E-ISSN 2250-0944

ISSN 2250-1150
doi: 10.48047/ijprt/16.01.293

Case Report

The Impact of the Conceptual Imagery Intervention Model on Sports Knowledge and the Development of Basic Basketball Skills

Ghufran Jamal Mohammed
University of Baghdad, College of Science,Iraq
Email: gufran.j@sc.uobaghdad.edu.iq

Abstract

The purpose of this research was to determine the impact of the conceptual imagery intervention model on the development of sports knowledge and achievement of the level of performance of the selected basic basketball skills in the first-year female students. The researcher adopted experimental pre-test/post-test design and two equal groups. The study sample was 40 female students randomly divided to form an experimental group (n = 20) and a control group (n = 20). The experimental group learned under instructional units that were modeled based on the conceptual imagery intervention model, but the control group learned under the traditional teaching method. The protocols involved the pre-tests of sports knowledge and three fundamental basketball skills that comprised passing, dribbling, and layup shooting, and an eight-week educational program involving 16 instructional units, each of which took 90 minutes. Tests were then done again later on the same instruments and at similar conditions.

The intervention was used using three stages, which were integrated, namely pre-imagery performance, imagery performance, and post-imagery reflection. The researcher employed a cognitive achievement test and standardized skill tests, and the SPSS analysed data using means, standard deviations, standard errors, paired-samples t-tests, independent-samples t-tests, and chi-square tests of expert agreement. The findings indicated a statistically significant difference between pre-tests and post-tests in the two groups towards the latter. Nevertheless, it improved more in the experimental group. The comparisons of the post tests also revealed a significant superiority of experimental group over the control group in all the variables of the research. The research arrived at the conclusion that the conceptual imagery intervention model is an effective teaching strategy to build sports knowledge and enhance basic basketball skills as it incorporates cognitive processing, mental representation, guided attention, and athletic performance.

Keywords: Conceptual imagery intervention model; sports knowledge; basic skills; basketball; mental imagery

Introduction

Physical performance is no longer the sole topic of interest in physical education and the sport sciences. The modern sport pedagogy more and more views learning as a holistic process, a combination of movement, perception, attention, tactical perception, and cognitive decision making. A good illustration of this integration is basketball since the learner needs to know the intent of the skill, interpret a game

scenario, choose a proper response, and perform the movement correctly. Passing, dribbling and shooting are hence not stand-alone technical actions, they are fundamental skills that require an understanding of the rules, spatial cognition, timing and the support of stability in movement organization. The books on sport-pedagogy of today underline that the effective acquisition of skills is enhanced in case of the interrelation of technical performance with a tactical meaning, the existence of well-organized tasks, and the interrelation between cognition and movement in teaching models (Casey & Kirk, 2022; Light & Curry, 2021; Light & Harvey, 2021; Metzler & Colquitt, 2021; Mitchell et al., 2021; SueSee et al., 2020).

Verbal explanation, demonstration, and repeated physical practice are often relied upon in the traditional approach to basketball instruction. Such processes can generate improvement; however, they might not be adequate in cases where students engage in mechanistic work with no clear mental picture of the skill. Both tactical games approach, and model-based instruction emphasize the importance of the teacher creating a coherent instructional environment where the learner understands what to do, why the action is required and how the action is to be corrected during practice. In more recent motor-learning and skill-acquisition textbooks, the quality of practice, feedback, coupling between perceptions and actions, and task design are also believed to be the focus of stable learning, not repetition itself. (Button et al., 2021; Chow et al., 2022; Hodges & Williams, 2020; Metzler & Colquitt, 2021; Mitchell et al., 2021).

Mental imagery and mental practice are significant in sport psychology, motor learning in the sense that they enable learners to create internal images of movement, predict demand of a task, and prepare neuromotor system to perform. According to sport psychology books, visual, kinesthetic, cognitive, and emotional elements can be part of the imagery, whereas in motor-learning books, mental practice is viewed as a type of rehearsal that may be used to supplement physical practice, provided that the learner has clear cues and feedback (Bertollo et al., 2021; Coker, 2021; Hodges and Williams, 20 Recent books on mental skills training also introduce the aspect of imagery as a component of a more general intervention system, in which attention control, feedback, reflection, and confidence, as well as performance regulation, are also considered (Bertollo et al., 2021; Weinberg and Gould, 2024).

