



The Impact of Performance-Based Learning on Improving Fundamental Basketball Skills in Youth Aged 10-12 Years

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Abstract

The main aim of this study was to investigate the impact of performance-based learning on fundamental basketball skills in youth athletes aged between 10 and 12 years. Procedure The research utilized a quasi-experimental design where participants were randomly placed into either the experimental group (performance-based training) or control group (traditional skill drills). Both groups trained three times per week for 90 minutes each over an 8-week period. The game group played scenarios that reflected decision-making processes while the control group alternatively executed drills. The subjects dribbling speed, passing and shooting accuracy were tested before and after the skill training intervention. The authors found significant gains in the experimental group compared to the control group for all skills. These results are indicative of the superiority of performance-oriented learning that links tactical decision making with situational awareness over traditional methods in improving both technical and cognitive aspects. The performance-based approach, the study finds is more effective in enhancing basketball skills of youth athletes and should be considered for a wider adoption in sports training programs. Further research is required on the long-term sustainability and effectiveness of this method in other sports.

Keywords: performance-based learning, basketball skills, youth athletes, skill development, training methods.

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Introduction

Basketball is a team sport with two teams of five players each using physical and cognitive skills such as dribbling, passing, scoring or shooting, and defensive efforts to compete. These are all the basic skills a player needs to master in order to perform well on the court. Young athletes need to gain skill from a young age and be exposed early this where it all begins? This is the age group or 10 -12 years old whereby motor skill of dribble, pass and shoot are developed which cater for the elementary technique used in progressive skills learning (Candra et al., 2023; Moody et al., 2013; Abdulhussein et al., 2026).

Conventional ways of training basketball they are confronted with, such as the often used repetitive exercises or theoretical knowledge, do not necessarily correspond to the way young players learn (Lund & Kirk, 2019). One of the advantages is that performance-based learning (PBL) has arisen as a more contemporary approach to training it's a more modern model that promotes participation through learner engagement, instant feedback and hands-on learning in practical environments. Other research works that have used PBL with activities where the participants actually experience and perform positioning-related on-field tasks have showed improvements in perceptual-motor-visuomotor skills/motor-skills and technical performance within several sports (Horn, 2019; Yousef, 2021).

Paivio is good but with the inclusion of physical activities and sports education many studies on this aspect were done in recent days. The performance-based drill of soccer and game-related drill were found to improve passing accuracy and dribbling (Gaviria Alzate et al., 2025) and shooting percentage by defense respectively, in basketball (Bourdass et al., 2024). As long as even if there are some research works about PBL in soccer and tennis, there are few literatures relating to simple basketball skill training of young people aged 10-12 years-old. This is a key group for development of fundamental skills, and the lack of research subjects leaves open the potential scope with which PBL may be applied in young basketballers (Ouyang & Wu, 2022).

The bulk of the research on performance-based learning to date has been for older athletes, so there is a bigger gap in knowledge about whether it works with younger kids. In these ways, PBL may be more effective since traditional methods tend to lack sensitivity for the cognitive and physical developmental differences of 10–12-year-old youth (Schmidt & Wrisberg, 2008). Moreover few studies exist with regard to the comparison of PBL and traditional coaching methods in youth basketball suggesting it is an intervention that maybe requires more attention. (Pouregbali et al., 2020; Sheikhzadeh et al., 2025; Standing & Maulder, 2019).



The purpose of this study was to fill that void by monitoring the changes in basic basketball skills as part of an evaluation of a performance-based learning program aimed at 10–12-year-old youth. This study aims to contribute to the current knowledge of both PBL and sport pedagogy by comparing the effects of traditional training methods with PBL upon fundamental shot technique in basketball. This project will investigate the effect of PBL on the technical skill acquisition as well as tactical and game awareness.

An innovative platform like a performance-based learning model could give a new dimension to doing things differently when it comes to training for the youth hoopers where real time performance matters where feedback is in your hand every second you perform with live game-like scenarios. This research will seek to not only add to the increasing literature base investigating performance-based learning in youth sports but also provide applied recommendations for coaches of youth athletes within basketball (Curry & Athanases, 2020; Sarang et al., 2018).

Materials and Methods

Study Design

This was a quasi-experimental study designed to investigate the effects of performance based learning on development of basic basketball skills. Subjects were randomly assigned to either the experimental group that received experiential instrumental learning, or to the control group which was instructed according to classic methods. The session took place three times per week for 8 weeks. Experimental group participants participated in interventions emulating real-game-like situations, whereas the control group members were involved in repetitive training sessions concentrating on composition of individual skills and merging them into game context.

