

Experience of using Google cloud services in Ukrainian universities: survey results

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Abstract. The research analyzes a survey of Ukrainian teachers regarding the advantages of cloud technologies provided by Google Workspace for Education. We surveyed 167 respondents from different regions of Ukraine. They were asked to complete a specially designed questionnaire that included three closed-ended multiple-choice questions and two open-ended questions that required extended responses. It was found out that during distance or blended learning teachers together with students most often use Google Sheets, Google Meet, Google Forms and Google Documents. The most significant advantages of Google Workspace for Education services are the convenience and usability, as well as a possibility of distance learning. Keywords: Cloud technologies, Google Workspace for Education, teachers, higher school

1 Introduction

Today, the active use of information and communication technologies (ICT) is considered a necessary component of the education system. It concerns the emergence of new training areas for future IT specialists, the use of interactive and multimedia tools [1], etc. In case children and adults have the Internet connection, cloud technologies and electronic educational resources, they can learn at any time, no matter what their location is. It is especially relevant in the conditions of distance and blended learning [2], when there is no possibility to be physically present in the classroom.

The use of cloud technologies allows us to obtain significant advantages in various areas of human activity. It involves a possibility of saving huge amounts of information in virtual space, automated data processing, a possibility of shared work with various formats of digital content. This trend directly applies to education, which involves the transfer of social experience and mastery of certain amounts of information. The main principles and advantages of using cloud technologies in education are reflected in the works by M. Attaran and S. Attaran [3], G. Al-Rasheedi and N. Khan [4]. The attitude of students and

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teachers to cloud technologies, the readiness to use them in the educational process were studied in the works by A. Korucu [5], M. Amron et al. [6] and others.

One of the most widespread educational packages, which is based on the use of cloud technologies, is Google Workspace for Education (GWfE). Due to the variety of digital services included in the GWfE, higher education institutions (HEIs) can implement electronic document management and informatization of educational activities. Teachers can provide access to educational materials, they can provide individualization of learning and communication between students during group work, etc. With the help of Google Workspace for Education, students can develop communicative and digital competencies, they have an opportunity to communicate without borders, etc. As a result, the use of GWfE capabilities is reflected in numerous researches. For example, R. Lanzon [7] studied the frequency of using Google Workspace for Education by teachers in different fields of knowledge. Based on some recent research works, U. Akcil et al. [8] identified a list of Google digital tools that can be used at various stages of students' educational activities, etc.

Despite the significant capabilities of Google Workspace for Education, some teachers fail to understand their importance for the organization of the educational process, as well as for the improvement of the teaching quality in the conditions of distance and blended learning. Our research involves ranking of the GWfE tools used by Ukrainian teachers in the educational process, and outlining the advantages of using GWfE tools. The obtained results will make it possible to formulate recommendations for greater involvement of the educational community in the use of Google Workspace for Education in the process of professional activity.

2 Theoretical Background

The use of cloud technologies, in particular Google Workspace for Education applications, is a natural step on the way of the technological development of society. At the same time, the introduction of any technology has certain features, sometimes opposite in their meaning.

According to the work by [3], it is difficult for educational institutions to function without the use of ICT, which provide communication, collaboration, processing, transfer and preservation of various information (official, referential, etc.). To solve these problems, the HEI administration uses appropriate software solutions which do not cost a lot but have powerful functionality.

In this context, Google Workspace for Education gives a possibility to solve plenty of tasks related to management and educational activities. Researchers outline the main advantages of GWfE cloud services: a) providing all participants in the educational process with tools for shared work and communication, various communication channels [9], [10], b) the opportunity to jointly discuss and create a scientific product in various areas of agriculture is available [11], [12], c) improving the organization of individual and group work, a possibility to work on different digital devices [13], d) ensuring a continuous and independent learning process regardless of space and time [14], effective organization of feedback between the teacher and students.

Availability of feedback and quality control of educational achievements [15] are important characteristics of the modern educational environment, which ensures the organization of distance [16] and blended learning. In this context, V. Oliynyk et al. [17] highlight the possibilities provided by Google Workspace for Education services for the organization of distance learning. In addition, on condition that appropriate methods and forms are applied, GWfE will allow users and teachers to develop digital competencies, which are a necessary characteristic of a modern person.

