

The Effect of Using the Concept Mapping Strategy with the Self-Check Style on Developing the Learning of Bounce Pass and Set Shot Skills in Basketball

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ABSTRACT

This research aims to identify the effect of the conceptual mapping strategy using the self-analysis method on the learning of rebounding and scoring management skills from consistency in basketball. The research sample consisted of first-stage students from the Faculty of Physical Education and Sports Science at Al-Maaref University. The researchers adopted the experimental method to suit the nature of the research problem and used statistical package software (SPSS) to process the data statistically. The researchers concluded that the strategy of mapping concepts using the self-analysis method has a positive and effective effect on the learning of both skills studied. In light of these findings, the researchers recommend the need to combine traditional methods with modern educational strategies in the same classroom for the middle and university stages, as this contributes to generating expectation, spreading a spirit of cooperation, and deviating from the traditional pattern of learning the basic skills of various sports.

Keywords: Learning strategy, bounce pass skill, set shot skill, basketball

1 Introduction

This study involved the introduction of a strategy that combines the traditional instruction used in the command style with instruction utilizing both brain hemispheres through drawings, data, figures, and colors, while granting the learner freedom of expression and transforming the skill—in terms of its concept, technical steps, and common errors—from mere theoretical verbal instruction into creativity through the drawing process and forms, thereby unleashing brain activity with great freedom within the lesson among the research sample. Strategies rely on prior cognitive information, which grants learners an active role regarding their capabilities to accept this information and translate it into performance reality; this results in a difference from one learner to another in terms of the ability to translate and benefit from it. Therefore, instructional strategies did not emerge arbitrarily, but rather came as a result of numerous scientific experiments that influenced the learner's personality, thinking methodology, and translation of information. Over time, their characteristics became stable, distinguishing the learner from peers; hence, developing their multiple skills is required to achieve a specific performance level during lecture times and their associated pressures. This necessitates that the learner be well-informed and fully proficient in the basic skills correctly and with proper technique; accordingly, the two researchers introduced this instructional strategy using the self-check style in an attempt to enhance and develop the learning of the set shot skill in basketball.

The significance of the research lies in the optimal utilization of time and effort expended by both the teacher and the learner through integrating this strategy with the traditional strategy, which provides the learner with mastery learning of basic skills through their creativity in transforming information into drawings and figures by reorganizing the read text into graphical and schematic layouts. This is based on placing detailed elements in relation to main ideas and core concepts in connection with sub-concepts, achieved through mutual discussion between the teacher and the learner regarding the information of the read text and the learners' prior knowledge. These features are unavailable in traditional styles and strategies; consequently, a conceptual map schema is constructed representing the cluster of concepts contained within the topic, arranged in a two-dimensional manner, whether they are mental maps, concept maps, spider maps, comparative, descriptive, fishbone, or cause-and-effect maps.

1.2 Research Problem

Through the two researchers' experience and observation of the teaching process of physical education and sports sciences regarding basic skills—whether offensive or defensive—in basketball, they noticed that the instructional strategies and styles dominating skill teaching in basketball are the command style, which may not fulfill all the requirements for achieving the educational and pedagogical objectives of the lesson due to individual differences and motivation levels among students. Furthermore, it restricts, to a certain extent, the special and creative capabilities of the students, confining the active role solely to the teacher. Hence, those responsible for educational processes must strive to keep pace with developments in teaching physical education and sports sciences by experimenting with several modern instructional strategies that highlight the learner's active role in acquiring scientific subject matter by investing the learners' mental and creative capacities, as well as their actual participation in the educational process, demonstrating their effectiveness and capabilities by recognizing all parts of the targeted skill to be learned, transforming information into drawings and data, and engaging both brain hemispheres in the educational process.

1.3 Research Objective

Detecting the Effect of Employing the Concept Maps Strategy by Psychological Examination Method on Learning and Developing the Skills of Rebound Handling and Scoring from Stability in Basketball among the Students of the Study Sample.

