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Conversion of sports technologies as a development and improvement mechanism for designing training systems

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Annotation.

The article describes the theoretical and methodological basis for the conversion of sports technologies into training systems in order to increase the efficiency of their function, as well as practical ways of conducting conversional operations in relatively independent areas of physical culture and sports activities: sports-centric physical education and mass sports, with their specific goals and objectives, different competence levels of specialists working in these areas, as well as a way to design training systems in high-performance sports.

Keywords: theoretical and methodological basis of conversion; modernization and design of training systems; methods of conducting conversional operations.

The term "Conversio" translated from Latin means "transformation, change". Conversional changes of an object are performed in order to obtain new properties and qualities of said object. Conversion in the field of physical education and sports means using theoretical and practical achievements applied

in the training of Olympic athletes for the interests of physical education and sports.

Some aspects of solving the problems of conducting conversional procedures are presented by the author in a number of his previously published works [1,2,3,4], and this article presents a holistic theoretical and methodological justification for the conversion of sports technologies and practical ways of conducting conversional operations. The developed conversional methodology highlights the theoretical side and practical ways to implement it. The theoretical part is based on the patterns and principles of conversional transformations.

Conversional patterns of sports technology:

1. The possibility of conversion is determined by the relationship between the nature of the technology and the specifics of the competitive activity of sports discipline being "enriched".
2. The effectiveness of the converted sports technology after adaptation to new conditions depends on the degree of preservation of its conceptual framework.
3. The nature of conversional changes in the sports training system being enriched depends on the class of technology being converted.
4. The process of introducing and adapting sports technology from high-performance sports into physical education and training process of schoolchildren is based on the relationship between horizontal and vertical conversional directions.

Conversional Principles:

- principle of the primacy of the purpose of the conversional operation establishes that it is the purpose of the conversional operation that is the priority, determining the directions and nature of adaptations;

- principle of subordination of the implemented technology and the "own" technologies of the training system determines the entry point for technology introduction into the training system and the nature of changes in the training system produced by said implementation;
- principle of compliance of the converted technologies with the conditions of competitive activity in the sports discipline being enriched, allows us to determine the "technological compatibility" of the implemented technology and the training system being enriched;
- principle of successive stages of conversional procedures means that the adaptation of the converted technology in a new environment is carried out in several stages with their own qualitative features;
- principle of preservation of the conceptual basis of the converted technology establishes the possibility of achieving the planned effect of using this technology in a new environment;
- principle of changing the content of the converted technology determines the direction of adaptive transformations in technology being implemented;
- principle of changing the content of the training process of sports discipline being enriched determines the possibility and direction of "connections" between converted technologies and technologies being enriched.

The theoretical side of the conversional methodology has been embodied in three practical ways of its implementation. Various methods of conducting conversional operations are necessary for three seemingly independent areas of physical culture and sports activities: sports-centric physical education, youth and mass sports, high-performance sports, with their own specific goals and objectives, and a different set of competencies for specialists working in these areas. Therefore you need relatively simple and affordable tools for mass use but also high-precision ones used both to modernize the training systems for highest ranked athletes and to design new high-tech technologies. Based on this

each conversional approach has its own set of objectives to be solved determined by the specifics of the levels of sports activity.

The first approach is designed to modernize the training systems used in sports-centric physical education and children's sports. The essence of modernization procedures is that the procedural part of the technology being implemented without changing training techniques and programs is implemented into the training system being enriched. Only the training load is adjusted accordingly based on the characteristics of the training contingent of athletes. In other words the "outdated" procedural part is replaced by a more effective procedural part from the implemented technology in the training system being enriched. The two training systems are connecting mechanically. With this approach of conversion it is necessary to solve three main objectives in the process of technology implementation:

1. Choosing the technology that solves the appropriate training objectives.
2. Determining the entry point of technology implementation in the training system being enriched.
3. Adjusting the exercises applied (without changing their orientation) and the training load in accordance with the characteristics of the contingent of athletes.

Overcoming these objectives and solving the problem of selecting the appropriate technology occurs according to the methodological principle of "Compliance of the converted technologies with the specifics of competitive activity in the sports discipline being enriched." The technology being implemented must meet the following criteria:

- Conforming to the specifics of the competitive activity in the sports discipline being enriched, the technology being enriched should take into account the kinematic and dynamic characteristics of motor actions (non-specific technologies can be modified or applied unaltered). Therefore, the target

goal of the implemented technology should coincide with the goals and objectives of the sports training system being enriched.

