish the correct understanding of the content and concepts in an appropriate way to ensure successful learning. Nowadays there is a strong need to implement modern methods of teaching in the form of the mapping strategy, in which organized and ranked maps help

the students to store the knowledge, understand and recall at the right moment. The present study was conducted to find out the effect of the mental maps strategy in the application of some plans and offensive formations in football for students.

With the extensive review of the literature that was done by the researchers in the field of football, the teaching methods, and the learning process, they identified a significant lack of the use of programs and strategies that contribute to the development of planning processes and the correct implementation of the programs and strategies inside the stadium. They also identified that most of the learners lost attacks and opportunities to score during the time of their instructional units. Hence, the researchers prepared an educational curriculum according to the use of the mental maps strategy to distribute the players to their positions that may help in the development of some kinetic abilities that are greatly involved in performance when implementing those plans.

The primary aim of this paper was to identify the effect of an educational curriculum according to the strategy of mental maps on kinetic abilities and offensive game plans in football in university students. The researchers hypothesized that there would be a significant effect of the educational curriculum according to the mental maps strategy on some of the kinetic abilities and offensive game plans in football in the university students.

2. METHODS

2.1. Design and participants

The present study had an experimental design (Table 1). The present study was conducted on the students of the fourth stage in the College of Physical Education and Sports Sciences at the University of Babylon for the academic year 2020-2021, within the time frame of October 2021 to January 2022. The study was conducted in the stadium of the Faculty of Physical Education and Sports Sciences at the University of Kufa. A total of 40 students were recruited as the participants of the study. Participants were allocated into two groups, experimental group and control group, by simple random allocation method (raffle) with n=20 in each group.

Table 1. Experimental design of the study

Groups	Pre-test	Experimental treatment	Post-test
Experimental	Implementation of formations and offensive plans	Applying the educational curriculum according to the concept maps strategy	Re-test the implementation of formations and offensive plans
Control	Implementation of formations and offensive plans	The curriculum followed by the teacher	Re-test the implementation of formations and offensive plans

2.2. Instruments

In the present study, many tools and devices were used for the data collection to achieve the objectives of the research. The various tools used in the present study included a computer, two Chinese-made video cameras, electronic stopwatches, five soccer balls, a display device, mind maps booklet containing all the maps prepared by the researchers, a tape to measure the height, and a medical scale to measure weight.

The tests used to measure the kinetic abilities were the following:

1) Torso flexion test from proneness: The test was conducted with the intent to measure the back flexibility of the spine. The tools required for the test included a tape measure and an apron. The participant was asked to attain a prone lying position with the arms behind the back with the lower limb fixed by a colleague. The participant was asked to slowly return the torso backwards to the maximum extent possible keeping this position for 2 seconds. The distance between the chin and the couch surface was measured by measuring tape, keeping the tape perpendicular to the surface of the couch. A total of two attempts were given to each participant. The best one was recorded and documented (Hassanein, 2003).

2) Zigzag running test 4 x 9m to measure agility: The test was conducted with the intent to measure the ability to change direction while running. The test was conducted in a running field established on the solid ground having 9 m length and 2 m width. A starting line was drawn with a length of (1.8) m and a width of (5) cm. Four barriers or poles were placed in the front of the starting line so that the first barrier was placed at a distance of (3.6) m from this line, and the distance between each

line and the last was 1.8 m. A stopwatch was used to document the time taken. Initially, the participant was directed to take the starting position from the high start behind the starting line. After hearing the start signal, He/she was directed to run between the signposts. Followed by which, the tester revolved around the last sign and continued to run between the barriers in the same way. The participant was asked to finish the test in the shortest period of time. Only one attempt was given to each participant. The time taken by the participant to complete this test was recorded (Hassanein, 1995).

3) The test of moving over the marks: The test was conducted with the intent to measure the kinetic balance. A tape measure was used in the test. The participant was asked to stand on the starting line with the right foot. Followed by this, the participant stood on mark 1 with the left instep. He was asked to stand firm in this position. Then the participant was asked to jump to mark 2. Followed by this, the participant stood on the mark 2 with the left instep and so on until he reached the last mark with the same technique on each dart. One degree was recorded for each jump (Hassanein, 2003).

2.3. Procedures

In the present study, the researchers adopted the offensive plans, taught within the curricula of the fourth stage students of the College of Physical Education and Sports Sciences, the University of Babylon for the academic year 2021-2022. These plans were compatible with the abilities and capabilities of the students. An evaluation plan was designed by the researcher to evaluate the performance of the students' formations and offensive plans. The research team photographed the performance of the students and forwarded it to a panel of experts specialized in the field of football and attack plans. In the present study the researcher studied formation (4-3-3), formation (4-4-2).

Before conducting the primary experiment, the researcher conducted an exploratory experiment on the students in the College of Physical Education and Sports Sciences at the University of Babylon in the month of October 2021. A total of 12 students were recruited as the participants for the exploratory experiment. The exploratory experiment was conducted to ensure the appropriateness of the plans and formations for the sample, as well as to ensure the efficiency and knowledge of the auxiliary staff, to identify the problems the researcher may encounter during the study and to extract the scientific bases (honesty and consistency) for forms for evaluating the performance of offensive formations.

