

# Psychophysiological aspects of professional activity

## Annotation

Professional competence implies a personality trait that is formed in the process of the corresponding activity. At the same time, it is established that psycho-physiological indicators affect the nature of the subjective activity of the teacher.

In this aspect in the article is made an attempt to study psycho-physiological features of pedagogical activities in order to improve the process of professional teachers training. It was carried out an analysis of materials on the work psychology and work physiology. The definitions and characteristics of mental and physical work are presented. The study showed that the performance of professional duties requires certain requirements for the musculoskeletal system of the employee and his mental processes, which is being regulated by the central nervous system. There were revealed the characteristics of functional systems. Their self-regulation contributes to human adaptation for working conditions.

This way, the process of becoming future teachers of physical education will become more effective if their pedagogical and sports training is carried out not only on the basis of general psychological and pedagogical laws, but also taking into account the level of development of psycho-physiological indicators of this professional activity.

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**Abbreviations:** SOL, scientific organization of labour

## Introduction

Professional competence implies a personality trait that is formed in the process of the corresponding activity. At the same time, it is impossible to deny the study of the natural prerequisites of professional suitability, the study of all its physiological, psychological and social aspects, which allows in each case to outline the forecast and ways to achieve the optimal result. The implementation of labour activity is possible only if a person satisfies certain requirements for the profession.

The development of the socio-economic system is constantly accompanied by a revision of the requirements for professions. They are based on psycho-physiological criteria that define a list of functions, processes and qualities designed to ensure that a person realizes a specific activity.

From this perspective, the profession of a teacher acquires special status. It is established that psycho-physiological indicators affect the nature of the subjective activity of the teacher and this is justified by the characteristics of the basic properties of temperament in the interpretation of V.S. Merlin.<sup>1</sup> Such properties are: sensitivity, reactivity, activity, reactivity to activity ratio, reaction rate, plasticity or rigidity, emotional excitability, extraversion or introversion. Therefore, it is appropriate to present the type of temperament as a manifestation of the type of higher nervous activity in behaviour in terms of strength, balance, and the rate of manifestation of the processes of excitation and inhibition. In this case, the properties of higher nervous activity affect, first of all, the individual style of activity of the teacher.

## Methodology and organization of research

The study involved the determination of the psycho-physiological characteristics of pedagogical activity with the *aim* of improving the process of teacher training. The *methods* of theoretical research that have been used during the work are: abstract and axiomatic method, analysis and synthesis, induction and deduction, idealization, comparison and generalization.

## Results and Discussion

The theory of functional systems has identified the *learning process* as a way to eliminate the mismatch of the organism with the environment.<sup>2</sup> From this point of view, it is interesting to consider the physiological characteristics of the main types of human activity.

At the present stage, the physiology of the central nervous system is an area of interdisciplinary knowledge that allows us to study the physiological mechanisms of regulation of functions, including higher ones: behaviour, organization of movements, features of the activity of sensory systems.<sup>3,4</sup>

An analysis of researches on the physiology of various types of human activities<sup>5,6,7</sup> allowed us to state that in this aspect they can be compared with labour activity, the diverse forms of which can be divided into *physical* and *mental* work.

As well as labour activity, game and educational activities can be carried out both in intellectual and in practical form, naturally taking into account their features (species, age, social).

From these positions, in modern conditions of human life activities, characterized by increased technogenic solvency, *mental* work draws the attention of scientists in the field of

psychophysiology.<sup>8,9,10</sup> Given that intellectual activity combines the work associated with the reception and processing of information, for its successful implementation requires special tension of the sensory apparatus, activation of mental processes (attention, memory, thinking), maintaining balance in the emotional sphere<sup>11,12,13</sup>. This work is accompanied by *hypokinesia*, leading to the deterioration in the reactivity of the body and an increase in emotional stress. The consequences of hypokinesia can be pathology of the cardiovascular system, metabolic disorders, leading to obesity and, as a consequence, to diabetes.<sup>14,15</sup> Long-term mental stress has a depressing effect on mental activity: the functions of attention, memory, and perception deteriorate.<sup>16,17</sup>

*Physical* work is characterized by an increased load on the musculoskeletal system and the functional systems providing its activity (cardiovascular, neuromuscular, respiratory, etc.). By developing the muscular system and, thereby, stimulating metabolic processes, physical work has a number of negative consequences. In some cases, it is the low productivity, the need for a high voltage of physical forces, which requires a long rest (up to 50% of the working time).<sup>6</sup> Physical work is classified according to the severity of performance, which is determined in accordance with energy supply and taking into account the type of load (static or dynamic) and loaded muscles.