1.4 Research Hypotheses

1. There are statistically significant differences between the experimental group and the control group in the results of the pre- and post-tests for the bounce pass and set shot skills, in favor of the post-test results of the experimental group.
2. There are statistically significant differences between the results of the experimental group and the control group in the results of the post-tests for the bounce pass and set shot skills, in favor of the results of the experimental group.

2. Research Methodology

2.1 Study Design



The two researchers used the experimental method due to its suitability to the nature of this study to solve the research problem (Khalaf et al., 2024; Mohammed et al., 2025; Omar et al., 2025).

2.2 Research Sample

The research sample was selected using a deliberate method, represented by the students of the first stage of the Faculty of Physical Education and Sports Sciences of Al-Maaref University for the academic year (2025-2026), who are (70) students. (10) students were excluded due to their absence on the day of the exam, adding the sample to 85.71% of the original research population. The sample was divided by lot into two equal groups (experimental and control) with (30) students per group, where division (B) represented the experimental group to which the concept map strategy was applied by the self-examination method, while division (A) represented the control group that followed the traditional method followed by the teacher of the subject.

2.3 Experimental Design

The researchers adopted the randomly selected design of the two groups (experimental and control), applying pre- and post-measurements, where the pre-test is performed for both groups and then the members of the experimental group are subjected to the experimental variable. Then, the post-test is applied to the two groups and the differences between the two measurements (before and after the test) and between the two groups are calculated, to measure the effect of the experimental variable on the experimental group..

2.4 Skill Tests

First: Two-Handed Bounce Pass Test (Hammoudat & Jasim, 1987)

- **Test Objective:** To evaluate the performance of the two-handed bounce pass.
- **Tools Used:** Basketball court, regulation basketballs (2), measuring tape, chalk, and a whistle to signal the start.
- **Performance Description:** From a standing position, upon receiving the starting signal, the student executes a two-handed chest pass directed toward the floor to the last third of the distance toward a colleague standing at a distance of (5 meters).
- **Performance Evaluation:** Each student is given two attempts, and the best score is recorded, noting that the maximum score is out of (10).

Second: Set Shot Test (Al-Mandalawi et al., 1997)

- **Test Purpose:** To measure the accuracy of shooting from a stationary position (set shot).
- **Necessary Tools:** Basketball court, basketball goal, basketball.

- **Performance Description:** The test-taker shoots the ball at the basket for three sets, each set consisting of (5) consecutive shots from the middle of the free-throw area and on both sides, allowing each test-taker an appropriate rest period between each set and the next.
- **Scoring:** Two points are awarded for each ball that enters the basket, and one point for each ball that touches the rim without entering. The total score of the test-taker equals the sum of points obtained across the fifteen attempts, noting that the maximum possible score is 30 points.

2.5 Field Research Procedures

First: Pre-Skill Tests

The researchers performed the skill tests of both groups (experimental and control) on the skills studied, represented by (bounce management and consistency score), on Saturday (11/1/2025). The tests were conducted for each group separately with the help of a support team and under the direct supervision of the researchers.

Second: The Main Experiment

Before starting the main experiment, and in light of reviewing the literature and previous studies on teaching and motor learning methods, the researchers designed hierarchical concept maps of the skills under study in basketball (rebound handling, scoring from consistency), ranging from general and comprehensive concepts at the top to sub-and less general concepts, with the details of the skill linked to precise linkage tools. These maps were printed on horizontal flex boards with dimensions of (2×2 m) to be displayed in the educational section. In parallel, the benchmark (comparison) paper for the self-examination method, which included the student's data, skill exercises, and three performance evaluation tables (average, good, very good), was designed to serve as self-feedback and a work guide that helps the student discover and correct his mistakes during the transition between training stations, provided that the teacher collects these papers at the end of each lesson to follow up on the development of performance.

After implementing an introductory educational module for the students of the experimental group to familiarize them with the mechanism of learning and self-assessment, the main experiment began to be applied on Tuesday (4/11/2025) in the closed hall of the Faculty of Physical Education and Sport Sciences – Al-Maaref University. The curriculum lasted for (8) weeks with two units per week (with a total of 16 teaching units: 8 units for feedback handling, and 8 units for scoring from consistency). The main section of the unit included (4) skill exercises with an applied time of (40) minutes, taking into account the gradation from easy to difficult and linking skills in the advanced stages. The concept mapping strategy was applied to the experimental group (divided into three groups according to the level), while the control group underwent the traditional method used by the teacher. The implementation of the method continued with field follow-up by researchers until the conclusion of the experiment on Tuesday (30/12/2025), followed by setting Saturday as the date for the application of the post-tests.

