Features of distance learning of cloud technologies for the organization educational process in quarantine

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Abstract. The article substantiates the need to develop and implement a distance course "Cloud technologies in the educational process in quarantine". It is noted that the purpose of the course was to acquaint teachers of general secondary education institutions, college teachers, vocational and higher education institutions with the basic possibilities of using cloud technologies to ensure the educational process in distance learning. The list of topics with which the students get acquainted is given: basic concepts, models of cloud services, architecture and proposals from leading cloud services companies; cloud services in the work of the teacher, the peculiarities of working with mail; cloud storage as an alternative to replacing conventional drives; opportunities to create documents with the provision of sharing rights to multiple users; opportunities to create Internet surveys using cloud technologies; opportunities to create presentations using cloud technologies; cloud-based means of creating smart maps; means of creating sites; cloud-based learning management systems (for example, Google Classroom). The peculiarities of the proposed distance course and the difficulties that the students had in performing certain tasks are identified and described. The statistical results of the course are given.

1. Introduction

During the global pandemic, the question of the readiness of teachers of general secondary education institutions, college teachers, vocational, and higher education institutions to carry out distance learning qualitatively became acute. Teachers had to adapt to the new challenges of today quite quickly, in a few days. In particular, teachers had to prepare in a short time to organize the educational process for the period of quarantine, which also provided for the organization of distance learning, which in turn, qualitatively possible to perform using cloud technologies.

Also, following the "Procedure for the professional development of pedagogical and scientific-pedagogical workers", one of the approved forms of professional development is remote [9]. Also, by the same procedure, one of the main areas of professional development is: "the use of information and communication and digital technologies in the educational process, including e-learning", as well as

the development of digital competence [9].

Therefore, it was decided to modify the developed course ([43], [48]) for new challenges and offer teachers to take it remotely to develop their digital competence.

For this purpose, a certificate educational program "Information systems and cloud technologies in the educational process" was developed [38], which was developed within the accredited specialty 126 "Information systems and technologies" at the Zhytomyr Polytechnic State University. Within the framework of this certified educational program the course "Cloud technologies in the educational process in the conditions of quarantine" was developed.

The purpose of the course was to acquaint pedagogical and scientific-pedagogical workers with the main possibilities of using cloud technologies to ensure the educational process in terms of distance learning.

2. Theoretical background

The issue of informatization of the educational process at present the subject of many works of such scholars as D.S. Antonuik [49], O.V. Bondarenko [3], O.Yu. Burov [34], V.Yu. Bykov ([6], [7]), O.V. Chorna [10], O.G. Glazunova [13], A.M. Gurzhiy [8], A.V. Iatsyshyn ([20], [16]), A.E. Kiv [19], V.V. Kovalenko [20], O.O. Lavrentieva [23], S.H. Lytvynova [37], O.M. Markova [29], I.S. Mintii [47], Ye.O. Modlo [27], P.P. Nechypurenko [28], V.P. Oleksiuk [30], V.V. Oliynyk [31], L.M. Rybalko [24], M.P. Shyshkina [36], V.N. Soloviev [12], A.M. Striuk [44], N.P. Volkova [46], V.I. Zaselskiy [22], M.I. Zhaldak [51] etc.

At the same time, I.A. Getman [45], L.H. Havrilova [15], H.M. Kravtsov [21], L.M. Petrenko [33], S.V. Shokaliuk [41], V.V. Yahupov [50] and others pay attention to distance learning in their research.

In particular, I.S. Mintiy, N.A. Kharadzhian and S.V. Shokaliuk in their joint work considered the problem of development of information and communication competencies of teachers of pedagogical institutions of higher education according to the program of advanced training courses "Information and communication technologies in full-time and distance (combined) training" [26].

V.V. Osadchyi and K.P. Osadcha investigated the possibilities of distance learning in the study of technical disciplines [32].

A.V. Bukach offered a distance learning program "Google Apps for Education" [5], which aimed to familiarize participants with the possibilities of Google Classroom for the organization of the educational process.

