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Original Article

Influence of Computer-Assisted Drill Training Programme on Dribbling Ability of University Men Basketball Players

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Abstract

This study conducted an assessment of the influence of computer assisted dribbling training on university-level male basketball players, specifically targeting the quantification of changes in their dribbling skills. The evaluation involved the utilization of a meticulous zigzag dribbling test. The subsequent intricate ANCOVA analysis unveiled a substantial disparity between the group that underwent the specialized training and the control group. Ultimately, this research ascertained that a six-week duration of computer-assisted training exhibited a noteworthy enhancement in dribbling proficiency, thereby underscoring the efficacy of technology-enriched sports training.

Keywords: Computer Assisted Training, Dribbling Ability, Sports Skill Enhancement, Technology Integration.

Introduction

Computer assisted drill-and-practice programs represent a pivotal paradigm in contemporary educational technology. These programs have garnered substantial attention and adoption due to their capacity to offer an instructional approach that combines immediate corrective feedback and repetitive reinforcement of previously acquired knowledge (Clark, 2012). Leveraging the computational capabilities of modern computers, these programs have demonstrated notable efficacy in providing learners with structured, adaptive practice opportunities across various curricular areas (Kulik,1991). The integration of intelligent algorithms and machine learning technologies in these programs has enabled personalized and adaptive learning experiences. By continually assessing the learner's performance and adjusting the difficulty and content of exercises accordingly, computer-assisted drill-and-practice can offer tailor-made learning paths that match individual learning styles and aptitudes, fostering a deeper and more lasting comprehension (VanLehn, 2011). Additionally, they also have the potential to support the principles of spaced repetition, which is a scientifically validated technique for enhancing long-term memory retention. Spaced repetition involves presenting learning material in increasing intervals to optimize the retention of information (Kang. 2016). The adaptability and interactivity of these programs have the potential to revolutionize educational approaches, enabling learners to master skills and knowledge more efficiently and effectively (Mayer, 2014).

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For this research, we utilized the HomeCourt iOS app for computer assisted training. Developed by NEX Team Inc., a mobile AI company founded by former Apple, Google, and Facebook engineers in 2017, the app integrates cutting-edge mobile AI and computer vision technology. It provides real-time feedback on basketball techniques, aiding skill improvement, self-progress tracking, and remote training. This study aimed to discern the relative efficacy of two instructional approaches through skill test scores derived from two groups of university men's basketball players. The assessments were focused on evaluating their proficiency in basketball setting skills.

OBJECTIVES

To assess the impact of computer assisted training on the development of setting skills in university men's basketball players.

HYPOTHESIS

The hypothesis postulated a potential notable distinction between the cohort subjected to computer assisted instruction and the control group.

Table 1 Training plan (1-2 weeks)

Monday	Wednesday	Friday
Demonstration Video	Demonstration Video	Demonstration Video
Basic Dribble	Dribble Height	Crossover training
Right Hand	Right Mid	Crossover
Left Hand	Left Mid	Wide cross over
Cross Over	Right Low	Quick Cross Over
Right Hand: 20 in 15	Left Low	Crossover: 20 in 20
Left Hand: 20 in 15	Right High	Wide Crossover: 20 in 25
Cross Over: 20 in 15	Left High	Quick Cross Over 20 in 15
Basic 10’s drill	Left High	Crossover 10’s
	Right mid: 20 in 20	
	Left mid 20 in 20	
	Right low: 20 in 15	
	Left low: 20 in 15	
	Right high: 20 in 25	
	Left high: 20 in 25	
	Dribble height ladder drill	

Table 2 Training plan (3-6 weeks)

Monday	Wednesday	Friday
Demonstration video	Demonstration video	Demonstration video
V-dribble,	In and Out	Two balls sync
Right v-dribble,	Right In and out	2 ball sync Mid
Left v-dribble,	Left in and out	2 ball sync low
Right high v,	Right in and out: in a row	2 ball sync high
Left high v,	Left in and out: in a row	2 ball sync mid: 20 in 30
Right low v,	Right in and out: 20 in 40	2 ball sync low: 20 in 25
Left low v,	Left in and out: 20 in 40	2 ball sync high: 20 in 35
Right v- dribble: 20 in 20,	In and out the ladder	2 ball sync pyramids
Left v-dribble: 20 in 20,		
Right low v: 20 in 20,		
Left low v: 20 in		
V dribble 10’s		