Intellectual work has been divided into *operator, managerial, labour of medical workers, representatives of creative professions, teachers, pupils, students*.<sup>9,17</sup> All these types differ in the organization of the labour process, the uniformity of the load and the degree of emotional stress.

Both the severity and also the intensity of work are characterized by the degree of functional stress of the body. In mental work, it can be *emotional*, when there is information overload, in physical work – *energy*, depending on the power of work.

But in the process of any kind of work, a regular change in the functional state of the human body occurs: work can both temper the worker and lead to depletion of the nervous system as a result of overwork and atrophy of some muscles, which generally leads to a decrease in working capacity. At the same time, it must be borne in mind that in the field of social production a person appears with his complex psycho-physiological functions, various abilities, changing moods, emotions and feelings. And this will be very significant, since human performance is influenced by various environmental factors, which sometimes have an adverse effect of varying intensity and duration.

Moreover, each type of work has its own characteristics. The ideal fulfilment of professional duties requires certain requirements for the *physiology* of the employee (his motor, bone-supporting apparatus, muscle structure) and his *psychology* (such functions as perception, psychomotor, thinking, attention and memory), which is being regulated by the central nervous system.

When it is performed monotonous work, the human performance decreases. Monotonous work is realized by a small number of nerve elements with a low tone of most of the brain due to the uniformity of stimuli. The limited groups of nerve centers do not have time to fill up the expenditure of energy resources, and therefore fatigue develops<sup>8,11</sup>.

Any work involves a certain *rhythmic* character. In this regard, monotony can be represented by a monotonous rhythm, which through a monotonous long-term stimulus contributes to a decrease

in attention, the development of drowsiness, fatigue, and a decrease in mental activity. From these positions, the scientific organization of labour (SOL) proposes to apply a variable rhythm of work and use *functional music*.<sup>18,19</sup>

A component of SOL represents the use of *ergonomics* features.<sup>20,21</sup> Based on such disciplines as anatomy, biomechanics, as well as technical sciences, ergonomics carries out research aimed at improving the workplace in accordance with the needs and capabilities of the employee.

The ultimate *goal* of ergonomics is to develop recommendations for improving the psycho-physiological working conditions that provide a person with comfort and convenience for work while maintaining his health. It can be stated that technological progress predetermined the development of this science. When creating some new equipment and control systems, the share of materialized labour increases, which require a reasonable consideration of the psycho-physiological capabilities of a person.

And here the problem of human adaptation to working conditions is of great importance, in the framework of which the self-regulation of the functional systems of the body is investigated. This is due to their following characteristics:<sup>22</sup>

- functional systems of various levels have a similar structure, even if there are qualitative differences;
- in order to achieve the desired result, various elements are already being integrated into them;
- functional systems of higher levels hierarchically dominate or subordinate the lower systems;
- they all operate on the principles of self-regulation.

This way, in the characteristics of self-regulation of functional systems integrally is reflected both the state of a person and also his individual characteristics.

## Conclusions

Nowadays, in the theory and practice of professional training of teachers of physical education, a certain attention is paid to the problem of the formation of pedagogical activity skills. However, the traditional system of training a specialist in physical education, as a rule, does not take into account the individual characteristics of students in their formation. It is assumed that the theoretical provisions and practical recommendations that is communicated to him are equally suitable for any person, without emphasis on the individual characteristics of their application and taking into account the personality characteristics of students. The process of becoming future teachers of physical education will become more effective if their pedagogical and sports training is carried out not only on the basis of general psychological and pedagogical laws, but also taking into account the level of development of psycho-physiological indicators of this professional activity.

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## Conflicts of interest

The author declares that there is no conflicts of interest.

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