

Survey Analysis of University Teachers in Ukraine Regarding the Use of Google Workspace for Education

Sergii Sharov¹, Serhii Tereshchuk², Oksana Filatova³, Oksana Hinkevych³,
Olga Ksendzenko²

¹ Department of Computer Sciences, Dmytro Motornyi Tavria State Agrotechnological University, 69600, Zaporizhzhia, Ukraine

² Department of Physics and Integrative Technologies of Teaching Natural Sciences, Pavlo Tychna Uman State Pedagogical University, 20300, Uman, Ukraine

³ Department of Journalism, Advertising and PR Technologies, Admiral Makarov National University of Shipbuilding, 54000, Mykolaiv, Ukraine

Abstract – The article highlights the results of a survey of teachers at higher education institutions of Ukraine regarding the possibilities provided by Google Workspace for Education tools in the organization of the educational process. A questionnaire was used to gather data for this purpose, in which 167 respondents from different regions of the country took part. The questionnaire focused on the frequency of using specific educational applications, such as learning management systems, collaborative tools, and educational games. Most often, Google applications are used in blended learning (72% of respondents). To organize and conduct lectures/practical classes, teachers quite actively use Google Slides (79.4%/73.8% of respondents), Google Meet (69.2%/65.4% of respondents), YouTube (60.7%/56.1% of respondents). It was found that the vast majority of teachers (91%) positively evaluate the impact of Google Workspace for education tools on the effectiveness of teaching methods.

DOI: 10.18421/TEM131-33

<https://doi.org/10.18421/TEM131-33>

Corresponding author: Sergii Sharov,
Department of Computer Sciences, Dmytro Motornyi
Tavria State Agrotechnological University, 69600,
Zaporizhzhia, Ukraine


Email: segsharov@gmail.com

Received: 27 September 2023.

Revised: 21 December 2023.

Accepted: 25 December 2023.

Published: 27 February 2024.

 © 2024 Sergii Sharov et al; published by
UIKTEN. This work is licensed under the Creative
Commons Attribution-NonCommercial-NoDerivs 4.0
License.

The article is published with Open Access at
<https://www.temjournal.com/>

In the future, it is planned to research students' opinions regarding the use of Google Workspace for education while studying at university.

Keywords – Educational technology, distance learning, blended learning, Google Workspace for Education, students.

1. Introduction

Active use of information and communication technologies (ICT), as well as the Internet, the spread of the COVID-19 pandemic, and the impossibility of conducting classes only in face-to-face format have significantly affected the education system. As a result, both in Ukraine and the whole world, considerable attention is paid to the digitalization of education, implementation of distance, and blended learning based on modern educational and digital technologies [1]. The transition to the specified education models forced universities to look for cost-effective digital platforms that will sufficiently provide communication, interaction, and exchange of educational content via the Internet [2]. Most of these platforms are based on the use of cloud technologies, which are considered an important factor in improving the quality of education [3]. In this context, researchers highlight the advantages of using cloud computing in education [4]; they study the factors that influence students' willingness to use cloud computing services for learning [5].

The capabilities of cloud technologies are fully realized in Google Workspace for Education (GWfE), which was previously called G Suite for Education. It integrates many tools and services that provide communication and cooperation between participants of the educational process in order to learn effectively in conditions of distance [6] and blended learning [7].

Since Google Workspace provides full or partially free access to all tools from one account, it is effectively used in educational institutions, ensuring sustainable integration of technology into the education system [8].

As a result of its popularity, the use of GwFE and its individual tools has been reflected in numerous research works. In particular, the possibilities of Google Workspace for education were considered for studying mathematics [9], English [10], [11], as well as for development of digital competence of teachers [1] and students [12]. Teachers' perception of G Suite for education in terms of several criteria was studied in the work by [13]. The analysis of usability indicators of individual GwFE services and students' attitude towards them was carried out in the work [6]. A lot of attention is drawn to the use of Google Classroom and Google Meet. In particular, researchers analyze the functional advantages of Google Classroom for learning [14], they study the factors affecting students' perception of the Google Classroom platform (hedonic motivation, social influence, habit [15], usefulness, simplicity of use [16], [17], etc.). If we take into account Google Meet, researchers study the level of students' awareness about the possibilities of this tool in the conditions of distance learning [18], the level of satisfaction from its use in the educational process [19]. At the same time, most studies refer to the use of only the most common tools of Google Workspace for Education [7], [20]. At the same time, GwFE offers significantly more tools for the implementation of educational and management tasks of the educational institution. There are also certain risks associated with the loss of personal information when using Google Workspace for Education tools and using it for commercial purposes [21], [22], [23]. The work by [24] indicates the main problematic issues that may arise during the organization of online education in general.

