a powerful visual tool that gives the coach and his wards not only the opportunity to perform this or that exercise correctly or to demonstrate on the computer screen the consequences of incorrect or dangerous movements (techniques, methods, ways). In fact, augmented reality scrupulously, balancedly shows all the positive and negative aspects of the training process or game situation that cannot be seen or evaluated in any other way;

7) *knowledge mining systems Data Mining*. At present, a huge factual material has been accumulated, both on sports and educational topics in physical culture and sports educational organizations. As a rule, this is diverse and motley information, and it is difficult to get any useful data from it. But now the so-called Data Mining systems have appeared, which in translation means systems of “extraction” (elicitation) or “excavation of data”. It is they who can revolutionize the search for new patterns. On the basis of the same intellectualization of big data processing processes, impressive results have already been achieved, which, in principle, cannot be obtained in other ways. Systems of “data mining” find completely new laws of sports functional systems that a person did not suspect before. For example, they reveal (“dig out”) absolutely new methods of sports rivalry, find previously unknown methods of training processes, etc. These discoveries are gradually making their way into pedagogical practice. This became possible because intelligent systems process colossally large amounts of information, in which, using special algorithms, most often working on the ideas of artificial neural networks, completely unusual innovations in sports are sought out.

For the selection of information competencies, the international ICT standard [2] was taken as the basis, which contains a detailed description of 722 blocks of informatics (related to the discipline “Informatics”, included in information) competencies and 61 sets of specialized professional skills. Considering that the level of the Russian physical education and sports bachelor’s degree corresponds to the eighth level (Graduate diploma, Graduate certificate, Bachelor honors degree) of the Australian qualifications framework [2] (for the European Higher Education Area, it corresponds to the seventh level - Bachelor degree), then from it we Information competencies suitable for this professional activity were selected.

The closest analogue of the bachelor’s program in terms of information competences is the ICT60120 standard - Advanced Diploma of Information Technology [1], which can be considered at the level of an additional specialty or practical specialization in the field of information and communication technologies. Other training programs offered at the undergraduate or graduate level are even more specialized in ICT.

The study of these international and domestic standards made it possible to clarify the system of informatic competences of a physical culture and sports worker (with a specialization of a trainer-teacher). Based on them, we proposed a classification structure of the information competencies of a sports coach (see figure). It included the following components of information competencies: *technological, communication, technical, modeling and predictive, protective, informational.*

It is this structure of information competencies that meets the modern requirements for a sports coach. It is only necessary to remember that it is possible to realize the best sports results not only with the formation of such competencies, but also with the methodically correct organization of training sessions and creating favorable pedagogical conditions in achieving high sports productivity.

C**onclusions.** Summarizing the theoretical material, from the point of view of the essence and content of the concept of *“information competence of a sports coach”*, we will present its following definition: it is an integrative quality of a person, which is knowledge, skills and abilities in the use of modern information and communication technologies, digital instruments and devices for sports training, competitive and judicial orientation, through the willingness to use them, taking into account professional culture, professional abilities, based on coaching and sports experience, leading to high sports results.

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Development of cognitive and creative abilities of students of the faculty of physical culture under the conditions of teaching complex-coordinated physical exercises

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Abstract

Objective of the study was to reveal the influence of the "operational-circular information model" of teaching physical exercises on the development of creative and cognitive abilities of future physical education teachers.

Methods and structure of the study. The work was carried out on the basis of the Moscow State Regional University in the period from 2018 to 2021. 24 students (boys and girls) of the Faculty of Physical Culture were involved in the study, who studied in the direction of training 44.03.01 "Pedagogical education" (training profile - Physical Culture). The technique was based on an operational-circular information model of training and was worked out by comparing the technique for performing a new exercise being learned with the technique of a reference sample.

Results and conclusions. A structurally organized methodology, which includes blocks of physical, technical and technological training, allows for the period of study from the 2nd to the 4th semester to improve the indicators of students' cognitive abilities from 22 to 41%, and creative - from 19% to 51%. During the period of the experiment, the creative potential of the students of the experimental group improved on average from 47.9±0.98 to 67.4±2.13 (≤ 0.05).

Keywords: *creative abilities, cognitive abilities, complex coordination physical exercises, future teachers of physical culture, operational-circular information model of education.*

Introduction. Currently, most experts believe that improving the quality of education in professional pedagogical institutions becomes possible if modern in-novative approaches and technologies are introduced into their educational process [2]. A similar judgment applies to the practice of professional education of future teachers of physical culture [3]. However, here, according to the literature, there is not only the problem of subject-oriented professional training of future teachers, but also the problem of the development of their mental processes associated with the formation of creative and cognitive abilities [7]. The need for the latter is dictated by the active introduction of innovative approaches and technologies, new educational content into general educational organizations of the Russian Federation, requiring from teachers not only subject-oriented professional knowledge, skills and abilities, but also a sufficiently high cognitive potential and creative thinking [5].

