

OPTIMIZING SPORTS TRAINING LESSONS BY USING THE LED SYSTEM FOR BEGINNER BASKETBALL GROUPS

Adrian PAȘCAN^{1,*}, Cosmin MOCA¹

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ABSTRACT. Optimizing sports training lessons by using the LED system for beginner basketball groups. **Objectives.** This paper proposes the introduction into the training plan of the beginner basketball groups of some modern means, namely led systems for the development of reaction speed by making decisions to visual signals. The main purpose of this paper is to study the effects of this approach on the U13 players of the CSS Gheorgheni basketball team. **Materials and methods:** The subjects of the experiment were the athletes of the beginner basketball group born in 2010-2011, namely 16 girls. Initial tests were applied, then the players were subjected to specific training by applying some modern means, and at the end the same tests were applied again. **Results:** At the first test on execution speed, we notice that all the athletes managed to improve their results. From the point of view of mistakes, also in this test, we notice that almost all the participants in the experiment improved their performance, three of them managing not to make any mistakes. In the throwing test, they all improved their performance. In the combined test (changes of direction and throwing in the basket) 7 athletes finished the route without any mistakes, 7 girls improved their performance, and 2 girls had the same number of mistakes. **Conclusions:** based on the results obtained, we can say with certainty that by using exercises based on an LED system for the development of reaction speed by making decisions to visual signals throughout the season, the performance of the sportswomen under research has improved.

Keywords: modern means, LED system, reaction speed

¹ Faculty of Physical Education and Sport, Babeș-Bolyai University, Cluj-Napoca, Romania

* Corresponding author: adrian.pascan@ubbcluj.ro

REZUMAT. Optimizarea lecțiilor de antrenament sportive prin utilizarea sistemului led la grupele de baschet începători. Obiective. Această lucrare propune introducerea în planul de pregătire al grupelor de baschet începători a unor mijloace moderne și anume sisteme led pentru dezvoltarea vitezei de reacție prin luarea deciziilor la semnale vizuale. Scopul principal al acestei lucrări este de a studia efectele acestei abordări pe jucătoarele U13 ale echipei de baschet CSS Gheorgheni. **Materiale si metode:** Subiecții experimentului au fost sportivele grupei de baschet începători născute în anul 2010-2011, și anume 16 fete. S-au aplicat teste inițiale, apoi jucătoarele au fost supuse unor antrenamente specifice prin aplicarea unor mijloace moderne, iar la final s-au aplicat din nou aceleași teste. **Rezultate:** La primul test, la viteza de execuție, observăm că toate sportivele au reușit să își îmbunătățească rezultatele. Din punct de vedere al greșelilor, de asemenea, la acest test observăm că aproape toate participantele la experiment și-au îmbunătățit performanța, trei dintre ele reușind să nu facă nicio greșeală. La testul de aruncări, toate și-au îmbunătățit performanța. La testul combinat (schimbări de direcție și aruncare la coș) 7 sportive terminând traseul fără nicio greșeală, 7 fete și-au îmbunătățit performanța, iar 2 fete au avut același număr de greșeli. **Concluzii:** pe baza rezultatelor obținute, putem afirma cu certitudine că prin folosirea unor exerciții bazate pe un sistem LED pentru dezvoltarea vitezei de reacție prin luarea deciziilor la semnale vizuale pe tot parcursul sezonului, prestația sportivelor aflate în cercetare, s-a îmbunătățit.

Cuvinte-cheie: mijloace moderne, sistem LED, viteza de reacție

INTRODUCTION

The uncertainties that “haunt.” The coach or the teacher can either be clarified or remain uncertainties. This process depends on the desire to know” (Roman, 2003, p.9)

The training session is the basic form of organizing and conducting the athletes' preparation process (EFS Terminology, 1973). The training session - from a pedagogical perspective: it is a "link" of the microcycles training that solves objectives of the most diverse, depending on the training period and the training component approached; - from a functional perspective: it represents a system of stimuli (tasks) designed in such a way (usually as a model) as to leave a "trace" in the athlete's body, producing, through accumulation, adaptation of different durations (C.A. Dragnea, 1993).

“Adapted to the specifics of high-level basketball, the conception of game and training is defined as a system of methodical-scientific knowledge, continuously formed and improved through information and each trainer's

own experience, applied in practical activity with the aim of achieving training objectives and competitive performance.” (Predescu, 2001, p.11) And a very efficient way to do this is through the LED system.

“The basketball players must act consciously, each action they undertake representing a response to the specific situation on the field at that moment, considering their relationships with opponents and teammates...” (Hrisca,1998, p.9). The LED system has aimed to decrease this response time, which is critical in resolving certain tactical situations and actions, both individual and collective, both in offense and defense.