Following the latest educational trends and technological development, Ukrainian educational institutions actively use Google tools, ensuring a high-quality educational process in the conditions of blended and distance learning. At the same time, taking into account the lack of qualitative research on this topic in the context of domestic higher education, the purpose of the article is to analyze the results of the survey of university teachers regarding the possibilities provided by Google Workspace for Education applications in the educational process. This research will allow teachers to form an individual set of the most effective digital tools for teaching their own disciplines, and higher education institutions will be able to form the directions for informing the educational community about the prospects of implementing less known digital tools of Google.

2. General Background of Research

Today, the use of cloud-based online learning environments is the requirement of our time for several reasons. First, the COVID-19 pandemic significantly affected the higher education system forcing it to be innovative and proactive [25], to change the face-to-face format of classes to distance [24] and blended learning, to introduce modern digital technologies into educational activities [23], and management of the educational institution. On the other hand, students got already accustomed to using digital gadgets and the Internet which help them perceive varied information, study, relax, etc. Therefore, today's youth has a positive attitude towards using ICT in education [11], [17], including nonformal education.

The use of cloud technologies in educational activities allows obtaining numerous advantages. For teachers and students, it means access to a large number of free or low-cost services, personalized learning [2], gradual increase in learning opportunities, scalability of the learning environment depending on the wishes of students/teachers, ensuring collaboration and communication between participants of the educational process, development of digital competencies, provision of group work, and individual training [3]. On the other hand, educational institutions can save money, maximize green potential [4], implement separate areas of the internal system of education quality assurance [26], they can ensure electronic document circulation within the institution due to the shared access to documents, etc.

Today, there are various software solutions for educational activities based on cloud technologies. In this context, the work by [2] suggests paying attention to the following criteria for selecting the optimal cloud solution: data security (availability of means for backing up and restoring information, ensuring data integrity); data protection; integration into the company's activities (customization of the cloud solution to the local requirements of the company); availability of management tools; flexibility of the educational process (necessary opportunities to ensure distance learning). Additionally, important criteria are the cost of the cloud solution, the frequency of updates depending on new conditions, and functionality. At the same time, Google Workspace for Education has accumulated a significant number of tools for the implementation of various management and educational tasks without the need to increase hardware and software capabilities on the part of the educational institution. Hence, we consider it a significant advantage over other software solutions.

GWfE is one of the most famous and powerful online educational environments based on the use of cloud technologies. It is successfully used in the educational process of secondary and higher education due to numerous advantages: ensuring cooperation at different levels (student-student, teacher-student, teacher-teacher [13], administration-teacher; development of students' critical thinking and creative collaboration [10]; engaging students in reflective communication and sharing ideas; development of communication skills [9]; creation of communities to enable group work; discussing ideas, posting announcements [11]; development of digital skills (remote work in the cloud with different data formats), ensuring interactivity [7]; the ability to work on various digital gadgets. The significant educational effect of Google Workspace for Education is evidenced by the high values of such indicators as simplicity of use [14], acceptability [6], and attitude [15].

An important advantage of GWfE over other educational environments is a wide range of digital tools for communication and interaction, as well as for increasing learning productivity. For example, Google Classroom is one of GWfE's widely used educational tools. It allows users to simplify the process of communication between students and the teacher online, to facilitate the distribution of educational tasks and their assessment, to set time limits, to see the progress of each student, to write comments on the task completion [16]. The work [14] mentions such basic functions of Google Classroom as class registration space, connection with other Google tools, the possibility of creating tasks and their automatic distribution among registered users, determining the deadlines for the task completion with the possibility of further sorting by completion status, providing feedback communication using comments, bulletin boards and other means, the possibility of editing a document submitted for evaluation, etc. From the students' point of view, the important advantages of Google Classroom are the simplicity of use and the benefits obtained in the achievement of learning objectives [16]. While working with Google Classroom, they will be able to develop digital competences, learn how to search for relevant information, check its validity, and use it to achieve learning goals [12].