Third: Post-Skill Tests

Upon completion of the implementation of the main research experiment, the researchers conducted the post-tests for the experimental and control groups on Saturday (3/1/2026) at ten o'clock in the morning and under the same conditions as the entire tribal tests were conducted in the closed sports hall .

2.6 Statistical Methods

The researchers used the statistical package (SPSS) to process the data statistically (Abdullateef AbdulJabbar et al., 2025; Fayyad et al., 2025, 2026; Mohammed et al., 2025).

3. Results

3.1 Presentation and Analysis of Pre- and Post-Test Results for the Experimental Group

Table (1) shows the arithmetic means, standard deviations, differences of means and standard deviations, and the calculated *t*-value between the pre- and post-tests for the experimental group.

Table 1. *Statistical parameters between pre- and post-tests for the experimental group (N = 30)*

Variab les	Unit of Measure ment	Pre - Tes ts (M)	Pre - Tes ts (SD)	Pos t- Tes ts (M)	Pos t- Tes ts (SD)	Mean Differe nce (Mdiff)	Standa rd Deviati on Differe nce (SDdiff)	Calcula ted t- value	Significa nce
Bounc e Pass	Score	6.11	1.6 1	8.5 5	1.1 0	1.99	0.43	5.68	Significa nt
Set Shot	Score	16. 88	3.5 9	25. 40	3.0 8	8.55	0.52	8.70	Significa nt

* *Tabular t-value is (1.697) at a significance level of (0.05) and degrees of freedom (30 – 1 = 29).*

3.2 Presentation and Analysis of Pre- and Post-Test Results for the Control Group

Table (2) shows the arithmetic means, standard deviations, differences of means and standard deviations, and the calculated *t*-value between the pre- and post-tests for the control group.

Table 2. *Statistical parameters between pre- and post-tests for the control group (N = 30)*

Variab les	Unit of Measure ment	Pre - Tes ts	Pre - Tes ts	Pos t- Tes ts	Pos t- Tes ts	Mean Differe nce (Mdiff)	Standa rd Deviati on	Calcula ted t- value	Significa nce
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		ts (M)	(SD)	ts (M)	(SD)		Difference (SDdiff)		
Bounce Pass	Score	6.94	2.71	8.64	1.11	1.70	1.60	3.00	Significant
Set Shot	Score	13.83	3.86	19.12	2.90	5.28	0.98	3.07	Significant

* Tabular *t*-value is (1.70) at a significance level of (0.05) and degrees of freedom (30 – 1 = 29).

3.3 Presentation of Post-Test Results for the Experimental Group and Control Group

Table (3) shows the arithmetic means and standard deviations of the selected research variables for the experimental and control groups, along with the calculated *t*-value (*t*).

Table 3. *Post-test arithmetic means and standard deviations for the experimental and control groups (N = 60)*

Variables	Unit of Measurement	Experimental Group (M)	Experimental Group (SD)	Control Group (M)	Control Group (SD)	Calculated <i>t</i> -value	Significance
Bounce Pass	Score	8.55	1.10	8.64	1.11	3.54	Significant
Set Shot	Score	25.40	3.08	19.12	2.90	5.47	Significant

* Tabular value is (1.671) at a significance level of (0.05) and degrees of freedom (60 – 2 = 58). (Note: Original text reads "Calculated *F*-value / Tabular *F*-value", mathematically representing standard test parameters between two independent groups).