- The procedural part of the implemented technology should solve training objectives more effectively than the "outdated" procedural part of the training system being enriched (to bring athletes to a higher level of fitness, to bring them into a state of athletic shape on a specific timeframe, etc.).

The second of the above objectives is solved as follows: to reduce the likelihood of negative interference the appropriate entry point to introduce the technology into the training system is the beginning of the next training stage. Provided that it is in continuity with the previous stage in terms of total load, the structure of partial loads and the training tools used, the process of developing fitness and entering the state of athletic fitness in the preparatory period or its preservation in the competitive period of the annual cycle will continue.

Solving the objective of adjusting the applied exercises and training load in accordance with the characteristics of the contingent of athletes is based on methodological principles: "Subordination between the implemented technology and "own" technologies of the training system", "Changing the content of the converted technology" and "Changing the content of the training process of the sports discipline being enriched". In fact, adaptive manipulations relate mainly to special developing training tools and may partially affect special preparatory exercises. Because in special developing exercises muscle operation modes and other body systems are set at the level of competitive modes or exceeding them. In this regard, methods are being replaced by those that correspond to age and gender characteristics, level of training and other factors. There is also an adjustment of partial volumes of the training load while maintaining their structural balance in order to avoid disrupting one of the essential mechanisms of the implemented technique. Additionally, in order to reduce the impact of issues associated with errors between the applied technology and the system being enriched, it is recommended to limit the scope of conversational

transformations through this method of conversion into meso- and microtechnologies.

The first approach of conversion is characterized by ease of use and it's accessible to a wide range of specialists in the field of physical culture and sports which implies its mass use.

When you convert using the second approach, unlike the first one, not the whole technology is introduced into the training system being enriched, but separate ready-made "blocks" adapted for the goal and objectives of the conversion - structural and functional components (structural schematics, training programs consisting of sets of exercises of various orientation, training methods that determine the specifics of performing exercises in training classes, their volume and intensity of performance in the micro-, meso-, and macrocycles). Structural and functional components are used, both from the technology being implemented and components of other technologies that meet certain criteria.

The fundamental element of the forming technology is the selected "design blueprint" — a method for constructing the training program. The primary criterion for selecting and customizing the method for constructing the training program is its capacity to fulfill the function required by the objectives of the conversion. Clearly, the most suitable approach to constructing the training program must be tailored to the conversional context. To do this, the time frames of the stages and blocks (depending on the method of constructing the training process) should be adjusted in such a way as to create conditions for the course of adaptive restructuring at the level of various body systems and ensure the implementation of a given dynamics of the athlete's condition in the annual training cycle. The foundation for these adjustments is information about extremes of time required for the implementation of adaptive changes in the development of different motor skills.

But the structure of the forming training system will take its final form only after the adaptation of the implemented training programs. The selected programs must meet the following criteria:

1. Adequacy of the goal both for the objectives of the training process, accumulated volume and for the nature of the training work.
2. Compliance with the logical structure (stage, block, period) of the training process.
3. The functionality of the program. It is necessary to follow set program of actions, their sequence, order of repetition to precisely normalize loads and rest intervals and form specific functional systems in athlete's body that contribute to achieving a high athletic result.
4. Harmonious relationship with other programs in a single training system. Ideally, the implemented programs should not only fit into the training system, but also achieve synergy in interaction with each other.
5. Compliance with the timeframe. According to the duration of application, the implemented programs must be entered into at the appropriate training stage, period. Therefore, when adapting the implemented programs some of them will have to be shortened, and some will have to be lengthened provided their functionality is preserved. When you change the duration of the programs and their functionality suffers, then it is better to follow the path of adjusting the time frames of stages, blocks, etc. Therefore, the final timeframe of the structural formations of the training process is determined after the adaptation of the implemented programs.

A characteristic feature of these first and second conversional approaches is that they are based on a single approach – "technological continuity", which consists of choosing such technologies or structural and functional components of technologies that have already been successfully used in the training process to modernize training systems.

Logical development of the theoretical part of conversional methodology in practical ways of its implementation made it possible to expand the subject of conversion to the construction of high-tech technologies designed to train athletes of the highest ranks. The necessity to create a third approach is driven by the fact that it is impossible to indefinitely upgrade sports technologies, as, eventually, they reach their modernization limit. Additionally in training systems upgraded with first and second approaches it is difficult to achieve high-precision impacts. To solve the problem of achieving high accuracy (basically, high efficiency) of sports technologies, the following approach is introduced: forming a conceptual component of a training system based on conversion from the entire variety of achievements in theory and practice of sports training of such training mechanisms that will contribute to the implementation of the system's function. However, the converted mechanisms must meet two main criteria: providing function of the training system under specified conditions and also fit into the system of mechanisms of the conceptual component.