The next important educational tool is Google Meet, the main task of which is to provide video communication between the participants of the educational process. With the help of this tool, one can easily demonstrate a presentation or broadcast a lecture, write questions in the chat and discuss them at a video meeting. The work by [18] notes that students can easily access Google Meet and customize it to their needs.

From the point of view of teachers and the administration of the educational institution, Google Meet can be used to hold meetings, conferences, and other events [19]. With the help of GWfE, teachers and students can jointly edit documents (Google Docs), tables (Google Sheets), and presentations (Google Slides), store and access various files using Google Drive, communicate with each other using Gmail and Google Chat, conduct survey (Google Forms), etc.

3. Methodology

We used several methods of scientific knowledge in our research. The analysis and synthesis of scientific literature made it possible to identify the importance of cloud technologies for providing educational activities, to learn about certain risks of their use, to summarize the research that relate to the specifics of using Google Workspace for Education in higher education institutions. A diagnostic method (questionnaire) was used to assess the frequency of using Google Workspace tools in Ukrainian universities. We used a diagnostic method (questionnaire) to evaluate the possibilities of Google tools when used at Ukrainian universities. In this context, we suggest the postulate that the increase in the effectiveness of students' learning due to the use of the specified applications could encourage teachers to use them more often. In this case, teachers are experts in evaluating the effectiveness of GWfE applications. Therefore, during the survey we found out how often teachers used Google digital tools in their professional activities.

By the frequency of use, we mean the percentage ratio of the number of mentions of a certain tool to the total number of respondents participating in the survey. In other words, the frequency of use of a learning tool or method (technology) is the percentage of respondents who use this Google tool. For this, a special questionnaire was developed using Google Forms, which is intended for teachers of higher education institutions. In order to ensure the anonymity of the answers, the respondents did not indicate their name and the name of the university. For completing the questionnaire one month was allocated from the day of publication. It was freely distributed on the Internet at the end of the academic year (early July), when teachers have the best memories of the educational process.

The questionnaire contained closed questions (Q1, Q2, Q3, Q4, Q6) with several answer options and an open question (Q5), which required an extended response from the respondents to the proposed question.

So, these are the questions offered to the respondents: Q1: What devices do you most often use when working with Google Workspace for Education? Q2: What Google Workspace for Education Tools do you use at your lectures? Q3: What Google Workspace for Education Tools do you use at colloquia / practical / laboratory / seminar classes? Q4: What form are the classes where you use Google Workspace for Education Tools? Q5: Briefly describe an example of using Google Workspace for Education Tools in the classroom. Which educational activities do you use this or that Google tool for? Q6: Has the use of Google Workspace for Education Tools affected the effectiveness of teaching your subjects?

The analysis and display of the survey results on the closed question was carried out with the help of Google Forms. The processing and analysis of the answers to the open question Q5 was carried out as follows. Initially, respondents' answers from Google Forms were transferred to a Google Sheets table.

The analysis of the answers was carried out by searching text blocks by keywords. Firstly, we included all the names of GWfE digital tools into them; secondly, we included the terms reflecting learning methods, learning goals, and students' learning activities.

4. Results

During the research, 167 questionnaires were processed. The teachers who took part in the experiment territorially cover almost all of Ukraine. The maximum number of respondents is from Cherkasy (34.6%), Zaporizhzhya (13.1%), Zhytomyr (10.3%), Poltava (12.1%), and Khmelnytskyi (7.5%) regions. The survey covered various disciplines. The majority of teachers teach humanities (72%) and physical and mathematical disciplines (21.5%).

The analysis of respondents' answers to the question Q1 made it possible to identify the devices which teachers most often use working with Google Workspace for Education (Fig. 1).

