



THE EFFECT OF AN EDUCATIONAL CURRICULUM BASED ON METACOGNITIVE STRATEGY ON LEARNING DRIBBLING AND SHOOTING SKILLS IN BASKETBALL AMONG STUDENTS

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Abstract

The purpose of the study was to determine the effect of metacognitive strategy on the learning of dribbling and shooting basketball skill [...]

The post The Effect of Metacognitive Strategy on the Learning of Basketball Skills appeared first on Study Aims. According to some sources, one of the modern strategies used in physical education in particular lessons is whenever teachers use it to enhance students together with their minds and knowledge. The aim of the study was to examine differences in the learning of dribbling and shooting skills between experimental and control groups through the application of this strategy. The researcher employed the experimental method, specifically a design incorporating pre-test and post-test equivalent groups (experimental and control groups). The research population is first-grade students in the College of Physical Education and Sports Sciences, University of Al-Qadisiyah, who are 250 students, during the academic year 2025-2026, and which are taught by 10 sections. Two sections were selected at random; the main experimental sample comprised of 40 students, sections C & D. The participants were assigned two groups, namely an experimental group and a control group made up of a total of 20 students. Both groups were given a pre-test. "The experimental group was given 8 instructional units, one unit each week by the researcher. It was the metacognitive strategy-based educational units." The research found that the metacognitive (constructivist) strategy significantly assisted students in learning some basic skills in basketball. Furthermore, the learners' metacognitive abilities and knowledge construction improved beyond that achieved through explanation, repetition and demonstration. It was recommended the educational curriculum be based on the metacognitive strategy.

Introduction

The learning process depends on an individual's readiness, capability, and the amount of time required for learning. The student represents the focal point of the educational process, and the development of students' abilities, skills, and capacities constitutes the primary objective of education. Achieving this objective requires comprehensive and precise attention through diverse educational situations.



Playing basketball helps students acquire a mix of offensive and defensive skills essential for their academic journey. Learning fundamental skills will help students perform well as future physical educators. The skills represent the basis for attaining competence and excellence. Every player or learner should have sufficient knowledge regarding the basic basketball skills. The reason is that all the skills are important. In college-level basketball teaching programs, these are the movements and techniques that students need to learn to produce good results with less effort and a delayed onset of fatigue (Ismail et al., 1989, pp. 29-30).

Basketball has turned into one of the most important team sports subject that is characterized by considerable development, as it is one of the basics taught in colleges of physical education and sports sciences and it involves various offensive skills including a dribble and shooting. Cooperation and integration of efforts aimed at attaining great performance through its technical and tactical skills make the game interesting to the spectators as well.

As the performance of students taking this course undergoes change, we look to experts and coaches to determine the educational methods and techniques which can lead to the development of complex skills with high accuracy and speed. As a result, students require ongoing instruction in order to reach an acceptable level of performance, control, and mastery. The researcher observed basketball education at college level physical education and sports sciences and found that there was less concentration on the lying of the dribbling and shooting skills in addition to limited use of modern educational methods and technologies. The current situation demonstrates the need for the use of modern education, including metacognitive strategies in the learning.

The application of scientific methods to plan an action strategy is an educational method, which aims to improve students' learning from the existing learning level, to achieve its educational objectives. Especially the learning of motor skills such as dribbling and shooting. The integration of the metacognitive strategy into the instructional curriculum used by the College, taking into account the characteristics and movement patterns of offensive skills, may improve the offensive skills of basketball and the performance of students. According to the information above, the present study is thus significant in using an educational curriculum based on the metacognitive strategy in learning basketball skills of dribbling and shooting the children.

Purpose of the Study

1. To design an educational curriculum based on the metacognitive strategy for learning dribbling and shooting skills in basketball among students.
2. To identify the effect of the educational curriculum based on the metacognitive strategy on learning dribbling and shooting skills in basketball among students.

