

Paradigm of theoretical preparation in sports

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Abstract

Focusing on the results of the scientific base and the practice of sports, we have developed the concept of theoretical preparation in sport. It consists of four hierarchical components: the preconditions level (athletes preparation system, pedagogical and training process guidelines), the basis level (theoretical preparation system, athletes preparation sections and stages of the long-term sports improvement), the implementation level (principles, tasks, functions, implementation provisions, methods, means, forms, implementation conditions, control and implementation and determining elements: separate athletes preparation sections and specified long-term training stages); the result level (cognitive, methodological, psychological, communicative and integral components). Based on the main principles of the concept, a theoretical preparation program in sport was developed and experimentally tested. Upon completion of experimental researches, was recorded an increase in the level of theoretical preparedness of athletes at the stage of the elementary training as a result of the use of a differentiated program developed on the basis of structurally significant units of the "Humanistic and socializing knowledge" section and game and competitive methods application (1.1-2.2 points, 56.1-69.6% at $p < 0.01$). At the stages of preparation for higher achievements and maximum realization of individual opportunities as a result of the use of the differentiated program by means of information search and self-education, the level of theoretical preparedness of the participants in the experiment also increased (14.86-64.00%, $p \leq 0.05$). The substantiation of the organizational and methodological foundations of theoretical preparation in sports provides a qualitative construction of the system of athletes training in general. At the same time, the combination of knowledge about the social, cultural and biological unity of a person determines the importance of theoretical preparation as a component of improving the athletic skill and factor of socialization of the athlete.

Key words: theoretical preparation, sport, system, programs, knowledge.

Introduction

The system of training athletes during the XX-XXI centuries has undergone significant changes in theoretical, methodological and organizational character, which has led to an increase in the results of competitive activities in various sports [1, 2]. Fundamental sports research provides evidences of relatively independent and at the same time closely interconnected aspects of the athletes training process [3, 4].

The evolution of athletes training system in various sports groups led to the emergence of a significant number of scientific researches on physical, technical, tactical, integrative, psychological preparation [5, 6], and their combination in the system of long-term improvement of athletes in various sports [4, 7]. According to the education and training process patterns, the sequence of knowledge and ideas generation through the theoretical preparation is really important in sports, as skills and abilities are based on them [8, 9, 10].

Theoretical knowledge, obtained at various stages of many years training, becomes part of the athletes' values system forming the preconditions for successful formation and maintenance of the athletic skill level and harmonious personality development [8, 11, 12].

Scientists' attempts to justify theoretical preparation in sports for now have not allowed to create the integral system focused on the formation of athletes specific knowledge [13, 14].

The research urgency is conditioned by the following problems [11, 15, 16, 17, 18]: the necessity to implement the basic physical culture and sports normative legal documents, which determine the importance of the chosen research direction (the Law of Ukraine "On Physical Culture and Sports", presidential decrees "On the Priorities of the Physical Culture and Sports Development in Ukraine" and "On the National Doctrine of Physical Culture and Sports Development", etc.); the discontinuity of the theoretical preparation of physical education and sports specialists, the lack of the concept presentation for the theoretical preparation in sports; the necessity to stimulate and economize cognitive and intellectual activity, to improve the athletes intellectual level

at various stages of many years training; the lack of taking into account special nature of the sport, qualification, age, training stage and athletes individual characteristics during the theoretical preparation; the appearance of new information units in the system of athletes knowledge based on the world processes.

Thus, we determined the topical scientific and applied problem of creating the conceptual basis of the theoretical preparation in sports, which is conditioned by the contradiction between the compulsory theoretical preparation as a relatively independent aspect of training in the long-term athlete's education system and the lack of its substantial scientific and methodological justification.

The purpose of the research: to substantiate the scientific basis of theoretical preparation in sport.

Methods

Theoretical analysis and generalization of data of scientific and methodical literature and Internet information network to determine the problem area of the theoretical training in sports and its scientific and methodological provisioning condition; pedagogical observation to determine athletes theoretical education criteria and levels at different research stages; pedagogical experiment to verify the implementation provisions effectiveness of the theoretical training in sport; methods of mathematical statistics to analyze the empirical data at different research stages.