The conceptual imagery intervention model applied in the study is informed by a process of organizing imagery prior to performance, during performance, and after performance. The learner visualizes the proper body position and movement trajectory before the skill. In the course of practice, the learner employs brief mental hints prior to repetitions. The learner goes through trial and error after which he/she reinvents the correct image. This order corresponds to the modern coaching communication, in which the focus is on the use of accurate cueing, meaningful language, demonstration, and feedback that helps to draw the attention of the learner to the most significant aspects of movement (Beach et al., 2023; Goodway et al., 2020; Winkelman, 2020). To this end, the current study investigates the potential of structured conceptual imagery

to build sports knowledge and enhance selected basic basketball skills in first-year female students.

Research Problem

Although teaching techniques in physical education have been developed, explanation and physical practice remains the most common way of teaching basketball skills in most learning environments. This may cause students to pass, dribble and shoot in a robot-like fashion without adequate knowledge of the technical aspects of the skill or the tactical aspects of the skill.

In this study, the researcher found that a great number of female students who were in the first year of the basketball sport had very little knowledge about the sport, through teaching and field experience with first-year female students in basketball. This weakness was manifested in recurring mistakes in performances, ineffective decision making and inability to transfer insulated practice to game-like contexts. It was not just the physical problem but also cognitive and representational. Students tended to learn how to repeat a gesture in one of their drills, but they did not have a consistent mental image that they could rely on to perform in a different situation.

The research problem thus is in the fact that no explicit instructional model that integratively involves conceptual imagery with practical basketball teaching exists. The present research aims to figure out whether the conceptual imagery intervention model has a possibility to be more successful than the traditional one in the development of sports knowledge and enhancement of basic basketball skills.

Research Objectives

To develop instructional units according to conceptual imagery intervention model in the case of the experimental group.

To determine the impact of instructional units in accordance with the conceptual imagery intervention model on sports knowledge and the chosen basic basketball skills.

To contrast the conventional teaching approach with the conceptual imagery intervention model to form sports knowledge and the acquisition of basic basketball skills.

To present feasible suggestions on how conceptual imagery can be used as a form of structured instruction in basketball classes.

Research Hypotheses

The research sample has statistically significant differences in the pre-test and post-test in sports knowledge and the chosen basic skills of basketball favoring the post-tests.

The experimental and control groups have statistically significant differences in the post-tests of sports knowledge and chosen basic basketball skills in favor of the experimental group.

Scope of the Study

Human Scope (Population): The sample was first-year female students in the College of Physical Education and Sports Sciences at the University of Diyala during the 20242025 academic year. Following the exclusion criteria, the ultimate sample was composed of 40 female students in equal amounts in experimental and control groups.

Temporal Scope (Timeframe): The study was carried out in the first semester of the 20252026 academic year. The pilot study was done on October 5, 2025, the pre-tests were held on October 7, 2025, the instructional program was held between October 12 and December 2, 2025, and the post-tests on December 7, 2025.

Geographical Scope (Location): The field work was conducted in the basketball hall and court of the College of Physical Education and Sports Sciences, University of Diyala, Iraq. Institutional affiliation The University of Baghdad of the College of Science is where this author works.

Method

Design and Participants

The researcher also used the experimental approach since it was suitable to the nature of the research problem. The design of the study was two-group pre-test-post test. The study sample was first-year students of the University of Diyala College of Physical Education and Sports Sciences during the 20242025 academic year. There were 465 students. The number of female students was 96 students in two academic sections.

Section F, with 46 female students, was chosen as the control group, and 20 students were selected using a lottery. Section E (45 female students) was selected to form the experimental group, and 20 students were randomly chosen. Students that played in clubs, teams in colleges or universities, were repeaters, absentees, and students who took part in the pilot studies were eliminated to prevent any differences in knowledge and skill level. In this way, the final sample was composed of 40 female students, 20 students in each group.

Table 1. Equivalence of baseline in experimental and control groups in basic basketball skills and cognitive achievement.

Variable	Group	Mean	SD	SE	t	p	Significance
Passing	Experimental	14.9500	1.23438	.27601	1.738	.090	Not significant
Passing	Control	14.3000	1.12858	.25236	1.738	.090	Not significant
Dribbling	Experimental	8.0500	.82558	.18460	.021	.991	Not significant
Dribbling	Control	8.0500	.68633	.15347	.021	.991	Not significant
Shooting	Experimental	3.2000	.89443	.20000	.809	.423	Not significant
Shooting	Control	3.0000	.64889	.14510	.809	.423	Not significant
Cognitive achievement	Experimental	14.5000	1.10024	.24602	.729	.471	Not significant
Cognitive achievement	Control	14.2500	1.06992	.23924	.729	.471	Not significant

Note. $p < .05$ was used as the criterion for statistical significance. The pre-test results show no significant differences between the two groups, indicating equivalence before the intervention.

