

## EXPERIENCE OF INTRODUCING CLOUD TECHNOLOGIES

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**Abstract.** *Modern education is closely connected with widespread digital technologies, through which communication, collaboration, creativity, and innovation can be organized. The aim and objectives of the article consist in describing the experience of real experience with cloud technologies on the example of a municipal organization (institution, establishment) “Shostka educational complex: specialized school of I-II degrees-lyceum of Shostka town council of Sumy region”.*

*To test the effectiveness application of cloud computing technologies in the educational process of the institution, experimental work was carried out, as a result of which carried out: analysis of the possibility application of cloud computing technologies in the learning process; determination of pedagogical conditions application of cloud computing technologies in the learning process; testing the effectiveness of certain pedagogical conditions.*

*Assessment of the possibility of using the selected technologies in education was carried out according to the results of a survey of all participants in the study. This stage made it possible to determine the main directions of research, take into account the possible obstacles to their use.*

*To implement the selected pedagogical conditions, guidelines for teachers on the use of these technologies in the learning process were developed, which contain a set of methods and techniques for organizing lessons, ways to implement a business game, cluster, senkan, fishbone, comparison chart, brainstorming .*

*Organizing the educational process with the help of cloud technology is one of the priority areas of updating modern education that allows not only to improve the quality of education, but also to achieve a new level of relations between participants in the educational process at all stages of teaching. They help teachers work not only with children but also with their parents.*

*During the transition to the new educational standards, cloud technologies contribute to forming a new digital culture of teachers and students. Their applying in the educational allows to make the educational space open.*

**Keywords:** *digital technologies, cloud technologies, educational process, online education.*

## **Introduction**

Modern education is closely linked to the widespread use of digital technologies, through which it is possible to organize communication, collaboration, creativity and innovation. Realizing their functional features, limitations, general principles, consequences and risks of use, it is advisable to implement changes in the educational process, the central figure of which is the student.

Digital technology is an integral part of modern education (Kovalchuk, 2019). They provide an opportunity to increase study time through independent work of higher education students; change the forms of control over the quality of the educational process; to provide flexibility in the management of the educational process; increase the digital competence of the educational process participants, that makes them a powerful means of improving the quality of education (Yakovenko, 2019).

The problems of using cloud computing technology in education are covered in the works of N. Bakhmat (Bakhmat, 2013), T. Vakalyuk (Vakalyuk, 2016), Y. Dyulicheva (Dyulicheva, 2013), G. Kiselyov (Kiselyov, 2013), V. Kobysya (Kobysya, 2012), S. Litvinova (Lytvynova, 2016), N. Morse (Morse, 2018), A. Struk (Struk, 2014), N. Khmil (Khmil, 2015).

In her works, S. Lytvynova identified the types of educational clouds, forms and necessary components of using cloud technologies, types of activities supported in the cloud, the possibility of using these technologies to organize a cloud-based learning environment at school (Lytvynova, 2016). T. Vakalyuk considered the topic of choosing a cloud platform for designing a cloud-based learning environment (Vakalyuk, 2016). N. Morse and O. Kuzminska in their works reveal the topic of using cloud computing for testing and independent work (Morse & Kuzminskaya, 2012).

Cloud technologies provide educational institutions with resources and services that are available without significant capital investment in hardware and software. The undoubted advantage of their applying is also constant access to information and software for its processing. Therefore, in the current conditions, cloud technologies are very necessary and important for education.

With the help of cloud technologies there is an opportunity to create an accessible cloud-oriented educational environment for organizing cooperation which aim is to achieve certain didactic goals, fulfill pedagogical tasks, unite subjects and objects of the educational process for effective cooperation aimed at improving the quality of students' educational results by means of cloud technologies (Lytvynova, 2016).

The benefits of cloud technology are multifaceted. The use of programmes and services supplied by external providers is a cost-effective solution for

educational institutions. Their use reduces the cost of hardware and software, as well as reducing the cost of their maintenance by specialists, paying for the use of cloud technology only for actual consumption, and the most attractive is that there are many free services for educational institutions (Danylyuk, 2019).

Cloud technologies provide access to educational resources and software from any device and at any time of its connection to the Internet. This, in turn, allows the ideas of mobile learning to be realized not only in the use of cell phones for learning purposes, but also in the mobility of participants in the learning process and the possibility of their lifelong learning.

At present, there are a large number of cloud service providers, the most popular used in education are Google's G Suite for Education and Microsoft's Office 365.

### **Purpose and Tasks of Research**

The object of the study is the introduction of cloud technology in the educational process.

The subject of the study is the possibilities of applying cloud technologies in the pedagogical process of the school. The purpose of the study is to make a list of fixed assets and their capabilities based on the experience of implementing cloud technology in the school educational process.