LED-based systems of different colors have not been used in athletes’ training for a long time. They are produced by various companies, but the vast majority of them operate on the principle that the athlete will deactivate the LEDs either through complete contact or through proximity contact. I will present two of them.

The Fitlight Trainer System is based on the principle of HIIT (High-Intensity Interval Training Systems). This training has high applicability in different sports areas. It is a wireless equipment composed of 8 LED devices equipped with sensors and controlled by tablet. The system can be configured for all sports and types of training, the user being the one who will deactivate the LEDs either through complete contact or through proximity contact. It helps athletes improve their techniques and their ability to react in intense training conditions. At the same time, the system also provides a deep analysis of athletic performance. The system is perfectly adapted for intense physical exercises, to increase athletes’ performances. The flexibility of this system allows the creation of individual routines, applicable fitness exercises, or specific sports programs, both for athletes and coaches.

This system has the ability to analyze the user’s athletic abilities, thus allowing the setting of concrete goals for performance improvement. Reaction time, speed, flexibility, and acceleration can be easily measured with the help of the system, as this equipment has the ability to project specific exercises or programs that mimic real movements during training. Athletic capacity and movement fluidity can be measured in real-time with precise measurements and subsequently evaluated to improve athletes’ performances.

The Fitlight Trainer system can be used as physical therapy equipment for patient recovery following health problems, as well as for complex diagnostic establishment. Reax Lights PRO is a light system designed to develop interactive training programs, task combinations, and improve reflexes. The Reax Light Pro devices are based on patented technology created to enhance motor skills, cognition, peripheral vision, and reactivity. The Reax Lights Pro light system includes mobile LEDs that can be positioned on walls and floors, as well as a complete range of accessories for innovative cognitive training. Benefits:

increases reaction rate and coordination, improves performance and motor skills, defines muscles better, burns more calories, metabolic activation, faster recovery and functional medical rehabilitation.

“If there are connections between your life and other’s, you are an influential person but if, through these connections, you add value to others, you are a successful person.” (Maxwell, 2010). This system can bring value and growth to players if applied correctly, thus offering them the opportunity to improve their performances as players.

MATERIAL AND METHOD

The hypothesis of the research

This study starts from the hypothesis that by using exercises based on an LED system to develop reaction speed through decision-making on visual signals throughout the season, training sessions and players’ performances can be optimized.

The subjects and the research location

The subjects were 16 female basketball beginners from the Gheorgheni School Sports Club, Harghita county, during the school year 2022-2023.

Table 1. Subjects of the research

Nr.	Subjects	Gender	Year of birth
1	B.V.	F	2010
2	B.A.	F	2010
3	D.K.	F	2010
4	E.B.M.	F	2010
5	E.D.	F	2010
6	F.V.A.	F	2010
7	G.B.	F	2010
8	G.B.	F	2010
9	J.N.	F	2010
10	K.E.	F	2010
11	L.I.	F	2010
12	P.K.	F	2010
13	R.F.	F	2010
14	S.B.	F	2010
15	S.S.	F	2010
16	Z.T.	F	2010

The stages of research

For the experimental group, we designed a basketball-specific training program using LED system exercises twice a week - on Tuesdays and Thursdays - out of the 4 weekly training sessions, and we applied it from October 2022 to May 2023. We conducted three control tests at the beginning of October for the initial assessment of the athletes. We used the exercises described in the training sessions, and at the end of May 2023, we performed the final testing using the same control tests. We compared the initial results with the final results of the measurements to determine the athletes' progress.

The tests applied

Test 1 - Description of the exercise: Four LED cones are placed along the court, two at the three-point lines and two at the center circle. The athlete starts from the baseline. When approaching within one meter of a cone, the color of the LED changes. Green light indicates a change of direction with the ball passing in front. Red light indicates a change of direction with the ball passing behind. White light indicates a change of direction with a spin. Blue light indicates a change of direction with the ball passing between the legs. The route is performed 4 times (Figure 1). The time is measured, as well as the number of errors.

Top of Form

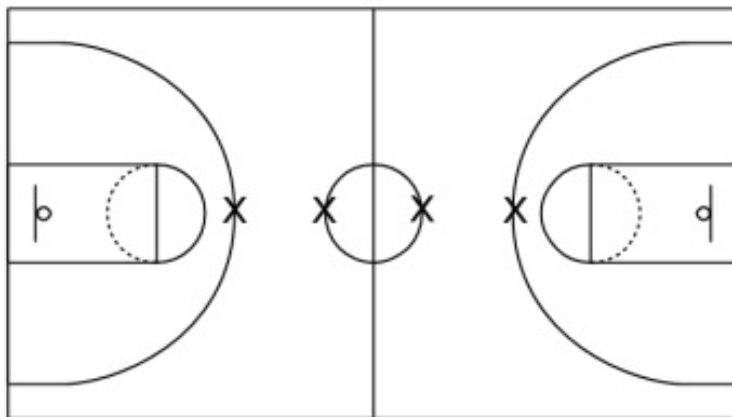


Figure 1. First test

Test 2 - A LED cone is placed on the free-throw line. The athlete starts from the three-point line. When approaching within one meter of the cone, the color of the LED changes. Green light indicates shooting at the basket from dribbling with the right hand. Red light indicates shooting at the basket from

dribbling with the left hand. White light indicates shooting at the basket from a jump. Blue light indicates shooting at the basket from dribbling with a pass under the hoop. The route is completed 10 times. Only the baskets scored and thrown according to the LED color procedure will be numbered.