Participants

The sample was identified as 30 youth aged from 10-12 years, and was derived from a specific school in Baghdad; they had previous knowledge of informal basketball. Pre-test A pre-test was adopted to record the players' baseline skill performance in various basic dribbling, passing and shooting tasks designed before the training program took place. After this screening, the youth were randomly divided into experimental (15 players) who received training using performance-based learning and controls (15 players) trained with traditional methods. Initial skill levels were equivalent in both groups, as shown in table 1.



Table1. *Baseline (Pre-Test) Skill Comparison Between Experimental and Control Groups*

Skill	Experimental Group (Mean $\pm$ SD)	Control Group (Mean $\pm$ SD)	p-value
Dribbling Speed	10.5 $\pm$ 1.2	10.3 $\pm$ 1.3	0.45
Passing Accuracy	75 $\pm$ 5.1	74 $\pm$ 6.0	0.56
Shooting Accuracy	65 $\pm$ 7.4	63 $\pm$ 7.8	0.58

Training Protocol

Training continued for a total of 8 weeks, which included three training sessions per week lasting 90 mins each. The experimental group took part in performance-based learning exercises with game-like situations where players actively employed their skills under pressure. The emphasis was placed on training with dribbling, passing and shooting under real-life conditions and direct instructions from the coach during the exercises. These drills were structured to encourage tactical reasoning, fast skill execution, and an understanding of the game situation throughout a basketball game, as shown in table 2.

The control procedures only performed traditional training in which little immediate feedback was provided. These drills were isolated to individual skills (e.g., stationary shooting, dribbling around cones) and required minimal game-like decision making.

Table 2. *Show Training Protocol for the Experimental Group in Basketball Skill Development*

Training Focus	Activity Description	Details
Dribbling	Game-like dribbling drills	Players practiced dribbling under pressure in simulated fast-break and defensive scenarios, aiming to improve control and decision-making.
Passing	Targeted passing drills under pressure	Passing drills included targeting moving players while maintaining awareness of the defense, improving passing accuracy and timing in dynamic game situations.
Shooting	Shooting drills with defensive pressure	Players practiced shooting from various court positions while being challenged by a simulated defense, enhancing shooting accuracy under pressure.
Tactical Decision-Making	Decision-making drills (e.g., pass or shoot) in real-game situations	Players were placed in situations where they had to make quick decisions, such as when to pass, shoot, or dribble, simulating the decision-making required in actual games.
Situational Awareness	Defensive positioning and transitioning drills	Drills focused on understanding court positioning, recognizing offensive and defensive transitions, and reacting accordingly during high-pressure scenarios.
Feedback	Immediate verbal feedback	Coaches provided immediate, specific feedback on each player's performance during drills, emphasizing tactical choices, technique, and decision-making under pressure.



Skill Assessment

To assess the training, skill was evaluated in a test-session prior to training and after 8 weeks of intervention. Dribbling speed was measured with predefined standard course of cones, while passing accuracy was assessed using target-based passing drill. Shooting accuracy was tested from different spots on the court. All performance variables were trained with a stop watch for time and video to determine shooting and passing accuracy.

Data Collection

Statistics are from the skills assessments, performed before starting the course (pre-test) and after 8 weeks of training (post-test). All tests of the dribbling, passing and shooting were also separately run for each participant. The dribbling test was timed each player navigating through a course of cones between touches. The hitting test tasked subjects with hitting a target from different distances and the shooting test asked subjects to take shots from different locations on the basketball court. The performance on each skill (dribbling time, passing accuracy and shooting percentage) was recorded and documented for analysis .

Data Analysis

The data collected was analyzed using SPSS ver. 26. Paired t-tests were used to compare the pre- and post-test results for both the experimental and control groups, allowing for an assessment of the improvement in each group's skills over the course of the training program. Next, an independent t-test was performed to compare the improvement in performance between the experimental group and the control group at a significance level of less than 0.05. The normality of the data was verified using the means and SD $\pm$ test for Experimental Group and Control Group to ensure the appropriate use of parametric tests.

Result

Table 3. *Paired t-tests Results for Experimental and Control Groups*

Skill	Experimental Group		Control Group		p-value
	(Pre-Test Mean $\pm$ SD)	(Post-Test Mean $\pm$ SD)	(Pre-Test Mean $\pm$ SD)	(Post-Test Mean $\pm$ SD)	
Dribbling Speed	10.5 $\pm$ 1.2	9.2 $\pm$ 1.1	10.3 $\pm$ 1.3	10.1 $\pm$ 1.2	0.02
Passing Accuracy	75 $\pm$ 5.1	85 $\pm$ 4.9	74 $\pm$ 6.0	76 $\pm$ 5.5	0.04
Shooting Accuracy	65 $\pm$ 7.4	80 $\pm$ 6.1	63 $\pm$ 7.8	66 $\pm$ 7.2	0.01