Research Tools

The research utilized field and teaching instruments that would fit the teaching and testing of basketball. These consisted of three Sony cameras, a data-show projector, a projection screen, one loudspeaker, one Dell computer, a legal basketball court, official basketballs, hoops and backboards, a digital stopwatch, a metric measuring tape, cones, colored vests, score-recording forms, and SPSS to process the statistics.

The instructional resources were chosen to aid guided imagery and visual representation. The units of the experimental group still images, short video clips, teacher demonstrations, board diagrams, cue words, and brief reflective questions were used. These aids are aligned with the up-to-date motor-learning, coaching, basketball, and sport-science instructions that suggest demonstration, outside stimulus, feedback, performance evaluation, and reflection by the learner as strategies to enhance movement knowledge and execution(Gillett and Burgos-Fontanez, 2020; Laver et al., 2020; Magill and Anderson, 2024; National Strength and Conditioning Association [NSCA], 2022; Winkelman, 2020).

Pilot Study

The pilot study was done at 10:00 a.m. on Sunday, October 5, 2025 in the College of Physical Education and Sports Sciences, University of Diyala. It entailed 10 extraneous female students. The aim was to determine the appropriateness of the cognitive test and the chosen skill tests to the level of the students, to determine the

preparation of the basketball hall and the equipment, to test the comprehensibility of the instructions on the tests, to train the assistant team, to estimate the time required in each of the procedures, and to norm the conditions of measurement.

The pilot study also assisted in confirming the viability of implementing the conceptual imagery stages in instructional unit. The researcher verified the reaction of the students to pre-imagery, imagery during performance and imagery after performance. The outcomes of this training were employed to enhance the structure of the main experiment.

Main Experiment

The pre-tests were done on Tuesday, 7 October 2025, at 9:00 am, having done the requirements of the study. The experimental program was started on Sunday, October 12, 2025, and lasted until Tuesday, December 2, 2025. The program was 16 units (eight weeks) with two units per week and 90 minutes each unit. All fundamental skills that were being studied, passing, dribbling and shooting were handled systematically as part of the program.

The experimental group received their learning based on conceptual imagery intervention model, as opposed to the traditional approach that is used in teaching basketball. The post-tests were administered on Sunday, December 7, 2025, with the same procedures, tools, place, and the time conditions as the pre-tests as possible.

Conceptual Imagery Intervention Model

The model of the conceptual imagery intervention was implemented within the instructional units in three connected stages. The pre-imagery was employed first in the initial phase of the main part of the lesson. The teacher then discussed the purpose of the unit, e.g., to make the chest pass more accurate, or the coordination of the layup shot. A visual model was then presented to the students in the form of picture, short video, diagram or through an accurate verbal description. They were required to shut their eyes about 20 to 30 seconds and visualize the position of the body, ball trajectory, location of the teammate or basket, and the time of the action.

Second, performance was accompanied with imagery in the context of practical practice. Each student went through a brief imagery rehearsal of about 5 to 10 seconds before proceeding to a series of three to five attempts which they performed consecutively. There were short cue words, which included imagine the path, imagine the take-off point, or imagine the ball moving smoothly towards the target. This was the stage that was aimed at linking the mental image to the motor action.

Third, on attempts of performance, post-imagery reflection was performed. The students were requested to re-imagine the last time the attempt was successful or an unsuccessful attempt and to determine the difference between the correct and incorrect feeling. Short questions were employed: What flashed in your mind before performance? What mistake did you make as you visualized the unsuccessful attempt? What can be done to rectify the picture prior to the second attempt? The purpose of this reflective step was to stabilize the correct performance in motor memory and to correct the mental image of incorrect performance.

This cycle (pre-imagery, performance with imagery, and post-imagery reflection) was repeated throughout the program in every

unit. Imagery time was greater and teacher guidance more detailed in the early units. The imagery shortened and became more independent as the students advanced. This organization is a reflection of the principle of motor-learning that the best practice is described by providing meaningful information prior to the action, attentional activity during action, and post-action reflection (Magill and Anderson, 2024; Weinberg and Gould, 2024).

Testing Conditions

.

The sports knowledge test was a test of 30 multiple-choice questions. There were four options in each item, one point was given when an item was answered correctly and not given when the item was answered incorrectly. The overall score was 30. The materials included the fundamental skills of passing, dribbling and shooting in basketball and applicable rules and strategies. The test was also checked by 12 specialists of teaching methods, motor learning, testing and measurement. Chi-square was used to analyze expert agreement to establish item validity

Table 2. Expert consensus and computed chi-square scores of the cognitive achievement test items.