It should be noted that the spread of cloud services among users, in particular GWfE often depends on the desire to use them. In this context, Sidhu et al. [10] studied teachers' attitudes towards using G Suite for Education based on four criteria: usability, usefulness, intent, and actual use of Google services. In his work, D. Khuntari [18] studied such usability indicators of Google Workspace for Education as the application grade, the application's adjective rating category, the application's acceptability rating. The research by U. Alturki and A. Aldraiweesh [19] is devoted to the analysis of students' attitude to Google Meet in terms of the following criteria: satisfaction with use, subjective norms, usefulness. The work by K. Ansong-Gyimah [20] states that such indicators as usefulness and usability have a positive effect on the attitude towards this tool and the intention to use it on a long-term basis.

According to research works, the most common services used in the educational process are Google Classroom, Google Meet, Google Form, Google Calendar [14]; Gmail, Google Classroom, Google Meet, Google Drive [7], [21]. One should not forget about the office applications, in particular Google Documents, Google Slides, Google Presentations [13]. As a result, almost all employees and students of educational institutions have their own account in the Google system and store personal information there.

However, according to M. Lindh and J. Nolin [22], D. Krutka et al. [23] and other researchers, information stored in the cloud can be used for commercial use. For example, it can be data analysis according to various criteria, formation of targeted advertising, improvement of search algorithms, formation of a base of potential customers of paid products, etc. Therefore, researchers advise that users should be careful and responsible as for the storage of personal information in the cloud; they should develop critical thinking and follow the rules of information hygiene.

3 Research Methods

In order to outline the capabilities of GWfE for the organization of the educational process and the attitude of Ukrainian teachers towards them, a survey was carried out. We surveyed 167 respondents from different regions of Ukraine who anonymously completed a special questionnaire created with Google Forms. The questionnaire contained closed-ended multiple-choice questions (Q1, Q4, Q5) and open-ended questions (Q2 and Q3) that required an extended response.

Q1: What Google applications do you use in class together with students in the conditions of distance/blended learning?

Q2: In your opinion, what are the advantages of using Google Workspace for Education tools in the educational process of the higher school?

Q3: What problems did you have when using Google Workspace for Education in the educational process?

Q4: In your opinion, did the use of Google Workspace for Education applications influence the quality of students' progress in your disciplines?

Q5: What is students' attitude towards studying your disciplines with Google Workspace for Education?

The questions were formulated in such a way that the respondents' answers to the open-ended questions (Q2 and Q3) directly or indirectly explained their choice of answers to the closed-ended questions (Q1, Q4, Q5). The research used the concept of "Frequency of a term use" or "Frequency of appearance" – it is the ratio of the number of a term use by respondents to the total number of respondents expressed in percentage.

Processing and analysis of answers to open-ended questions Q2 and Q3 were carried out as follows. Respondents' answers were exported to Google Sheets. After analyzing the answers, we made manually a list of key words that appeared in the answers at least three

times. The key words were the names of all GwE digital tools, as well as the terms that denote learning methods, learning goals, and student learning activities. All other terms were classified as “Other”, and they were not considered in the research.

4 Results and Discussion

The results of the analysis of answers to question Q1 that concerns the ranking of Google applications by the frequency of their use during the shared work of teachers and students, are shown in Figure 1.

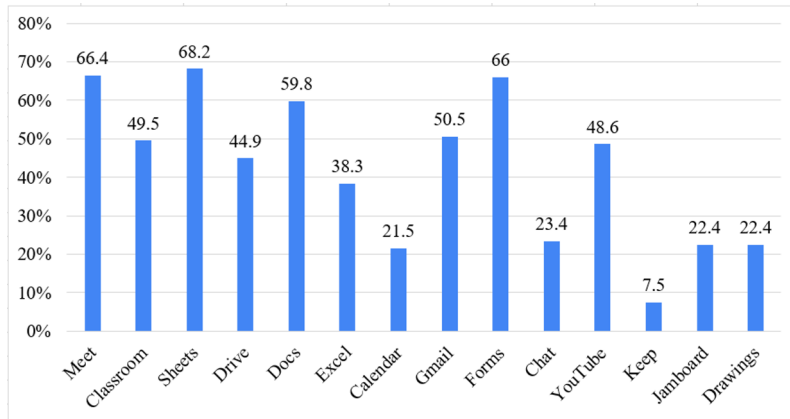


Fig. 1. Shared use of Google applications in class

The analysis of respondents’ answers to question Q1 showed that teachers most often use those Google applications that encourage the use of traditional teaching methods. According to Fig. 1, such services include Google Sheets (68.2%), Google Meet (66.4%), Google Forms (66%) and Google Documents (60%). At the same time, Google Chat (23.4%), Calendar (21.5%), Jamboard (22.4%), Drawings (22.4%) and Keep (7.5%) are not so frequently used.

