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**ON THE NECESSITY OF FORMING AN ERGONOMIC CULTURE OF FUTURE TEACHERS**

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**Abstract**

The article considers the problem of the formation of an ergonomic culture with the aim of creating a safe and comfortable educational environment for the development of personality, and maintaining the health of the subjects of the educational process. The presented basis of pedagogical ergonomics provides the development of the need for future teachers to master ergonomic knowledge, skills. The problem of the formation of an ergonomic culture is revealed through the fulfillment of labor functions by future teachers of the modern school as the main condition for the teacher's professional activity. The ergonomic and pedagogical validity of the effectiveness of the implementation of the labor functions of future teachers in the practice of a modern school, confirmed by empirical research, is given.

**Keywords**

Ergonomic culture – Teacher – Comfortable and safe educational environment

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PH. D. LARISA OKULOVA

## Introduction

The widespread informatization of the educational space of modern schools dictates a growing need to master the knowledge and skills to create conditions that would strengthen the health of schoolchildren and teachers of modern schools, create safe conditions for schoolchildren, and ensure the life and health of schoolchildren and teachers. However, subject to the fact that this knowledge is based precisely on ergonomics, it can be said plainly that providing an effective, comfortable and health-friendly educational environment in a modern school largely depends on the ergonomic culture of each teacher<sup>1</sup>. At present, the problem of creating a comfortable, safe educational environment of a modern school taking into account ergonomic knowledge is a rare subject of research in the Russian Federation with only some ergonomic aspects highlighted. In our opinion, one of the reasons for the current situation is found in the lack of training of future teachers of the modern school for ergonomic knowledge, therefore, the lack of formation of ergonomic culture in future teachers. Thus, there is a need to identify the influence of ergonomic culture on the work functions of future teachers of a modern school in providing a comfortable and safe educational environment of a modern school<sup>2</sup>.

## Methods

The professional standard of the teacher offers a description of the labor functions in the form of a functional map by type of professional activity of the teacher. The list of labor functions and skills a teacher must perform in a modern school, taking into account ergonomic knowledge, is extensive. In this regard, the problem of the lack of studying pedagogical ergonomics as a subject in the preparation of university students — future school teachers — is growing more urgent. The problem of creating a comfortable and safe educational environment of a modern school that is specially organized and adapted for learning activities can be solved only by identifying the influence of ergonomic culture on the labor functions of future teachers of modern school, which certainly updates the qualitatively new setting of modern educational policy.

The need to study the influence of ergonomic culture on the labor functions of future teachers of modern school is determined by contradictions:

- between the expectations of schoolchildren and teachers to study in a comfortable and safe educational environment and standards imposed, on the one hand, and the current state of schools unable to provide comfortable, safe and convenient learning environment, on the other;
- between the social need of the society in providing the school with a comfortable and safe educational environment and the demand for ergonomic knowledge that improves the quality of education, comfort and safety of the educational environment, and the difficulties the teachers face with in organizing a comfortable learning

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<sup>1</sup> Chia-Ju Liu; David B. Zandvliet and I.-Ling Hou, "The learning environment associated with information technology education in Taiwan: Combining psychosocial and physical aspects", *Learning Environments Research*, Vol: 15 num 3 (2012): 379–402.

<sup>2</sup> Larisa Okulova, "Students and teachers of a modern higher educational establishment: ergonomic requirements and satisfaction in learning and work", *Revista Espacios*, Vol: 39 num 40 (2018): 13–15.



environment and workplace due to the lack of ergonomic knowledge and skills in such teachers and an immature ergonomic culture.