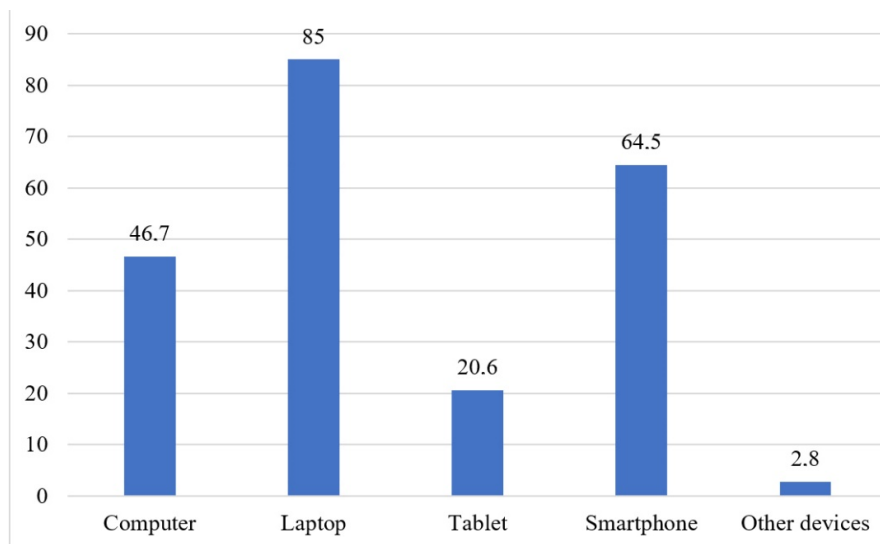


Figure 1. The devices teachers use to work with Google Workspace for Education (in %)

It was found that users of laptops and mobile phones represent the largest percentage of respondents (85% and 64.5% respectively). At the same time, only 46.7% of respondents use a personal computer to work with Google Workspace for Education. It allows us to draw certain conclusions. First, it demonstrates the mobility of GWfE, that is, the ability to work on any digital gadget. Secondly, it proves the satisfactory state of teachers' provision with digital teaching aids.

Thirdly, this distribution of answers reflects the general (world) trend of the digital industry development, when the use of personal computers gradually recedes into the background, giving way to laptops and mobile devices. This state actualizes the use of innovative learning technologies, including mobile learning, e-learning, and blended learning.

In order to identify the frequency of using Google tools that teachers use at lectures, we processed the answers to the question Q2 (Fig. 2).

