Build a Technology for Mass Organization of Distance Learning for Pupils in Quarantine

Oleg M. Spirin[1,2][a], Kateryna R. Kolos[3][b], Olena A. Kovalchuk[4][c], Olena O. Demianchuk[5][d] and Feliks M. Zhuravlev[6]

[1]*University of Educational Management, 52A Sichovykh Striltsiv Str., Kyiv, 04053, Ukraine*

[2]*Institute for Digitalisation of Education of the National Academy of Educational Sciences of Ukraine, 9 M. Berlynskoho Str., Kyiv, 04060, Ukraine*

[3]*Zhytomyr Polytechnic State University, 103 Chudnivska str., Zhytomyr, 10005, Ukraine*

[4]*Zhytomyr Ivan Franko State University, 40 Velyka Berdychivska Str., Zhytomyr, 10008, Ukraine*

[5]*Municipal Institution "Zhytomyr Regional Institute of Postgraduate Pedagogical Education" of Zhytomyr Regional Council, 15 Mykhailivska Str., Zhytomyr, 10014, Ukraine*

[6]*State University of Economics and Technology, 5 Stepana Tilhy Str., Kryvyi Rih, 50006, Ukraine*

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Abstract: The current state of implementation of distance learning in general secondary education institutions and the existing disadvantages in the organization of this form of education during quarantine were analyzed in the research; besides, the necessary means for the effective organization of distance learning were allocated. The expediency of the deployment on the basis of the Moodle platform "Educational portal for general secondary education institutions" was substantiated and the preconditions for its using by the participants of the educational process of these institutions are determined; the structure of the electronic educational resource is presented. It is established that it is much better for students to use the weekly format of the course, which provides enough time for any student not only to learn educational materials either independently or with the support of a tutor according to the curriculum, but also for homework, recreation, hobbies and self-improvement. An example of the structure of a distance course for a particular class of general secondary education is given. Compulsory content elements in the structure of the distance course are distinguished.

1 INTRODUCTION

1.1 The Problem Statement

The question of the probable existence of distance education is no longer relevant. The distance education exists all over the world and occupies a socially-significant place in the field of education (Lénárt, 2021). At the end of 1997, there were about 1,000 distance learning institutions in 107 countries. In 1997 the number of those who received higher education due to the distance education system was about 50 million people, in 2000 the quantity increased, it was 90 million people, according to the forecasts it will be 120 million people in 2023 (Tatarchuk, 2020).

In 2013, the Order of the Ministry of Education and Science approved the "Regulations on distance learning" (Verkhovna Rada of Ukraine, 2013), which defines the basic principles of organization and implementation of distance learning in Ukraine.

Because of the threat of the spread of coronavirus COVID-19 in Ukraine, the Cabinet of Ministers introduced the quarantine measures, prohibiting attending the educational institutions throughout the country since 12 March 2020 (Verkhovna Rada of Ukraine, 2020; KMU, 2020).

In such circumstances, the heads of educational establishments and also preschool, general secondary institutions, vocational and technical education, professional higher and postgraduate education are obliged to ensure the organization of the educational process on the basis of distance learning technologies for the period of quarantine (MON, 2020).

[a] https://orcid.org/0000-0002-9594-6602
[b] https://orcid.org/0000-0002-1038-8569
[c] https://orcid.org/0000-0003-1261-538X
[d] https://orcid.org/0000-0003-1845-9664

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Most teachers are aware of this form of organization of the educational process, but only a few have used its elements in their professional activities or for self-education. However, nowadays teachers must quickly and effectively use the latest technologies, methods and forms of learning and studying.

The creation of an educational portal with methodological and didactic materials, Ukrainian e-encyclopedias, multimedia textbooks and interactive online resources was provided within the reform of education and science, to help teachers to cope with everything (KMU, 2018).

1.2 Related Works

The National Report on the Status and Prospects of Education Development in Ukraine points out that "effective development of education is possible only if all components of pedagogical systems, including informational and educational environments of educational institutions, are modernized based on the implementation of anthropocentrism paradigms and equal access to the quality education. Among the important directions as for the development and improvement of the education system, the problems of informatization of the educational process are of particular importance, it allows expanding and deepening the theoretical knowledge base and creating effective computer-based methodological systems of education" (MON, 2016).

The primary task, defined in the Concept of Digital Economy and Society of Ukraine for 2018–2020, is the formation of a thorough national policy of digitalization of education as a priority component of education reform, one of the main directions of which is the development of distance education using cognitive and multimedia technologies (Verkhovna Rada of Ukraine, 2018).

Bykov (Bykov, 2008) notes that among the most modern educational technologies that have actively declared themselves at the end of the 20th century and have become really widespread in developed countries nowadays there are distance learning technologies that support and provide distance education. Besides the distribution of the world educational space takes place and distance education plays a leading role in this process, significantly diversifying the market of educational services.

The scientific researches of Ukrainian and foreign scientists cover theoretical, methodical, technological, as well as practical aspects of providing distance learning of pupils, students, teachers and others. Thus Bykov and Shyshkina (Bykov and Shyshkina, 2014), Kukharenko (Kukharenko, 2013a,b; Kukharenko and Oleinik, 2019) and others analyzed the available normative implementation of distance education and the recommendations for the formation of draft documents "Regulations on distance learning in the system of general secondary education" and "Standard regulations on the resource center of distance education in the system of general secondary education" are developed.