Later, the team of authors Yu.M. Bogachkov, A.V. Bukach, and P.S. Uhan proposed another approach – a comprehensive application of Google Classroom to create variable courses. They proposed a prototype of the Classroom X application, which provides the ability to automatically plan a specific sequence of tasks, automate the verification of tasks, the organization of repetition of a certain material, etc. [1].

Regarding foreign authors, that M. Britto considered cloud computing in higher education [4], C. Dzikite, Y. Nsubuga and V. Nkonki studied lecturers' competencies in information and communication technology for effective implementation of ICT-integrated teaching and learning in textiles and clothing degree programs [11], D. Hanson-Baldauf and S. Hughes Hassell studied the problem of the information and communication technology competencies of students enrolled in school library media certification programs [14].

M. Jalgaonkar and A. Kanojia analyzed the possibilities of adoption of cloud computing in distance learning [18], M. Simonson, S. Smaldino, M. Albrigth and S. Zvacek studied the problem of teaching and learning at a distance [42]. But the researchers ignored the question of the effectiveness of organizing such courses in a remote form.

The purpose of the article is to identify and describe the features of distance learning of cloud technologies for teachers of general secondary education, college teachers, vocational and higher education institutions for use in the educational process in quarantine.

3. Results

To provide distance learning for teachers of general secondary education, college teachers, vocational, and higher education institutions, we develop the course "Cloud technologies in the educational process in quarantine" [39].

This course has been modified by improving the course "Cloud Technologies in Education" [3] taking into account the new challenges currently facing pedagogical and scientific-pedagogical staff of educational institutions.

The main challenges include the organization of distance learning using cloud technologies, the organization of the educational process in quarantine, time constraints, and more.

The previous course "Cloud technologies in education" [3] was changed by reducing the amount of educational material, tightening the deadlines, and the feature was not traditional learning in the classroom, and distance learning.

The course was limited for 5 days, so that course participant could quickly get acquainted with the necessary cloud technologies that would allow them to organize the educational process in their educational institution.

During the course, teachers had the opportunity to get acquainted with:

• basic concepts, models of cloud services, architecture and proposals from leading cloud services companies [25];

  • Google services in the work of the teacher, the peculiarities of working with mail;

  • cloud storage as an alternative to replacing conventional drives;

  • the ability to create documents with the provision of sharing rights to multiple users;

  • opportunities to create Internet surveys by cloud-based tools;

  • opportunities to create presentations by cloud-based tools;

  • cloud-based mind maps [17];

  • tools for creating sites [35];

  • cloud-based learning management systems (for example, Google Classroom [2]).

Here is an example of a training session.

Topic: ***Creating a mind map.***

Objective: To learn how to create mind maps using cloud technologies.

1. Select one of the suggested services for creating mind maps.

2. Log in to your account.

3. Create a new smart map on a topic related to the subject you teach.

4. Give access to the 2 people after you in the list and the teacher.

5. Take a screenshot of the created mind map. Go to the Classroom, select the appropriate task, go to it by clicking "View Tasks", create a picture, and paste a copied screenshot.

6. After completing all tasks and inserting a picture, click "Submit".

Note that for each task there are theoretical materials, where the teacher step by step described the work with each service and supplemented the material with screenshots. Each topic was fully disclosed in the theoretical information and the listeners only had to open the materials and get acquainted with it.

Besides, the theoretical materials also gave examples of the use of a cloud service in the educational process of an educational institution.

We will point out the peculiarities of this course and the difficulties that students have in performing certain tasks. At this stage, we apply the method of mathematical statistics – the method of registration, which involves the detection of a particular phenomenon and its quantitative calculation.

The first is that *when registering for the course, a significant number of potential students (113 people) indicated e-mails either with errors or non-existent.* As a result, some of them were unable to join the course at the time it began.

Second. *Listeners do not read the instructions and messages carefully.* As a result, the teacher had to spend a significant amount of time answering the questions that are fully listed in the instructions.