Ascertaining pedagogical experiments involving handball players and fencers were conducted. In this research 36 handball players were involved at the specialized basic training and at the high performance preparation stage. In this ascertaining pedagogical experiment 30 fencers were involved at the preliminary basic training and specialized basic training stages, and 20 athletes at the high performance preparation and maximal individual possibilities implementation stages. During this research the expert assessment was conducted (8 higher qualification specialists) of the significance of the fencers' theoretical preparation components. The forming pedagogical experiment was conducted to verify the implementation provisions of the theoretical training concept in the bases of the archery classes. During this research the expert assessment was conducted (8 higher qualification specialists) of the significance of the archery beginners theoretical preparation components. 34 archers were involved at the initial training stage, among whom 18 athletes belonged to the experimental group and 16 athletes belonged to the control group. During the pre-contest training mesocycle the forming pedagogical experiment was conducted to verify the effectiveness of the implementation provisions of the theoretical preparation concept involving 19 weightlifters (13 masters of sport and 6 candidates for master of Sport).

Results

Sports theoretical preparation is a system for scientific cognition, which is composed of a set of entities, subject-object relations for special knowledge generation and relations between the pedagogical process participants. Theoretical preparation can be separated from the sports activities environment for some time period to provide the comprehensive learning of the appropriate athletes training aspect. The development of organizational and methodological basis of the theoretical preparation in sports allowed us to define those concept components, which ensure the concept effectiveness.

We defined the theoretical preparation role within the long-term sports enhancement system, which is implemented with the help of the direct activities of the educational and training activities subject and his/her interaction with other process participants. Within this scope a set of the theoretical preparation functions is defined, including cognitive, socializing, disciplinary, communicative, motivational, hedonistic, axiological, gnostic, diagnostic and corrective, informative, holistic, self-fulfilling, planning and constructive functions, which is new in the sports training theory. As to the combination of the theoretical preparation methods (the way of the goal achieving in generation and perception of the special knowledge system, aimed at the sports result achieving and athletes personal development), we can confirm the usage of some methods (groups), differently represented in the sports scientific and methodological literature. Among such methods there are those described in the scientific and methodological literature on theoretical preparation (verbal and visual methods); those viewed by scientists for other athletes preparation aspects implementation (gaming and competitive techniques); those added by us to the theoretical preparation with the help of the structural and logical analysis of their impact on athletes (information search and interactive methods). However, we considered the set of these methods within the framework of the theoretical preparation tasks implementation for the first time.

Similarly, we substantiated the theoretical preparation means (special training measures, exercises), which allow to accumulate, process and perceive the knowledge system, which directly or indirectly influences the main tasks solving process in the long-term athletes training system. According to the objective factors for our purpose, we divided the theoretical preparation means into basic and auxiliary, technical and non-technical means. While selecting and developing the theoretical preparation means, the necessity of considering the main sensory (visual, auditory, proprioceptive) dominants was determined.

We relate the sports theoretical preparation content to the author's model of the athletes' knowledge system, with structural-functional connections and "Basic knowledge" and "Auxiliary knowledge" subsystems. "Basic knowledge" subsystem contains knowledge groups and sections that correspond to the specifics of the

target-oriented aspects of the athletes training system. The "Athletes training system" group contains such information sections as "Competitive activities" and "Training process", the "Provision of the athletes training system" group contains "Financial and technical support" and "Medical and biological support" sections and relatively independent sections as "Humanitarian and socializing knowledge" and "Safety, safety rules". The consistent solution of the research tasks allowed to determine the factors of the effectiveness of theoretical preparation in sport. These include sources and ways, implementation conditions, scope, participant's number, implementation period and control. The verification of the sports theoretical preparation organizational and methodological basis effectiveness was performed during the summative and formative pedagogical assessments accompanied by the tracking of the theoretical preparation objective indicators and their changes as a result of the differentiated programs implementation. The programs are developed taking into account individual characteristics of athletes, who participate in this training

The dissonance of the qualification level and athletes theoretical competence at the stages of specialized basic training and high performance sports training in handball for the information units of the section "Athletes training system" – "Technique" – 15.0 %, and "Tactics" – 31,4 % of correct answers, and insufficient theoretical competence indicators for the information unit "Rules" (67.66–74.00 % of correct answers) of the "Competitive activities" section indicated the theoretical preparation enhancement resources using updated information sources, deepening the relationship between theoretical and practical classes, improving the ability of qualitative response wording.