In addition to mechanisms providing function, the system of mechanisms of conceptual component of the training system uses mechanisms establishing the framework for transforming training from diverse drills into actual competitive actions, ensuring positive interaction between exercises of different types and mechanisms regulating the interaction of the “work-rest” phases in training sessions and micro- and mesocycles of training. Simultaneously, the emphasis of training effects and load parameters is aligned with the natural rhythm of the age-related development of kinesiological potential of the training person and his current condition. Precisely the system consisting of the most effective mechanisms and connections between them developed taking into account the genotypic predisposition and phenotypic readiness of the athlete's body for the direction, volume and intensity of loads ensures high accuracy of training

effects. In turn formed system of mechanisms determines the rules for building a training system: periods of training process, necessary tools, methods, etc.

Appropriate system bases have been developed to implement proposed approach. The first systemic basis is the goal and objectives of the training system's operation. The goal is the initial origin, the system-forming factor when forming a training system: thanks to the goal the elements of the system combine and function in order to achieve it. Additionally the objectives of the training system functioning specify the function while organizing necessary structural and functional components. The list of objectives limits the number of issues that need to be adjusted when building a training system, which in turn limits the number of system mechanisms. There should be precisely as many of them as necessary to effectively achieve the goal, so as not to "overload" the forming training system.

The next systemic basis is the pattern of conversion, which determines the possibility of introducing and adapting high-tech technologies into the training system being "enriched". This pattern allows us to identify the *systemic nature of the mechanisms* within the forming training system. The defining characteristic of a mechanism within the system of mechanisms of conceptual framework of the forming training system is the correlation between the issues addressed by the mechanism in the training process and the specific aspects of competitive performance in sport for which the training system is being developed. The main criterion of the "systemic nature" is the effectiveness of achieving the goal.

The third systemic basis is the factors that determine the construction of the structure, content and procedural deployment of the training process. These factors are determined by the characteristics of the trained contingent: age, gender, initial and planned level of preparedness. At each stage of long-term sports training, the decisive influence of factors is variable. From stage to

stage of long-term training the number of factors contributing to the maximum realization of athletes' athletic and achievement capabilities increases which complicates the structure and content of the training system. The structure of an athlete's fitness, the leading components that determine the level of achievement and lagging components that prevent an increase in his level, as well as his anatomical and physiological inclinations, are also analyzed. Correlation of that data with the goal and objectives of the training allows you to build individual structure of the training process. You analyze the training volumes mastered by athletes of the appropriate qualification and individual training experience at previous stages of training to establish the quantitative characteristics of partial loads. The most significant indicators of special training are identified, the level of which needs to be increased, but also identify the amount of their increase. Setting individual parameters or the entire set of indicators of the internal side of the competitive load in the training process allows you to control the effects of training loads with a greater degree of accuracy.

The approach is designed to create training systems used in the training of elite athletes. It is quite difficult to use. The complexity of the third conversional approach is due to the complexity of the objectives which require the necessary work of a wide range of specialists with their abilities for projective thinking based on the most cutting edge scientific achievements and the need to operate large amounts of information. Therefore, for the successful use of the third conversional approach a need arises for widespread use of artificial intelligence technologies. Firstly, this will minimize the likelihood of errors at the design stage of the conceptual component of the training system. Secondly, forming conceptual components of training systems with necessary parameters in most sports disciplines in a short amount of time. This will drive the massive emergence of high-precision training systems in high-performance sports.

Developed on the basis of the conversional methodology, three approaches of its practical implementation make it possible to solve a whole range of issues of working with training systems: modernize existing ones, as well as design innovative ones, both in "manual" mode and using digital technologies. The revealed patterns, formulated principles and practical ways of carrying out conversional operations developed on their basis make a significant contribution to solving two important problems of the theory and methodology of physical education and sports training:

1. Modernization of physical education and training systems through the introduction of highly effective sports technologies.
2. Designing high-tech sports technologies for athletes of the highest ranks.

This opens up the opportunity to provide a significant increase in the socio-cultural effectiveness of the physical education field for children and adolescents, as well as high-performance sports field for elite athletes. The most significant effect is that the widespread adoption of conversion will contribute to the broadening of professional horizons, enhance professional competence, and foster systemic thinking among a diverse range of professionals in the field of physical education and sports.

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