Methods and Procedures

The researcher employed the experimental method using an equivalent-groups design because it is suitable for addressing the research problem. Experimental methodology is regarded as one of the most precise approaches in scientific inquiry because it relies on controlled experimentation (Qandilji, 1993, p. 33).

The research sample was selected from second-year students in the College of Physical Education, University of Al-Qadisiyah, during the academic year 2025–2026. The population consisted of 250 students distributed across ten sections. Two sections (C and D) were selected randomly. Each section included 20 students,



resulting in a total sample of 40 students. This proportion was considered appropriate for representing the research population accurately. (Dawood et al., 2020)

The purpose of dividing the sample into two groups was to attribute any observed differences to the experimental factor. Therefore, the two groups had to be equivalent in all variables except the independent experimental variable affecting them (Aliyan & Ghoneim, 2000, p. 341). To verify sample equivalence, several procedures were implemented, as presented in Table 1.

Table 1

Equivalence of the Experimental and Control Groups in Dribbling and Shooting Skill Tests

Test	Control Group Mean	SD	Experimental Group Mean	SD	Calculated t-value	Significance
Dribbling	14.945	0.614	14.866	0.828	0.063	Not Significant
Shooting	3.051	0.886	3.100	0.913	0.052	Not Significant

Tests Used in the Study

First Test: Straight High-Speed Dribbling for 20 m (Ismail et al., 1991, pp. 101–102)

Purpose of the Test:

To measure the speed of straight high-speed dribbling.

Equipment:

A 20-meter distance marked by a starting line and a finish line, a stopwatch, and a basketball.

Performance Procedure:

The participant starts behind the starting line and performs high-speed dribbling as fast as possible. Upon the official start signal from the evaluator, timing begins and continues until the participant crosses the finish line located 20 meters away.

Conditions:

- The participant must perform legal basketball dribbling.
- Each participant is given only one attempt.

Scoring:

- The recorded score is the time required to cover the distance from the start signal until crossing the finish line, measured in seconds and tenths of a second.

Second Test: Free-Throw Shooting Test (10 Attempts) (Ali, 1991, p. 179)

Purpose of the Test:

To measure shooting accuracy from a stationary position.

Equipment:

Basketball court, basketball hoop, and ten basketballs.

Performance Procedure:

- The player stands behind the midpoint of the free-throw line while holding the ball.
- Each player performs two sets, with each set consisting of five consecutive shots.



- The player may use any appropriate shooting technique.
- Each player is provided with one pass before beginning the shooting attempt.

Test Administration

- A recorder was responsible for calling the participants' names and recording the shooting results.
- An evaluator stood beside the player to provide the ball, monitor the correctness of performance, and count successful attempts.

Scoring Procedure

- One point was awarded for each successful shot when the ball entered the basket.
- No points were awarded for unsuccessful attempts.
- The player's final score was calculated as the total number of successful shots out of ten attempts.

Pre-Tests

The researcher conducted the pre-tests for both the experimental and control groups in the skills of dribbling and shooting on Tuesday, January 20, 2026, for first-year students in the College of Physical Education and Sports Sciences during the academic year 2025–2026. The tests were administered in the indoor hall of the College of Physical Education and Sports Sciences at the University of Al-Qadisiyah. The researcher ensured that all pre-tests were conducted under identical conditions, including the same location, appropriate testing environment, and equal testing conditions for all participants in both groups.

Educational Curriculum Content

The researcher prepared an educational curriculum based on the metacognitive strategy for first-year students in the College of Physical Education and Sports Sciences during the first semester of the academic year 2025–2026. The experiment was implemented by the researcher from Sunday, January 25, 2026, until Sunday, March 22, 2026.

The educational curriculum lasted eight weeks for the experimental group, with two instructional units per week. Four instructional units were devoted to learning the dribbling skill, while four instructional units focused on the shooting skill. The instructional sessions were conducted on Sundays and Tuesdays at the basketball courts of the College of Physical Education and Sports Sciences, University of Al-Qadisiyah, and were organized as follows:

Preparatory Section

The total duration of the preparatory section was 18 minutes and included the introduction, general warm-up, and specific warm-up.