4. Discussion

4.1 Discussion of Pre- and Post-Test Results for the Experimental Group

From Table (1), it is evident that there are statistically significant differences between the pre- and post-test results for the skills under study, in favor of the post-test results of the experimental group. The two researchers attribute the cause of this to the fact that the skill exercises and their optimal employment—in alignment with cognitive learning in summarizing explanations and enhancing the linkages between the sections of the skill to be learned—facilitated performance for learners by allowing them to discover the best methods during that performance. This occurred as a result of the development of mental capacities that guide the educational process, ensuring that these exercises are appropriate for the age and gender of the target sample, supported by clear and directed concept maps that make their content easy to apply, alongside questions suitable for the sample's responses. Skill learning requires

conditions within the educational environment that increase learner activity, which become clearly evident in their application of the presented model; therefore, it is imperative to employ elements that influence cognitive processes—represented by concept maps with the self-check style—to provide the learner with the opportunity to increase their freedom in decision-making represented by the specific motor response aligned with the objective of the educational unit. Furthermore, due to the specificity of basketball skills regarding their speed and accuracy, which the test results determined to be superior as the score increased—meaning that the interplay between speed and accuracy factors increases the difficulty of the motor duty in maintaining its trajectories—this process required measures to alleviate this difficulty. This was achieved through the optimal utilization of the number of units, exercises, and their progression from easy to difficult, in addition to investing sensory and mental capacities, which had a clear impact on the findings of this study as indicated by the results. The basic basketball skills under study require a progression during learning from easy to difficult and from general to specific, which aligns precisely with concept maps using the self-check style. This is confirmed by Zayer et al. (2012), who indicate that "concept maps are a cluster of concepts within a specific topic arranged in a hierarchical, sequential manner such that the general or comprehensive concept is situated at the top, followed progressively by less comprehensive concepts" (Zayer et al., 2012). This is precisely what must be enacted in the skill learning process with learners; consequently, an improvement occurred in the performance of the skills under study, reinforcing the importance of using concept maps with the self-check style in learning basic basketball skills.

From Table (2), it is evident that there are statistically significant differences between the pre- and post-test results for the skills under study, in favor of the post-test results of the control group. The two researchers attribute this to the fact that the exercises utilized by the teacher in the traditional style followed in learning the basic skills under study were effective and had a positive impact on the learners.

From Table (3), the post-test results for the experimental and control groups reveal the superiority of the experimental group, which utilized the concept mapping strategy with the self-check style. The two researchers attribute this superiority and improvement in skill learning for the bounce pass and set shot skills in basketball to the effectiveness of the instructional style in increasing self-reliance—meaning a greater role for the learner than the teacher—and influencing development channels. This was clearly manifested in enhancing the learning of the skills under study, where a complementary role existed in the integration between maps and the instructional style in targeting cognitive aspects, facilitating their perception and awareness regarding skills and motor trajectories that must be adhered to. Although the nature of basketball skills is open-loop, their teaching and testing occur by closing these skills and granting freedom or a central role to the learner in making decisions independently, accompanied by feedback regarding what has been performed, given that the skills are characterized by speed and accuracy. This well-studied and precise integration, tailored to learners' capabilities, contributed to activating the instructional style to achieve the desired objectives. Concept maps assist the learner in enhancing self-confidence as well as presenting useful information in a clear and sequential manner, thereby enabling the learner to

conduct self-evaluation and identify their areas of weakness and deficit. This is precisely what the teacher provides by using concept maps with the self-check style, as noted by Hyerle (2004): "Concept maps are visual mapping forms serving as tools used by both teacher and student for instruction; they carry within their content cognitive subject matter, reflect levels of thinking, and render the student active and effective in the educational process through self-evaluation and critical thinking" (Hyerle, 2004).

5. Conclusions and Recommendations

5.1 Conclusions

1. Teaching using the concept map strategy and the traditional method contributed to improving the learning of the basketball skills in question among the study samples, with a significant advantage in favor of teaching with the concept map strategy to the detriment of the usual method.
2. Employing teaching methods that give students a positive and effective role during the educational process has a significant and positive impact on learning outcomes.

5.2 Recommendations

1. The use of teaching strategies that give the student a positive and effective role during the study of physical education in the preparatory and university stages, due to their impact on adding the element of suspense, spreading the spirit of cooperation and deviating from the traditional pattern followed in teaching the basic skills of all sports.
2. The need to employ the concept map strategy to teach motor and educational skills for events and team sports.
- 3.