Third. Some students (353 people) *did not complete the tasks in the scheduled time* specified at the beginning of the course, which led to inconvenience to other participants, as all participants interacted not only with the teacher but also with each other.

Fourth. One of the forms of reporting turned out to be quite *complicated – inserting a picture in the form of screen capture* to confirm the performance of certain tasks. Everyone who encountered this problem did not even read the instructions, which again described all the steps step by step. Moreover, if one participant asked this question, and the teacher gave a meaningful answer, the other participants pretended not to see these comments, and just asked the question again. Again, all this reduced productivity and, accordingly, the effectiveness of the teacher's work on checking tasks, advising students on more important issues.

Fifth. *The implementation of project activities, which consisted of joint work on documents of different types, proved to be problematic.* For example, there were difficulties in studying the topic "Creating documents with sharing rights to multiple users". One of the tasks of this topic was:

1. Create an essay on "Cloud technologies in education".
2. Give access to 3 people on the list after you and the teacher.
3. Edit the document you have been granted access to.
4. In each document in which you are granted access, write a comment.

The task "Edit the document you have been granted access to" caused negative emotions in most students because they perceived this task as having another participant in the course have to make changes to show that the person is making many mistakes. Although in fact, the teacher in the organizational moments and the comments to the tasks drew attention to the fact that the purpose of the courses is to learn to work together on the project, and not another.

Significant difficulties also arose in working on a joint presentation. As in all tasks, users worked with 6-7 persons (under the conditions of tasks), and in this task, it was necessary to work at once with all groups, it led to more serious problems. In particular, the task was to create a business card about yourself on a separate slide. But some course participants already created their business cards on the created slides, or deleted already filled business cards, which led to misunderstandings and confusion when checking such a task.

There were also tasks that the students liked more, and they could express themselves creatively. In particular, one of the topics proposed for the study was cloud-based tools for creating mind maps. Course participants were offered 4 different cloud services that can be used for this type of activity, although some teachers used others not listed in the instructions.

As a result, course participants proposed their vision of using cloud-based tools to create mind maps, and created mental maps on a variety of topics: Mathematics, Biology, Polish, English (grammar, words – see figures 1-2), Higher Mathematics, Computer Science, etc.

Note that an interesting and creative task was to create your presentation using cloud technologies. Each teacher, taking into account the specifics of teaching their subject, created a presentation using cloud technologies (see figure 3). Several cloud services were offered to the course participants.

Upon completion of this course, students who have completed all planned tasks and worked on all assigned topics, receive a certificate of completion of the course "Cloud technologies in distance learning in quarantine".

The distance course "Cloud technologies in distance learning in quarantine" was conducted in three waves: the first wave took place from 30.03.2020 to 03.04.2020, the second – from 06.04.2020 to 10.04.2020, and the third – from 13.04.2020 to 17.04.2020. Similarly, we apply the method of mathematical statistics – the method of registration, which is described above.

A total of 1,500 participants were registered, of whom 1029 took on the tasks, and only 816 completed the entire course. The statistics of participants by waves are presented in table 1 and visualized in figures 4 and 5 in the form of diagrams.

Negative dynamics between registered participants and those who started the tasks is because some registered participants did not specify their e-mail when registering, some participants did not take into account external factors that hindered them in performing tasks, and some participants did not check

