

# Preparing Students of the Institute of Physical Education and Sport to Use Distant Learning Technologies in the Course of Pandemic

## Preparar a los estudiantes del instituto de educación física y deportes para utilizar las tecnologías de aprendizaje a distancia en el curso de la pandemia

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**Received** 07-12-20 **Revised** 08-14-20 **Accepted** 09-12-20 **On line** 09-16-20

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### Cite as:

Olesov, N. P., Sergin, A. A., Alekseev, V. N., Nikiforov, N. V., & Baishev, I. I. (2020). Preparing Students of the Institute of Physical Education and Sport to Use Distant Learning Technologies in the Course of Pandemic. *Propósitos y Representaciones*, 8(SPE3), e709. doi: <http://dx.doi.org/10.20511/pyr2020.v8nSPE3.709>

**Summary** San Ignacio de Loyola, Vicerrectorado de Investigación, 2020.



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This study reveals the importance of distance learning for professional students' training in this innovative activity in regional institute of physical education. The urgency of research is based on the problem of insufficient readiness of physical education teachers and sports coaches in the Republic of Sakha (Yakutia) to implement distance learning. It is also based on the lack of widely used educational programs that are scientifically grounded, well tested in practice and that promote targeted training of physical education teachers to use DL technologies in the course of pandemic. The experiment involved bachelors' and masters' degree students in various specialties from the M.K. Ammosov North-Eastern Federal University (NEFU) and the Churapchinsky State Institute of Physical Education and Sport. All the students were majoring in Pedagogical Education and Physical Education. The leading method of research into the problem is the use of mathematical statistics to monitor the dynamics of the process development of training future physical education teachers and sports coaches to use DL technology. Main findings: The research results show that the use of new types of educational activities in the course of pandemic contributes to the effective contemporary professional training of Physical Education teachers and sports coaches. The practical implications of the research may be found in the analysis of future Physical Education teachers' training to use DL in conditions of remote access to the educative process of the discipline "Information Technologies in Physical Education and Sports" study. The content of the article will be useful for faculty members of institutions of higher education, institutions of additional education, and physical education teachers. The originality of this study is in providing the facts that the high proficiency and professional capacity of graduates of physical culture institutes, their ability and competence to adjust the accumulated knowledge and skills to new goals and objectives of education, regularly changing conditions of professional activity can be formed and developed through the effective use of DL technologies. adapted to the solution of occupational tasks.

**Keywords:** Distance Learning; E-Learning Technologies; Adaptive Training; Future Physical Education; Teachers and Sports Coaches.

## Resumen

Este estudio revela la importancia de la educación a distancia para la formación de los estudiantes profesionales en esta actividad innovadora en el instituto regional de educación física. La urgencia de la investigación se basa en el problema de la insuficiente preparación de los profesores de educación física y los entrenadores deportivos de la República de Sakha (Yakutia) para poner en práctica el aprendizaje a distancia. También se basa en la falta de programas educativos ampliamente utilizados que tengan una base científica, estén bien probados en la práctica y que promuevan la formación específica de los profesores de educación física para utilizar las tecnologías de DL en el curso de la pandemia. El experimento involucró a estudiantes de licenciatura y maestría en varias especialidades de la Universidad Federal del Noreste de Ammosov (NEFU) y el Instituto Estatal Churapchinsky de Educación Física y Deportes. Todos los estudiantes se especializaron en Educación Pedagógica y Educación Física. El método principal de investigación del problema es el uso de estadísticas matemáticas para supervisar la dinámica del desarrollo del proceso de formación de los futuros profesores de educación física y entrenadores deportivos en el uso de la tecnología de DL. Los resultados de la investigación muestran que el uso de nuevos tipos de actividades educativas en el curso de la pandemia contribuye a la efectiva formación profesional contemporánea de los profesores de educación física y entrenadores deportivos, con un índice delgado eran más altos que aquellos con un índice normal y con exceso de peso. Además, se encontró una correlación positiva significativa de bajo nivel entre los niveles de actividad física. El nivel de actividad física es una variable que predice el nivel de resistencia psicológica.

Las implicaciones prácticas de la investigación se pueden encontrar en el análisis de la formación de futuros profesores de Educación Física para utilizar la DL en condiciones de exceso remoto al proceso educativo de la disciplina "Tecnologías de la Información en la Educación Física y el Deporte" estudio. El contenido del artículo será útil para los miembros del profesorado de instituciones de educación superior, instituciones de educación adicional y profesores de educación física. La originalidad de este estudio consiste en proporcionar los hechos de que la alta competencia y capacidad profesional de los graduados de los institutos de cultura física, su capacidad y competencia para ajustar los conocimientos y habilidades acumulados a las nuevas metas y objetivos de la educación, las condiciones regularmente cambiantes de la actividad profesional pueden formarse y desarrollarse mediante el uso eficaz de las tecnologías de DL adaptadas a la solución de las tareas ocupacionales.