The researcher conducted an extensive review of the teaching curriculum for the fourth stage and successfully implemented the educational curriculum according to the mind mapping strategy on the vocabulary of this curriculum. They also conducted personal interview sessions with the experts specialized in the field of teaching methods and kinesthetic learning to know their opinion on the modern strategy. The new strategy is focused on making drawings in the form of maps that represent the basic and sub-concepts of all formations and offensive plans from the theoretical side and the practical side. The teaching was done according to two strategies; regressions and deviations. The application of this strategy during the main experiment was in line with the abilities of the students. A total of 8 educational units were included in the study.

Educational units included preparation of mental maps that represent main and sub-details about the cognitive aspects of football, based on the simple basic aspects of field game like the law of the game, basic skills, offensive and defensive formations and plans. It also included mind maps that represent illustrations of the offensive plans and formations showing the movements of each player in any of the playing centers, mind maps that represent illustrations for each play center (each center has its map). In the educational units, each student was asked to create special knowledge maps according to his ability and cognitive ability (considering those maps that each student prepares after the end of each educational unit as an evaluation tool). The display method was used to explain the movement of the players, and each position according to its duties. It also included the live model method of teaching in which, the teacher performed the offensive plans and formations, position for standing and movements in the positions assigned to each player inside the field in front of the students to identify the correct model.

The researcher conducted the pretests on the participants of both the groups in the month of October 2021 and obtained the data in special forms in preparation for its statistical processing. For the purpose of ensuring the homogeneity of the members of the research sample and the equivalence of the two groups among them in all the variables, the researcher relied on the data of pre-measurement and extracted indicators as shown in Table 2.

Table 2. Homogeneity and equivalence of the two research groups

Variables	Unit	Control group			Experimental group			T	Sig.
		Mean	Skewness	SD	Mean	Skewness	SD		
Height	Cm	174.5	0.20	4.62	174.4	0.13	4.64	0.184	Non sig
Weight	Kg	65.11	0.11	7.75	66.02	0.19	7.23	0.249	Non sig
Age	Month	267.4	0.27	5.97	265.9	0.21	5.85	0.334	Non sig
Agility	Second	11.86	0.854	0.73	11.82	0.84	0.62	0.855	Non sig
Kinetic flexibility	Cm	57.68	0.654	2.65	57.62	0.951	3.20	0.952	Non sig
Kinetic balance	Degree	5.31	0.584	0.94	5.37	0.369	0.95	0.854	Non sig
Offensive plan (4-3-3)	Degree	4.47	0.58	0.44	4.48	0.69	0.31	0.522	Non sig
Offensive plan (4-4-2)	Degree	3.82	0.47	0.40	3.84	0.61	0.55	1.17	Non sig

Tabular value (T) at significance level (0.05) and degree of freedom (38) equal to 2.04

After completing the implementation of the educational curriculum, researchers conducted the post-test on the participants of the control and experimental groups under the same conditions and specifications implemented in the pre-tests. Post-tests measurement was done in January 2022.

2.4. Statistical analyses

After post-tests, the data were organized for statistical processing. In the present study, the statistical analysis was done using the Statistical Package for the Social Sciences (SPSS). The researchers calculated means, standard deviations and t tests.

3. RESULTS

Table 3 describes the results of the pre and post-tests of the control group. Table 4 presents the results of the pre and post-tests of the experimental group. Table 5 describes the results of the post-tests of the experimental and control groups. These results showed that there were significant differences between the pre and post-tests for the control and experimental groups, in favor of post-tests. Also, there were significant differences between the post-tests, in favor of the experimental group.

Table 3. Results of the pre and post-tests of the control group

Variables	Unit	Pre-test		Post tests		T	p	Sig.
		Mean	SD	Mean	SD			
Agility	Second	11.86	0.73	11.06	0.58	3.85	0.003	sig
Kinetic flexibility	Cm	57.68	2.65	60.50	2.16	4.92	0.000	sig
Kinetic balance	Degree	5.31	0.94	6.62	0.80	4.39	0.002	sig
Offensive plan (4-3-3)	Degree	4.47	0.44	2.38	0.67	4.61	0.001	sig
Offensive plan (4-4-2)	Degree	3.82	0.40	3.68	0.38	4.16	0.002	sig

Table 4. Results of the pre and post-tests of the experimental group

Variables	Unit	Pre-test		Post tests		T	p	Sig.
		Mean	SD	Mean	SD			
Agility	Second	11.82	0.62	10.67	0.45	5.91	0.000	sig
Kinetic flexibility	Cm	57.62	3.20	62.37	1.20	5.38	0.001	sig
Kinetic balance	Degree	5.37	0.95	7.68	0.87	6.38	0.000	sig
Offensive plan (4-3-3)	Degree	4.48	0.31	9.71	0.47	6.11	0.000	sig
Offensive plan (4-4-2)	Degree	3.84	0.55	16.82	0.54	6.22	0.000	sig