the mail. The situation is the same with those participants who joined the course and those who completed it. This is because some of the participants did not understand that they would need to complete the task, but decided that to obtain a certificate they only need to register. Some of the participants simply could not complete the proposed tasks.
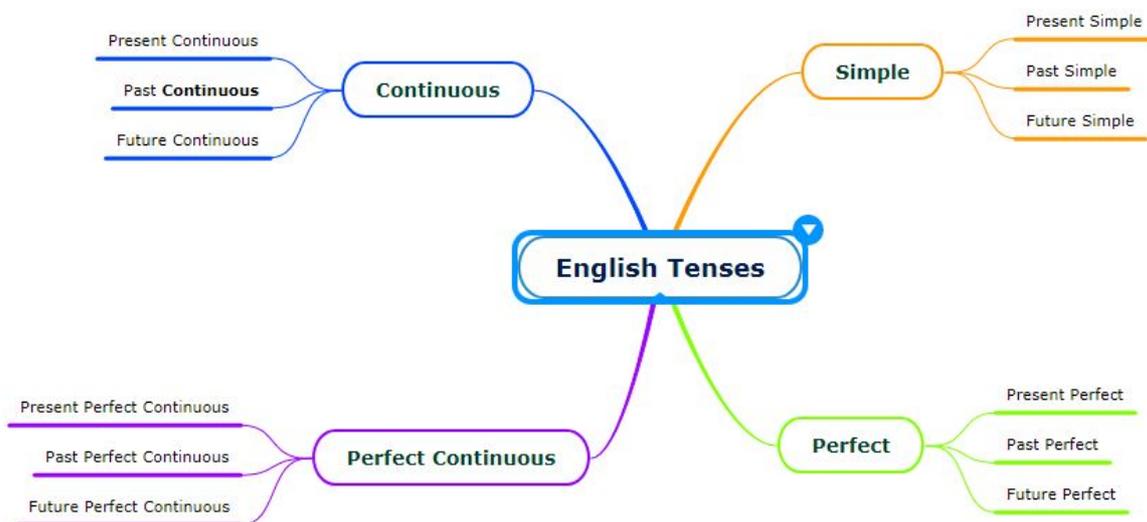

Figure 1. An example of a mind map for learning foreign languages, created by students during a distance learning course.
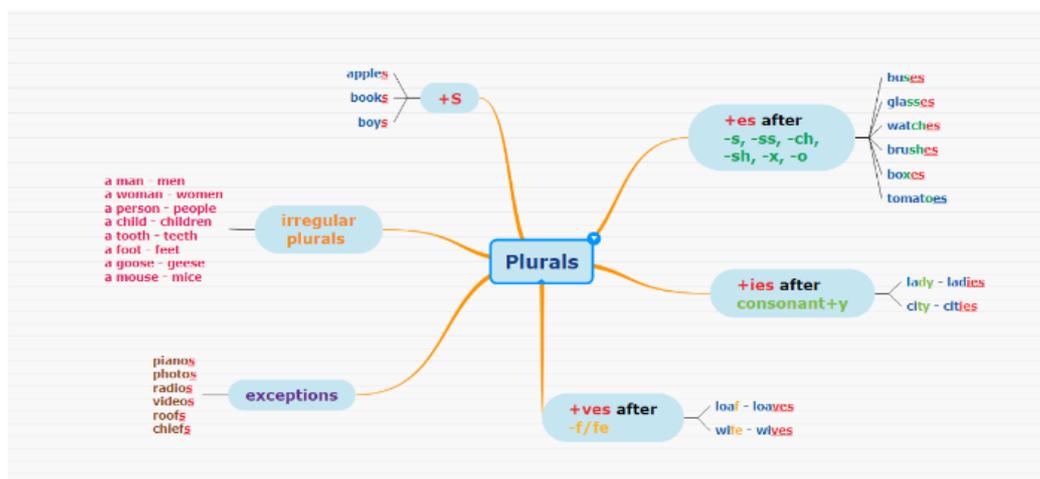

Figure 2. An example of an intellectual map for learning foreign languages, created by students during a distance learning course.

During the whole period of the courses were involved: teachers of general secondary education – 499, educators of preschool educational institutions – 16, pupils and students – 5, teachers of higher education institutions – 70, teachers of colleges and vocational schools – 82, managers of educational institutions – 94, employees of education departments – 5, other employees at school – 34, researchers – 3, managers of other institutions – 8. Detailed statistics are visualized in figure 6.

