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Effect of ICT enabled and traditional training for selected skill performances of novice school basketball players

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Abstract
To achieve the purpose of the study, forty-five school boys aged between 14 and 18 years were selected from schools in Tiruchirappalli district, Tamil Nadu. The selected subjects were randomly assigned into three groups of fifteen each, group I - ICT enabled training group (ICTEG), group II - traditional training group (TTG) and group III - control group (CG). The experimental groups underwent a six-week training program of three alternate days per week, sixty minutes per session. The ICTEG received computer-based video analysis and feedback-based basketball skill training, while the TTG performed conventional drills such as dribbling and shooting. The control group did not receive any specific training apart from their regular physical activities. Skill performances were assessed using standardized Johnson Basketball Tests for dribbling (in seconds) and shooting (in counts). The pre and post test data were statistically analyzed using dependent t-tests and ANCOVA at the 0.05 level of significance. The results revealed that both ICT enabled and traditional training groups significantly improved dribbling and shooting performance. When compare with the experimental groups the ICT enabled training group showing greater enhancement than the traditional training group.

Keywords: ICT Enabled training, traditional training, basketball skills, dribbling, shooting, performance

Introduction
The integration of Information and Communication Technology (ICT) into physical education and sports coaching has transformed traditional training methods by introducing digital tools that enhance learning efficiency, accuracy, and motivation among athletes. ICT-based training enables players to receive immediate visual feedback, analyze performance errors, and engage in self-directed correction, leading to faster skill acquisition and improved motor learning outcomes (Subramanian & Raj, 2017) [7]. ICT-based training methods allow players to visualize their performance, analyze movement errors, and receive immediate feedback, thereby accelerating skill acquisition and improving motor learning efficiency. In the field of sports training, video-based performance analysis and computer-assisted instruction have become powerful aids to optimize athletes technical and tactical performances (Singh & Bansal, 2018) [6]. The use of slow-motion video playback, motion tracking and simulation-based tools enables players to understand biomechanical principles and refine their technical skills more efficiently (Rana & Sharma, 2019) [5]. Such technology-supported learning encourages deeper cognitive engagement and supports long-term motor retention compared to verbal feedback alone (Magill & Anderson, 2017) [3]. ICT-enabled instruction provides an innovative supplement to traditional coaching. It allows learners to visualize correct techniques, compare them with their own performances and make necessary adjustments based on computer-generated feedback (Clark, *et al.*, 2012) [1].
Several studies have demonstrated that ICT tools such as video modeling and computer-assisted learning significantly enhance performance in various sports. For instance, video-based instruction has been shown to improve technical precision in tennis (Liu, *et al.*, 2015), batting performance in baseball (Clark, *et al.*, 2012) [1], and tactical awareness in football (Ong, *et al.*, 2020) [4].

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Traditional basketball training typically relies on direct instruction and repetitive practice, emphasizing motor repetition and coach observation. Traditional basketball training typically depends on direct observation, coach feedback, and repetitive drills, which, though effective to an extent, often lack objective performance measurement and individualized error correction. However, the inclusion of ICT allows players to view their movements, compare them with expert models, and make necessary corrections in real time (Williams & Hodges, 2005) [9]. Basketball, as a fast-paced and skill-demanding sport, requires athletes to master several fundamental abilities such as dribbling, passing, shooting, and movement coordination. For novice players, learning these basic motor skills through traditional repetitive practice alone may be insufficient to achieve high levels of performance consistency (Thomas & Wulf, 2018) [8].

Methodology
The purpose of the study was to analyze the effect of ICT enabled and traditional training for selected skill performances of novice school basketball players. To achieve the purpose of the study, forty-five school boys aged between 14 and 18 years were selected from schools in Tiruchirappalli district, Tamil Nadu. The selected subjects were randomly assigned into three groups of fifteen each, group I - ICT enabled training group (ICTEG), group II - traditional training group (TTG) and group III - control group (CG). The experimental groups underwent a six-week training program of three alternate days per week, sixty minutes per session. The ICTEG received computer-based video analysis and feedback-based basketball skill training, while the TTG performed conventional drills such as dribbling and shooting. The control group did not receive any specific training apart from their regular physical activities. Skill performances were assessed using standardized Johnson Basketball Tests for dribbling (in seconds) and shooting (in counts). The pre and post test data were statistically analyzed using dependent t-tests and ANCOVA at the 0.05 level of significance.