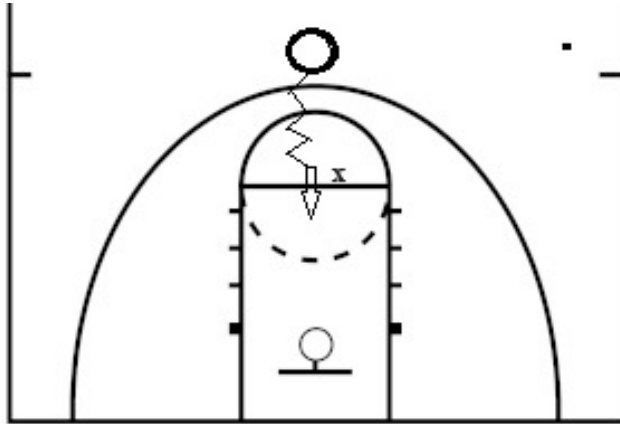


Figure 2. Second test

RESULTS

Tabel 2. The results of the test 1 (the execution speed)

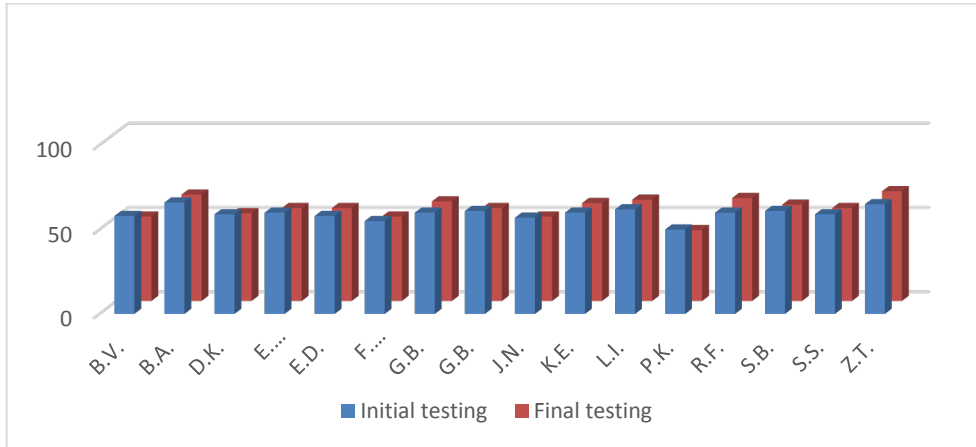
Nr.	Subjects	IT	FT
1	B.V.	58	50
2	B.A.	66	63
3	D.K.	59	52
4	E.B.M.	60	55
5	E.D.	58	55
6	F.V.A.	55	50
7	G.B.	60	59
8	G.B.	61	55
9	J.N.	57	50
10	K.E.	60	58
11	L.I.	62	60
12	P.K.	50	42
13	R.F.	60	61
14	S.B.	61	57
15	S.S.	59	55
16	Z.T.	65	65

Table 3. The results of the test 1 (the number of mistakes in execution)

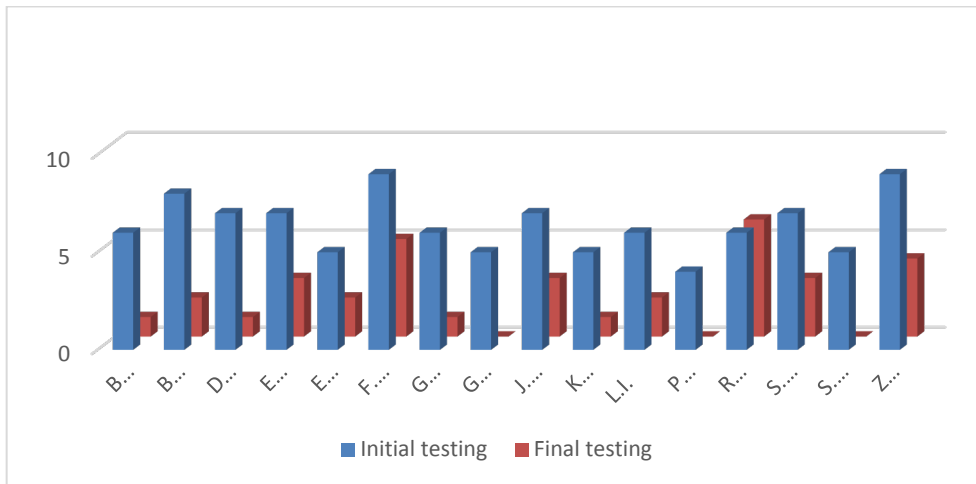
Nr.	Subjects	IT	FT
1	B.V.	6	1
2	B.A.	8	2
3	D.K.	7	1
4	E.B.M.	7	3
5	E.D.	5	2
6	F.V.A.	9	5
7	G.B.	6	1
8	G.B.	5	0
9	J.N.	7	3
10	K.E.	5	1
11	L.I.	6	2
12	P.K.	4	0
13	R.F.	6	6
14	S.B.	7	3
15	S.S.	5	0
16	Z.T.	9	4