The object of the research is the ergonomic culture of students of the psychological and pedagogical universities. The subject of the research is the mechanisms of the influence of ergonomic culture on the labor functions of future teachers of modern school. The hypothesis of the study: the relationship of basic training and the active use of ergonomic knowledge by students of the university, presumably, actualizes their need for continuous ergonomic self-improvement as one of the indicators of human culture. Implementation of the practice of mastering ergonomic knowledge and skills by a university student to create a comfortable educational environment will make ergonomic education at the same time the leading prerequisite for the formation of an ergonomic culture for a future teacher. In this regard, there is a need to clarify the essence of the phenomenon of “Ergonomic teacher culture”, which is an integral part of the professional and pedagogical culture of the teacher of the modern school and determine the components of the influence of ergonomic culture on the labor functions of future teachers.

The conceptual idea of our work should substantiate that such components of the ergonomic culture of future teachers as ergonomic knowledge, skills, thinking and focus, are the leading mechanism of influence of ergonomic culture on the labor functions of future teachers of modern school. If the future teacher has an ergonomic culture, then he/she will be able to implement proper organization and strict observance of ergonomic requirements (interior design, teacher’s and student’s workplaces, training facilities, thermal comfort, furniture, lighting, space planning, class schedule, *etc.*) in modern school to:

- the fulfillment of his/her professional tasks in a comfortable and safe educational environment, both in the school and in the teacher’s workplace;
- the functioning of the school and classrooms in terms of compliance with ergonomic requirements for process and educational equipment, and preservation of health.

## Results

The methodological basis of the fundamentals of safety, ergonomics and psychology of mental labor is presented in the scientific works by A.A. Krylov, E.A. Klimov, B.F. Lomov, V.S. Merlin, V.M. Munipov, V.D. Parondzhanov, K.K. Platonov, and A.A. Radugin. Problems of development of the labor functions of school teachers are considered by such scholars as: A.N. Leontiev, V.A. Druzhinin and others. Some ergonomic aspects are presented in the works by such modern authors as: A.A. Belov, E.V. Voronina, R.S. Gershunskaja, V.P. Zinchenko, A.A. Kriulin and others. Physiological and ergonomic factors of schoolchildren performance are presented in the works by N.V. Alishev, M.V. Antropova, A.S. Egorov, V.I. Rozhdestvenskaia. However, there are unheeded issues of the formation of ergonomic knowledge and skills of future teachers as an important component of ergonomic culture as well as components of the influence of ergonomic culture on the labor functions of future teachers of modern school<sup>3</sup>.

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<sup>3</sup> Jonathan Davy et al., “‘Ergonomics on the Ground’: A Case Study of Service Learning in Ergonomics Education,” in Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018), ed. Sebastiano Bagnara et al., vol. 826 (Cham: Springer International Publishing, 2019), 693–702; Gabriela Cuenca and Michelle Aslanides, “Professional Ergonomics Education in Argentina,” in Proceedings of the 20th Congress of the International Ergonomics Association (IEA 2018), Volume

The formation of the ergonomic culture of the personality of the future teacher of the modern school requires effective pedagogical guidance and skill. The study of the problem of improving the ergonomic culture of the subjects of the educational process (teacher and student) has intensified in recent decades abroad. Foreign teachers consider the concept of ergonomic culture with the possibility of their use in school. L.A. Sidorchuk from Ukraine understands the ergonomic culture of the teacher to mean the integration of the personality traits of the teacher. Such a teacher is able to interact in the "man - technology - environment" system. The ergonomic culture of the teacher prepares his/her students for a creative way of life, both in a modern technological society, and modern pedagogical activity. I. Gedrovits from Latvia explains the concept of ergonomic culture of a teacher through the labor culture of computer users. This culture includes the full ergonomic fit of the computerized workplace and the entire working educational environment. A modern school teacher understands the need for ergonomic knowledge and therefore complies with the relevant ergonomic requirements and recommended prescriptions and rules on labor protection in the learning process. The Russian practice of the education system practically neglects studying the concept of ergonomic culture.

In terms of an active search in achieving a high level of mental performance, teachers and schoolchildren acquire special importance for the teacher: ergonomic knowledge, ability to use subject knowledge as a means of ergonomic learning and student development to create a comfortable and safe educational environment, ways of organizing learning activities and ergonomic teacher culture.