Analyzing the answers to question Q2, we obtained a set of key words (advantages), which were used for further analysis and data processing (Figure 2).

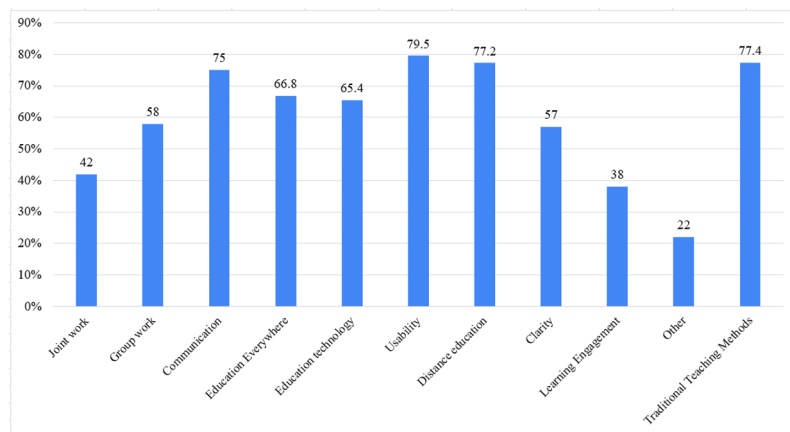


Fig. 2. Advantages of using Google Workspace for Education tools in the educational process

The frequency of the key word appearance is shown in Table 1.

Table 1. Frequency of the key word appearance in respondents' answers to question Q2

Key words	Frequency of appearance (%)	Context
Shared work	42	Obtaining shared access to educational materials; all students get equal access to the educational content
Group work	45	Getting students into groups for educational projects and discussions
Communication	75	Feedback, mutual exchange of information between the teacher and student
Education beyond the classroom	66.8	Completion of educational tasks at a place that is convenient for the student
Learning technologies	65.4	Interactive, mobile learning technologies, development of critical thinking
Speed and convenience	79.5	Time-saving, convenient and quick check of the completed tasks, usability of digital tools. Quick search for the necessary information
Distance learning	77.2	A convenient set of digital tools for the organization of distance learning
Visual aids	57	Convenient implementation of the principle of visibility, demonstration of educational materials
Educational activities	38	Modernization of the educational process, new types of educational activities in connection with distance learning
Traditional teaching methods	77.4	Narration, explanation, conversation
Other advantages	22	Flexibility of the GWfE system; student motivation; free of charge; use on different types of devices

The analysis of Table 1 showed that the respondents noted several advantages of using GWfE. 79.5% of the surveyed teachers pointed out such advantages as the speed of work, convenience and usability of Google services. However, such advantages of Google services as flexibility, their being free of charge, a possibility to be used on various digital devices were found in only 22% of responses.

The vast majority of respondents (77.4%) use GWfE tools to employ traditional teaching methods (demonstration of educational content, narration, explanation, discussion on a given topic). At the same time, 57% of teachers use digital tools to demonstrate educational materials or real objects. 65.4% of teachers use digital tools to employ innovative methods and technologies (mobile learning, blended learning, technologies of critical thinking development, interactive technologies, etc.) In our opinion, it is a high indicator that correlates well with the percentage of group work (58.8%). At the same time, only 42% of teachers mentioned the shared use of Google applications with students. It is obvious that students' shared work requires intensification, especially in the conditions of distance or blended learning.

77.2% of respondents noted the advantages of GWfE for the organization of distance learning. The percentage of teachers who pointed out the possibility of using GWfE services to provide training beyond the classroom according to the principle of "education

where you are” turned out to be high (66.8% of respondents). This indicator is related, among other factors, to the state of war in Ukraine.

Having analyzed the answers to open-ended question Q3, we identified certain disadvantages of Google applications during their use in the educational process (Figure 3).