The peculiarities of the organization of distance learning and the requirements for the usage of distance learning platforms in the institutions of postgraduate pedagogical education were determined in (Petrenko et al., 2020). The basics of the use of distance learning technologies in the training of future specialists and teachers in particular were described in (Bondarenko et al., 2018; Shokaliuk et al., 2020; Tryus and Herasymenko, 2021). The pedagogical and information support of distance learning is characterized in (Havrilova et al., 2019; Kravtsova et al., 2020; Kushnir et al., 2020).

At the same time, the problem of distance learning for students of general secondary education is not fully resolved. There are some researches, dedicated to the technology of the organization of mass distance learning in the whole at the level of teachers of individual subjects (student-tutor), each of them worked relatively isolated from colleagues (volumes and deadlines coordination).

Instead, Reynolds (COVID-19 and Extended Online Learning, 2021) notes that during the quarantine period, the so-called "emergency distance learning" is introduced, which is not identical to distance learning. The scientist notes that "the main purpose of such kind of training is to provide temporary reliable access to studying and pedagogical support during the crisis, but not to create a reliable educational ecosystem. This is a triad situation: extraordinary and accountable goals, students' expectations of teacher assessment and evaluation. Mostly lower in quarantine conditions" (COVID-19 and Extended Online Learning, 2021).

We partly agree with Reynolds (COVID-19 and Extended Online Learning, 2021), as an outbreak of a coronavirus pandemic, according to epidemiologists, can last for several years; moreover, outbreaks and other infections, unknown to mankind, are also not ruled out. So, it is really necessary to organize an effective system of distance learning for students during the quarantine, elements of which can be successfully used in traditional and inclusive education.

Nowadays, under such special conditions (for education organizers, teachers and students) as (Reshchuk and Lukashova, 2020): lack of opportunity to use other forms of education, lack of access to

the premises of educational institutions, in isolation under quarantine restrictions, – there are problems at the institutional level – at the level of the educational institution there is a requirement for more coordinated organization of the educational process, including the selection and usage of not only one or a limited number of platforms by teachers within the educational institution taking to the consideration the required level of informational security and health, but also the selection of "home-setting" recommended means which might be installed outside the educational institution on students' personal devices to work with files of certain types and formats.

This applies also to teachers, the vast majority of whom must use their own software / hardware ICT tools, serve and maintain them in working condition at their own expense, and also provide a proper access to the Internet. At the same time, the problems and tasks of the institutional level may be increased by the difficulties of the regional level connected with different levels of infrastructure development of different territories, communities, settlements and their individual areas, including low speed and quality of data transmission in relevant segments of the Internet, and even sometimes lack of access to network itself.

All this requires the development and using of appropriate scientific and methodological support for the implementation of mass distance learning at the institutional level in quarantine.

The purpose of the research is to build a technology for mass organization of distance learning for pupils in quarantine on the basis of the Moodle platform.

1.3 Research Methodology

To achieve the goal, such research methods were used as: theoretical – analysis of regulatory documentation as for the organization of the educational process in institutions of higher and general secondary education, educational development in Ukraine, the introduction of distance learning; survey of pedagogical workers as for the current state of the organization of distance learning in general secondary education; identification, analysis, systematization of affiliation of fulfilling the functions by the tutor; empirical - conversations with participants of the educational process of general secondary education institutions; direct, indirect, included monitoring the implementation of distance learning in general secondary education institutions; method of expert assessments, etc.

2 RESEARCH RESULTS

2.1 Basic Concepts

Distance form of education is an individualized process of education, which occurs mainly through the indirect interaction of distant participants in the educational process in a specialized environment that operates on the basis of modern psychological, pedagogical and information and communicative technologies (Verkhovna Rada of Ukraine, 2017).

Bykov defines that distance learning is a form of organization and implementation of the educational process, in which its participants carry out educational interaction (both synchronously and asynchronously in time) mainly extraterritorially on the basis of digital technologies (Kremen, 2008).

An online course is a set of educational and methodical materials and educational services created in a virtual learning environment for the organization of distance learning based on information and communication technologies (Bykov, 2008).

Studying, using online course is an interactive process, based primarily on the paradigm of modern education, which aims to create an interactive communicative network space, identify individual characteristics of each participant, and of course stimulate him to find an independent solution to any problem, moreover it encourages to self-education (Kukharenko et al., 2005).

2.2 The Structure of the Distance Course

The main components of the distance course are:

- the system of educational and methodical materials;
- the system of educational services.

It is desirable to have a structure in online course that will help create conditions for learning in activities and cooperation.

For students of general secondary education institutions, it is best to use a weekly course format – which provides time for students to study educational materials independently or with the support of a tutor in accordance with the curriculum, for homework, for recreation, hobbies and self-improvement. Therefore, while developing a distance course for students of general secondary education institutions it is necessary to take into account this principle.

In figure 1 an example of the structure of a distance course for a particular class is shown. This structure provides:

1. The entire period, while distance learning, is divided into weeks: the dates of each of school weeks are indicated (March 30 - April 5, April 6 - April 12, etc.);
2. In each of these weeks the days for studying (from Monday to Friday) with the indication of the date (Monday (March 30), Tuesday (March 31), etc.) are indicated;
3. In each of the days the training sessions and their duration are indicated according to the schedule;
4. Teachers fill in with the content each of these classes, choosing the necessary activities (tasks, test, choice, seminar, etc.) and resources (page, file, URL-link, etc.).

The distance course, located in a virtual learning environment, provides: learning process management and administration; providing knowledge by studying theoretical material; self-control; the formation of skills and abilities on the basis of the received knowledge; fixing the material; joint activities of students in small groups; synchronous and asynchronous communication; control the learning and understanding of theoretical material; doing of practical tasks and their control (Kukharenko et al., 2005).