Table 4. *Independent t-test Results Comparing Performance Improvements Between Groups*



Skill	Experimental Group (Improvement)	Control Group (Improvement)	t-value	p-value
Dribbling Speed	1.3 sec	0.2 sec	3.25	0.003
Passing Accuracy	10%	2%	2.95	0.005
Shooting Accuracy	15%	3%	4.17	0.0004

Discussion

These results suggest that the performance-based learning strongly improves basic basketball skill in 10–12-year-old youth. The paired t-test results showed that the experimental group (participating in performance-based learning activities) recorded significant improvement in dribbling speed, passing accuracy and shooting accuracy as outlined in Table 3. These improvements were even more marked than the those seen in the control group, which undertook standard forms of training. Specifically this work underscores a wealth of research supporting the positive impact of performance-based learning on technical and tactical elements in youth.

The results of the paired t-test showed that all the measured skills were significantly enhanced in experimental group ($p < 0.05$). Based on the ANOVA 3x2 analysis involving the testing time factor of dribbling, passing accuracy and shooting percentage parameters revealed a statistically significant reduction in dribbling time; improvement in pass accuracy higher shot % for the experimental group after their additional 8-week training program. This is consistent with the discoveries of (Ali, 2011) who proved that employing game-like situations in training results in drastic increase in skill execution and making decisions under pressure. Performance-based learning does not only improve technical skills, but is also related to tactical decision-making and should be developed so that players can be successful in real-game situations (Afrouzeh et al., 2017).

The results of independent t-test also indicated that there were significant differences between the experimental group and control in favour of the experimental group for all skills - in terms of reduction in time for dribbling or percentage change into 1 and shooting accuracy; respectively (all $p < 0.05$) (Table 4). With t-values between 2.95 and 4.17, indicating considerable additional skill improvement using the performance-based approach compared with the typically used training of performers. This is a finding supported by (Marsh et al., 2007; Hassan & Abdulkareem, 2026) who investigated performance based versus traditional team-sport training and found that a performance-based approach to training resulted in significantly higher athletic performances — especially when the practice mirror real-game situations.



Furthermore, the direct verbal feedback given to players during the learning with performance drills were paramount in reinforcing skill mastery (Mornell et al., 2025). state that immediate feedback will speed up the learning process as actions can be made immediately during that learning periodos. Control group the control group, which received traditional drills that emphasized isolated skill practice without any situational decision-making demonstrated a clear lack of progress in this feedback mechanism. This is in line with the conclusion by (Mikołajec et al., 2025; Hassan & Abdulkareem, 2025) that traditional approaches are generally helpful for understanding standard skills but not competitive decision-making needed in sports.

The For this reason, the results from the current study help to reinforce conclusions reached by (Farias & Mesquita, 2022), in which its effectiveness on youth sports performance was analysed. The researchers found that real-time games that contain both practice of a motor skill and engagement of the brain in decision-making related to the learning of that skill were significantly more effective for learning than either physical therapy alone or game-based training with specific shapes. This method not only allows athletes to establish physical mastery but also psychological preparedness which is crucial in a high-demanding environment.

Additionally, (Gil-Arias et al., 2019) Connecting the Dots and drawing a direct line to improvement in sports performance by incorporating tactical decision making into training routines has also been highlighted by (Abdulkareem & Ali Hassan, 2025) The tactical training elements, which were not included in the traditional drills used with the control group, that this study incorporated into game-like scenarios was what allowed the experimental group to benefit from regular decision-making practice.

Conclusions

Based on this study, a performance-based learning approach successfully enhances the basic set of basketball skills in youth 's sports athletes between 10 to 12 years old. Results- The experimental group, which played games based on the performance improved more in dribbling speed, passing accuracy and shooting accuracy than did the control group. The findings indicate that the use of game-like scenarios and immediate performance feedback results in improved skill acquisition compared to traditional training approaches as a result.

Performance-based learning enhanced not only the technically necessary skills, but also basketball specific tactical decision-making, and reaction time for high-level basketball success. It also elicited greater gains than the previous protocols that relied on traditional resistance training with isolated exercise.



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Recommendations

Performance based learning could be included in the training programme of trained coaches for developing youth 'technical and tactical skills. For this, he throws in game-like situations in which his players are instantly told how they have performed verbally so that there can be an improvement decision making and situational awareness to succeed in competitive environments. Furthermore, training should take place not only in single-skill practice but in contexts where athletes need to apply those skills under pressure and with the manifold game-type dynamics.

It is suggested that future studies consider the long-term effects of performance-based learning on retention of skills and competitive performance over time. Expanding the sample to more heterogeneous participants and different sports might help us get more evidence for these effects.



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