**Palabra clave:** La Enseñanza a Distancia; Las Tecnologías de Aprendizaje Electrónico; La Formación Adaptada; Los Futuros Profesores de Educación Física y los Entrenadores Deportivos.

## Introduction

Providing accessible and high-quality education for all students of universities and institutes, regardless of their place of residence, has been and remains the main goal of the Russian state policy in the field of education. One of the mechanisms for the implementation of this priority area is the use of distance learning (DL) in the field of physical culture and sports. Distance learning provides new means and new educational technologies, new forms and methods of teaching, learning, knowledge assessment, and allows the introduction of new models of interaction between participants in the educational process. It changes the very model of educational activity. These educational innovations require a new teaching staff which is ready and able to carry out their professional practice applying DL technologies. However, the practical implementation of these technologies remains at a very low level, which is largely due to the unpreparedness of physical education teachers and sports coaches to work with them. To solve this problem, the teachers at the Department of Theory and Methods of Physical Culture and Life Safety at the Institute of Physical Culture and Sports have developed and implemented a continuous training system for future physical education teachers in a specially created adaptive electronic information and educational environment focused on students addressing professional problems by means of DL.

The purpose of the research is to develop practical foundations for effective adaptive training of students at the Institute of Physical Culture and Sports at M.K. Ammosov North-Eastern Federal University (NEFU) on the use of DL technologies. The study was carried out by a team of authors who work at various departments at the Institute of Physical Culture and Sports at the NEFU in the Republic of Sakha (Yakutia). This allows us to cooperatively use the innovative, human and resource potential of the institute to address the challenge of high-quality and effective training of specialists in physical culture and sports in the field of DL and to identify possible risks and specific features of this new type of education in the regional system of physical education in the face of a pandemic.

The study was carried out within the framework of educational programs at the Institute of Physical Culture and Sports (IPC&S) and the Churapchinsky State Institute of Physical Culture and Sports (ChSIPC&S), based on the use of DL technology for the professional training of physical education teachers and sports coaches for work in the face of a pandemic. The study was carried out among students enrolled in the master's educational programs "Social and Pedagogical Management in the Field of Physical Culture", "Professional and Applied Physical Culture", "Training of Highly Qualified Athletes in the Chosen Sport", "The System of Training Athletes in Olympic Sports", providing effective training of future physical education teachers and sports coaches to use DL in the educational process.

## Literature Review

One of the promising areas for the Republic of Sakha (Yakutia) is the implementation of DL elements, which involves the application of modern information and telecommunication technologies and the implementation of DL without direct contact between teachers and students (Barakhsanova & Sorochinsky, 2016; Prokopyev, 2012; Solovyeva, 2019).

The theoretical foundations of the study are the works of domestic authors related to the use of DL (Lapchik, 2014; Khutorskoy, 2015). The introduction of DL technologies significantly saves and streamlines the teacher's time and strengthens the managerial and communicative aspects of the educational process in the context of the e-learning implementation (Barakhsanova & Danilova, 2018).

The works as regards schools of thought by researchers, such as Barakhsanova (M.K. Ammosov NEFU) and Vlasova (the Herzen State Pedagogical University of Russia) (2017) state that DL helps get education in an agile, timely and effective way; makes feedback between teachers and students in the shortest possible time; makes possible an individual choice for the acquisition of new knowledge: promotes the use of uniquely designed educational programs and improves the education quality through the use of information and communication tools, digital libraries, and various methods; allows significantly reducing the cost of conducting lectures and practical classes in educational institutions, as well as the cost of training due to the absence of fees for renting classrooms, utilities, commuting to the place of study, etc. (Barakhsanova et al., 2018; Vlasova, Goncharova et al., 2019a; Vlasova, Goncharova, et al., 2019b).

In a number of publications, "distance learning" is understood as training implemented through the use of multi- and hypermedia, remote access to distributed educational resources based on web technologies, with automated control and analysis of learning outcomes and the widespread use of various network means of interaction between students and with a teacher (Barakhsanova et al., 2017; Vlasova, 2010).