2.3 Tutor as an Organizer and Leader of the Distance Learning

In distance learning, a tutor is an important person responsible for conducting classes with students, creating an appropriate learning environment. A tutor manages the learning process as an activity and tries to provide the planned results both in the acquired knowledge and skills and the acquired personal abilities of students (Kukharenko et al., 2005).

It is really difficult to adapt learning materials to the requirements of students, because these requirements often become known during the training itself. Therefore, the adaptive role is usually performed by the tutor.

A tutor is often more than a source of information. Tutor can help the student to become sufficiently autonomous, it can teach to learn independently.

The distance course tutor does much of what a teacher does in traditional teaching, for example, leading a group in a discussion using effective techniques. However, it works in an electronic environment where participants are not placed in one real room at a certain time. The tutor teaches to communicate, using different styles, approaches, language means of communication, examples, questions that are used to improve the learning process in the group (Kukharenko et al., 2005).

Most teachers believe that learning to manage distance learning is just mastering some new software or developing computer skills, that is, to add information technologies to an established learning system. This is a misconception.

Successful distance learning management cannot be achieved through classroom experience only. Tutor skills cannot be acquired due to the lectures or observations primarily because they contain many areas, directions and responsibilities that are rarely used and we don't observe them in traditional teaching (Kukharenko, 2007).

For the organization of distance learning in an educational institution, it is important that the tutor has the following basic competencies:

- to know the basics of telecommunicate etiquette;
- to have informational navigation skills;
- to be able to work with LMS;
- to be able to create web pages;
- to have a certain computer-based learning environment (CBLE);
- to be able to use a range of services provided by this environment;
- to be able to present educational material, to ensure effective, individual, independent of the place and time, student's work;
- to know the methods of intensification of the student's activity in the network, and to be able to use them during the distance learning;
- to know the peculiarities of students independent activity during distance learning;
- to be able to conduct psychological and pedagogical testing and analyze the current activities of students;
- to be able to prevent and solve conflict situations;
- to know active teaching methods (collaborative learning, project method, multilevel learning, research, search methods, etc.);
- to be able to conduct role-playing online games;
- to help students to be active in a computer-based learning environment, systematically to motivate students to learn;
- to provide a personal approach, give some advice and consultation, etc.;
- to determine the effectiveness of students' learning activities through feedback;
- to determine the necessity for the formation and development of new subject competencies of students, in accordance with the content of education, and also to be able to improve its quality;

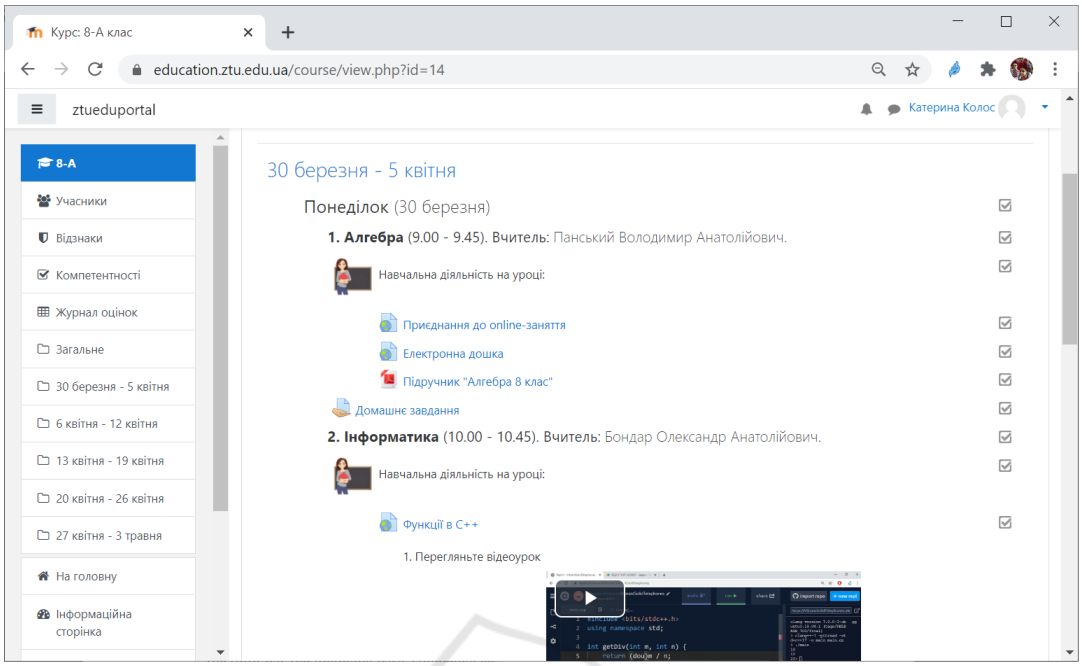

Figure 1: An example of the structure of a distance course.

- to determine the level of assimilation of new knowledge and skills by students within the subject;
- to carry out high-quality content of distant course, as well as pedagogically balanced selection of ICT used during the training;
- to identify the problems with student registration, record and notation keeping, etc.
- to be able to integrate full-time and distance learning;
- to master a method of forming systemic thinking, including critical thinking, and also the student reflection, as a means of evaluation of their activities for further improvement;
- to be able to organize and conduct online classes in real time;
- to use actively the communicative capabilities of computer networks to organize communication among the participants in the learning process;
- to be able at least to adjust and correct the existing courses according to the new requirements of the educational process, if there is no opportunity and possibility to create a new one.

In addition to the competencies, mentioned before, a considerable attention must be paid to the issues, related to subject-subject relationship in the learning process, pedagogical approach and support, opportunities for communication, adaptation, motivation and learning management.