Item	Suitable	Not suitable	Agreement (%)	Chi-square	Significance
1	11	1	91.66%	8.32	Significant
2	12	0	100%	12	Significant
3	10	2	83.33%	5.32	Significant
4	12	0	100%	12	Significant
5	10	2	83.33%	5.32	Significant
6	12	0	100%	12	Significant
7	11	1	91.66%	8.32	Significant
8	12	0	100%	12	Significant
9	11	1	91.66%	8.32	Significant
10	10	2	83.33%	5.32	Significant
11	12	0	100%	12	Significant
12	11	1	91.66%	8.32	Significant
13	12	0	100%	12	Significant
14	11	1	91.66%	8.32	Significant
15	12	0	100%	12	Significant
16	11	1	91.66%	8.32	Significant
17	10	2	83.33%	5.32	Significant
18	12	0	100%	12	Significant
19	11	1	91.66%	8.32	Significant
20	10	2	83.33%	5.32	Significant
21	11	1	91.66%	8.32	Significant
22	12	0	100%	12	Significant
23	10	2	83.33%	5.32	Significant
24	12	0	100%	12	Significant
25	10	2	83.33%	5.32	Significant
26	12	0	100%	12	Significant
27	11	1	91.66%	8.32	Significant
28	12	0	100%	12	Significant
29	11	1	91.66%	8.32	Significant
30	10	2	83.33%	5.32	Significant

Note. After reviewing by experts, all items were accepted due to the calculated chi-square values and the percentage of agreement indicating the appropriateness of the items.

The accuracy of the two hand chest pass was measured using the chest-pass accuracy test. The student was positioned at a distance of 2.75 m in front of a smooth wall that was marked with three concentric circles. The radius of the central circle was 45 cm, middle circle was 89 cm, and the outer circle was 150 cm. The bottom of the outer circle was 90 cm above the ground. The pupil did 10 passes. There were three points given to hitting the central circle, two to the middle circle, one to the outer circle and zero in case no circle was hit. Passing accuracy was represented by the total score.

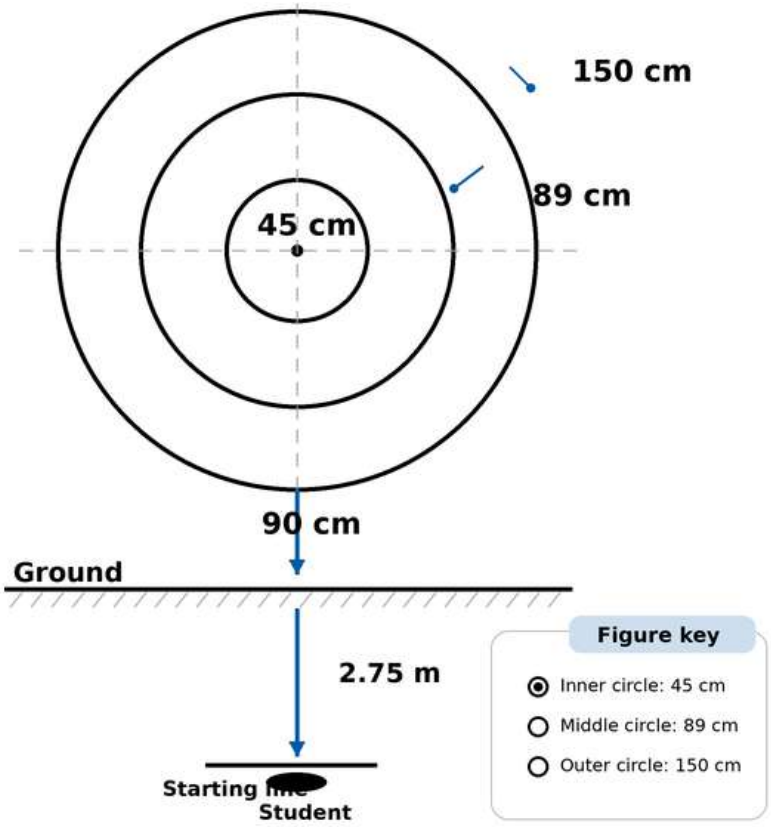

Figure 1. Chest-pass accuracy test used in the study.

Dribbling performance around obstacles was measured by the use of zigzag dribbling test. Four cones or chairs were put in a straight line with 2.5 m in between them. The first cone was 1.80 m in distance to the starting line. When the signal was given, the student dribbled the basketball in a zigzag line between the obstacles and returned to the starting line and repeated until the 30-second stop signal. A point was assigned to every obstacle in the test period that was passed successfully

.

