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SYSTEM OF CONTINUING EDUCATION "SCHOOL-UNIVERSITY-ENTERPRISE" IN THE FOCUS OF NATIONAL SECURITY ISSUES

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Abstract

This article is devoted to the current problem of education, namely, distance learning in the context of the global coronavirus pandemic. The article presents the experience of the implementation of distance learning, within the framework of the developed system of continuing professional education "school-university-enterprise". This system was implemented at the Belgorod State University named after Shukhov, most of the classes are held in e-learning mode, on specially created online platforms. After the introduction of quarantine, almost all classes were adapted and transferred to a distance format, which makes it possible to study at any time and in any place. In the article, we examined many educational tools of a distance nature: online monitoring of the quality of education, a circle of additional education for children "NIKA", information and analytical system for identifying and supporting gifted children, information and educational portals (website of the advanced training program; website of the professional retraining program; website of additional educational courses for senior students), educational process management system. A sociological analysis of the effectiveness and efficiency of distance learning in this system of continuing professional education "school-university-enterprise" in the context of national security was carried out; the degree of satisfaction of the participants in this system was revealed. A comparative assessment of the data obtained was carried out with data from similar studies conducted at various sites on the Internet in 2020.

1. Introduction

There is a spread of the epidemic of a new coronavirus infection around the world and the introduction of quarantine. According to a government decree, in order to prevent the epidemic and ensure the safety of the population, electronic education was introduced. In March 2020, all educational institutions in Russia were transferred to distance learning and most enterprises to remote work. Unfortunately, most of the organizations, and even more so the students, were not ready for such an abrupt transition. This circumstance led to many problems with a lack of software and equipment, systemic interruptions, incorrect operation of Internet providers, a lack of digital skills of teachers and other problems. At the moment, most of the problems have been resolved, the government is introducing amendments to the passport of the national project "Education", all organizations are provided with uninterrupted Internet and equipment for distance learning, new online platforms are being created, and network capacities are being increased. According to experts, there is a possibility of entering the new academic year from September 2020 along the current trajectory, that is, in a distance format, and in the future, a massive transition to continuous distance education is possible (Martynenko et al., 2016).

"The unforeseen situation that has arisen should maximally mobilize education workers at all levels to create the necessary and safe learning conditions," said the Minister of Science and Higher Education of the Russian Federation Valery Falkov. In the developed system of continuous education "School-university-enterprise", much attention is paid to training in the E-learning mode, i.e. electronically via the Internet or remotely using learning management systems. Today there are two related concepts "e-learning" and "distance learning", in fact, both of them denote the interaction of a teacher (teacher) and students using Internet technologies, providing interactivity. However, according to the law on education of the Russian Federation, they have a clear distinction, in turn, e-learning is the transfer of information from a database through information networks and technologies, and distance learning is the transfer of knowledge using information and telecommunication networks; students and teachers are at a distance (Kashina et al., 2018). Such formats are necessary, both for the implementation of the developed training system, and the most relevant in the existing realities.

2. Problem Statement

The decree of the President of the Russian Federation Vladimir Putin "On national goals and strategic objectives for the development of the Russian Federation for the period up to 2024" states the need to create a safe and modern digital educational environment. This system should ensure high quality and timely transfer of knowledge to each person, regardless of the level of education received. In this regard, the task of each region is to realize this goal.

The Belgorod State University named after Shukhov has developed and implemented a system of continuous education "school-university-enterprise", where most of the classes are held in e-learning mode, on specially created online platforms. After the introduction of quarantine, almost all classes were adapted and transferred to a distance format, which makes it possible to study at any time and in any place. In this regard, it became necessary to conduct a sociological assessment of the effectiveness and efficiency of the system of continuing professional education in a distance format.

3.   Research Questions

The main issue of the study is to conduct a sociological assessment of distance learning within the framework of the system of continuing professional education, its effectiveness and efficiency, as well as the satisfaction of the participants in the system.

4.   Purpose of the Study

The article aimed to identify the problems that students face in distance learning.

5.   Research Methods

The collection of sociological information was carried out through the analysis of documents, a questionnaire survey, and interviews. For assessing the effectiveness of distance learning in the framework of the lifelong education system, a sociological survey was conducted.

6.   Findings

We conducted a sociological survey on satisfaction with distance education and the effectiveness of online training on the developed Internet sites. The goal is assessing the effectiveness of distance learning in the framework of the lifelong education system, among the participants of each of the subsystems "school", "university", "enterprise", as well as parents, teachers and scientists (Table 01).