The quality of distance learning mostly depends on the skills of the tutor, who must effectively direct the group and individual learning process in the right direction. A competent tutor is able to create a learning environment where the participants together define the essence, generate ideas and understanding.

In general, the tutor's activity is a model of systematic organization of learning, which involves combining the perception of theoretical information with their transformation into personal knowledge, as well as the widest expansion, distribution and deepening of this knowledge by students (through analysis and search) during practical implementation.

2.4 Student as the Main Person in Distance Learning

The main person of distance learning is a student, so the effectiveness of learning must be assessed according to the following indicators:

- the attitude of students to distance learning;
- the student satisfaction with the learning process;
- the student achievement.

As a rule, the student feels comfortable in the learning environment, if he is responsible enough for learning (Kukharenko et al., 2005):

- sets real goals;
- monitors his/her progress;
- reflects understanding;
- finds a good support both among tutors and classmates.

The main condition and contribution for the student success in DC is a high level of motivation and self-discipline. Additional factors of learning success are the willingness to ask for help and a responsible attitude to distance learning.

Students evaluate the quality and positive features of interaction with the tutor, based on reliable and timely feedback.

The tutor must understand and take into account while organizing distance learning that the student needs some help at all stages of learning.

At the beginning of the student's studying, it is necessary to get acquainted with the structure and content of the distance course.

The tutor should be able to characterize thoroughly the main basics of the training course, to help with establishing communication among the participants of the distant course.

The tutor's advice on planning educational activities, its organization, formation and improvement of learning skills, the process of learning technical and informational means of learning is extremely important for students. During the studying, students need some advice on (Kukharenko et al., 2005):

- planning the schedule of the day;
- self-organization;
- improving learning skills;
- learning a new means of information transfer;
- solving technical problems;
- doing some educational tasks;
- non-formal learning with other students;
- self-assessment of the quality of the studied material;
- fulfillment of the tutor's requirements;
- doing some tests, control tasks.

As everybody knows students can differ significantly in the style of perception, processing and using of the information in educational activities, as well as in the ability to communicate and collaborate, so the tutor needs to use a differentiated approach to work with students.

Not to provide the assistance in technical and organizational matters in time is the most disorganizing for students. It creates a feeling of confusion, anxiety and frustration, the contradiction in the interpretation of instructions appears when students do not receive a quick feedback of their tutor.

It is often believed that all difficulties disappear in the first weeks of training. However, the research shows that students may experience anxiety and frustration at later stages of the course, but they are afraid to write to the tutor about it. So, the tutor must be able to predict the possible complications in the processing of this or that material for the student in the learning process and prevent them in the methodological developments (Kukharenko et al., 2005).

2.5 Distance Learning Tools

Current distance learning is based directly on the information and communication technologies, so the organization of distance interaction among participants in the learning process requires not only connection and free access to the Internet, but also the availability of software.

For the effective implementation of distance learning in educational institutions, one of the key tasks is pedagogically balanced selection of software taking into account the demands and capabilities of the educational institution. On the basis of this software not only distance communication between tutors and students must be implemented, as well as to provide access to electronic educational resources for educational purposes, but also maintain the appropriate level of education.

To study the current state of the organization of distance learning in general secondary education from 8 to 22 April 2020, a survey of teachers of Zhytomyr region (Survey, 2020) was conducted, which was attended by 2445 respondents, among them: 63% – subject teachers of the 5th–11th grades, 20% – primary school teachers, 8% – principals and deputy principals, 2% – teacher assistants and 7% – other teachers (educators of extended day groups, teachers, organizers, psychologists, social educators) (figure 2).

Since the total number of teachers of general secondary education institutes in the region is more than 20,000 people, so, in accordance with the recommendations as for the formation of the sample (Survey, 2020), the available group of survey participants is representative, and the results are 95% reliable.

According to the results of the survey, 2% of respondents noted that they had not organized the distance learning system for students yet, and 2% of respondents partially use distance learning technologies (figure 3).

At the same time, 96% of respondents carry out regular distance learning, among which 89% have in-

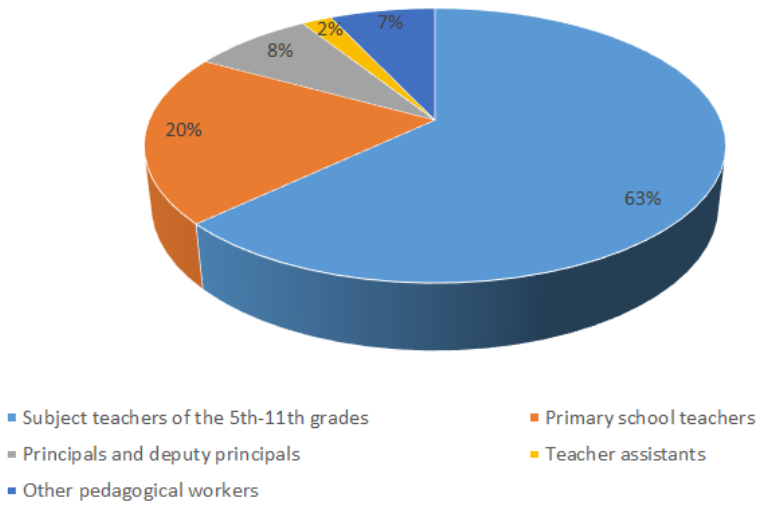

Figure 2: Distribution of respondents according to the positions.

troduced this form of education only since March 12, 2020 (since the introduction of quarantine throughout Ukraine) (figure 3).