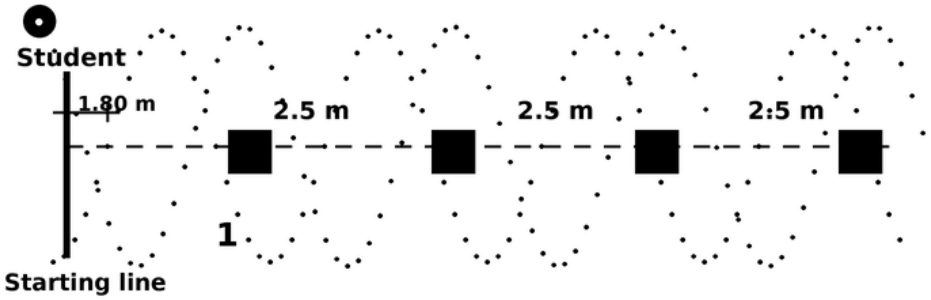

Figure 2. Zigzag dribbling test for high dribbling performance.

The ability of the student to shoot the layup was measured by the layup shooting test. The student began at the marked starting point, and on the signal of the referee, took the ball in his hand, made the necessary approach, dribbled and layup,

and shot at the basket. Each student did five attempts on the appropriate side. Correct successful shots were awarded two points and a ball that touched the rim or backboard, but never got into the basket, was awarded one point.

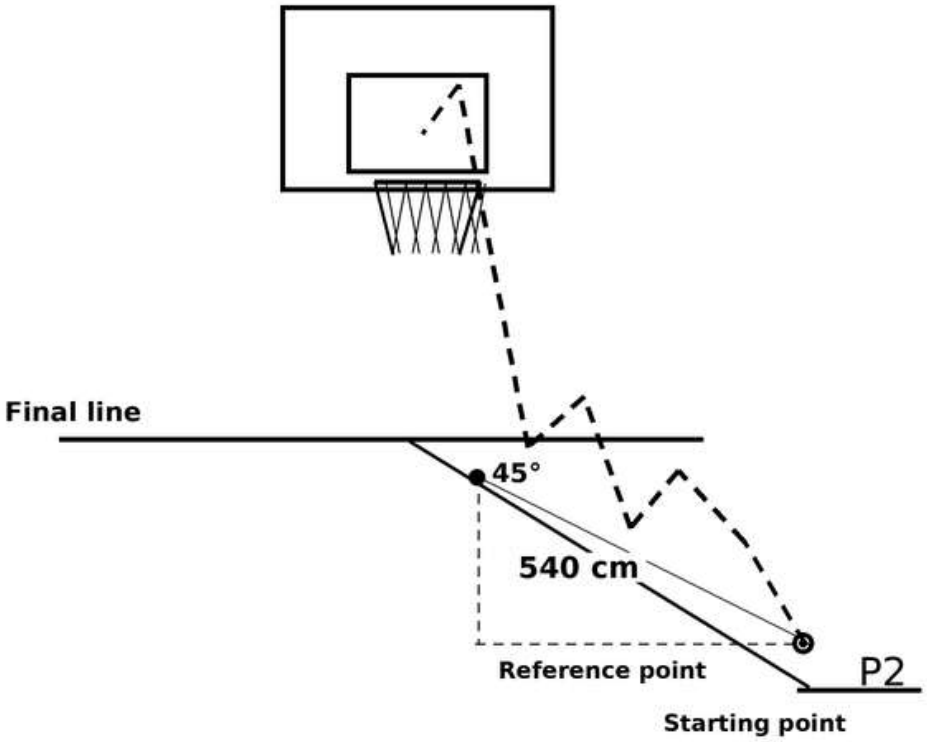

Figure 3. Layup shooting test used in the study.

Measured Variables

Dependent variables included passing accuracy, dribbling performance, layup shooting performance, and sports knowledge/cognitive achievement. These variables were chosen as they reflect simple learning outcomes of basketball in psychomotor and cognitive domains. The teaching method and the conceptual imagery intervention model were the instructional variables of the control group and the experimental group respectively.

The application of the cognitive and skill measures aligns with current measurement and assessment principles of human performance that highlights the significance of applying valid, reliable and task-relevant measures to assess learning outcomes. The use of objective, repeatable and context-related measures in the context of learning and sport performance is also supported by performance-analysis and sport-statistics books (Hughes et al., 2020; Morrow et al., 2023; Severini, 2020; Weir and Vincent, 2021).

Statistical Analysis

The data was processed with the help of the Statistical Package of the Social Sciences (SPSS). The research variables were computed in terms of means, standard deviations, and standard errors. To test baseline equivalence of the two independent groups (experimental and control) and to contrast the two groups during the post-tests, independent-samples t-tests were employed. The results of the pre-test and post-test between each group were compared using paired-samples t-tests. The expert agreement on cognitive achievement test items was analysed with chi-square. The statistical significance was determined to be $p < .05$. The procedures

are suitable in experimental design of research on physical activity and sport when the aim is to compare the results of the pre-test and post-test performance of two groups (Creswell and Creswell, 2023; Field, 2024; Gravetter et al., 2021; Nelson et al., 2025; Thomas et al., 2023).