Table 4. The results of test 2 (the scored number)

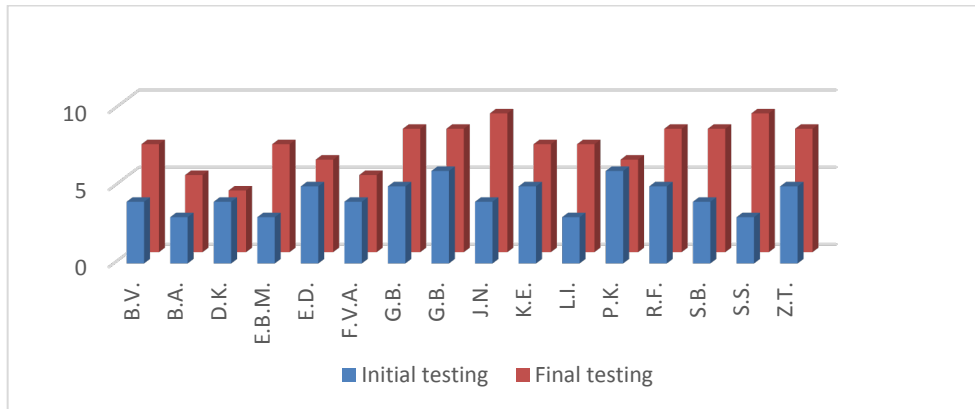
Nr.	Subjects	IT	FT
1	B.V.	4	7
2	B.A.	3	5
3	D.K.	4	4
4	E.B.M.	3	7
5	E.D.	5	6
6	F.V.A.	4	5
7	G.B.	5	8
8	G.B.	6	8
9	J.N.	4	9
10	K.E.	5	7
11	L.I.	3	7
12	P.K.	6	6
13	R.F.	5	8
14	S.B.	4	8
15	S.S.	3	9
16	Z.T.	5	8



Graph 1. The results of the test 1 (the execution speed of the route)



Graph 2. The results of test 1 (the number of mistakes in execution)



Graph 3. The results of test 2 (the scored number)

DISCUSSIONS

As can be observed in both the tables and the presented graphs, there are improvements in both tests performed by the players.

In test 1 (execution speed), with the exception of one player, all the others showed improvements in the speed of executing the route. The greatest difference between the initial and final testing was 8 seconds. In test 1 (number of mistakes in execution), except for one player, the players improved their performance, all managing to execute the procedure indicated by the LED correctly.

In test 2 (number of baskets scored), all players improved their performance in terms of the number of baskets made. It should be mentioned that a significant contribution was the reaction to the color displayed by the LED, rather than the execution technique of the shooting procedure.

Additionally, the increased number of successful shots may also be due to the fact that the attitude and seriousness towards the two tests were higher at the end than at the beginning.

CONCLUSIONS

As we can observe from the recorded data, the LED systems method has made a significant contribution to the development of reaction speed and the ability to make correct decisions in response to visual stimulus. The major advantage of this method is that athletes work with visual stimulus that will help them make decisions during matches. Due to the fact that I have a very good

relationship with the athletes, the research was conducted under very good conditions. Based on the results obtained, we can confidently state that by using exercises based on an LED system to develop reaction speed and decision-making skills in response to visual signals throughout the season, training sessions have been optimized. Tactical exercises with LED lights on the panel force players to constantly look at the basket, thus correcting a common mistake made by many beginners who tend to focus on the ball rather than the basket. Due to the possibility of diversifying exercises, they become more attractive, thus providing additional motivation for participation in training sessions. With a system of this type that can be programmed and equipped with proximity sensors to automatically record data, which could then be analyzed, I believe it would contribute to optimizing both tactical and technical and physical training, as well as psychological training by increasing attention and concentration.

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