83% of teachers have the necessary technical support and equipment, but the biggest problem for distance learning participants is the lack of high-speed Internet access. Also, for the implementation of distance learning, each teacher of Zhytomyr region uses only those software tools which he knows and can use to implement the planned activities during distance learning, in particular:

- For message distribution and file exchange: 92% – Viber, Telegram, 61% – e-mail; 51% – social networks, 9% – Google Classroom;
- For the presentation of educational material: 90% – Google cloud services (YouTube, Drive, Slides, Docs, Sites, Classroom), 25% – Zoom, 20% – educational platforms ("My class" and others);
- To monitor students' learning activities: 42% – Viber, 16% – e-mail, 14% – Google Classroom, 13% – "My class", 10% – Google Forms and others.

However, according to our observation, it is difficult for students to acquire new knowledge and skills, using such a variety of ICT for distance learning, besides it overloads them and disorganizes. The lack of a single learning environment in such kind of "distance learning", where there is a proper schedule of classes, established the system of interaction among students and independent educational activities of students, so in other words it distracts students' concentration, attention, reduces motivation to learn, increases mental stress, and of course, it negatively affects learning outcomes. It is necessary to conduct thorough psychological and pedagogical research on these issues.

It is important that only 59% of respondents use special distance learning platforms for the implementation of distance learning in general secondary education institutions, in particular: 37% – Google Classroom, 20% – "My class", 2% – Moodle (figure 4).

Each of the platforms chosen by pedagogical staff contains the necessary means for the implementation of the digital learning process. As we can see looking at the obtained data, the numerical value of the levels as for the manifestation of the criteria for the selection of distance learning platforms for general secondary education institutions are the lowest in "My class":

- Organizational criterion: 0.08;
- Training and resource criterion: 0.1;
- Constructive criterion: 0.08;
- Analytical and evaluation criterion: 0.16.

In general, according to all the criteria for selecting distance learning platforms for general secondary educational institutions, the numerical value of the level of manifestation in "My Class" is 0.42.

Higher numerical values of levels as for the manifestation of the criteria for selection of distance learning platforms for educational institutions are observed in Google Classroom:

- For personal account:
  - Organizational criterion: 0.10;
  - Training and resource criterion: 0.20;
  - Constructive criterion: 0.15;
  - Analytical and evaluative criterion: 0.10.

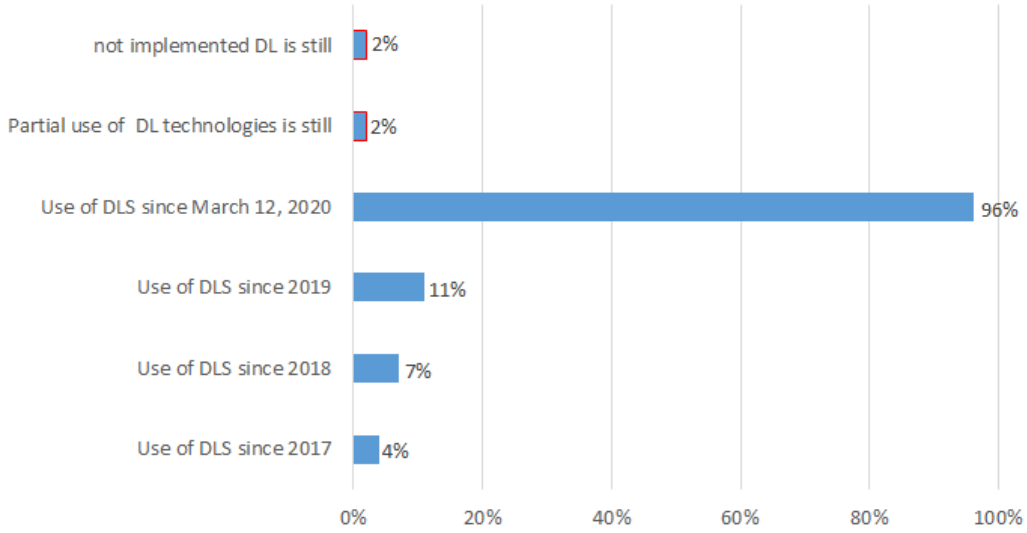

Figure 3: Use of distance learning system by pedagogical workers.

- For the account of the educational institution:
  - Organizational criterion: 0.10;
  - Training and resource criterion: 0.22;
  - Constructive criterion: 0.15;
  - Analytical and evaluative criterion: 0.10.

In general, according to all the criteria for selecting distance learning platforms for general secondary educational institutions, the numeral value of the level as for the manifestation in Google Classroom for a personal account is 0.55, and for an account of an educational institution – 0.57.

At the same time, we can see that the "My Class" platform has a bit higher numeral values in terms of the level of the manifestation of the constructive criterion than Google Classroom, while Google Classroom has insignificant advantages in terms of learning and resource criteria.

The highest numerical values of the level of manifestation of the criteria for the selection of distance learning platforms for educational institutions belong to Moodle platform:

- Organizational criterion: 0.11;
- Training and resource criterion: 0.31;
- Constructive criterion: 0.21;
- Analytical and evaluation criterion: 0.22.

On the whole, according to all the criteria for selecting distance learning platforms for general secondary educational institutions, the numeral value of the level of the manifestation in Moodle is 0.84, which indicates the significant advantages of the Moodle platform and the advisability of its using in general secondary education.

To use the Moodle platform, it is necessary to deploy it on the servers of the educational institution. However, most educational institutions do not currently have the technical and financial capacity to do it.

Therefore, on the basis of technical means of the State University "Zhytomyr Polytechnic" the electronic resource "Educational portal for general secondary education institutions" (http://education.ztu.edu.ua/) was established and developed, based on the Moodle platform, besides it can be used by any institution.