In modern literature, there are data on the positive impact of the process of teaching motor actions on the development of the cognitive abilities of those in-volved [4]. At the same time, the development process is more efficient if students, thanks to direct and feedback from the teacher (coach), actively participate directly in the learning process itself. At the same time, in recent years, separate judgments have appeared in the specialized literature about the need in the learning process, including teaching physical exercises, to single out the external and internal connection of information transfer.

Under the external direct "informational" connection, it is proposed to un-derstand the connec-

tion going from the teacher to the student, and under the feed-back - going from the student to the teacher. In turn, under the internal "infor-mation" connection, it is proposed to understand the connection that goes from the student himself to himself (the student).

Based on self-address, the student acts as a “learner”, reproducing infor-mation about the exercise he performed, and as a “teacher”, evaluating the perfor-mance of the exercise being learned and making the necessary correction to it. In the process of self-learning physical exercises, this connection can be defined as an operational-circular information model of training. In the construction of such a model, the student simultaneously increases the activity of cognitive processes, forming a mental image of action and creative processes, comprehending the ac-tion he performs and making the necessary corrections to it.

Thus, the judgments expressed on the basis of the analysis of special litera-ture gave grounds to assume that the use of an urgent circular information model in the process of teaching future physical education teachers the physical exercises of the school program allows you to develop cognitive and creative abilities and, means to positively influence their professional activity.

Objective of the study was to reveal the influence of the "operational-circular information model" of teaching physical exercises on the development of cretive and cognitive abilities of future physical education teachers.

Methods and structure of the study. The work was carried out on the basis of the Moscow State Regional University in the period from 2018 to 2021. The study was of a longitudinal nature, which was dictated by the need to trace the features of changes in the studied indicators in the same participants of the experiment over a relatively long time (the first and second years learning).

24 students (boys and girls) of the Faculty of Physical Education were in-volved in the study. To diagnose cognitive and creative abilities, we used: a test for the development of logical thinking (Raven D.) [6]; a test for determining the speed of thinking (B.D. Karvasarsky); a test to determine the speed of memoriza-tion (“Random Access Memory”) [5], a test to determine the level of development of semantic memory (“Reproduction of a story”) and a test questionnaire of personal creativity (E.E. Tunik) [9].

To achieve this goal, we studied the nature of the change in the main indicators of cognitive and creative abilities under the influence of an experimental methodology for mastering complex-coordinating physical exercises by students of the school program in physical culture, developed on the basis of an operational-circular information model of education.

The experimental methodology included consistently physical, technical and technological training of students, where each type of training was characterized by the solution of relatively independent pedagogical tasks. The first block was subordinated to the solution of physical training problems, which was necessary to ensure the functional readiness of students to master new physical exercises. The main content of this block was the physical exercises of special physical training, which was included in the invariant part of the curriculum in the first and second semesters of students' professional education.

The second block of the experimental methodology included teaching stu-dents the technique of physical exercises taken from the line of textbooks on physical culture for students in grades 8-9 by A.P. Matveeva (2019). While learning the technical actions of sports games (volleyball and basketball) and the exercises from the "gymnastics and acrobatics" section, students performed training tasks that were different in their target orientation. The first group of tasks included a comparative analysis of the technique of the same exercises, but taken from different sources. Students had to highlight the differences and either agree with one of the proposed options, or offer their own version. But in both the first and second cases, they had to justify their choice based on the available knowledge. Upon completion of the tasks, students were given the opportunity to discuss their options.

Tasks of the second type were focused on the formation of students' skills to independently learn the technique of physical exercises using an operational-circular information model of training. Here the students were offered to get ac-quainted with the written description of the technique of the sample of the exercise being learned. After reading the text, the students were offered three attempts at practical implementation of the sample, without looking into the text. After the last attempt, the students were asked to describe the technique of the performed action and compare it with the technique of the sample. When comparing, students identified "inconsistencies" and made the necessary correction. After that, the students again tried to reproduce the given sample of the technique of the exercise being learned and again recorded their action with its subsequent comparison with the sample. At the same time, by identifying discrepancies between the emerging mental image of the exercise technique and its given text sample, the students made the necessary correction, both in the execution technique and in the self-study methodology. Here it was allowed to learn a sample of technique “in parts”, which were allocated by the students themselves.

Learning tasks of the third type included the formation of skills for self-assessment of the technique of the learned exercise, which was achieved on the basis of highlighting its elements that determine the qualitative characteristics of the performance. This group of tasks assumed joint activities of students, when one student controlled the performance of another and evaluated his technique according to a jointly developed scale of marks (the task was performed, as a rule, in pairs or groups). At the same time, the supervisor identified errors and suggested ways to eliminate them, which were discussed with the performing student.

The third block of the experimental methodology included technological training of students, within the framework of which the tasks of developing the skills to design the process of teaching new physical exercises were solved. The implementation of the tasks of this block took place during the passage of peda-gogical practice by students on the basis of the content of the planned results of the exemplary work program of a physical education teacher. The design assumed:

1) the choice of the exercise to be learned in accordance with the content of the subject planned result and its textual description;

2) description of "intermediate" results, ways and methods of achievement;

3) a plan for the phased achievement of the planned result.

During practice, students independently mastered the developed sample of physical exercise technique and demonstrated it for evaluation at the reporting conference.