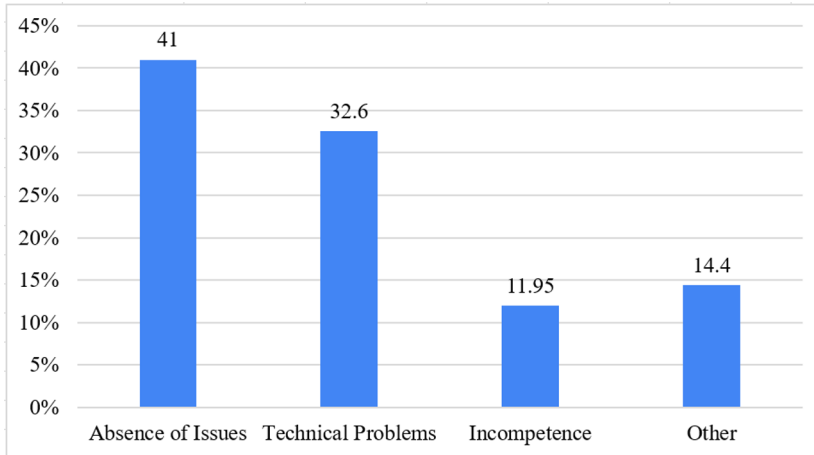


Fig. 3. Problems of using Google Workspace for Education in the educational process

We would like to note that the number of problems (key words) turned out to be much smaller than the number of advantages (see Figure 2). 41% of respondents pointed out the complete absence of problems. 32.6% of teachers reported technical problems related to the Internet speed and outdated computer equipment. 12% of respondents lack their own competence in using Google digital tools. Among other problems, the respondents indicated the reluctance of both students and teachers to use GWfE, as well as insufficient awareness of students of the capabilities provided by Google applications (14.4%).

When analyzing the results of the answers to question Q4, the vast majority of respondents (72.9%) positively assessed the influence of GWfE digital tools on the quality of students’ acquisition of educational material in the discipline. 26.2% of respondents pointed out a partial positive effect on the quality of teaching the discipline. Less than 1% of teachers suppose that the use of Google services did not affect the quality of students’ learning outcomes. Similar results were obtained for question Q5 about students’ evaluation of Google tools. The vast majority of respondents (98%) fully support the use of GWfE services in the educational process. Only 2% did not support the teacher’s initiative.

In our opinion, the number of advantages far outweighs the number of problematic issues of using GWfE in the educational process. Teachers and students are more likely to use the tools which they know about and have found useful. We share the opinion of B. Bervell et al. [24] and believe that the positive attitude towards GWfE is explained by the users’ familiarity with those services. At the same time, low awareness of certain tools and a need to read instructions before using them reduces students’ cognitive interest and the quality of learning [18]. Also, a decrease in educational motivation occurs in the case of being forced to use unfamiliar digital tools and methods [25]. There are some subjective disadvantages that are specific to certain tools. For example, students do not want to turn on their cameras during a video conference [14], which results in minimal visual contact with the teacher.

In order to effectively use cloud technologies and Google applications in particular, students must be aware of their capabilities and advantages over traditional methods [6]. For this, educational institutions should inform students about new digital tools and their

capabilities. For example, it could be done through computer literacy courses [20], electives, Science Clubs. In their work, A. Barun et al. [26] suggest instructing students on the use of Google Workspace tools at the beginning of a semester. Also, Google Workspace tools should be considered at the review lectures. During this period, teachers should explain the rules of using Google Workspace when studying the discipline, they should talk about the tools that will be used during classes, and they should request information and an email address to organize online training.

It should be noted that the frequency of using Google Workspace for Education largely depends on the form of organization of the educational process in the educational institution. Out of doubt, its constant use is justified during distance learning. As for blended learning, it is appropriate to use Google Classroom and other digital tools as an additional form of presenting material, to monitor student learning achievements, to demonstrate presentations, etc. At the same time, blended learning does not exclude working with ordinary textbooks and equipment, as classes are held in the classroom and involve live communication between the teacher and students. The full-time form of education involves the use of GwE tools for organization of extracurricular or independent work, performing practical and laboratory classes, monitoring students' educational achievements, various surveys, etc.

5 Conclusions

Thus, most researchers emphasize the positive features of Google Workspace for Education, which provides easy and effective tools for the collective work of all participants in the educational process.

The research showed that during distance and/or blended learning teachers together with students most often use Google Sheets (68.2%), Google Meet (66.4%), Google Forms (66%) and Google Documents (60%). The most significant advantages of Google educational services, according to respondents, are convenience and usability (79.5% of respondents), the possibility to work online (77.2%).

As for the obstacles that may prevent the use of GwE, 32.6% of respondents noted low quality Internet connection and outdated computer equipment. At the same time, almost all respondents confirmed the benefits of using Google Workspace for Education in the educational process.

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