Results

It is indicated in Table 1 that no statistically significant differences were found between the experimental and control group during the pre-tests in passing, dribbling, shooting, and cognitive achievement. This implies that the two groups were equal prior to the intervention in the form of instruction.

As indicated in Table 2, items of the cognitive achievement test all had acceptable expert agreement. The percentages of agreements varied between 83.33% and 100% and the chi-square results obtained were used to justify that the items could be used to measure the desired cognitive variable.

Table 3. Descriptive statistics (experimental-group pre-test and post-test).

Variable	Unit	Test	Mean	SD	SE
Passing	Score	Pre-test	14.9500	1.23438	.27601
Passing	Score	Post-test	21.8000	2.09259	.46792
Dribbling	Score	Pre-test	8.0500	.82558	.18460
Dribbling	Score	Post-test	13.0000	1.12390	.25131
Shooting	Score	Pre-test	3.2000	.89443	.20000
Shooting	Score	Post-test	7.3500	.67082	.15000
Cognitive achievement	Score	Pre-test	14.5000	1.10024	.24602
Cognitive achievement	Score	Post-test	21.9000	1.68273	.37627

Note. The experimental group showed clear post-test improvement in all variables.

Table 4. Results of paired-samples t-tests of the experimental group.

Variable	Mean difference	SD diff.	SE diff.	t	p	Significance
Passing	-6.85000	1.84320	.41215	16.620	.000	Significant
Dribbling	-4.95000	1.05006	.23480	21.082	.000	Significant
Shooting	-4.15000	.98809	.22094	18.783	.000	Significant
Cognitive achievement	-7.40000	1.60263	.35836	20.650	.000	Significant

Note. All differences were statistically significant at $p < .05$ and favored the post-test.

Tables 3 and 4 show that, in passing, dribbling, shooting, and cognitive achievement, the experimental group made a significant change between the pre-test and the post-test. The t-values were high and all the p-values were.000, which means that there was significant improvement after the conceptual imagery intervention model.

Table 5. Control-group descriptive statistics of pre-test and post-test results.

Variable	Unit	Test	Mean	SD	SE
Passing	Score	Pre-test	14.3000	1.12858	.25236
Passing	Score	Post-test	17.3000	1.03110	.23056
Dribbling	Score	Pre-test	8.0500	.68633	.15347
Dribbling	Score	Post-test	10.0000	.79472	.17770
Shooting	Score	Pre-test	3.0000	.64889	.14510
Shooting	Score	Post-test	5.2000	.61559	.13765
Cognitive achievement	Score	Pre-test	14.2500	1.06992	.23924
Cognitive achievement	Score	Post-test	17.6500	.98809	.22094

Note. The control group also improved from pre-test to post-test, but the amount of improvement was smaller than that of the experimental group.

Table 6. The results of paired-samples t-test in the control group.

Variable	Mean difference	SD diff.	SE diff.	t	p	Significance
Passing	-3.00000	.91766	.20520	14.620	.000	Significant

Variable	Mean difference	SD diff.	SE diff.	t	p	Significance
Dribbling	-1.95000	.51042	.11413	17.085	.000	Significant
Shooting	-2.20000	.61559	.13765	15.983	.000	Significant
Cognitive achievement	-3.40000	.94032	.21026	16.170	.000	Significant

Note. All differences were statistically significant at $p < .05$ and favored the post-test.

Table 5 and table 6 indicate that the control group also statistically significantly improved in the post-test. The regular practice, teacher explanation, and repetition in the traditional instruction method can be credited with this improvement. The degree of improvement was however less compared to that of the experimental group.

Table 7. Comparison of the experimental and control groups at the end of the test.

Variable	Group	Mean	SD	SE	t	p	Significance
Passing	Experimental	21.8000	2.09259	.46792	8.627	.000	Significant
Passing	Control	17.3000	1.03110	.23056	8.627	.000	Significant
Dribbling	Experimental	13.0000	1.12390	.25131	9.747	.000	Significant
Dribbling	Control	10.0000	.79472	.17770	9.747	.000	Significant
Shooting	Experimental	7.3500	.67082	.15000	10.561	.000	Significant
Shooting	Control	5.2000	.61559	.13765	10.561	.000	Significant
Cognitive achievement	Experimental	21.9000	1.68273	.37627	9.740	.000	Significant
Cognitive achievement	Control	17.6500	.98809	.22094	9.740	.000	Significant

Note. The experimental group outperformed the control group in all post-test variables at $p < .05$.