Based on the purpose of the study to verify the effectiveness of the cloud technology usage in the educational process of the school, the following tasks were set:

- 1) to analyze the possibilities of using cloud technologies in the pedagogical process;
- 2) to determine the pedagogical conditions for the cloud technologies usage in the educational activity;
- 3) to check the effectiveness of certain pedagogical conditions.

Let's consider the experience of implementing cloud technologies on the basis of the municipal organization (institution, establishment) "Shostka educational complex: specialized school of I-II degrees-lyceum of Shostka town council of Sumy region".

The methodological basis of the study:

- analysis and synthesis of the literature on the topic of research in order to determine the state of development of the problem under study in the context of digitalization of education; system analysis to determine the pedagogical conditions for the use of cloud technologies in educational activities;
- questioning, testing, observation, pedagogical experiment to test the effectiveness of certain pedagogical conditions;

- data processing methods: grouping, ranking, parametric methods of comparison of research results for quantitative and qualitative analysis of the data obtained, methods of generalization, comparison and prediction; method of generalizing indicators for analysis of aggregate data; tabular and graphical methods.

## **Results**

In order to implement the first task, a literature analysis of the problem under study was conducted. The result suggests that the use of cloud computing technology is a promising area that can improve the efficiency of the educational process and reduce the cost of its implementation.

These technologies provide opportunities for resource sharing and online collaboration, as data is stored on the servers of the company providing the services. With cloud technology, education participants work in real time on shared documents, projects and tasks. Everyone can see and comment on the activities of other participants, which increases the benefits of cooperation.

Cloud technology serves as a tool for creating an interactive educational environment in which there is active interaction in educational activities, students collaborate and communicate with all participants in the learning process. They are an indispensable tool for cooperation between students on joint projects, where everybody performs individual tasks, and the results are represented as a joint document. Students can evaluate and edit project work during collaboration, which promotes the development of critical thinking, analysis and evaluation skills, expression of opinion, etc. Interaction encourages students to actively participate in various tasks because the results of their joint work are visible to others. Teachers can objectively assess students' knowledge and skills, as there are options for tracking and establishing each student's personal contribution.

Cloud technologies also provide the ability to work offline with further synchronizing (when Internet connection is available), no ties to the place where the training takes place and the time of the training, which gives participants the freedom to work at their own pace.

There is a special educational application Google Classroom for creating courses while organizing the educational process. In the courses you can create tasks of different types, according to which you can distribute and collect students' work. With the help of Google Classroom you can organize individual or group work using the appropriate access settings. You can add different types of files from your computer, Google Drive, YouTube channel or links to educational resources in the classroom. Managing educational activities is realized through commenting, responses, i.e. quality feedback. Students have the opportunity to communicate with teachers when completing tasks, while

comments and questions are divided into private and open for discussing with the class. Children work on tasks use of these technologies and have the ability to add files of various types (text document, spreadsheet, presentation, photo or video from mobile phones).

Applying communication programmes in the educational process, such as e-mailing, instant messaging, online conferences, forums and others expands the opportunities for communication between the teaching participants. With their help you can add comments to tasks and creative work, share creative thoughts, seek advice from the teacher and all these activities proceed in real time.

Participants in the learning process can manage future and current events, meetings with the help of calendars. The capabilities of the calendar created for the classroom are useful in managing individual tasks of students, notification of various events. Common calendars help the training participants to more effectively organize joint work on group projects. Teachers can use the calendar app to set lesson dates and due dates, as well as monitor the timeliness of assignments.

For creating and editing documents in G Suite there are appropriate programmes: for the ability to process text it is Google Docs, for spreadsheets it is Google Spreadsheets, and Google Presentations. One of the major benefits of using these technologies is real-time file sharing with all students. They can simultaneously view, comment on and edit shared files. Opportunities for comments and messages improve collaboration and can be used to share ideas, discuss and communicate. The change history is also available, and teachers can track changes and revert to previous versions.

Creating and working with text documents, spreadsheets and presentations using cloud technology is possible in the centralized cloud storage of Google Drive. Participants of the educational process have access to a virtual disk and updated versions of all documents. Cloud storage is gaining popularity because of the ability to share documents, which improves productivity. For managing files on Google Drive there are appropriate tools that allow creating folders, which then move the files, add a description, thus allowing you to use different criteria when searching in collections of saved documents.

Storing information on a virtual disk has numerous advantages. The main one is the ability of all trainees to access saved files at any time and anywhere through different devices.

Cloud technologies make it possible to work both online and offline. Files are automatically updated and synchronized between user's different devices and between multiple users who work with them when connected to the Internet.