At the preliminary basic training and specialized basic training stages there is a significant disproportion ($p \leq 0.05$) between the theoretical competence of fencers (1.60–2.47 points) and the importance of the following information units "History and development of fencing", "Athletes training theory and methodology" (2.84–3.90 points).

The more conspicuous dissonance ($p \leq 0.05$ – 0.01) is noticed for most information units at the high performance sports training and individual capabilities best fulfillment stages between the significance of the theoretical preparation content for fencers (4.00–4.96 points) and their theoretical competence (2.60–3.34 points). There are no significant discrepancies in expert assessments (3.00–4.33 points) and athletes theoretical competence in fencing (2.76–3.37 points) for the "Olympism" information unit, starting from the of specialized basic training stage ($p > 0.05$).

The differentiated program of the athletes' theoretical preparation at the initial training stage in archery was developed taking into account the effective and significant units of the "Humanistic and socializing knowledge" section. Its structure and content included game and competitive methods and some theoretical preparation means, related to the "List of sports in the Olympic Games program", "Host cities of the Olympic Games", "Olympic history", "Best archers of Ukraine" topics. The differentiated theoretical preparation program effectiveness for athletes at the initial training stage is confirmed by the higher values of the intragroup and intergroup differences (by 1.1–2.2 points, $p < 0.01$) and by the general theoretical qualification of archers in the experimental group (56.1–69.6 %, at $p < 0.01$) (Table 1).

Table 1. Effectiveness of the Differentiated Program for the Archers' Theoretical Qualification Improvement

Knowledge Blocks	EG (n = 18)		Ucr, p	CG (n = 16)		Ucr, p	Differences significance EG and CG	
	before PE (points)	after PE (points)		before PE (points)	after PE (points)		before PE	after PE
Origination history and development of sports	1.2	2.3	34.5 <0.01	1.4	1.5	120.0 >0.05	115.5 >0.05	48.5 <0.01
Competitive activities	1.9	3.7	45.0 <0.01	1.8	1.8	134.0 >0.05	124.0 >0.05	37.0 <0.01
Archery technique	2.9	3.0	127.0 >0.05	3.0	3.0	142.0 >0.05	132.0 >0.05	143.5 >0.05
Olympism	2.4	4.6	12.5 <0.01	2.6	2.6	140.0 >0.05	113.5 >0.05	23.0 <0.01

Notes: EG – experimental group; CG – control group; PE – pedagogical experiment; $U_{cr} (n = 18) = 95$ at $p < 0.05$ and 76 at $p < 0.01$; $U_{cr} (n = 16) = 83$ at $p < 0.05$ and 66 at $p < 0.01$.

Athletes intragroup theoretical qualification improvement by 14.86–64.00 % in the main information units and topics proved the effectiveness of the information search methods and theoretical preparation self-education in weightlifting at the at the high performance preparation and maximal individual possibilities implementation stages (Table 2).