Table 7 shows the comparison of the experimental and control groups after the test. The findings revealed that there was a great deal of superiority of the experimental group in passing, dribbling, shooting, and cognitive achievement. This validates that the conceptual imagery intervention model significantly impacted skill and cognitive learning outcomes as compared to the traditional method.

Discussion

The findings suggest that the experimental group had a higher improvement in all the selected basketball skills as compared to the control group and in cognitive achievement. This enhancement could be ascribed to the systematicness of the conceptual imagery intervention model. Practice was not considered as simple repetition in the model. Instead it demanded every student to create a mental image of the skill, associate the image with performance and cogitate on the quality of the movement performed. This type of sequence promotes the hypothesis that motor learning is reinforced when the learners put together the attention, memory, feedback, repeated action, and meaningful practice conditions (Button et al., 2021; Coker, 2021; Magill and Anderson, 2024).

The fact that the experimental group achieved higher in terms of cognitive achievement indicates that the imagery assisted the students to comprehend the meaning of the skill, but not its appearance. In pre-imagery, the students were able to determine the relevant positions, the path of the ball, rhythm, and target. When performing, they relied on brief cues to action. They made comparisons between successful and unsuccessful attempts during post-imagery. This process must have assisted them in organizing knowledge on rules, technique and tactical application of skills. Both model-based instruction and tactical sport teaching focus on the fact that significant learning happens when performance is tied to understanding and when the teacher approaches the learning environment with clear goals and feedback (Casey and Kirk, 2022; Light and Curry,

2021; Metzler and Colquitt, 2021; Mitchell et al., 2021).

Guided attention and coaching language are also important as evidenced in the improvement of passing, dribbling, and shooting. When the learner is instructed to visualize a particular target, ball path, take-off point or position of the body, the cue turns out to be an interface between cognition and movement. Good coaching language will help to lessen confusion and focus the learner on information of the most important movements. This coincides with the modern coaching, pedagogy, and motor-development literature that highlights cueing, feedback, demonstration, and communication as the important factors that affect movement learning (Beach et al., 2023; Goodway et al., 2020; Light and Harvey, 2021; SueSee et al., 2020; Winkelman, 2020).

The control group also gained considerably, which is not surprising since any structured teaching program can bring about learning provided students drill regularly. Yet, the conventional approach seemed to be less efficient due to the increased use of explanation and repetition. It failed to give the same cycle of systematic mental-representation. The intergroup difference thus justifies the importance of mental practice coupled with physical practice. Imagery is one of the strategies of performance-enhancement, reported by sport psychology and mental-skills books as the ability to boost confidence, attention, emotional preparedness, and movement preparation when applied in a planned and repeated manner (Bertollo et al., 2021; Tenenbaum and Eklund, 2020; Weinberg and Gould, 2024).

The results also confirm the applicability of imagery to basketball. The playing of basketball involves a series of perceptual and action switching. To pass, one needs to be aware of the position of the teammate, to dribble, one needs to control the ball and scan the environment, and to shoot needs to be coordinated, balanced and targets. Basketball-specific training, sport-science and sport-medicine books have underlined that high performance relies on the transfer of physical, technical and perceptual abilities to the court and this explains why teaching methods that involve movement of the body along with decision-making and deliberate control are necessary (Cartwright & Peer, 2025; Gillett & Burgos-Fontanez, 2020; Laver et al., 2020; NSCA, 2022).

Conclusions

The conceptual imagery intervention model brought about great enhancement of the fundamental basketball skills of passing, dribbling and layup shooting among first year female students.

Another important result of the model was that it generated a great deal of change in sports knowledge/cognitive achievement in terms of basketball performance situations, rules and skills.

The experimental and the control group improved on the pre-tests and post-tests, but the experimental group had a higher improvement in all the variables.

The superiority of the experimental group in the post-test implies that conceptual imagery makes a good connection between cognitive knowledge and motor skills.

The combination of pre-imagery, imagery during performance and post-imagery reflection assisted students to rectify mental representations, stabilize correct movement patterns, and carry out skills more accurately.

Recommendations

The researcher suggests the use of the conceptual imagery intervention model in basketball instruction in college physical education and sport sciences particularly when instructing the fundamental skills to novice learners.

The use of guided mental imagery, cue words, visual models and reflective questioning should become a common aspect of the instructional unit to be trained to teachers.

Knowledge, imagery, and practice of performance should be integrated in basketball units in such a way that students can know the technical and tactical meaning of each skill.