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Appendix (1): Sample of Instructional Units

- **Educational Objective:** Teaching the bounce pass skill.
- **Strategy Used:** Concept mapping strategy and self-check style.
- **Pedagogical Objective:** Accustoming students to activity and discipline.

Section of Unit	Time	Activities and Motor Skills	Formations and Organization	Notes
Preparator y Section (20 Min)	4 Min (Introduction)	• Taking out equipment. • Student formation. • Recording absences.		• emphasizing quietness, order, and cooperation. • emphasizing

		• Reciting the sports greeting.		arm movements in any arm-specific exercise and granting the highest possible repetitions.
	4 Min <i>(General Warm-up)</i>	• Standing → Normal walking → Normal jogging ↔ Jogging with high knees ↔ Side jogging ↔ Jogging while touching the ground → Normal walking + Standing.		
	4 Min <i>(Physical Exercises)</i>	• (Standing, legs shoulder-width apart, hands on hips) Head twisting to both sides alternately — (2) counts. • (Standing) Swinging both arms forward and backward together — (2) counts. • (Standing) Torso twisting		

		to both sides — (2) counts. • (Standing) Lifting legs forward, sideward, and backward and returning to starting position — (2) counts.		
	8 Min <i>(Specific Warm-up)</i>	• Specific preparation serving the main section while introducing skills for physical familiarization — • Stretching exercises. • Running and executing chest passes for a specific distance. • Free play and ball familiarization.		
Main Section (60 Min)	20 Min <i>(Educational Segment - 30 Min total)</i>	• The teacher explains the bounce pass skill along with its correct technical execution, presenting a demonstration		

		model in front of them. • Directing a set of questions to the students and answering them orally using concept maps as an auxiliary visual aid. • Explaining the advantages of the self-check style, explaining the criterion (comparison) sheet, how to obtain feedback from it, and how to perform exercises using this style.		
	10 Min (<i>Practical Segment - 40 Min total</i>)	• Students apply the bounce pass skill by dividing into two facing groups. • After performing the pass with a colleague, the student moves to the back of their		

		respective team line.		
	10 Min	The exact same previous exercise, but switching positions between the two teams (the player transfers to the opposite team line).		
	10 Min	- Students stand in two groups (A and B) starting from the basketball baseline beneath the backboard. - Each player initiates a bounce pass to their colleague in the opposite group while running toward the opposite baseline of the court, returning in the exact same manner along the sideline of the court.		
	10 Min	The exact same previous exercise, but		

		with increased distance between the players.		
Concluding Section (10 Min)		• A small (recreational) game serving the main section. • Light cool-down exercises for muscle relaxation to restore the body to its normal state. • Returning equipment and dismissal.		

Assignment Sheet Using the Concept Mapping Strategy with the Self-Check Style

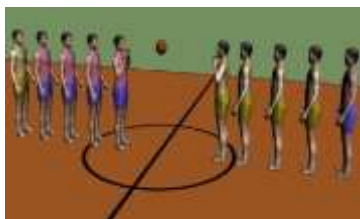
- **Student Name:** _____
- **Academic Stage:** _____

Exercise 1: Students apply the bounce pass skill by dividing into two facing groups. After performing the pass with a colleague, the student moves to the back of their respective team line.



Average (1–5)					Good (1–5)					Very Good (1–5)				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Exercise 2: The exact same previous exercise, but switching positions between the two teams (the player transfers to the opposite team line).



Average (1–5)					Good (1–5)					Very Good (1–5)				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Exercise 3: Students stand in two groups (A and B) starting from the basketball baseline beneath the backboard. Each player initiates a bounce pass to their colleague in the opposite group while running toward the opposite baseline of the court, returning in the exact same manner along the sideline of the court.



Average (1–5)					Good (1–5)					Very Good (1–5)				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5

Exercise 4: The exact same previous exercise, but one student returns by dribbling along one side of the court while the other student returns by jogging.



Average (1–5)					Good (1–5)					Very Good (1–5)				
1	2	3	4	5	1	2	3	4	5	1	2	3	4	5