2.6 The Background for the Usage of the "Educational Portal for General Secondary Education"

To give the opportunity for teachers of general secondary education institutions to use this electronic resource, it is necessary:

1. General secondary education institution to apply to the State University "Zhytomyr Polytechnic". To do this, it is compulsory to fill in the form according to the sample: https://bit.ly/3duqfcK.
2. After the registration of this or that general secondary education institution on the specified portal, the responsible person of an establishment gets the login and the password of the administrator.

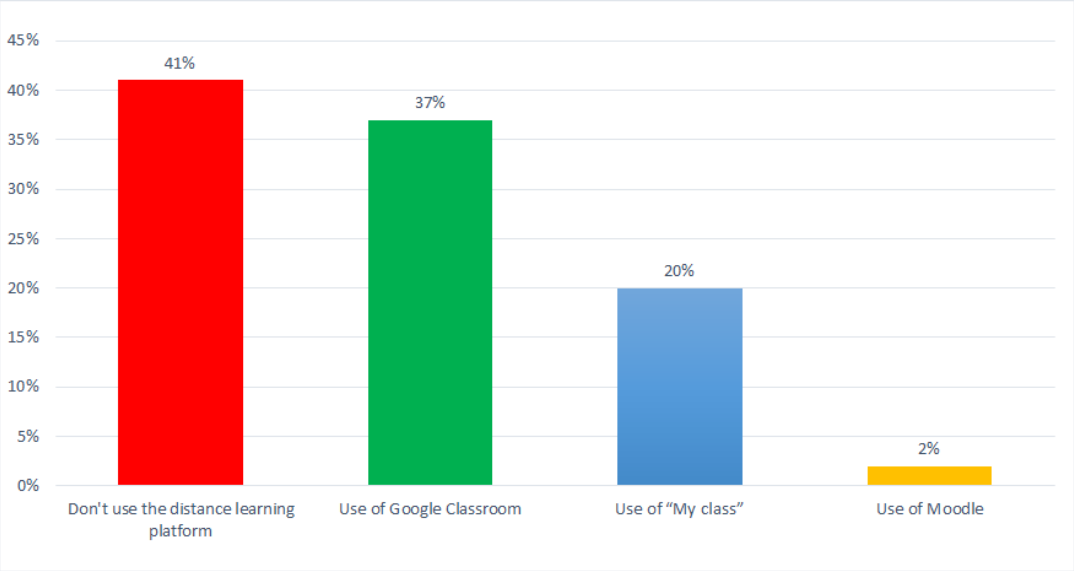

Figure 4: Use of distance learning platforms by pedagogical staff.

3. Then the responsible person of general secondary education institution having identified himself/herself (using the provided login and the password) on "Educational portal for general secondary education institutions" will have an opportunity to register all the participants of distance learning of the establishment: teachers, lecturers, masters and pupils.
4. Thus, each participant will be able to access the definite electronic educational resource according to their login and password: teachers will have the opportunity to create and fill in the content of distance courses, and in the future – to carry out direct distance learning of students based on these courses.

After scanning the application, submitted by general secondary education institution, the State University "Zhytomyr Polytechnic" creates a subcategory with the name of the registered institution of general secondary education (for example, Secondary school I–III degrees No. 33 of Zhytomyr) in the category of the relevant administrative unit (for example Zhytomyr), where the responsible person of the registered institution has the opportunity to allocate subcategories – parallels (for example: 5th grade, 6th grade, 7th grade, 8th grade, etc.) and to create some definite distance courses according to the names of the classes (for example, 8-A, 8-B, etc.) (figure 5), and teachers will be able to fill with the content these courses in accordance with the curriculum, selected forms and developed programs (figure 1).

General education institutions of Zhytomyr (17) and Vinnytsia (2) regions have joined the "Educational portal for general secondary education institutions" on January 18, 2021 including:

- Zhytomyr:
  - Secondary school of I–III degrees No. 33;
  - Zhytomyr private gymnasium "Or Avner";
  - Zhytomyr local lyceum No. 1 of Zhytomyr City Council;
  - Zhytomyr local lyceum No. 2 of Zhytomyr City Council;
  - Zhytomyr Technological College of Kyiv National University of Construction and Architecture.
- Berdychiv:
  - Berdychiv Vocational College of Industry, Economics and Law;
  - Berdychiv educational complex No. 4.
- Korosten:
  - Secondary school No. 11.
- Olevsk:
  - Olevsk secondary school of I–III degrees No. 3.
- Berdychiv district:
  - Starosolotvyn institution of general secondary education of Hryshkivtsi village council;
  - Ivankivtsi secondary school of I–III degrees of the Department of Youth Education and Sports of Semenivka village council.
- Lyubar district:

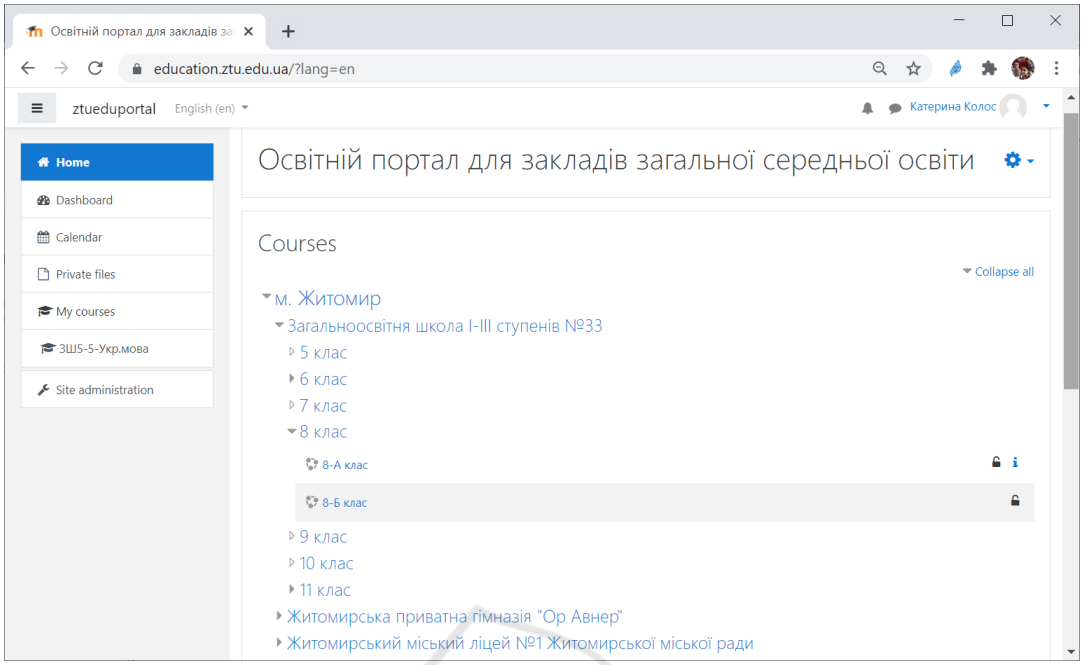

Figure 5: The structure of the "Educational portal for general secondary education institutions".

  - Berezivska secondary school of I–II degrees;
  - Velykovolytska secondary school of I–II degrees of Novograd-Volynsk district;
  - Zholobnenska secondary school of I–III degrees;
  - Ivankivtsi secondary school of I–III degrees of the Department of Youth Education and Sports of Semenivka village council.
- Khoroshiv district:
  - Budo-Ryzhanska secondary school of I–III degrees;
  - Chervonohranitnyanska secondary school of I–II degrees.
- Vinnytsia region:
  - Tomashpil secondary school of I–III degrees – gymnasium;
  - Makhnovskaya secondary school of I–III degrees.

Besides on the basis of this portal the State University "Zhytomyr Polytechnic" organized distance training of pedagogical and scientific-pedagogical workers within the course "The organization of mass distance learning during the quarantine" (108 hours). To register for this course you need to fill in an electronic form: https://forms.gle/MrKTtMwfziQ9hyw38.

Thus, within the definite course from October 5, 2020 to January 5, 2021 at the State University "Zhytomyr Polytechnic" 31 people improved their skills: 8 teachers of general secondary education (Zhytomyr local lyceum No. 1, Makhnovskaya Secondary School of I–III degrees of Vinnytsia Kozyatyn district, Velykovylytsia Secondary School of I–II degrees of Lyubar village council, Berdychiv education complex No. 4, Zhytomyr Technological College) and also 13 pedagogical and scientific-pedagogical employees of higher educational establishments (Municipal institution "Zhytomyr Regional Institute of Postgraduate Pedagogical Education" of Zhytomyr Regional Council, Zhytomyr State University named after Ivan Franko).

The training was carried out according to a special professional (certificated) program of professional development of pedagogical and scientific-pedagogical workers (tutors) taking to the consideration the organization of mass distance learning during the quarantine, the following topics were studied within this program:

1. Distance learning: relevance, features and principles of the construction, ways of development and scope.
2. The current state of distance learning in educational institutions of Ukraine.
3. Means of organization of distance learning.
4. Comparative analysis of distance learning plat-

forms.

5. Moodle system as a means of effective mass distance learning.
6. The development of the structure of the distance course.
7. Designing of the distance course.
8. Informational content of the distance course.
9. The development of distance course design.
10. Monitoring system of distance learning quality.
11. A tutor as an organizer and a leader of the distance course.
12. A student (listener) is the main person of distance learning.
13. The practice of developing and using a distance course on the Moodle platform.
14. The organization of educational activities in a computer-oriented educational environment of an educational institution.

After a successful training, all the participants received the certificate of professional development (figure 6).

Figure 6: The certificate of professional development according to the special professional (certificate) program of professional development for pedagogical and scientific-pedagogical workers (tutors) as for the organization of distance learning during the quarantine.

3 CONCLUSIONS AND PROSPECTS OF FURTHER RESEARCH

Thus, during the research it was found out that only 2% of teachers in Zhytomyr region had organized the system of distance learning for students, and 2% of respondents partially used distance learning technologies. At the same time, 96% of respondents carry out regular distance learning, among them 89% of teachers have introduced this form of education only since March 12, 2020 (since the introduction of the quarantine throughout Ukraine).

83% of teachers have the necessary technical support, but the biggest problem for distance learning is the lack of high-speed Internet access.

At the same time, for the implementation of distance learning, each teacher of Zhytomyr region uses only those software means which he knows and can use to implement the planned activities during distance learning.

As we know, only 59% of pedagogical workers use special distance learning platforms for the implementation of distance learning in general secondary education institutions nowadays, in particular: 37% – Google Classroom, 20% – "My Class", 2% – Moodle. Each of these platforms to some extent contains the necessary items for the implementation of the digital learning process. This led to the analysis of these platforms according to pre-established criteria and their indicators. In general, according to all the criteria for selecting distance learning platforms for general secondary education institutions, the numeral value of the level of manifestation in Moodle is the highest, so it indicates the significant advantages of the Moodle platform and the preference of its use in general secondary education institutions.

To use the Moodle platform, it is necessary to download it to the servers of the educational institution. However, most of educational institutions do not currently have the technical and financial capacity to do it. So, on the basis of the State University "Zhytomyr Polytechnic" on the Moodle platform the electronic resource "Educational portal for general secondary education institutions" (http://education.ztu.edu.ua/) was developed and it can be used by any educational institution.