Table 1.   Answers to the question: Do you like distance learning? (in %)

Listener Categories	Answers to question Yes	More yes than no	More no than yes	Not
Schoolchildren	21	46	18	15
Students	18	63	8	11
Employees of enterprises	51	43	5	1
Parents	4	23	67	6
Teachers	15	18	46	21

Based on the table, it can be seen that 21 % of respondents like to study remotely. 46 % of respondents see more advantages in such training. However, some are not at all satisfied with this organization of the educational process, which is 15 % of the respondents. Most of the schoolchildren in the framework of the lifelong education system had previously taken classes remotely, so the full transition to distance learning was painless for them.

A similar survey among high school students was conducted within the framework of the All-Russian Popular Front project "Equal Opportunities for Children" and the National Education Resources Foundation, for the majority of respondents (65 %) face-to-face classes are more familiar, during traditional classroom teaching it is easier for them to memorize the material received. 40 % say that

distance learning is psychologically more comfortable. Some saw new opportunities for themselves, they became interested in learning differently, and they can prepare well for exams at home.

As part of the NIKA additional education circle for children, the following took place in a distance from entertaining chemical and physical experiments, lectures from leading scientists from universities in the region, pieces of training on the development of creativity and personal growth, multidisciplinary master classes, research work, courses for designers and architects. The overwhelming majority of schoolchildren (68 %) liked to participate in online master classes and pieces of training while sitting at home. They also noted that all classes were played playfully, which is absolutely not tiring. 25 % of schoolchildren lacked communication and personal presence. However, some did not like to study and study remotely at all, which is 6 % of the respondents. Statements that the information is not assimilated, there are many distractions, and they have a habit of resting at home characterize this group of respondents.

In February 2018, we surveyed employees of enterprises. In that direction, it is worth improving the system of continuing education, and most of the answers were about distance learning. 85 % of teachers surveyed positively assess distance learning; most of them used online educational platforms regularly or from time to time even before they entirely switched to such education. Only 3 % believe that distance education is not productive.

Nevertheless, for the majority of parents of schoolchildren, this form of education was not satisfactory; more than half of the respondents were against distance learning. According to the data of the "Children of Mail.ru" project obtained in the course of a survey of parents of schoolchildren, the majority of parents are dissatisfied with distance education. They argue that the responsibility for learning lies entirely with the parents. 25 % noted that they saw nothing wrong with such education, but paid attention to technical problems, an inconvenient Internet platform, incomprehensible instructions and other problems.

We asked a similar question to the parents of schoolchildren involved in the continuous education system. They were asked to describe in a free form their attitude to continuous distance education within the system. Most parents noted the convenience of an open portal with lectures and assignments, and indicated that the children liked to participate in master classes and conduct experiments at home. Some respondents (23 %) complained about the lack of time, the inability to control the child due to the workload. Of course, there were also those families in which there was not enough technology to study and work for all family members in quarantine simultaneously.

However, in general, the results of the survey are positive; distance education is now the most relevant and safe. Now there is much talk about the second wave of coronavirus infection, which will again lead to total quarantine and the only way to protect yourself and they loved ones is to study and work remotely.

Within the framework of the continuous education system, many distance educational tools are used. The use of distance learning technologies in the educational process presupposes the availability of a useful tool for monitoring the assimilation of knowledge and conducting independent work by students. Testing of students is used as such a form of control over acquired competencies.

The effectiveness of e-learning depends significantly on the technology used in it. The capabilities and characteristics of e-learning technology ensure the maximum efficiency of interaction between the

student and the teacher within the framework of the e-learning system (Vorobyova, 2015). In the process of implementing the software environment, the features of interaction with the interfaces of various groups of students are taken into account: from schoolchildren to enterprise specialists. A well-designed learning environment interface can improve learning efficiency and engagement by 20–40 %.

An essential factor in the successful implementation of distance learning is based on the correct choice of software that meets specific requirements. Such requirements are dictated by the needs of the teacher and the student, as well as the effectiveness of interdisciplinary interaction with IT specialists who ensure the development and development of software (Kiseleva & Starodubtsev, 2010). A well-tuned educational process management system will provide:

- precise planning of assignments for students;
- specific content for the student, taking into account his level of training, educational goals, preferences and interface settings recorded in the personal profile.