- The introduction lasted 5 minutes and included organizing students in a single formation, taking attendance, and giving the starting signal for the instructional unit.
 - The general warm-up, part of the training, lasted for 5 minutes and consisted of general exercises for all body parts.
 - The warm-up was specifically designed for 8 minutes of activity period including exercises related to parts of the body involved in the performance. It focuses on the muscles which bear the main load in the performance of a skill.

Main Section



The main section lasted for 63 minutes. In this section the play and competition strategies were applied to enable the learning of the skills under investigation. There were two main components involved:

Educational Component

The researcher explained the skill and modelled it personally. Next, a student model performed the skill for participants. The researcher focused on presenting the metacognitive strategy and implementing it within the learning unit through the skills of dribbling and shooting. It took 20 minutes for this component.

Practical Component

Students used what they learned in the educational component according to the metacognitive strategy prepared by the researcher to achieve targeted skills. This component was 43 minutes long.

Concluding Section

The closing section is of 9 minutes involving some recreational exercises, making students stand in one formation, giving the last signal, and dismissal.

Post-Tests

The dribbling skills and shooting skills' post-tests were arranged by the researcher on Tuesday, 24th March 2026 as was conducted under identical conditions as the pre-tests with respect to place, time, assistant staff availability, and direct supervision by the researcher. Results were recorded in new data sheets, one for the control group that adheres to the conventional instructional method and the second for the experimental group which follows metacognitive strategy. The data collected were analyzed statistically to accomplish the objectives of the study.

Results

Table (2)

Differences Between the Pre-Tests and Post-Tests for the Dribbling and Shooting Skills in Basketball for the Control Group

No.	Variable	Unit of Measurement	Pre-Test Mean	SD	Post-Test Mean	SD	Mean Difference	SD Difference	Calculated t-value	Significance Level
2	Dribbling	Time	14.945	0.614	13.288	0.714	1.657	0.464	10.233	0.000
3	Shooting	Score	3.051	0.886	5.951	0.827	2.900	1.210	7.869	0.000

Table (3)

Differences Between the Pre-Tests and Post-Tests in the Dribbling and Shooting Skills in Basketball for the Experimental Group

No.	Variable	Unit	Pre-Test Mean	SD	Post-Test Mean	SD	Mean Difference	SD Difference	Calculated t-value	Significance Level
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1	Dribbling	sec	14.866	0.828	12.493	1.017	2.371	1.420	6.070	0.000
2	Shooting	score	3.100	0.913	7.051	0.998	3.950	1.395	8.806	0.000

Table (4)

Differences Between the Control and Experimental Groups in the Post-Test of Selected Basic Basketball Skills

No.	Variables	Control Group Mean	SD	Experimental Group Mean	SD	Calculated t-value	Significance Level
1	Dribbling	13.288	0.714	12.493	1.017	2.862	0.007
2	Shooting	5.951	0.827	7.051	0.998	3.797	0.001

Based on the data obtained from the research sample, Table (2) illustrates the differences in the values of selected basic basketball skills (dribbling and shooting) between the pre-test and post-test. As shown in the table, the participants of the control group demonstrated differences between the pre-test and post-test results. For the dribbling skill, a paired-samples t-test was used to determine the significance of differences. The calculated t-value reached 10.233 at a significance level of 0.000 and a degree of freedom of 19, indicating significant differences between the pre-test and post-test in favor of the post-test.

For the shooting skill, a paired-samples t-test was also employed. The calculated t-value reached 7.869 at a significance level of 0.000 and a degree of freedom of 19, indicating significant differences between the pre-test and post-test in favor of the post-test.