Table 3 Criterion Measures

Sr.no	Dependent variables	Test item and Equipment	Unit of measurement
1.	Dribbling ability	Zig-zag Dribbling test/Cone, stopwatch, and Measuring tape.	Second

METHODOLOGY

The study sought to elucidate the repercussions of a computer assisted drill training regimen on the dribbling prowess of university-affiliated male basketball athletes. The research cohort consisted of thirty such individuals hailing from Annamalai University. Through a random allocation process, these participants were apportioned into two commensurate groups, each harboring fifteen individuals. The initial cohort, designated as Group I, underwent a rigorous six-week computer assisted drill training protocol, replete with three weekly sessions. In contradistinction, the second cohort, Group II, served as an experimental control and remained devoid of any specialized training regimen, adhering solely to their customary basketball activities. The pivotal variable of scrutiny rested in the domain of dribbling capability, assessed via the rigorous zig-zag dribbling test. Preceding and succeeding in the intensive training interlude, both groups underwent meticulous pre-test and post-test evaluations. To discern any substantial disparities between the two groups, a meticulous analysis of covariance (ANCOVA) was enlisted, demarcating a statistical significance threshold at .05. This methodological approach was deemed apt for ascertaining the pertinence of the 'F' ratio derived from the ANCOVA analysis, thereby providing insights into the potential disparities between the groups. The statistical software, SPSS version 22.0, served as the analytical bedrock for this comprehensive investigation.

Group I: underwent a computer-assisted drill training programme for three days per week for six weeks. Computer-assisted drill training program: ball handling fundamentals (dribble training program) powered by the HomeCourt iOS app."

Group II: Acted as control who did not undergo any special training programme apart from their regular programme.

Ethical Guidelines Implemented for Data Collection in The Research Study

Ethical procedures were strictly adhered to, including informed consent and participant awareness of objectives, procedures, risks, and benefits. The study prioritized autonomy, confidentiality, and privacy. It was conducted at the University basketball court, with participant safety ensured through comprehensive health assessments. Throughout, no injuries occurred, showcasing safety measures' effectiveness. Data collection respected participants' rights and confidentiality, with their cooperation highlighting informed involvement. Ethical guidelines-maintained anonymity and ensured the data's research-specific use.

Analysis of the Data

TABLE 4 shows that the pre-test means of the computer assisted drill training group and control group are 30.87 and 30.73 respectively on dribbling ability. the obtained "F" ratio of 0.25 for pre-test means is less than the table value of 4.20 for df 1 and 28 required for significance at .05 level of confidence in dribbling ability. The post-test means of the computer assisted drill training group and control group are 28.07 and 30.47 respectively on dribbling ability. the obtained "F" ratio of 20.90 for post-test means is more than the table value of 4.20 for df 1 and 28 required for significance at .05 level of confidence in dribbling ability. The adjusted post-test means of the computer assisted drill training group and control group are 28.04 and 30.49 respectively on dribbling ability. the obtained "F" ratio of 92.58 for adjusted post-test means is more than the table value of 4.21 for df 1 and 27 required for significance at .05 level of confidence in dribbling ability

Table 4 Analysis of covariance of the data on dribbling ability of pre and post-test scores of computer-assisted drill training and control groups

Test	Computer-assisted drill training group	Control Group	Source of Variance	Sum of Squares	df	Mean Squares	Obtained 'F' Ratio
Pretest							
Mean	30.87	30.73	Between	0.13	1	0.13	0.25
S.D.	0.72	0.68	Within	14.67	28	0.52	
Post Test							
Mean	28.07	30.47	Between	43.20	1	43.20	20.90*
S.D.	0.68	0.72	Within	57.87	28	2.07	
Adjusted Posttest							
Computer-assisted	28.04	30.49	Between	44.45	1	44.45	92.58*
			Within	12.96	27	0.48	

* Significant at .05 level of confidence.
(The table values required for significance at .05 level of confidence for 1 and 28 and 1 and 27 are 4.20 and 4.21 respectively).