Such a system is responsible for registering new and authorizing registered users (Gasparyan, 2011). When forming educational content, it is crucial to take into account the peculiarities of students' perception:

- In the "School" subsystem, it is necessary to primarily use the visual channel for obtaining data through the use of graphics, 3D models, 3D printing systems;
- In the "VUZ" subsystem, the use of the kinetic channel of perception and mathematical methods is required. Those, in addition to existing methods, computer modelling, mathematical analysis and work with remote laboratories are added;
- In the "Enterprise" subsystem, educational processes need to be accelerated. Therefore, training materials are being adapted for mobile platforms, specialized solutions (sets of mathematical models) are already being used, and materials are being adapted to the specific information infrastructure of the enterprise.

For assess, the quality of training, direct and indirect indicators of quality were used. The high level of educational programs is due to several reasons that are indirect indicators of the quality of a specialist's training:

- the quality of the content and presentation of educational products;
- qualifications of teachers;
- the quality of the educational process, as well as the qualifications of the administrative staff;
- correspondence of educational material, state of multimedia and technical teaching aids, digital educational resources, didactic materials, visual models (Podchalimova, 2012).

Direct indicators for assessing the quality of education include:

- the level of the defended final works;
- assessment of graduates by employers and their personnel bodies.

Also, the system provides for online monitoring of the quality of education. The quality of education is one of the parameters in the education system; it reflects the degree to which the level of education received meets the regulatory requirements and the state standard. The quality of education is the quality of goals, the quality of conditions, the quality of the educational process and the quality of the final results. Within the framework of the created system, information and analytical system for

monitoring the quality of education was designed and implemented (Rozhkova, 2019). The system functions in such a way as to take into account the versatile achievements of the students in the following areas: science, education, sports, social activities, as well as success in business and profession (Danakin et al., 2015).

Thanks to a set of synthetic indicators, all achievements are ranked according to the specified criteria for assessing the education quality. Internal monitoring of the quality of the educational process is based on a point rating system of assessment and test control of students' knowledge, which was used at all stages of passing subject modules. When developing test items, special attention was paid to the content, criteria and constructive validity of tests. Testing was carried out for various types of knowledge control: input, current, milestone and final (Orusova, 2020).

The static indicators obtained during the functioning of the system are crucial for assessing the effectiveness of the educational process, but management decisions are made based on dynamic data. For example, in schools, students' progress is recorded in online journals, after which the data is subjected to statistical analysis. The analytic system can identify sharp drops/jumps in academic performance or attendance and signal the person in charge of the need to make management decisions.

Another vital tool in building distance learning within the framework of the developed system is an information and analytical system for identifying and supporting gifted youth. Identifying gifted children is a long-term analysis of the level of development of each child, a required systematic approach. A reliable basis for building a piece of information and analytical system for identifying talented children is online monitoring of the quality of education, configured to collect information about the achievements of children, both within educational institutions and beyond. In this case, the process is divided into two parts: identification and support.

The identification of talented children is carried out through the formation of a multi-criteria system for assessing the achievements of students and their comparison with the results of online monitoring. The government of the Russian Federation supported the chosen direction to identify and support talented children. Supporting talented children is a more complicated process. It is based on the theory of prospects of the Nobel laureate Kahneman, which is that the system of assessing human values is relative and determined by his previous achievements. Thus, based on the analysis of the portfolio of schoolchildren and students, it is essential to take into account not only its absolute achievements but also the dynamics of their changes.

It has been experimentally revealed that a critical period can be determined for each group of students. When their emotional connection with scientific or professional achievements is secure, it significantly increases the motivation for further development. Support for trainees through coaching or mentoring mechanisms during this period significantly increases the effectiveness of the training system.

A feature of this tool is that its effectiveness grows inversely with the age of the trainees. The maximum effect from the introduction of monitoring of the critical period of students was achieved within the framework of the "School" subsystem.

For uninterrupted access to information and educational resources, for the high-quality implementation of the educational process, information and the educational portal has been created. The demand for educational and information services provided by the portal http://nanoopen.ru led to a greater

diversification of the portal's activities, namely: the allocation of the leading site of the scientific and innovative educational centre (http://nanoopen.ru) and several subsidiary sites in the corresponding areas: website for the advanced training program; website of the professional retraining program; site of additional educational courses for high school students.

7. Conclusion

Visual and semantic separation of the activities of the information and educational portal leads

- to increase the availability of educational resources for users;
- to simplify the process of registration and work with educational material;
- to improve the quality and visibility of the presentation material posted on the portal;
- personalize information and educational services for various categories of users;
- to simplify the learning process while maintaining the information content of the material;
- to form a basis for detailed monitoring and analysis of the learning process for various categories of students.

Moreover, the results of the conducted sociological research show that listeners positively assess the distance learning of the lifelong education system.

Acknowledgments

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