The researcher interprets these findings by suggesting that the students of the control group developed their dribbling and shooting skills during the learning process. The differences observed between the pre-test and post-test results for these skills were statistically significant, indicating that the control group improved its performance during the instructional units. Thanks to the instructor's competence and experience in teaching the skills, students were successful in acquiring the skills by the end of the instructional program, resulting in the improvement mentioned above.

According to the researcher, the educational program and teaching method designed by the teacher are also responsible for it. During the traditional mode of teaching, instructional units included suitable exercises and effective way of presentation of information, besides, repetition, practice, and sustained guidance through the teaching period.

Also, the researcher believes that the improvement among the control-group participants happened as a result of the manner of teaching being adopted by the course instructor based on an explanation and demonstration of skills in class. The instructor attained practical demonstrations, opportunities for repeating practice, and correction of students' errors through feedback. This enabled learners to interact in a constructive manner in learning. This interpretation agrees with Martin Leciden (1987) opinion that performance demonstrating the execution more effective (Martin Leciden, 1987, p. 143). According to Mosston and Ashworth (1991), one specific time on one specific teaching or learning style will lead to the achievement of one specific objective (Mosston & Ashworth, 1991, p. 26).



Table (3) presents the differences in selected basketball skills (dribbling and shooting) between the pre-test and post-test for the experimental group. The participants of the experimental group demonstrated significant differences between the two measurements.

For the dribbling skill, a paired-samples t-test revealed a calculated t-value of 6.070 at a significance level of 0.000 and a degree of freedom of 19, indicating significant differences in favor of the post-test.

For the shooting skill, the calculated t-value reached 8.806 at a significance level of 0.000 and a degree of freedom of 19, also indicating significant differences in favor of the post-test.

The results presented in Table (3) indicate clear improvements in both dribbling and shooting skills for the experimental group. The researcher attributes this development to the use of the metacognitive strategy. The stages of this strategy, including self-questioning, asking oneself questions, thinking aloud while solving skill-related problems, and activating prior knowledge by linking previously learned skills with new skills, were integrated into modern instructional methods incorporated within the educational units. These procedures enhanced students' learning and created an interactive educational environment that increased learners' motivation, made the instructional material more engaging, reduced learners' isolation, promoted cooperation and participation among students, and accommodated individual differences because the groups were heterogeneous.

In addition, the metacognitive strategy encouraged dialogue, discussion, and exchange of opinions among group members to achieve the intended objectives. These benefits were clearly reflected in the results of the pre-test and post-test measurements for the experimental group.

The researcher further argues that the use of the metacognitive strategy enhanced students' self-esteem by creating learning situations in which learners actively participated in the educational process. In other words, students became responsible for performing educational tasks and achieving learning outcomes rather than relying solely on the teacher as the primary source of information. In this strategy, the function of the teacher is mainly planning and monitoring of the students' work. Additionally, it was observed that learning was never limited to a few active students alone. On the contrary, all students were engaged in group work and paired work, switched roles, and worked together throughout.

This meaning can be taken from Basma Naeem 2010 who cites Abdullah Hassan 2005. He elaborated that placing the learner at the centre of the educational process and respecting learners' opinions and abilities is a way to facilitate learning along with accepting and encouraging learners (Naeem, 2010, p. 85).

Clearly seen in comparing the results, the experimental group who participated in metacognitive strategy performed better than the control group. The strategy gave students greater freedom to express their motor abilities through participation, competition and co-operative learning. Besides, it enables students to take responsibility for learning by communicating ideas and information with each other under the supervisor of the researcher thus achieving the educational objectives of each unit of instruction.

According to the result of the test on differences in the posttest scores for basic basketball skill dribbling and shooting between control group and experimental group. The data shows results with a big difference in experimental group.



Through independent samples t-test for the skill of dribbling, the calculated t-value was 2.862 at 0.07 level of significance at the degree of freedom of 38, the difference was significant in favor of experimental group. Regarding shooting rubric, the t-value computed is 3.797, significance level is 0.001 and blacked out 38. It explains there are differences significant in favour of experimental group.