Table 2. The Effectiveness of the Differentiated Program of the Theoretical Qualification Improvement for Weightlifters

Information units	Output Indicators		Intergroup output indicators differences	Result indicators		Intergroup result indicators differences	Intragroup indicators changes during the pedagogical experiment	
	EG1 (n=9)	EG2 (n=10)		Abs. (%)	EG1 (n=9)		EG2 (n=10)	Abs. (%)
Nutrition (8 test tasks)	3.11 ±0.81	2.70 ±1.04	0.41 (15.23)	7.56 ±0.49	7.50 ±0.50	0.06 (0.74)	4.44* (58.82)	4.80* (64.00)
Pharmacology (9 test tasks)	3.00 ±1.33	3.50 ±1.60	0.50 (14.29)	7.56 ±0.81	7.50 ±0.80	0.06 (0.74)	4.56* (60.29)	4.00* (53.33)
Competitive activities (9 test tasks)	7.00 ±1.11	8.20 ±0.68	1.20* (14.63)	8.22 ±0.96	8.30 ±0.98	0.08 (0.94)	1.22* (14.86)	0.10 (1.20)
Fundamentals of the theory and methodology of preparation (5 test tasks)	3.33 ±0.96	4.10 ±0.72	0.77 (18.70)	4.22 ±0.52	4.30 ±0.70	0.08 (1.81)	0.89* (21.05)	0.20 (4.65)
Olympism (15 test tasks)	9.67 ±3.11	10.60 ±2.00	0.93 (8.81)	14.33 ±0.96	14.00 ±0.60	0.33 (2.38)	4.67* (32.56)	3.40* (24.29)
In general (46 test tasks)	26.11 ±4.81	29.10 ±2.88	2.99 (10.27)	41.89 ±2.77	41.60 ±1.60	0.29 (0.69)	15.78* (37.67)	12.50* (30.35)

Notes : * – $p \leq 0.05$ (U cr (n = 9) = 21;

(n = 10) = 27, (n = 9–10) – 24);

EG1 – experimental group 1;

EG2 – experimental group 2.

There were no statistically significant differences between the performance of the experimental group 1 athletes who searched for the information using the sources of the LDUFK library database and the experimental group 2 athletes who used access to the Internet databases. The relative indicators of the theoretical preparation differences amounted to 0.69–2.38 % of the correct task solutions at $p > 0.05$.

Discussion

The methodology of the research was based on the fundamental provisions related to the humanistic value of sport; general laws and principles of the system of sports training; theoretical and methodological basis for the preparation of athletes in various sports; management and control of training of qualified athletes; design and implementation of active learning technologies; laws of development of spiritual, cognitive, communicative, aesthetic qualities, formation of individuality of a person; the theory of management of long-term preparation of athletes; stimulating and cognitive technologies of physical education and sports; theory of information and modeling in sport; general methodology of scientific research.

The sports theoretical preparation concept consists of four hierarchical components [19, 20, 21, 22]: the preconditions level, contains elements on the basis of which the author's concept is formed (athletes preparation system, pedagogical and training process guidelines); the basis level contains the main phenomena and processes (categories) that determine the specifics of the system of theoretical preparation in sport and actually it (theoretical preparation system, athletes preparation sections and stages of the long-term sports improvement); the implementation level has a basic functional load, low (derivative) elements of the concept of theoretical preparation (principles, tasks, functions, implementation provisions, methods, means, forms, implementation conditions, control) and the realization-defining elements, according to which it should be construction (separate athletes preparation sections and specified long-term preparation stages); the result level – the summary of the implementation of the previous levels of the concept, consisting of the following individual components: cognitive (a new level of analytical thinking, the development of all types of mental processes of athletes, among which perception, memory, the formation of concepts, problem solving, imagination and logic, resulting from the accumulation of new knowledge); methodological (creation of a set of knowledge about interconnected methods and techniques of appropriate training and competitive activities); psychological (changes on the basis of the received knowledge of mental processes and mental properties of the personality of the athlete, which make it possible to achieve a higher efficiency of competitive and training activities); communicative (awareness of the amount of knowledge that provides the optimal process of information exchange between participants of

the system of training of athletes, the involvement of effective verbal and non-verbal means to communicate effective communication and information quality); integral (interpenetration of the structures of the accumulated volume of the knowledge system, which is the basis of the content of theoretical preparation with other areas of activity of athletes).

There is an objective justification of effectiveness for many of the means, which proposed within the concept of theoretical preparation in sport. It has already been carried out by academics on sports and physical education [16, 21, 22].

