

## METHODIC OF SKILLS' FORMATION OF LIGHT ATHLETICS MOTOR ACTIONS WITH THE HELP OF INTER-DISCIPLINARY COMMUNICATIONS AND INFORMATIONAL TECHNOLOGIES, WORKED OUT FOR SENIOR FORM PUPILS

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**Abstract.** *Purpose:* to work out and substantiate technologies of motor and intellectual aspects' integral influence on development of basic light athletics movements' technique. *Material:* in the research 2 groups of schoolchildren participated: control group (n = 34) and experimental group (n = 33). *Results:* it was determined that main direction of motor skills' development in light athletics trainings is a holistic approach. Such approach implies mastering of principal movements of light athletics on the base of analogies with rational and economical movements in Nature and on the base of laws of mechanics. *Conclusions:* it is recommended to consider in trainings the fact that improvement of motor skills' mastering facilitates strengthening of demand in motor functioning. This demand is a condition of organism functioning's improvement.

**Key words:** knowledge, skills, light athletics, schoolchildren, methodic.

### Introduction

Development of motor skills and knowledge is of great importance for formation of the so-called human "motor intellect" [1; 3; 18; 23]. "Motor intellect" [1; 2; 3; 4; 5] is naturally connected with general level of intellectual, emotional and mental condition of a person [9; 11; 12; 19; 29; 30]. Special significance is acquired by development of motor skills in senior school age, when qualitative reconstruction of organism's functioning is the most active [22; 24; 25; 26; 27; 28].

D.N. Pukhov (2011) [17], Hribovska Iryna, Danylevych Myroslava, Ivanochko Victoria, Shchur Lydia (2015) [28] point that schoolchildren of this age, as a rule, loose interest to compulsory classes on physical culture at schools. One of the most difficult trainings for schoolchildren is light athletics [6; 14; 20]. However, just light athletics' movements are the most principle for a human being. These movements facilitated survival of human being as species in the process of evolution [16; 18]. At present, light athletics' skills are basic for many kinds of sports as well as for the most of movements in every day life.

That is why, working out of methodic, devoted to increase of interest to trainings and activation of intellectual component of light athletic movements' mastering is an urgent and important task. As it is pointed by David Hortigüela-Alcalá, Ángel Pérez-Pueyo, José Moncada-Jiménez (2015) [24], its importance is actualized by modern educational tasks. They reduce to receiving of required scope of knowledge by senior pupils. After leaving school this scope of knowledge will permit to use means of physical culture independently and consciously during all life [13; 21].

Analysis of scientific-methodic literature shows that at present there rather many works, devoted to training of movements' techniques [7; 8; 10; 16; 26]. Training of motor actions is regarded as complex dynamic system, effectiveness of control over which depends on how its components and interconnections were studied. In this respect important role is played by theory of actions' construction by D.D. Donskoy [7] and theory of multi-level models of movements' structural organization [5; 18], which permitted to expand knowledge about system of motor actions, their composition and content. In researches by Yu.V. Verkhoshanskiy [6] there are determined bio-mechanical laws of qualitative perfection of actions' composition and system-formation factors of optimizing of kinematic and dynamic structure. V.K. Balsevich [3] substantiated necessity in pedagogic influences' coincidence with stages of accelerated development of motor functions' elements. The worked out by I.P. Ratov [18] theoretical conception of "artificial controlling environment", envisaging formation of motor actions without visible reconstruction of their rhythm-speed basis with the help of special simulators is of great importance.

Thus, theoretical principles witness that for qualitative formation of motor skills it is necessary to realize conscious aspect of movements. For this purpose it is necessary to work out proper methods.

### Purpose, tasks of the work, material and methods

*The purpose of the work* is to work out and substantiate technologies of motor and intellectual aspects' integral influence on development of basic light athletics movements' technique with application of interdisciplinary communications and informational technologies.

*The methods of the research:* theoretical analysis and generalization of special literature, pedagogic testing, pedagogic experiment, methods of mathematical statistic.

For determination of influence of motor skills' development methodic on senior pupils at curriculum physical culture lessons and at circle trainings in light athletics, in period from September 2013 to May 2014 we conducted forming pedagogic experiment. Control (n = 34) and experimental (n = 33) groups consisted of senior pupils (boys) of Mu'tah, Al-Karak, Jordan secondary school.

### Results of the research

Coming from conceptual principles [8; 11; 16; 18; 20] and analysis of modern tendencies of education's development we worked out methodic of motor skills' training for senior pupils at lessons of light athletics with the help of interdisciplinary communication, informational and interactive technologies. In this methodic main direction of motor skills' development at light athletics' trainings is a holistic approach. This approach implies mastering of light athletics' basic movements on the base of analogies with rational and economical movements, existing in the Nature, and on the base of mechanics' laws. It conditions application of knowledge of physics, biology, physiology, bio-mechanic for receiving more complete knowledge about correct technique of light athletics' techniques. Besides, application of informational technologies permits to maximally increase effectiveness of training process in connection with influence on higher sectors of central nervous system [4; 11; 12]. Exactly such approach is the most accessible for training of senior pupils to motor functioning, as far as in senior school age cognitive and associative forms of training are more expressed. That is why application of means in activation of mind is one of the most effective ways to increase of training's quality.