Table 5. Results of the post-tests of the experimental and control groups

Variables	Unit	Control group		Experimental group		T	p	Sig.
		Mean	SD	Mean	SD			
Agility	Second	11.06	0.58	10.67	0.45	4.325	0.001	sig
Kinetic flexibility	Cm	60.50	2.16	62.37	1.20	4.984	0.001	sig
Kinetic balance	Degree	6.62	0.80	7.68	0.87	3.654	0.001	sig
Offensive plan (4-3-3)	Degree	2.38	0.67	9.71	0.47	3.694	0.001	sig
Offensive plan (4-4-2)	Degree	3.68	0.38	16.82	0.54	5.984	0.000	sig

4. DISCUSSION

Statistical analysis of the present study revealed significant differences between the pre and post-tests for the control and experimental groups, in favor of post-tests, and between the post-tests in favor of the experimental group. The researchers attributed this significant difference to the educational curriculum prepared by the subject teacher. The teacher used these exercises in multiple ways and methods. These exercises were implemented at the beginning of the preparatory section which included jogging and jumping. These exercises collectively contributed to the development of physical and kinetic abilities. The researcher attributed the significant difference between the experimental group members in kinetic abilities to the application of the educational curriculum according to the mental maps strategy prepared by the researchers. This curriculum contained situations involving complex and varied movements aimed at changing the conditions of the body.

The researcher used various auxiliary tools in the performance of educational situations that included posters, rings, stairs, rugs, etc. During physical and skill performance, these tools contribute to the development of physical and kinetic abilities. Al-Rubaie (2011) believed that "the devices and auxiliary tools work to improve and accelerate the learning process especially on mathematical skills in the least time and effort". In the present study, the researcher used the gold map strategy with an intent to improve and raise the level of the kinetic and skill abilities and self-realization of the learners and to gain them satisfaction with their overall performance. Al-Heila (1999) asserted that "when the educational situations are implemented effectively, the general performance of the learners

improves to a great extent. Mahjoub (2001) stated that "exercises are of great importance in general and specific physical preparation and skill preparation, even if they are for beginners or higher levels."

In the present study, the researchers used a mixture of physical, skill, and planning exercises in the educational curriculum. It had a great role in generating additional strength for the working muscles and accelerating the movement of various parts of the body, which led to an increase in the physical and kinetic abilities among players. This was indicated by Khaleq (1999): "The kinetic performance of the skill depends on special physical and kinetic abilities." The development of kinetic abilities is linked to the development of physical abilities, hence agility is linked to the speed and flexibility is linked to strength and speed. In a study conducted by Al-Saffar, the authors stated that "the learner must acquire an appropriate amount of strength and speed before developing flexibility long enough for flexibility exercises to have a good effect" (Al-Saffar, 1987).

The development of the experimental group in the plans is due to the nature of the mind mapping strategy. This strategy has a new and distinctive style that is presented to the students through posters for the details of the performance. This is consistent with the findings of the study conducted by Hatab (1988). A significant difference was also found within the experimental group in the favor of post-tests. The researcher attributed this to the nature of the educational curriculum that is structured based on the mental maps strategy. It helped the students to use more than one sense during teaching. This strategy is also concerned with helping the students to learn while participating in the design of the maps which led to an increase in their self-confidence and an improvement in their performance, thereby reducing the negative trend towards the subject while performing practical lessons that they thought were difficult. The results of the study were found to be consistent with the study conducted by Annan and Bahy (2001).

The researchers also attributed these significant differences to the visual models used by the teachers in the educational curriculum. Visual models helped the students to correct their performance in their minds and lead to significant improvement in their level of performance. Such visual models also helped the learners in making the comparison between their performance and the performances in the models presented to them and rectify those technical mistakes to achieve the desired goal.

The researchers also attributed this development to the offensive plans in football for regularity and continuity in the educational units. The students practiced a new strategy that was not recognized in the regular lessons, which increased the time invested in the performance. In a study conducted by Hamada (2004), the authors stated that the educational program inevitably leads to the development of achievement, if it is built on a scientific basis in the organization and programming of the training process and the use of appropriate and gradual intensity and observation of individual differences, as well as the use of optimal repetitions and effective intermittent rest periods and under the supervision of trainers, good conditions and specialized training tools in place and space.

5. CONCLUSIONS

Based on the findings of this study, the researchers concluded that the educational curriculum, according to the mental maps strategy, significantly contributed to the development of the kinetic abilities under discussion. These exercises also helped in applying the offensive plans and formations. The development of kinetic abilities was positively reflected in the development of the offensive plans of the research sample. Therefore, the authors recommend the use of the mental maps strategy in the educational curricula when teaching applied study subjects because of its role in developing effective education, creating a favorable atmosphere for learners and creating motivation for the learning process. The authors also recommend to conduct similar studies on other individual and collective activities, and on different age groups.

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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