The researcher attributes the superiority of the experimental group in the post-test to the educational units that incorporated the metacognitive strategy. The instructional program designed by the researcher had a positive impact on the participants, resulting in greater improvements in learning compared with the control group, as reflected by the statistical results and percentages obtained.

The metacognitive strategy provided students with opportunities for repetition, practice, reflection, and sufficient time to learn. Students repeatedly practiced the skills, cooperated with peers, identified errors, and corrected them collaboratively under the researcher's supervision. In addition, they performed the skills more frequently than the control group. The strategy also promoted cognitive processes related to awareness, thinking, evaluation, self-regulation, and motivation, all of which contributed to enhancing the learning process.

Conclusions

Based on the results obtained, the researcher reached the following conclusions:

1. The educational curriculum based on the metacognitive strategy had a positive effect on learning the dribbling and shooting skills in basketball among students.
2. The educational curriculum that employed the metacognitive strategy was more effective than the conventional teaching method used by the instructor in teaching the dribbling and shooting skills in basketball, as demonstrated by the results of the study.
3. The experimental group that learned according to the metacognitive strategy outperformed the control group that followed the traditional teaching method in learning the dribbling and shooting skills in basketball.

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Appendix (1)

Educational Unit for the Experimental Group: Dribbling Skill

Educational Objective: Learning the Dribbling Skill
 Educational Values: Developing Cooperation, Patience, and Leadership
 Equipment Used: Basketball Court, 10 Basketballs, Whistle, Cones, Training Goal, Stopwatch
 Duration: 90 Minutes

Educational Unit Sections	Time	Activity Description	Formation	Remarks
Preparatory Section	18 min			
Introduction	5 min	Students stand in an organized formation, attendance is recorded, and the starting signal for the educational unit is given.		Emphasis is placed on proper standing posture, which contributes to correct movement performance.
General Warm-up	5 min	Walking, jogging, jogging with alternating arm rotations, light jogging, and walking.		Emphasis is placed on maintaining group formation during movement activities such as walking and jogging.
Specific Warm-up	8 min	Various comprehensive exercises designed to serve the main section of the educational unit.		Emphasis is placed on the importance of the muscle groups involved in performing the required skill.

Educational Unit Sections	Time	Activity Description	Formation	Remarks



Main Section	63 min			
Educational Part	23 min	<p>Students stand in an open-square formation. A brief review of the previously learned skill is provided, followed by a comprehensive explanation of high dribbling. The researcher demonstrates the skill, and selected students perform a model demonstration. Errors are corrected in a simplified manner during performance.</p>	<p>Open-square formation</p> 	<p>Emphasis is placed on students' understanding of the technical aspects of the skill and maintaining attention during the instructor's explanation.</p>
Practical Part	40 min	<p>Before implementing the metacognitive strategy, the instructor directs students to warm up with basketballs by performing high dribbling among themselves. The metacognitive strategy is then applied through a competitive basketball game among students. Learners are given full freedom to perform all skills during play, while emphasis is placed on the target skill presented in the educational section. The skill is used more frequently than other skills during</p>		<p>Emphasis is placed on proper dribbling performance within each group and avoiding random execution. Competitive activities are regulated to ensure correct movement performance, adherence to game rules, reduction of errors, and equal opportunities for all students to perform the skill during the educational unit.</p>

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		competition. Adequate time is provided to increase repetitions, enhance motivation, and improve the required skill. Students are also encouraged to recognize the importance of sports competition in developing their skill performance, gaining practical experience, and achieving the intended educational objectives.	
Concluding Section	9 min		
Recreational Exercises	6 min	Light jogging followed by cool-down and relaxation exercises for the body muscles.	
Dismissal	3 min	Students stand in an organized formation, perform the farewell salute, and leave the court.	Dismissal is carried out according to the instructor's signal.