The works of teachers of the Institute for Physical Culture and Sports of the NEFU published in foreign and domestic publications, including the article "E-learning system application for physical education and sports specialist training" (Barakhsanov et al., 2018) reflects the importance of using the Moodle system for the organization of distance learning, which allows the teacher and the student to utilize the unique capabilities of the Internet, including digital information resources, educational and methodological complexes for taking training sessions, etc. The article by Khompodoeva and Olesov (2012) presents the role of sports and mass information in the regional information infrastructure, as well as the formation of research competence among students of a physical education institution in the context of the implementation of the new generation of Federal State Educational Standard (FSSES), taking into account the specifics of the informational educational environment. In his studies Sergin (2010) notes the need to pay attention to the informatization of physical culture in educational institutions at a faster pace, some other articles emphasize the importance of planning of the implementation of information support for the process of physical culture and sports in the Republic of Sakha (Yakutia), and deal with the advantages and requirements for the organization of the use of ICT (Khompodoeva & Sergin, 2012). Nikiforov (2011) focuses on the development of youth physical culture as a priority of leisure pedagogy, building models of teaching and the student.

The works of foreign authors discuss various aspects of preparing teachers for professional activities in innovative digital informational and educational environments (Schulz et al., 2014), taking into account the interactions between teachers and students. The authors of the articles analyze the experience of social cooperation and the possibility of using network tools in DL (Imran et al., 2016), explore teachers' attitudes, engagement and support for online professional development (Gunter & Reeves, 2017). It should be noted that the analyzed works do not reflect the problem of studying effective methods of adaptive training of university students

in the field of physical culture and sports for the use of distance learning technologies in the context of providing remote access to training. The problem of the quality of education in a constantly changing world is specifically dealt with in the writings of one of the leaders of the Worldwide CDIO Initiative (Kamp, 2016).

The analysis of the scientific articles substantiated that the use of distance learning technology in a physical education institute involves taking into account the subject characteristics, the characteristics of the participants in the educational process, providing an intensification of the learning process, using active methods and information technology tools based on the network interaction. To build an optimal educational process, it is necessary to use the theory of informatization of education grounded on the importance of DL technology. Modern information technologies provide opportunities for the upgrading of the educational process. Information technologies and means of DL make it possible to implement the principles of providing remote access to training in the course of pandemic. DL information technologies can be applied for both full-time and distance learning; in both urban and rural schools. They enable to implement global trends in education, opportunities in order to enter a single global information space. The use of DL technology allows increasing the level of self-education, motivation of educational activities; gives completely new opportunities for creativity, acquisition and consolidation of various professional skills.

### **Material and Methods**

This study was carried out from 2018-2019 to 2019-2020 academic year by teachers at the IFC&S and ChSIPC&S in the Republic of Sakha (Yakutia). This allows us to more deeply comprehend the problems and tasks of effective training of future teachers (students) of physical education and coaches of physical culture and sports and their adaptation to work in the context of the implementation of digital education and to identify and develop the necessary general, specific and relevant educational technologies adapted to regional characteristics, considering the pandemic.

At the first stage, the collection, analysis and systematization of information on the problem of the readiness of future physical education teachers and coaches to use DL technologies to solve professional problems was carried out, and attention was also paid to the question of how students of physical culture institutes are prepared to address these issues. As a result of analyzing the content of curricula, observing the educational process in a number of physical culture institutes in Russia, conversations with colleagues – teachers at pedagogical universities, a synthesis conclusion has been made that the acquisition of DL technologies by students is reduced to their study of the technique of working with these technologies, and often exemplified by the tasks that are very far from education. In addition, in general, teachers at the IPC&S do not use DL technologies when conducting practical classes.

At the second stage, the objects of research became first-year students (bachelors in “Physical culture” profile of training at the IFC&S, NEFU and ChSIFC&S, as well as undergraduates studying in the area of training “Physical Culture” according to the master’s programs “Professional and Applied Physical Culture” and “Social and Pedagogical Management in the Field of Physical Culture”, “Training of Highly Qualified Athletes in the Chosen Sport”, “The System of Training Athletes in Olympic Sports”. More than 120 bachelors and 70 master’s students (the NEFU and ChSIFC&S) took part in the experiment.

### **Results**

The major assumptions of the research are: 1) the development of a new content for training students at the IFC&S and ChSIFC&S in the field of information technologies with a focus on their practical application for solving professional problems of education and DL; 2) the implementation of students’ training in an electronic informational and educational environment, adapted to their future professional life; 3) development by students of their personal electronic

educational environment applying information technologies familiar to everyone. The research participants set a goal not only to qualitatively teach students to master the proposed information technologies, but also to motivate them to actively use these technologies as tools for learning, self-study, and for the implementation of new adaptive educational activities in the conditions of an electronic informational and educational environment.