Result

The results of the study indicated that there was a significant difference between the adjusted post-test mean of the computer-assisted drill training group and the control group on dribbling ability.

Discussion

These findings resonate with research emphasizing the efficacy of technology in sports skill enhancement (Adams et al., 1991; Antoniou et al., 2003). The study introduced the HomeCourt iOS app, developed by NEX Team Inc., as the computer assisted training tool, aligning with Conte et al.'s (2016) exploration of different training regimes for basketball skills. The study leveraged intelligent algorithms and machine learning technologies in the computer assisted drill training program to provide personalized and adaptive learning experiences, aligning with research on the relative effectiveness of intelligent tutoring systems (VanLehn, 2011). These programs have gained attention for their capacity to provide immediate corrective feedback and repetitive reinforcement of

knowledge, in line with Clark's (2012) concept of e-learning. Despite robust evidence of the program's efficacy, the study acknowledges several limitations, including a relatively small sample size and a short six-week training duration, reflecting the need for further exploration and longer-term investigations (Halouani et al., 2014). This study contributes to the growing interest in leveraging technology to optimize athletic training and skill development and aligns with the potential of computer assisted instruction to enhance skill acquisition.

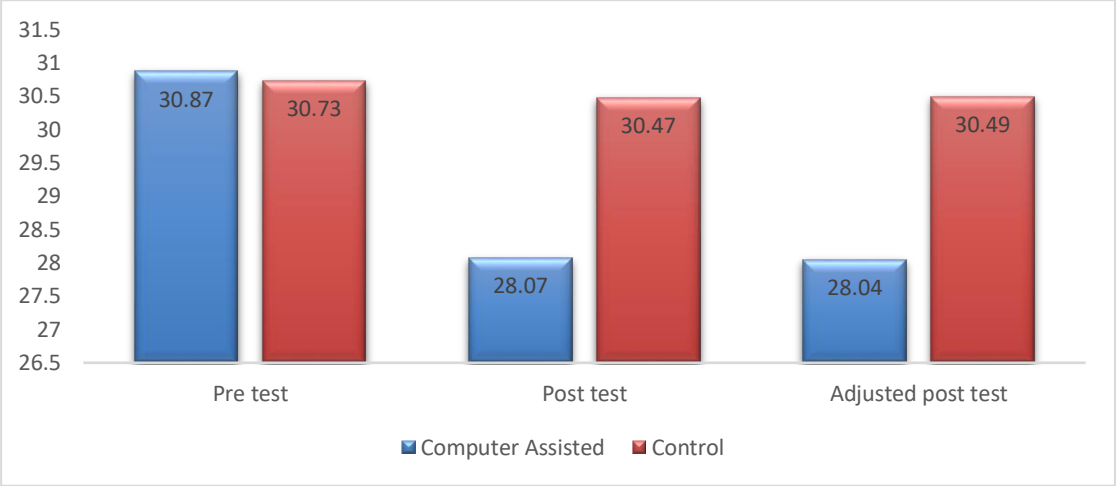

Figure 1 The bar graph illustrates the pre-test, post-test, and adjusted post-test means of computer-assisted drill training group and control group on dribbling ability test.

Constraints and Prospects for Future Research

Future research should involve larger, diverse groups, extend study duration, explore skill transfer to game performance, and use qualitative methods. Longitudinal design can assess sustained effects, comparative studies enhance insights. Variations in training intensity and skill transfer across sports broaden applications, while biomechanical analysis informs injury prevention potential.

Conclusions

The computer assisted drill training program had a substantial and statistically significant effect on improving dribbling ability. The findings underscore the efficacy of technology-enhanced training in enhancing specific sports skills, providing valuable insights for both athletic training and the integration of technology in sports education.

Conflict of Interest: The authors declare that there are no conflicts of interest associated with this paper.

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