Employees of 40 higher education institutions became students of the developed distance course. The most active were the employees of the following free economic zones: Zhytomyr Polytechnic State University, Pavlo Tychyna Uman State Pedagogical University, the National University of Life

and Environmental Sciences of Ukraine, the National M.P. Drahomanov Pedagogical University, Uzhhorod National University.
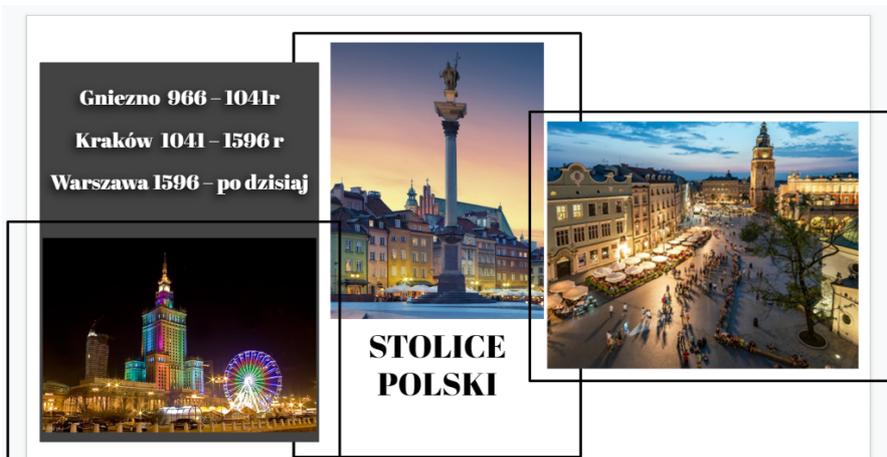

Figure 3. Example of a presentation created by students during a distance learning course.

Table 1. Statistics of participants on waves.

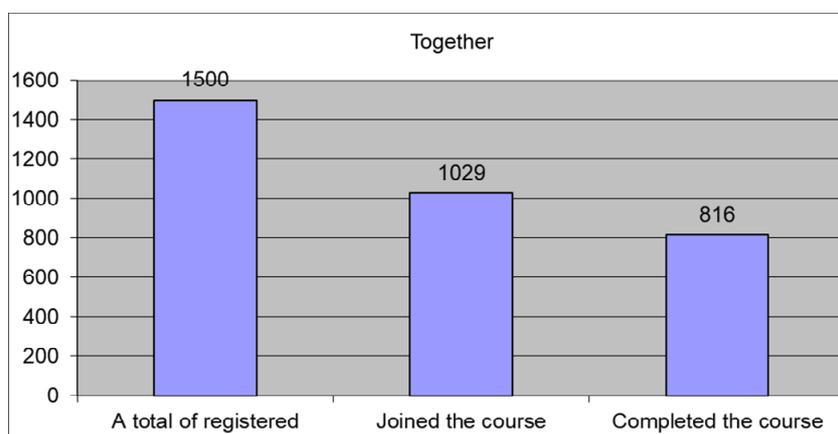|	1 wave	2 wave	3 wave	Together
A total of registered	500	600	400	1500
Joined the course	367	381	281	1029
Completed the course	296	274	246	816

Figure 4. Statistics of course participants in general.

If we consider the statistics of participants about the regions of Ukraine, there were representatives of all regions of Ukraine (see figure 7).