After completing the study of the discipline “Information technology in the field of physical education”, bachelors were asked to answer the question: Do you consider it useful to study the discipline in terms of its content, form and teaching methods? For all the years of the experiment, not a single student gave a negative answer. Moreover, all the respondents emphasized the effectiveness of teaching in the e-learning environment they were proposed, which was developed by the teachers at the Department of Theory and Methods of Physical Culture and Life Safety and focused on the multifaceted use of e-learning technologies in relation to tasks adapted to the future professional activities of a teacher and coach.

Every year, students who completed the study of the discipline were divided into two groups (the 1st group included the NEFU students, the 2nd group – the ChSIFC&S students). Each group was asked to answer the question: Do you consider it expedient from the point of view of your professional development to continue studying distance learning technologies in relation to the tasks of professional activity? At the level of significance,  $\alpha = 0.02$  ( $g = 0.98$ ), the hypothesis was tested that the students of the IFC&S and ChSIFC&S consider it appropriate to continue the study of DL technologies in relation to the tasks of professional activity.

The study also involved graduate students from two institutes who purposefully studied DL. At the same time, they studied actively using information technologies and e-learning, which significantly changed the educational activities of both students and teachers. Undergraduates from the NEFU and ChSIFC&S were asked to answer the question: Which of the listed characteristics of new educational activities influence the effectiveness of professional training of a modern physical education teacher? Arrange them in order of importance. The hypothesis was tested that the correlation between two ordered groups of characteristics in the sample related to NEFU and in the sample related to the ChSIFC&S is statistically significantly different from zero (i.e., the opinions of students from two universities on the issue under study are similar). The results were processed using the method of mathematical statistics.

On the basis of the results obtained during the processing of test questions, there was identified the need for training physical education teachers who are able to actively apply modern information and communication technologies in their professional activities, which are the technological and instrumental basis of DL. Its effective use in the educational process is confirmed by specific results obtained after processing experimental data.

**Table 1.**  
Results of a survey of students at the NEFU and ChSIFC&S

Year	NEFU		ChSIFC&S		Statistics, t
	Total number $n_1$	The answer is “Yes” $m_1$	Total number $n_2$	The answer is “Yes” $m_2$	
2018-2019	100	84	90	75	0.412

2019-2020	95	69	80	64	0.424
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It contains two samples with volumes  $n_1$  и  $n_2$  from two aggregates. The data was processed using an algorithm for testing the hypothesis concerning the equality of the shares of the evidence. Selected shares  $w_1$  and  $w_2$  were calculated, respectively, by the formulas

$$w_1 = \frac{m_1}{n_1}, w_2 = \frac{m_2}{n_2}, \tag{1}$$

where  $m_1$  и  $m_2$  is the number of elements in the first and the second samples, possessing the feature under study. Statistics  $t$  (for every year) was calculated by the formula

$$t = \frac{w_1 - w_2}{\sqrt{p(1-p)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}, \tag{2}$$

where  $p$  is calculated by the formula

$$p = \frac{m_1 + m_2}{n_1 + n_2}, \tag{3}$$

For the level of the value  $\alpha = 0.02$ , the values of  $t_{\text{critical value}} = 2.33$  were found from tables. Whereas

$$|t| < t_{\text{critical value}}, \tag{4}$$

then the hypothesis that the NEFU and ChSIFC&S students consider it equally expedient to continue studying DL technologies in academic disciplines has been proved. The result obtained must be taken into account for the meticulous organization of the educational process. It is the content of the master’s program “Physical Culture” for the master’s programs “Professional and Applied Physical Culture”, “Social and Pedagogical Management in the Field of Physical Culture”, “Training of Highly Qualified Athletes in the Chosen Sport”, “The System of Training Athletes in Olympic Sports” and efficient organization of instruction and training procedures with the active use of DL technologies have produced positive results in training students during a pandemic. This is confirmed by the results of a survey conducted with graduate students’ participation at the two institutes in May 2020.

Table 2 presents the rank indicators of the characteristics of the new educational activity. There are 13 of them. They were used to find the Spearman’s rank correlation coefficient  $r_s = 3.87$ . It is calculated using the formula

$$r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \tag{5}$$

There is a positive correlation between the opinions of students from the two universities on the issue under study at the level of value  $\alpha = 0.05$ , as  $t_{\text{test}} > t_{\text{critical value}} (3.67 > 2.18)$ . Student’s  $t$ -test was used to make a decision and calculated by the formula

$$t = |r_s| \sqrt{\frac{n-2}{1-r_s^2}} \tag{6}$$

The relationship between the opinions of the undergraduates from the IFC&S and ChSIFC&S is statistically significant at a 5% level of value.