At present, when every student has a mobile phone, the aim of school is to teach students to use them not only for entertainment but also for educational

purposes. An essential feature of cloud technology is the ability to support various cloud technologies to organize interaction on different devices.

An essential feature of cloud technology is sharing, with different levels of access to shared files: read-only, editing options, shared ownership.

Organization of shared access to files of all participants in the learning process involves communication in different forms: comments, chat, which increases the level of interaction, increases productivity and quality of educational activities. Also, teachers who have access to students' assignments can monitor their performance, give instructions, thereby providing timely feedback, assessing the contribution of each to the solution of common tasks.

It is possible to use Google Meet to conduct online lessons in the format of video meetings at school. With the help of the application or previously created link in Google Classroom, teachers organize online learning. It is not difficult for students to join such lessons, which makes the organization of online learning at school a very simple process from the technical point of view.

The study identified a number of benefits that the school will have when using this technology. Educational opportunities and tasks realized by means of cloud technologies were defined, among them - increase of degree of availability of educational content and possibility of its operative updating, organization of educational process by means of cloud technologies, organization of various forms of the control and monitoring of performance of educational tasks.

For realization of the second task of research the analysis of scientific works was carried out, pedagogical conditions were allocated and proved: motivation to learning by means of cloud technologies; organization of learning by means of cloud technologies; introduction of effective forms, methods of learning on the basis of cloud technologies.

The implementation of the first pedagogical condition is defined as an important stage of the study, as the effectiveness of the educational process is directly related to how high motivation is.

To increase the interest in the accumulation of knowledge, skills, appropriate conditions are necessary: to use active teaching methods, such as discussions, role-playing games, trainings and others; presentation of educational material to combine with appropriate emotional accompaniment; organize productive learning activities; create a favorable emotional climate for learning; organize feedback; to analyze the success and causes of failure.

Success is an important aspect of motivation. Awareness of the need for success contributes to the formation of goals. Motivation of learning and cognitive activity is likely to decrease if the need for success is not met. Therefore, it is important to create the necessary conditions for its achievement.

Thus, the use of active forms and methods of teaching, creating a comfortable atmosphere of interaction between participants in the educational

process, the amount of content and novelty of educational material, respect for the individual contributes to the active formation of motivation in students.

To implement the second and third pedagogical conditions, a survey was conducted among the participants of the experiment, as a result of which the possibility of using cloud computing technology in the learning process was assessed. This stage allowed us to identify the main areas of cloud computing in the organization of learning in the school. As a result of the analysis and assessment of the possibilities of cloud technologies, the educational activities in the municipal organization (institution, establishment) “Shostka educational complex: specialized school of I-II degrees-lyceum of Shostka town council of Sumy region”.

As a rule, cloud technologies in the basic version for educational institutions are free, which makes them even more attractive. G Suite for Education is a set of free Google programmes designed for educational institutions. The G Suite for Education package includes 14 basic and 51 additional Google services, including Gmail, Google Drive, Google Class, Google Meet (video conferencing tool), Google Calendar, Google Docs, Google Spreadsheets, Google Presentations, Google Sites, and a digital interactive Jamboard.

Due to G Suite for Education, our educational institution has free access to cloud technologies that can be used in the educational activities. This made it possible to create a cloud-based educational environment for the school. Each participant in the educational process has a personal account. Cloud technologies are available through a web browser and the Internet, so they do not depend on the equipment that allows teaching participants work on various devices, including mobile ones.

The application of the technologies highlighted in the study in education is one of the priority areas of modern education renewal, which allows not only to improve the quality of education, but also to reach a new level of relationship between teachers and students at all stages of education. They help teachers work not only with children, but also with their parents.

It is worth noting that in the current difficult conditions there is a need to change the traditional forms of work with parents. In the conditions of adaptive quarantine parents' access to school is limited and, therefore, such actions as parents meetings, consultations, questionnaires on various issues, seminars, welcoming days, carrying out joint actions, registration of information stands, booklets have objective difficulties together with all their positive characteristics. With the development of digital technology, when each parent has technical means and can find any information, teachers have the opportunity to communicate with them virtually. Using Google Meet, for example to hold parents meetings online as a video conference, becomes a necessity and can turn parents into active teaching participants.

To implement the identified pedagogical conditions of the study developed guidelines for teachers on the use of cloud technology in learning, which contain a set of methods and techniques for organizing classes, ways of implementing a business game, cluster, senkan, fishbone, a comparison table, brainstorming.

The total number of students of municipal organization (institution, establishment) “Shostka educational complex: specialized school of I-II degrees-lyceum of Shostka town council of Sumy region” involved in the experiment - 175 people, including 98 people in the experimental groups and 77 people in the control groups.