With such a structural organization of the experimental methodology, we assumed that with the content of the second block we would promote the predominant development of cognitive abilities, and with the technological block, the predominant development of the creative abilities of the participants in the experiment.

Results of the study and their discussion. As the results of the study showed, the experimental technique had the most noticeable effect on increasing the indicators of logical thinking and semantic memory, where the increase was about 40%. The remaining indicators of cognitive abilities also significantly im-proved over the period of the pedagogical experiment (≤ 0.05).

Showed creative abilities at the end of the pedagogical experiment improved in comparison with the initial values. The most significant increase in future teachers of physical culture is the indicator of imagination, which is one of the main indicators in the characteristic of creative abilities [1]. It should also be noted that there were significant increases in other indicators of creativity, which averaged from 19 to 33% (≤ 0.05) over the period of the pedagogical experiment.

Completing the analysis of the results obtained on the development of cognitive and creative abilities in the experimental group of future physical education teachers, it should be noted that they significantly outperformed their peers from the control group. Thus, future teachers of physical culture indicators of logical thinking by the end of the pedagogical experiment amounted to 8.1±1.12 points, and future teachers of the control group - 6.8±0.73 (p≤0.05); indicators of working memory were 8.8±0.86 and 7.0±0.76 points, respectively (p≤ 0.05); thinking speed - 7.8±1.01 and 6.6±0.58 points (p≤ 0.05); semantic memory - 8.6 ± 0.74 and 6.9 ± 0.56 (p≤ 0.05).

According to most indicators of creativity, the experimental group signifi-cantly outperformed their peers from the control group. Thus, the index of curiosity in the experimental group was 16.4±1.68, and in the control group it was 11.4±1.80 (p≤0.05); the indicator of interest in the knowledge of complex phenomena was 15.6±1.74 and 12.1±1.44, respectively (p≤0.05).

Conclusions. The conducted research showed that in the process of teaching future teachers of physical culture complex coordination physical exercises, there is an opportunity to actively influence the development of creative and cognitive abilities.

Such an opportunity is provided thanks to the methodology, which is based on the operational-circular information connection, which is one of the varieties of internal communication, when the teacher independently reproduces, independently analyzes and independently corrects the performance of the physical exercise being learned. At the same time, the experimental methodology structured according to three basic blocks allows not only to positively influence the development of mental abilities, but also to ensure a sufficient level of physical fitness of future physical education teachers, which is necessary for successful teaching of complexly coordinated exercises.

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Modern trends in the development of health physical culture

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Abstract

Objective of the study was to experimentally prove the effectiveness and safety of using the method of forming a neutral position of the spine in fitness for the abdominal muscles.

Methods and structure of the study. The experiment was carried out on the basis of the “Ratiborets” fitness club in Yekaterinburg. It was attended by 14 women aged 30 to 38 years. For the experimental group, a training program was developed that included exercises that strengthen the abdominal muscles by stabilizing the spine in a neutral position. The experiment took place in three stages. The first stage was aimed at the development of static stabilization, the second - dynamic stabilization, the third - integrated stabilization.

Results and conclusions. The introduction of training in the work of fitness clubs for the development of static and dynamic stabilization with the control of execution technique strengthens the posture, axial muscles, increases the strength and endurance of the abdominal muscles. Moreover, such training is safe for the spine, since the main task of the method of forming the neutral position of the spine is to maintain the physiological (natural) curves of the spine and distribute the load optimally over all joints, thereby protecting them from injury.

Keywords: *health-improving physical education, fitness, digitalization, pandemic, neutral position of the spine, safety.*

Introduction. In the field of physical culture and sports, quite a lot of attention is paid to health-improving physical culture. In recent years, this direction has become increasingly relevant. This is due, on the one hand, to the deterioration of the health status of various segments of the population, the rejuvenation of a number of diseases, the deterioration of the environment, and so on. On the other hand, it has become fashionable to lead a healthy lifestyle, engage in various types of physical activity, and attend fitness clubs. As a result, new fitness technologies began to appear, combining both traditional and innovative means and methods of health-improving physical culture (A.G. Furmanov, 2003). At the same time, learning the correct technique for performing movements is a key factor in preventing injuries during the training process.

Recently, the topic of choosing the right and effective exercises for body alignment, improving its functionality and biomechanics of movements has become important for discussion in the instructor environment. The neutral position of the spine is directly related to the preservation of physiological curves (lordosis and kyphosis). The skill of building a neutral position helps to stabilize the spine both during daily activities and during the training process and protect the joints from injury. In this regard, the training of the abdominal muscles and the choice of effective exercises that will help develop the skill of maintaining a neutral position of the spine become relevant. The main criterion in the selection of exercises is their safety for the spine (E.A. Bespamyatnykh, 2021).

Objective of the study was to experimentally prove the effectiveness and safety of using the method of forming a neutral position of the spine in fitness for the abdominal muscles.

Methods and structure of the study. The experiment was carried out on the basis of the Ratiborets fitness club in Yekaterinburg. It was attended by 14 women aged 30 to 38 years. The composition of the experimental and control groups - seven people each.