**Table 2.**  
Rank indicators of features of new educational activity

Features	Rank in the NEFU sample	Rank in the ChSIFC&S sample	d	d <sup>2</sup>
Individual focus	12	10	2	3
Flexibility	3	4	-1	1
Mobility	1	3	-2	4
Distribution (location of learners during a pandemic)	6	9	-3	9
Students' ability to use DL technologies	9	6	-3	9
Real time monitoring	12	10	-2	4
Students' individual work by means of Moodle system	8	7	1	1
Internet availability	9	7	2	4
Ability to use digital resources and instructional materials	2	1	1	1
Cooperation	9	6	3	9
Adaptivity	10	6	6	7
Active communications	8	7	-3	9

The most significant results include: the development of a fundamentally new content of the discipline “Information technology in the field of physical education”, adapted to the professional activity of the future physical education teacher, intended for bachelors in the “Pedagogical education” specialty profile and its teaching with the increased use of DL technologies; bachelors who have completed training in this discipline are motivated and interested in continuing a deeper study of DL technologies in relation to the tasks of professional practice; master’s degree students who studied at various institutes confirmed that the use of distance learning technology contributes to the effective professional training of a modern teacher and coach of physical education and sports.

### Discussion

This article deals with the efficient training of future physical education teachers in the Republic of Sakha (Yakutia), using DL technologies associated with their future professional life. The research proved that the synthesis of the Internet technology with information and communication means makes it possible to design various DL technologies. Feedback plays a fundamentally significant role in them, which allows these technologies to adapt to the conditions of a specific educational process. DL technologies have enabled to implement a flexible system of organizing educational and training sessions, using the whole variety of didactically grounded information and communication technologies and the Internet.

In the research, special attention was given to the high-quality preparation for providing DL, using the Moodle system.

This necessitated the use of the blended learning method as a didactic means of implementing the transition from the traditional model of education to an integrated one with the involvement of electronic systems and resources that contribute to the development of DL in a physical education institute. The implementation of adaptive training using DL technologies was carried out during a pandemic on the basis of an emergency management of remote access to training, part of which is a specially developed Moodle system. It includes: educational electronic

content, which fully prepares the study of the topics provided for by the curriculum for the discipline “Information technology in the field of physical education” and allows mastering the program individually with the possibility of choosing the technology for working with the studied material (text, audio, video, or infographics); a system of distributed joint development and use of electronic didactic and educational materials; creation of a common e-learning environment for students of both the IFC&S and ChSIFC&S. Teaching students can be performed on the basis of individual choice (out of modern educational methods of teaching) of blended learning, which is based on the concept of combining technologies of the “class and lesson system”, e-learning, or DL technologies. Among the main benefits of blended learning is the educational approach, which combines face-to-face and online learning. It should be noted that a special place in the developed system of preparation for the use of DL in professional practice is occupied by the worked out and successfully implemented master’s educational programs “Technologies and management of e-learning” and “Corporate e-learning” implemented at the pedagogical institute of the NEFU, the results of work related to this parts of the study are presented in publications (Barahsanova et al., 2017; Slobodchikova, Barakhsanova, & Danilova, 2007; Panina, & Barakhsanova, 2013; Zhirkova, 2011; Neustroev, 2012). The strong motivation of future teachers and coaches of physical culture and sports to study the didactic capabilities of e-learning technologies was the impetus for the implementation of DL at the IFC&S and ChSIFC&E. The modern institute of physical culture and sports should be the center for training professional pedagogical personnel for the new Russian school, which is impossible without intensifying the educational process through the use of advanced educational technologies, which should include DL technologies.

## Conclusions

The research findings have demonstrated that the high proficiency and professional capacity of graduates of physical culture institutes, their ability and competence to adjust the accumulated knowledge and skills to new goals and objectives of education, regularly changing conditions of professional activity can be formed and developed through the effective use of DL technologies. adapted to the solution of occupational tasks.

It should be emphasized that the forced transition to DL during the period of self-isolation allows each teacher and student to revise their competencies in the field of information and communication technologies and, through self-education, trial and error, improve skills and abilities, build an individual system of work in a remote format, expand pedagogical opportunities through the use in educational activities of a wide range of modern digital electronic resources.

It is worth mentioning that DL in the Republic of Sakha (Yakutia) has acquired particular relevance in the professional practice of an educator and a teacher in 2020 in connection with the COVID-19 pandemic, which caused the transition of the entire country’s population to self-isolation for an indefinite period. The need to preserve continuity and ensure the integrity of the educational process of students has brought the search for the up-to-date means, forms, methods of teaching, and upbringing “at a distance”, using e-learning and DL technologies in the pedagogical environment.

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