These principles are successfully realized in methodic of motor skills' development, offered by us for training of senior pupils at light athletics lessons with the help of interdisciplinary communications and informational technologies. This approach meant that with pupils' mastering of run, jumps, throws' techniques we proposed multiple repetitions of actions as methodic principles and explained physiological and bio-mechanical basis of movements (run, jumps, throws). It implied application of analogies from biology and physics. This information was given orally and in the form of printed recommendations, methodic literature, video-aids and so on.

Let us regard application of interdisciplinary communications and informational technologies in training of light athletics' elements on example of run (jumps) and throws. As the basis of interdisciplinary communications we chose approach, offered by N. Romanov [20]. This approach is recommended by the author for mastering of the so-called "postural method of run", which implies rising of run technique's effectiveness owing to mastering of necessary main body postures, ability to contract and relax required muscular groups. For realization of this idea the author address to analogies from the Nature, laws of physics, moving of wheel on inclined surface and etc.

For training of throwing technique we took as the basis methodic of initial training of throws' technique in game kinds of sports, offered by Zh.L. Kozina [13]. In this methodic, with the help of analogies from the Nature demand in addition of forces for turn-by-turn switching-on of all muscles is explained. Switching on of muscles with ball throwing starts from legs and finishes by movement of hand. In our opinion creation of holistic movement's image as well as profound understanding of movements' rational technique's physical principles are rather effective approaches. However, they are not used in school physical education. Moreover, different subjects of school program are delivered without considering their intercommunication. As a result person receives not systemic, fragmented knowledge. This knowledge is useless in practice and quickly forgotten after leaving school. In school program physical education is a "counter-balance" to theoretical disciplines, which does not envisage cognitive functioning. However, application of cognitive and associative forms of teaching in any kind of activity (including physical education) facilitates creation a holistic idea about action. It increases effectiveness of motor skills' mastering and effectiveness of mastering of other subjects' knowledge.

Here we render description of our methodic of motor actions' training of senior pupils with application of interdisciplinary communications on example of run (with "Postural method of run") taken as the basis (N. Romanov [20]) and training of throwing technique (with training of throwing technique in game kinds of sports offered by Zh.L. Kozina , 2003, 2013) [13] taken as the basis. Romanov's methodic [20] is oriented on adult people and was not used in training of school age children. It is logical to assume that adapted to schoolchildren's perception Romanov's methodic will show its effectiveness in training of movements.

#### *Example of run technique's training*

(with "Postural method of run" by N. Romanov [20], taken as the basis)

The trained run element: ability to rationally and economically change points of support in running.

Interdisciplinary communications: biology (run of animals), physical (principle of efficiency in usage of wheel).

Quotes of known philosophers, poets, writers on the studied topic: Albert Einstein wrote that "Everything shall be done in as simple manner as it is possible, but not simpler". Leonardo da Vinci wrote that "Simplicity is extreme form of refinement" [cited by 20].

Explanation of rational change of points of support in process of run with accent on interdisciplinary communications and application of visual aids: wheel is one of the most perfect inventions. In spite on evident simplicity, wheel is a complex mechanism, three properties of which have substantial significance for run of man. First: wheel is mechanically effective, as far as it ensures horizontal forward movement with minimal vertical oscillations. Secondly: for the period of wheel's full rotation distance between point of support and body (its center of gravity) does not change as well as their inter-location. The third key property is that point of support constantly changes independent on speed of wheel's rotation. More over, speed of body's movement is in direct proportion to speed of change of points of support.

To have vivid image of these mechanical properties it is necessary to simplify our analogy: let us imagine a person, going on bike. In this analogy "body" is frame with saddle and biker, sitting on it. In the bottom part of this "body" there is perfect moving circumference – wheel. In any moment of wheel's rotation only one its point is in contact with earth. It is a point of support to which weight of all body is applied.

Significance of "wheel principle" is very simple indeed: to move with efficiency of wheel we shall minimize vertical oscillations of body, land on support, which directly under body and keep high temp of steps.

Application of methodic of motor skills' training with the help of interdisciplinary communications and informational technologies during one academic year resulted in confident increase of pedagogic tests on motor fitness in light athletics in experimental group, which was trained by offered by us methodic.

Confident changes cover results of fulfillment of most of tests, reflecting main light athletics' skills.