The created technology of organization of mass distance learning for students of general secondary education provides a clear, logical and systematic combination of: the necessary means for the organization of distance learning; the usage of the definite electronic educational resource; the main components and structure of the distance course which contributes to the creation of conditions for learning in activities and collaboration; and also functions and competencies of the tutor, that is really necessary and important for the effective implementation and realization of distance learning.

Some further research is compulsory to identify the methodological features of the implementation of mass distance learning for students of general secondary education during the quarantine.

REFERENCES

Bondarenko, O., Mantulenko, S., and Pikilnyak, A. (2018). Google Classroom as a tool of support of blended learning for geography students. *CEUR Workshop Proceedings*, 2257:182–191.

Bykov, V. and Shyshkina, M. (2014). Emerging technologies for personnel training for IT industry in Ukraine. In *Proceedings of 2014 International Conference on Interactive Collaborative Learning, ICL 2014*, pages 945–949.

Bykov, V. Y., editor (2008). *Remote Course Development Technology*. Milenium, Kyiv.

COVID-19 and Extended Online Learning (2021). COVID-19 and extended online learning. https://www.sciline.org/covid-expert-quotes/online-learning#toc.

Havrilova, L., Ishutina, O., Zamorotska, V., and Kassim, D. (2019). Distance learning courses in developing future music teachers' instrumental performance competence. *CEUR Workshop Proceedings*, 2433:429–442.

KMU (2018). Education and science reform. https://www.kmu.gov.ua/diyalnist/reformi/rozvitok-lyudskogo-kapitalu/reforma-osviti.

KMU (2020). On amendments to the resolution of the Cabinet of Ministers of Ukraine of March 11, 2020 No. 211. https://www.kmu.gov.ua/npas/pro-vnesennya-zmin-do-postanovi-ka-a262.

Kravtsova, L., Kaminska, N., and Kravtsov, H. (2020). Cloud services in the distance learning system for future sailors. *CEUR Workshop Proceedings*, 2732:1187–1202.

Kremen, V., editor (2008). *Encyclopedia of Education*. Yurinkom Inter, Kyiv.

Kukharenko, V. (2007). *Distance learning*. Kompiuter, Kyiv.

Kukharenko, V. (2013a). Designing massive open online courses. *CEUR Workshop Proceedings*, 1000:273–280.

Kukharenko, V. (2013b). Massive open online courses in ukraine. *Proceedings of the 2013 IEEE 7th International Conference on Intelligent Data Acquisition and Advanced Computing Systems, IDAACS 2013*, 2:760–763.

Kukharenko, V. and Oleinik, T. (2019). Open distance learning for teachers. *CEUR Workshop Proceedings*, 2393:156–169.

Kukharenko, V., Syrotenko, N., Molodykh, H., and Tverdokhliebova, N. (2005). *Distance Learning Process*. Milenium, Kyiv.

Kushnir, N., Osypova, N., Valko, N., and Kuzmich, L. (2020). Distance learning technologies in institution of higher education by means of LCMS Moodle. *CEUR Workshop Proceedings*, 2732:1152–1163.

Lénárt, I. (2021). Comparative geometry in distance education. *Journal of Physics: Conference Series*, 1840(1):012003.

MON (2016). National report on the state and prospects of education in Ukraine. https://tinyurl.com/zkx6hkss.

MON (2020). About organizational measures to prevent the spread of coronavirus COVID-19. https://mon.gov.ua/ua/npa/pro-organizacijni-zahodi-dlya-zapobigannya-poshirennyu-koronavirusu-s-ovid-19.

Petrenko, L., Kravets, S., Bazeliuk, O., Maiboroda, L., and Muzyka, I. (2020). Analysis of the current state of distance learning in the vocational education and training institutions. *E3S Web of Conferences*, 166:10010.

Reshchuk, K. and Lukashova, S. (2020). From 15 to 68 million deaths from coronavirus. As others expect. https://www.pravda.com.ua/articles/2020/03/17/7243880/.

Shokaliuk, S., Bohunenko, Y., Lovianova, I., and Shyshkina, M. (2020). Technologies of distance learning for programming basics on the principles of integrated development of key competences. *CEUR Workshop Proceedings*, 2643:548–562.

Survey (2020). Survey of pedagogical workers of Zhytomyr region on the organization of distance learning. https://tinyurl.com/hmk74a5p.

Tatarchuk, H. (2020). Institutionalization of distance learning: the sociological aspect. *Obrazovanye*, 1(1):63–72.

Tryus, Y. V. and Herasymenko, I. V. (2021). Approaches, models, methods and means of training of future IT-specialists with the use of elements of dual education. *Journal of Physics: Conference Series*, 1840(1):012034.

Verkhovna Rada of Ukraine (2013). On approval of the Regulations on distance learning. https://zakon.rada.gov.ua/laws/show/z0703-13#Text.

Verkhovna Rada of Ukraine (2017). Law of Ukraine "On Education". https://zakon.rada.gov.ua/laws/show/2145-19/page#Text.

Verkhovna Rada of Ukraine (2018). Concept of development of digital economy and society of Ukraine for 2018-2020. https://zakon.rada.gov.ua/laws/show/67-2018-%D1%80#Text.

Verkhovna Rada of Ukraine (2020). On prevention of the spread on the territory of Ukraine of acute respiratory disease COVID-19 caused by coronavirus SARS-CoV-2. https://zakon.rada.gov.ua/laws/show/211-2020-%D0%BF#Text.