Table 1: Training Protocol

Group	Duration	Exercises / Activities	Each Session
ICT Enabled Training Group (ICTEG)	6 weeks, 3 days/week	Computer-Based Video Analysis of Dribbling and Shooting Techniques, Video Feedback Review, Slow-Motion Correction Analysis, ICT-Based Simulation Drills	60 min
Traditional Training Group (TTG)	6 weeks, 3 days/week	Conventional Basketball Drills such as Figure 8 Dribble, Zig-Zag Dribble Drill and Form Shooting Drill, Bank Shot Drill	60 min

Table 2: Criterion Measures and Test Selection

Criterion Variable	Test Item	Unit of Measurement
Dribbling	Johnson Basketball Test	Seconds
Shooting	Johnson Basketball Test	Counts

Statistical Analysis
The collected data were analyzed using dependent t-tests to find within-group differences between pre-test and post-test means, and ANCOVA to compare post-test means among groups. The significance level was fixed at p < 0.05.

Data Interpretation
The present study aimed to determine the effect of ICT-enabled training and traditional training on selected basketball skill performances specifically, dribbling and shooting among novice school players. The results of the pre-test and post-test are presented in table 3.

Table 3: Mean, Standard Deviation and Dependent 't'-Test Values

Variables	Group	Pre-Test Mean	SD	Post-Test Mean	SD	't'-Value
Dribbling	ICTEG	15.6	1.3	14.2	1.1	5.12*
	TTG	15.7	1.4	14.9	1.2	2.14*
	CG	15.5	1.2	15.4	1.3	0.38
Shooting	ICTEG	18.8	2.3	21.2	2.4	4.86*
	TTG	18.9	2.2	20.0	2.3	2.02*
	CG	19.0	2.0	19.1	2.1	0.42

*Table value for significance at p < 0.05 with df = 14 is 2.14.

Dribbling
From table 3, it is observed that the experimental and control groups (ICTEG, TTG and CG) started with almost similar pre-test mean values, indicating comparable initial performance levels. After the six-week training program, both the ICT-enabled training group (ICTEG) and traditional training group (TTG) showed improvement, whereas the control group (CG) demonstrated negligible change.
The ICTEG showed a greater reduction in mean dribbling time (from 15.6 to 14.2) compared to TTG (from 15.7 to 14.9) and CG (from 15.5 to 15.4). The dependent 't'-test values (5.12* for ICTG and 2.14* for TTG) were statistically significant at the 0.05 level, revealing that the improvement was meaningful for both experimental groups.

Shooting
Table 3 reveals that the ICTG showed noticeable improvement in shooting (mean increased from 18.8 to 21.2), followed by TTG (18.9 to 20.0), whereas the control group showed minimal change (19.0 to 19.1). The dependent 't'-test results (4.86* for ICTEG and 2.02* for TTG) confirmed significant improvement in both experimental groups, favoring ICTEG.

Data Interpretation
The present study aimed to determine the effect of ICT-enabled training and traditional training on selected basketball skill performances specifically, dribbling and shooting among novice school players. The results of the ANCOVA analyses are presented in tables 4.

Table 4: Computation of Analysis of Covariance on Dribbling and Shooting among Novice School Players

Variables	Adjusted Post Test Mean			SOV	SS	Df	'F'-Value
	ICTEG	TTG	CG				
Dribbling	14.3	14.9	15.5	Between	6.24	2	12.16*
				Within	10.54	41	
Shooting	21.1	19.9	19.2	Between	32.48	2	10.42*
				Within	63.98	41	

*Table value for significance at p < 0.05 with df = 2, 41 is 3.23

Table 4 presents the analysis of covariance (ANCOVA) results on dribbling and shooting among the ICT-enabled training (ICTEG), traditional training (TTG) and control group (CG). The findings demonstrate statistically significant differences among the groups on all the selected variables. For dribbling skill, the adjusted post-test means were 14.3 for the ICTEG, 14.9 for the TTG and 15.5 for the CG. The

obtained F-value of 12.16 exceeded the table value of 3.23 at p <.05, indicating a significant difference among the groups. For shooting, the adjusted post-test means were 21.1 for the ICTEG, 19.9 for the TTG and 19.2 for the CG. The obtained F-value of 10.42 exceeded the table value of 3.23 at p <.05, indicating a significant difference among the groups.