Differentiated programs, which constructed on the basis of organizational and methodological foundations, are the main tool for the theoretical preparation of athletes. In the center of their structure and content are the principles of personal orientation of content, criticality, informatization, economization, polysensor, integration, controllability, humanization; task; cognitive, civilization, educational, communicative, motivational, hedonistic, axiological, gnostic, diagnostic-corrective, informative, holistic, self-realization, design-constructive function; means; methods, including verbal, visual, gaming, competitive, interactive, information retrieval and self-education; conditions of realization and control, which corresponding to the individual characteristics of athletes according to which theoretical preparation is conducted.

In the course of the study, we found that there are excellent approaches to providing a model of a system of knowledge of athletes [11, 13]. The disadvantages of these models of knowledge systems are their simplified representation and the lack of functional connections between separate parts of knowledge.

Also, in models, proposed by scientists, was found the absence of such characteristics as the primacy of the whole relative to parts (integrity), the fundamental impossibility of adding properties of the system to the sum of properties of its constituent components (non-additive), the possibility of decomposition of the system on the components and the establishment of connections between them (structural), the possibility of considering each component of the system as part (subsystem) of a wider global system (hierarchy).

Within the framework of the substantiation of the factor of theoretical preparation in sport, which related with the sources and ways of information, was found a small amount of scientific data on the use of television and scientific literature as a way of information transmission in physical education and general didactics in the theoretical preparation of sport. We expanded, systematized and distributed these paths to personal - trainers, friends and team colleagues, family representatives, and mediators - literature, television, the Internet, etc.

Detecting of the activities content, the totality of tasks and functions of certain social institutions made it possible to distinguish some of them, which are decisive and responsible for creating the totality and amount of knowledge that needs to be transferred within the theoretical preparation. We combined them into a group of information sources, including sports federations, the National Olympic Committee, and other public and governmental organizations.

It was established that the conditions of implementation are an objective factor in the effectiveness of theoretical preparation. However, they had a fragmentary study in scientific and methodological literature on the subject of theoretical preparation. Understanding of the process's essence of the theoretical preparation in sports has made it possible to distinguish remote and organized conditions for the implementation of theoretical preparation, as well as realization in spontaneous conditions, independently and to characterize the interrelations between them.

Regarding the implementation period, we note that for all existing scientific studies, emphasis is placed on the study of theoretical preparation at the stages of the long-term preparation system for athletes. We considered the possibility of implementing theoretical preparation at the level of preventive, professional and post-phase theoretical training, which has significant reserves for increasing the effectiveness of theoretical preparation in general.

The axiomatic is the need to control the training system of athletes in general [8, 11, 13, 18]. The analysis of scientific and methodological literature, together with the objective features of the theoretical preparation in sport, made it possible to differentiate the control over the period of carrying out (operational, current, stage) and its quality (conditional, partial, complex, superficial and deepened).

Conclusions

1. The substantiation of the organizational and methodological basis of the theoretical preparation in sports provides the possibility to create a high quality athletes training system and in combination with knowledge on the social, cultural and biological integrity determines the importance of the theoretical preparation as a component of the athlete's skills improvement and athlete's socialization factor.

2. The implementation provisions effectiveness of the author's theoretical preparation concept is confirmed by the following results:

- the increase of the athletes theoretical competence at the stage of the elementary training, higher values of the intragroup and intergroup differences (1.1–2.2 points, 56.1–69.6 % at $p < 0.01$) as a result of usage of the differentiated program, developed on the basis of structurally significant units of the "Humanistic and socializing knowledge" section and game and competitive methods application;
- athlete's intragroup theoretical qualification improvement (14.86–64.00 %, $p \leq 0.05$) at the high performance preparation and maximal individual possibilities implementation stages as a result of the

differentiated program application using the information search and self-education methods. At the same time, there was found no differences between athletes who searched for the information using the sources of the Lviv State University of Physical Culture's library database and those who used access to the Internet databases (0.69–2.38 % of correctly solved tasks at $p > 0.05$).

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