To test the effectiveness of the selected pedagogical conditions, training was conducted with the introduction of a new factor (new teaching tools) and the effectiveness of its application was determined.

According to the results of the comparison of the obtained monitoring data, there was a significant improvement in the results of educational activities. The study showed that the number of participants in the educational process who recorded a sufficient and high level of achievement in the experimental groups increased. There was also a decrease in the low and average levels. In the control group there were no significant changes after the end of the experiment (Fig.1).

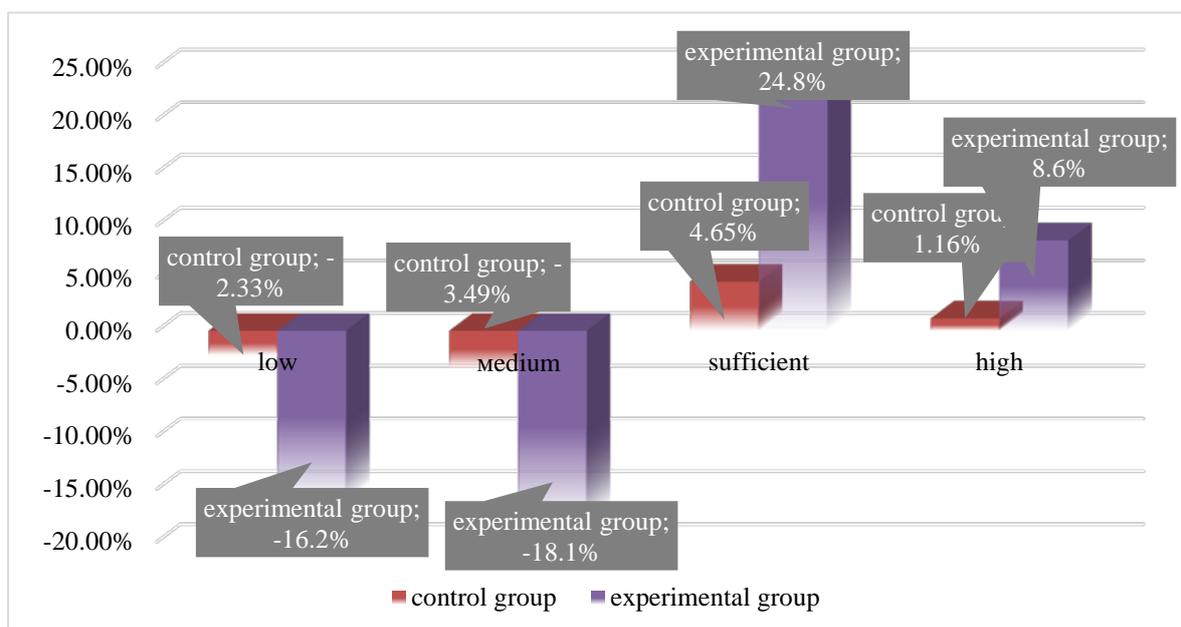


Figure 1 Experimental Results

The solution of the tasks of the study led to the achievement of its goal. In general, according to the results of the analysis we can talk about the high motivation of students to accumulate knowledge when organizing the learning process using cloud technology.

Thus, cloud technology provides the following opportunities for the educational establishments:

- 1) creating text documents, spreadsheets and presentations;
- 2) exchanging files and cooperation;
- 3) managing contacts, communication and calendars;
- 4) organizing online learning with the help of Google Classroom and Google Meet.

Files are available on various devices (including mobile ones), there is the ability to synchronize data between multiple devices and users, that makes cloud technology very popular for education.

### **Conclusions**

The study showed that in the context of the digitalization of modern society and modernization of education an obligatory technological tool to maintain and implement the educational process is cloud technology.

During the transition to the new educational standards, cloud technologies contribute to forming a new digital culture of teachers and students. Their applying in the educational process allows to make the educational space open.

Cloud technology is a space of interesting and productive education for students and teachers, it does not violate the principles of equal access to education, implements self-affirmation, disclosing individual and creative abilities, development of independence, responsibility, ability to analyze and synthesize selected material, increases interest in the subject. It is such new forms of virtual interaction that stimulate motivation, thinking, provide an opportunity to learn new means of virtual communication and digital environment, ensure the full use of the potential of the personality.

As part of the study, the set tasks were implemented. An analysis of the necessity and possibility of organizing training in the school with the help of cloud technologies was carried out. The pedagogical conditions of the use of cloud technologies in the organization of the educational process at school were identified, substantiated and experimentally tested.

As part of the experimental work a pedagogical experiment was conducted. The analysis and generalization of its results showed the positive dynamics of quantitative and qualitative changes in the educational activity of students that occurred during the period of the experiment.

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