We are convinced that the successful solution of these problems primarily depends on how the students understand the features of pedagogical ergonomics and the role of the ergonomic culture of the teacher's personality in it. There is also no doubt that the formation of the ergonomic culture of schoolchildren can take place only if there is an ergonomic culture among the teachers, which means that the future teachers should be trained accordingly.

Teacher's ergonomic culture is understood to mean the totality of ergonomic knowledge and skills that ensure the creation and use of a comfortable and safe educational environment and the workplace of a modern school teacher. Since the "teacher - school student - educational environment - teaching tool" ergonomic system is a component of pedagogical ergonomics, it can be concluded that the ergonomic culture consists of a teacher's culture, a student's culture, a culture of the educational environment, and a culture of teaching aids that direct the activity of the teacher to create an effective, comfortable and safe learning process.

The important components of the labor functions of future teachers within the framework of the ergonomic aspect are the compliance with the sanitary and hygienic, physiological, psychophysical, anthropometric and psychological characteristics of the human body in the context of creating a comfortable and safe educational environment of the modern school. The ergonomic characteristics listed above should be implemented with regard to the main focuses. Spatial focus shows where the teacher carries out his/her labor activity (workplace, zone). Time focus takes into account the teacher's labor movements,

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IV: Organizational Design and Management (ODAM), Professional Affairs, Forensic (Cham: Springer International Publishing, 2019), 711–717; Flore Barcellini, Tjerk De Greef, and Françoise Détienné, "Editorial for special issue on cognitive ergonomics for work, education and everyday life," *Cognition, Technology & Work*, Vol: 18 num 2 (2016): 233–235.

his/her work and rest regime (performance, fatigue, *etc.*). Informational focus shows where and how the teacher conducts the search, analysis, information processing (sense organs, symbols, signs, sounds, *etc.*).

In terms of the total technologization of the educational environment and the gradual formation of an ergonomic personality culture, we can speak about the emergence of an “ergonomic human” with his/her requirements of safety, comfort, optimization of activities, and increase in the efficiency of intellectual work. Considering the problem of the rise and formation of ergonomic culture, in terms of the need to bring training of future teachers in line with ergonomic requirements, it should be noted the importance of solving ergonomic tasks of improving the educational process. Only in this case, it is possible to provide a comfortable and safe educational environment in a modern school. Thus, an increase in the efficiency and quality of education, personal development and preservation of the health of participants in the educational process is achieved.

## Discussion

The labor activity of a modern school teacher is carried out under a complex interaction of a multitude of ergonomic factors. In this regard, one of the conditions for the teacher’s successful professional activity is the ability to ergonomic activities, mastering ergonomic knowledge and skills, and transferring ergonomic skills to schoolchildren in order to increase the efficiency, safety and comfort of the learning process. Immature ergonomic culture among teachers and students leads to a significant mismatch between the goals and results of educational activities. Its consequences are the decrease in efficiency, safety and comfort of the educational process, the considerable expenditure of human, technical, intellectual resources, lack of ergonomic knowledge and skills, whose carriers should be teachers and schoolchildren of modern school.

This is confirmed by the results of our study of the level of ergonomic training of students of 44.03.02. "Psychological and pedagogical education" branch of FSBEI HE "Udmurt State University" in Votkinsk, conducted in the 2017-2018 school year. Thus, a group of students answered the questions of the test about ergonomics and its role and place in the education system. The experiment involved 40 first-year extra-mural students with shortened periods of study. As a result, only 10% of students answered that they were familiar with the concept of ergonomics and had an idea about the use of ergonomics, and only 5% said that they had heard about the use of ergonomics in the education system. Such a low awareness of ergonomics and its role and place in the education system allows us to make an assumption about the unwillingness to perform labor functions, according to the teacher’s professional standard. Answering an open question of “How should a culture of healthy and safe lifestyle be formed among students?”, 65% of students indicated the subject “Physical Culture and Sport”, 35% - “Life Safety”. Thus, it is likely that only 14 people find the formation of a culture of healthy and safe lifestyle reflected in the ergonomic component, since the study of the basic fundamentals of ergonomics is one of the sections of the study of the subject "Life Safety" and, most often, the section of ergonomics by students in the university is studied independently. This makes the intellectual activity of the future teacher limited in the field of ergonomic education.