In the conceptual imagery intervention model, further experiments ought to be done on other sports, age, and levels of skills to ascertain the general applicability of the conceptual model.

The model employed in this research could be used as a practical model in designing instructional guidelines that would combine mental imagery and physical practice in team sports.

References

Beach, P. S., Perreault, M., Brian, A., & Collier, D. H. (2023). *Motor learning and development* (3rd ed.). Human Kinetics.

Bertollo, M., Filho, E., & Terry, P. C. (Eds.). (2021). *Advancements in mental skills training*. Routledge.

Button, C., Seifert, L., Chow, J. Y., Araujo, D., & Davids, K. (2021). *Dynamics of skill acquisition: An ecological dynamics approach* (2nd ed.). Human Kinetics.

Cartwright, L. A., & Peer, K. S. (2025). *Fundamentals of athletic training and sports medicine* (5th ed.). Human Kinetics.

Casey, A., & Kirk, D. (2022). *Models-based practice in physical education*. Routledge.

Chow, J. Y., Davids, K., Button, C., & Renshaw, I. (2022). *Nonlinear pedagogy in skill acquisition: An introduction* (2nd ed.). Routledge.

Coker, C. A. (2021). *Motor learning and control for practitioners* (5th ed.). Routledge.

Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). SAGE.

Field, A. (2024). *Discovering statistics using IBM SPSS statistics* (6th ed.). SAGE.

Gillett, J., & Burgos-Fontanez, W., Jr. (Eds.). (2020). *Strength training for basketball*. Human Kinetics.

Goodway, J. D., Ozmun, J. C., & Gallahue, D. L. (2020). *Understanding motor development: Infants, children, adolescents, adults* (8th ed.). Jones & Bartlett Learning.

Gravetter, F. J., Wallnau, L. B., Forzano, L.-A. B., & Witnauer, J. E. (2021). *Essentials of statistics for the behavioral sciences* (10th ed.). Cengage.

Hodges, N. J., & Williams, A. M. (Eds.). (2020). *Skill acquisition in sport: Research, theory and practice* (3rd ed.). Routledge.

Hughes, M., Franks, I. M., & Dancs, H. (Eds.). (2020). *Essentials of performance analysis in sport* (3rd ed.). Routledge.

Laver, L., Kocaoglu, B., Cole, B. J., Arundale, A. J. H., Bytomski, J. R., & Amendola, A. (Eds.). (2020). *Basketball sports medicine and science*. Springer.

Light, R., & Curry, C. (Eds.). (2021). *Game sense for teaching and coaching: International perspectives*. Routledge.

Light, R., & Harvey, S. (Eds.). (2021). *Applied positive pedagogy in sport coaching: International cases*. Routledge.

Magill, R. A., & Anderson, D. I. (2024). *Motor learning and control: Concepts and applications* (2024 release). McGraw Hill.

Metzler, M. W., & Colquitt, G. T. (2021). *Instructional models for physical education* (4th ed.). Routledge.

Mitchell, S. A., Oslin, J. L., & Griffin, L. L. (2021). *Teaching sport concepts and skills: A tactical games approach* (4th ed.). Human Kinetics.

Morrow, J. R., Jr., Mood, D. P., Zhu, W., & Kang, M. (2023). *Measurement and evaluation in human performance* (6th ed.). Human Kinetics.

National Strength and Conditioning Association. (2022). *NSCA's essentials of sport science* (D. French & L. Torres Ronda, Eds.). Human Kinetics.

Nelson, L., Groom, R., & Potrac, P. (Eds.). (2025). *Research methods in sports coaching* (2nd ed.). Routledge.

Severini, T. A. (2020). *Analytic methods in sports: Using mathematics and statistics to understand data from baseball, football, basketball, and other sports* (2nd ed.). Chapman & Hall/CRC.

SueSee, B., Hewitt, M., & Pill, S. (Eds.). (2020). *The spectrum of teaching styles in physical education*. Routledge.

Tenenbaum, G., & Eklund, R. C. (Eds.). (2020). *Handbook of sport psychology* (4th ed., Vols. 1-2). Wiley.

Thomas, J. R., Martin, P., Etnier, J. L., & Silverman, S. J. (2023). *Research methods in physical activity* (8th ed.). Human Kinetics.

Weinberg, R. S., & Gould, D. (2024). *Foundations of sport and exercise psychology* (8th ed.). Human Kinetics.

Weir, J. P., & Vincent, W. J. (2021). *Statistics in kinesiology* (5th ed.). Human Kinetics.

Winkelman, N. (2020). *The language of coaching: The art and science of teaching movement*. Human Kinetics.