4. Conclusions

The developed course is aimed at developing information and communication competence of teachers of general secondary education, college teachers, vocational and higher education institutions by acquainting students with the basic possibilities of using cloud technologies to ensure the educational process in distance learning.
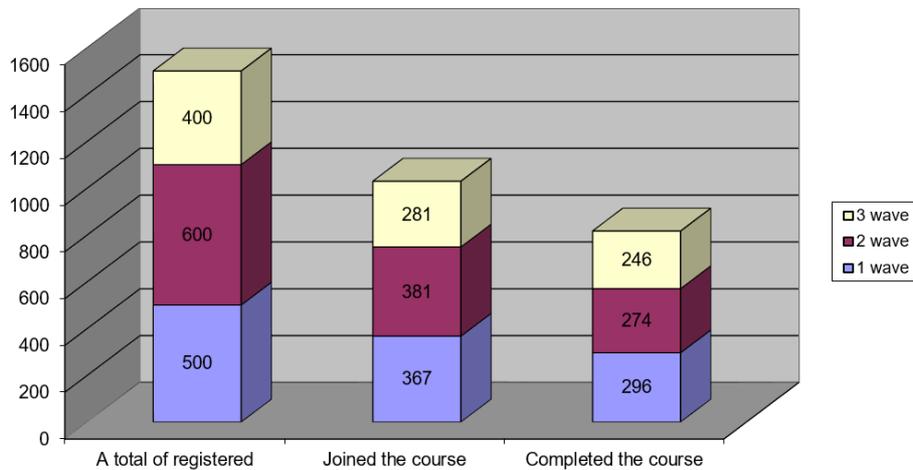
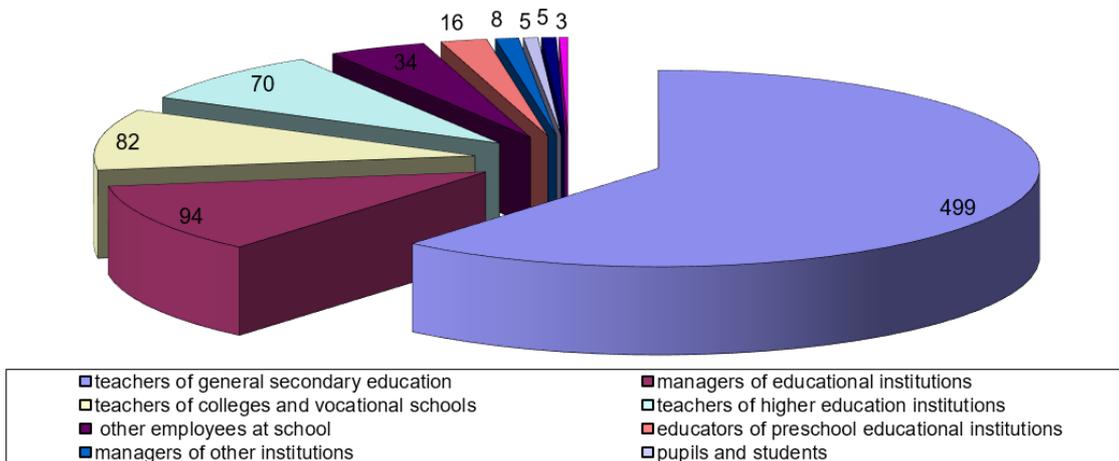**Figure 5.** Data on the participants of the course on the waves.

Figure 6. Percentage of participants at the place of work.

During the final survey of the course participants, it was found that the tasks took a lot of time and effort from the participants, but they were all satisfied after the courses. Students noted that the advantage of these courses for them was that there were more practical tasks than theory, the advantages of the students included the distribution of the submitted theoretical material and material for self-study and practical work.

Most of the students noted that they acquired new knowledge and skills in working with cloud services, as well as generalized and systematized them. As noted by students, the courses are modern, creative; lecture notes are clear; the clearly defined algorithm for performing tasks.

Participants also pointed out the advantage that the courses were organized and conducted in a convenient format. All participants of the courses expressed a desire to take part in further similar events.

Organizers of such courses must take into account the following features: 1) take into account the number of participants; 2) in the registration questionnaire to focus on the correct completion of all fields, especially when filling in the field "e-mail"; 3) when connecting students to the course, not only provide materials to familiarize with the organization of courses, Google Classroom, the purpose of the courses but also conduct introductory testing to determine the level of awareness of students with the necessary materials; 4) focus on the timely completion of tasks so as not to create inconvenience to other participants.

Figure 7. Statistics of course participants by regions of Ukraine.

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