Overall Interpretation

The results indicate that both ICT-enabled and traditional training methods produced measurable improvements in basketball skill performance. However, ICT-enabled training (ICTEG) was more effective than traditional training (TTG) and control (CG) conditions. The integration of interactive drills, visual feedback, and computer-assisted instruction likely facilitated better motor learning and performance efficiency.
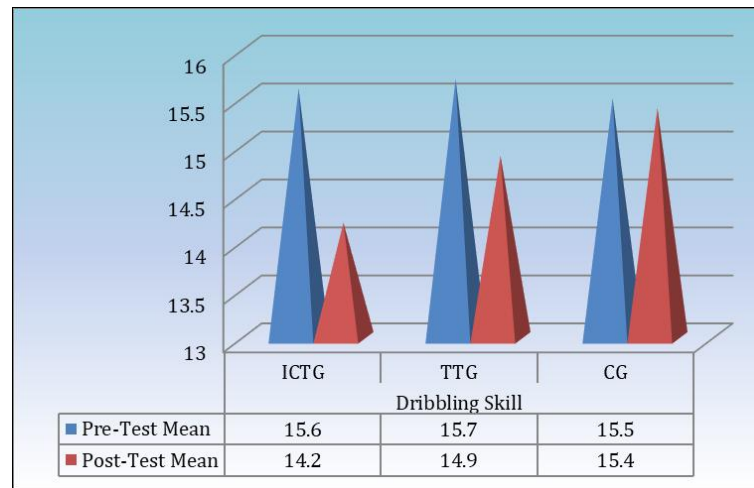

	ICTG	TTG	CG
		Dribbling Skill	
Pre-Test Mean	15.6	15.7	15.5
Post-Test Mean	14.2	14.9	15.4

Fig 1: Pre and Post Test Mean of Experimental Groups and Control Group on Dribbling Skills among Novice School Basketball Players

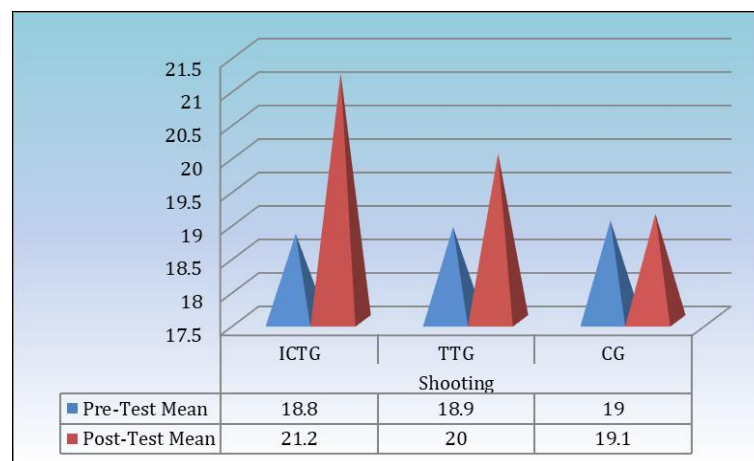|	ICTG	TTG	CG
		Shooting	
Pre-Test Mean	18.8	18.9	19
Post-Test Mean	21.2	20	19.1

Fig 2: Pre and Post Test Mean of Experimental Groups and Control Group on Shooting among Novice School Basketball Players

Discussion on Findings

The results of the study revealed that both ICT Enabled Training and Traditional Training significantly improved dribbling and shooting skill performances among novice basketball players. The ICT enabled training group showed superior improvement compared to the traditional training group and control group. The greater improvement in the ICT group can be attributed to the use of computer-based video analysis and immediate visual feedback, which help learners correct errors and internalize proper movement patterns. These findings are corroboration with previous studies showing that ICT Enabled Training and Traditional Training groups significantly improved dribbling and shooting skill performances among novice basketball players Singh & Bansal, (2018) [6] and Thomas and Wulf (2018) [8],

Conclusions

1. It was concluded that the six weeks of ICT enabled training significantly improved on selected skill performance variables such as dribbling and shooting skills among novice school basketball players.

2. It was concluded that the six weeks of traditional training also showed significant improvement on selected skill performance variables such as dribbling and shooting skills among novice school basketball players, though less than ICT enabled training.

3. When compare to the experimental groups, ICT enabled training proved to be more effective than traditional training in improving skill performance such as dribbling and shooting due to its visual, analytical, and feedback-based nature, among novice school basketball players. These findings suggest that integrating ICT tools such as video analysis provides a more effective approach for developing fundamental basketball skills in novice players.

4. The control group did not show any significant changes on selected skill performances.

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