The results of the study showed that school training does not provide the necessary level of ergonomic component in the education system for the future teacher. Therefore, future teachers need special training at the university to obtain ergonomic knowledge that will ensure the performance of labor functions, according to the teacher’s professional

standard. The modern Russian system of higher education does not intend the formation of the ergonomic culture of the teacher's personality as an object of purposeful education. In the future, in their professional activities, the teacher is unable to apply ergonomic knowledge and skills, which cuts down the content and forms of work of the teacher in modern schools, reduces the level of satisfaction with the teaching profession. Only a teacher with a high level of an ergonomic culture can form it in his/her schoolchildren at present. In general, the lack of an ergonomic culture in a future teacher of modern school negatively affects the performance of his/her labor functions.

To solve this problem, the branch of FSBEI HE "Udmurt State University" in Votkinsk included the subject "Ergonomics of Education" in the curriculum for fourth-year students of 44.03.02. "Psychological and Pedagogical Education". The program of "Ergonomics of Education" is part of the professional cycle of the variable part of the component subjects for choosing the Bachelor's basic educational program (B3.V.07.01). As a result of mastering the subject, the student develops the following competencies: OK-1 - masters the culture of thinking, is able to summarize, analyze, perceive information, set goals and choose ways to achieve it (OK-1); PK-7 - is ready to ensure the protection of life and health of students in the educational process and extracurricular activities (PK-7). The total scope of the subject is 2 credits, 72 hours. The assessment of the quality of the subject includes the ongoing monitoring of progress, intermediate qualification of students.

According to the results of the course "Ergonomics of Education", a retest was conducted about knowledge of ergonomics and its role and place in the education system. The same but already the fourth-year students took part in the experiment, total 38 people. As a result, 100% of students answered that they are familiar with the concept of ergonomics and have an idea about its use in the education system. Such a high level of awareness of ergonomics and its role and place in the education system suggests that there are formed ergonomic knowledge and skills, the readiness of students to perform work functions, according to the teacher's professional standard. Answering an open question of "How should a culture of healthy and safe lifestyle be formed among students?", 100% of students indicated the subject "Ergonomics of Education" together with such subjects as "Physical Culture and Sports", "Life Safety" *etc.* Thus, the presence of elements of ergonomic culture such as ergonomic knowledge, skills, thinking and focus indicate a willingness to shape the teacher's ergonomic culture.

## Conclusion

During the formation of an ergonomic culture the teacher has effective control over the level of formation of ergonomic knowledge, skills, thinking, focus, and other components of ergonomic culture. In our opinion, the future teacher will have an ergonomic culture formed if during the learning process various types of controls are regularly carried out, for example, testing, ergonomic knowledge and skills assessments. The educational activities of the future teacher should be organized in such a way as to timely identify and eliminate gaps in knowledge. The learning process should be active, contributing to the self-improvement of ergonomically significant labor functions, according to the teacher's professional standard. Thus, we have substantiated the relevance of the study of the influence of ergonomic culture on the labor functions of future teachers of the modern school. Analysis of the professional standard of the teacher showed the need for the formation of a teacher's ergonomic culture. The teacher's ergonomic culture shall be understood to mean the totality of ergonomic knowledge and skills that ensure the creation and use of a comfortable educational environment and the workplace of a modern school teacher. The

study of the problem of influencing the ergonomic culture on the teacher's labor functions has shown that the teacher's ergonomic culture contributes to the improvement and full performance of the teacher's labor functions and has a significant impact on the problem of teacher's participation in creating and implementing a safe and comfortable educational environment of the modern school and shaping the ergonomic culture of schoolchildren.

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