Table 1

*Indicators of light athletics' motor skills, demonstrated by pupils of control (n=34) and experimental (n=33) groups before and after experiment (boys) зрpynn*

<b>Indicators of testing</b>	<b>Testing period</b>	<b>Group</b>	$\bar{x}$	S	<b>p BE-AE</b>	<b>p CG-EG, BE</b>	<b>p CG-EG, AE</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>9</b>	<b>11</b>	<b>13</b>
Long jump from the spot, cm	BE	EG	160.3	5.79	0.001	0.55	0.00
	AE		175.7	4.87			
	BE	CG	162.2	4.67	0.35		
	AE		164.3	5.01			
Long jump from run, cm)	BE	EG	315.4	10.24	0.02	0.97	0.02
	AE		335.8	9.32			
	BE	CG	317.2	9.72	0.43		
	AE		321.4	10.11			
Run3×10 m (s)	BE	EG	9.51	0.51	0.00	0.83	0.00
	AE		9.12	0.49			
	BE	CG	9.53	0.50	0.45		
	AE		9.50	0.52			
Run30 m (s)	BE	EG	5.93	0.09	0.04	0.25	0.00
	AE		5.71	0.07			
	BE	CG	5.91	0.08	0.57		
	AE		5.90	0.09			
Run 60 m (s)	BE	EG	11.21	0.21	0.05	0.47	0.02
	AE		10.78	0.18			
	BE	CG	11.19	0.19	0.57		
	AE		11.20	0.23			
Run1000 m (min)	BE	EG	7.30	0.76	0.02	0.39	0.03
	AE		6.89	0.87			

Indicators of testing	Testing period	Group	$\bar{x}$	S	p BE-AE	p CG-EG, BE	p CG-EG, AE
1	2	3	4	5	9	11	13
	BE	CG	7.25	0.85	0.61		
	AE		7.23	0.94			
Ball throw (m)	BE	EG	19.82	2.14	0.04	0.55	0.02
	AE		23.15	2.09			
	BE	CG	19.95	2.13	0.35		
	AE		20.01	2.17			

Notes: CG – control group; EG – experimental group; BE – before experiment; AE – after experiment.

In experimental group confident changes of motor fitness indicators were registered in tests, reflecting jumping skills (see table 1), short distance run and long distance run (see table 1). In control groups these changes are not confident (see table 1). The received results convincingly show purposefulness and validity of motor skills training methodic application with usage of interdisciplinary communications and informational technologies at lessons of light athletics of senior pupils.

Effectiveness of the worked out methodic is also confirmed by the fact that in experimental groups level of motor fitness increased (registered by experts' assessments).

#### Discussion

Analysis of the received results from the point of their collation with literature data showed the following. As a result of the conducted research we obtained three groups of results by degree of their scientific novelty. The first group confirms the data of other authors; the second group supplements and expands the results of other authors; the third group of results contains data received for the first time. Let us regard every group of results in respect to their scientific novelty. Our work is devoted to development of senior school age children's motor skills.

In this aspect the conducted research confirms the data of L.P. Matveyev [15]; N.A. Nosko [16]; S.S. Iermakov [8]. In these works it is shown that development of motor skills facilitates formation of healthy life style. Its realization is most effective by means of application of different means of physical education and sport training, hygienic factors and is of the first priority in modern conditions. In the kit of health related means motor functioning is the determining one.

Children's motor functioning is conditioned by a lot of social, biological and natural factors: life regime, health condition, coordination and its connection with vegetative systems, climatic conditions. In this respect our work confirms the data of the authors, who dealt with research of motor functioning and schoolchildren's motor fitness [24].

A number of authors [2; 3] point that active motor functioning is of special importance for growing organism. It is a factor, facilitating development and educating of a child in general. Practice of physical education, researches, conducted in this direction, witness about substantial influence of movements on development and condition of children's health as well as on their workability.

From this point of view our work confirms the data of L.P. Matveyev [15]; N.A. Nosko [16] about determining role of physical education in formation of schoolchildren's motor skills.

Our research supplements the data of N.A. Romanov [20], Zh.L. Kozina [11; 13] about effectiveness of analogies' with Nature application for explanation of correct technique of main light athletics movements' fulfillment (run, jumps, throws).

The received data can be explained by the fact that increasing of motor fitness facilitates increase of demand in movements. Realization of this demand is a necessary condition of increasing of organism functioning's level.

#### Conclusions:

1. We have worked out methodic of motor skills training of senior forms' pupils at light athletics lessons, based on application of interdisciplinary communications of natural and humanitarian sciences and informational technologies. These technologies contain animation illustrations for opening of main aspects of light athletic movements' techniques.

2. We also have determined positive influence of methodic of motor skills training of senior forms' pupils at light athletics lessons, based on application of interdisciplinary communications of natural and humanitarian sciences and informational technologies on senior pupils' motor fitness in field of light athletics.

The prospect of further researches imply perfection of methodic of methodic of motor skills formation in senior forms' pupils at light athletics lessons, with the help of integral influence of interdisciplinary communications and informational technologies.

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**Conflict of interests**

The authors declare that there is no conflict of interests.

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