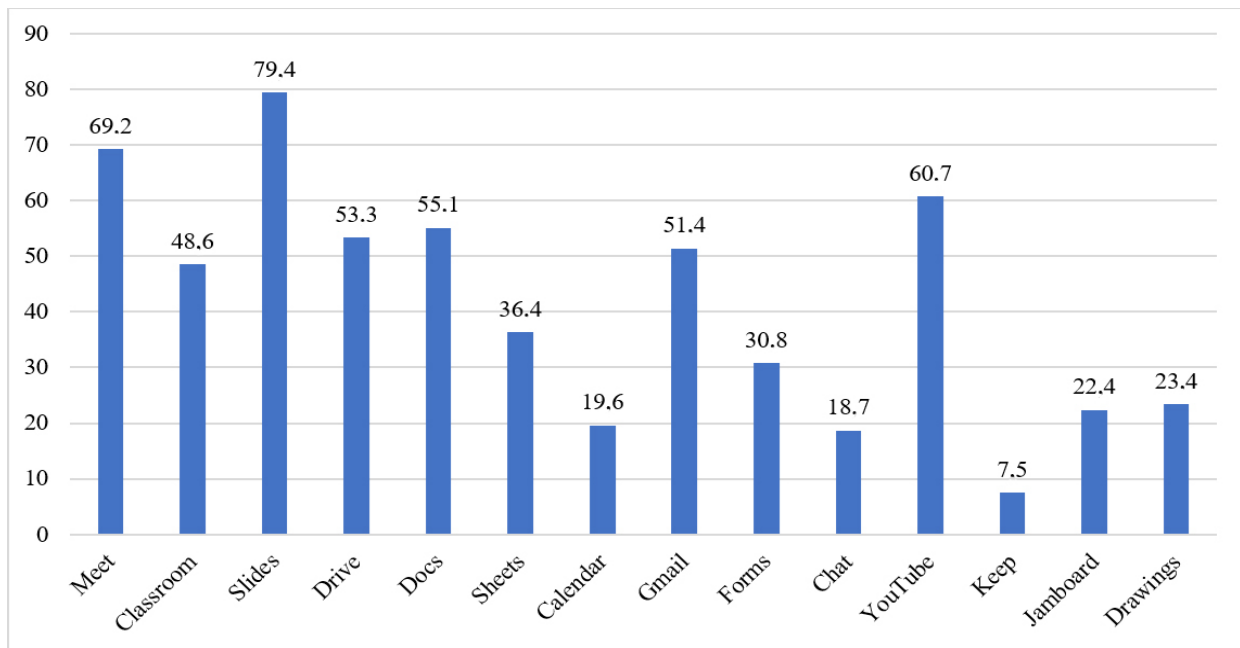


Figure 2. The frequency of using Google tools at lectures by teachers

Based on the analysis of Fig. 2, one can see high rates of using Google Slides (79.4%) and YouTube (60.7%) by teachers and, at the same time, low percentage of using Google Classroom (48.6%), Google Sheets (36.4%), Google Forms (30.8%), and Google Chat (18.7%). Perhaps, most of the interviewees use only traditional teaching methods at lectures (demonstration, story, explanation). The percentage of using Google Classroom, Google Docs, and Gmail turned out to be approximately the same (about 50% of respondents).

We also noted low percentage of using Google Calendar and Google Keep (19.6% and 7.5% respectively), which may indicate insufficient reliance on digital assistants in planning and preparing lectures. Therefore, teachers' preparation for lectures using Google digital tools requires additional research.

The frequency of using Google tools at colloquia/practical/laboratory/seminar classes was revealed by processing the answers to the question Q3 (Fig. 3).

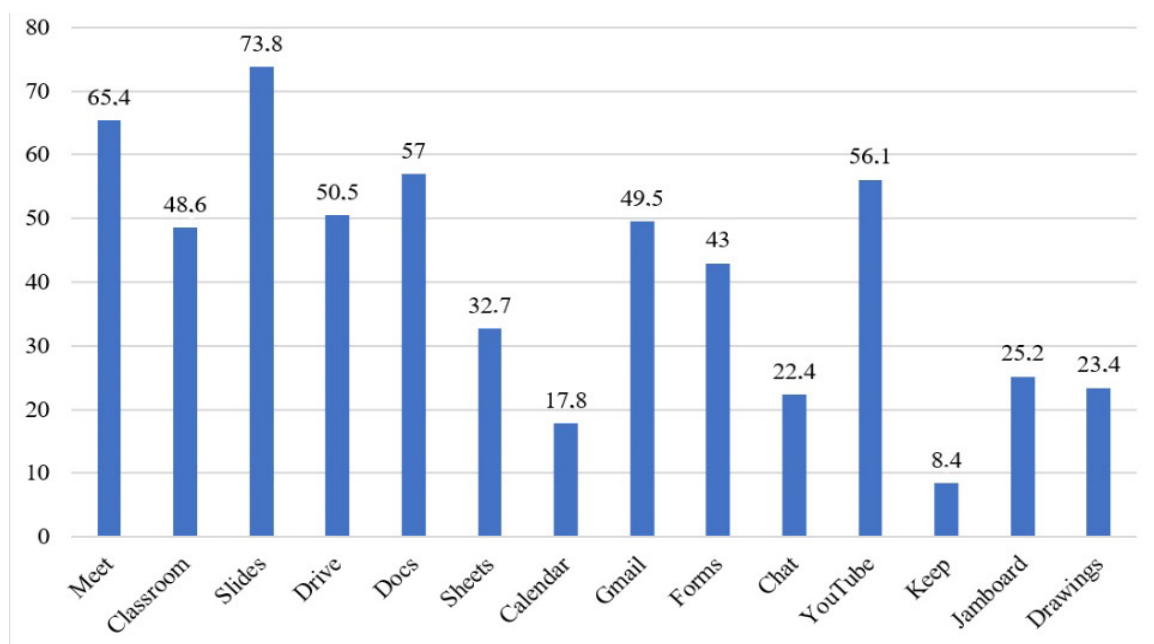


Figure 3. The frequency of using Google tools at colloquia/practical/laboratory/seminar classes

The results obtained for Q3 (practical, laboratory, seminar classes, colloquia) are slightly different from those of Q2 (lecture). Therefore, we carried out their comparative analysis and displayed it in Table 1.

Table 1. Comparison of the answer results to questions Q2 and Q3

Digital tools	Results of Q2, %	Results of Q3, %	Difference (Q2 - Q3), %
Meet	69.2	65.4	3.8
Classroom	48.6	48.6	0
Slides	79.4	73.8	5.6
Drive	53.3	50.5	2.8
Docs	55.1	57	-1.9
Sheets	36.4	32.7	3.7
Calendar	19.6	17.8	1.8
Gmail	51.4	49.5	1.9
Forms	30.8	43	-12.2
Chat	18.7	22.4	-3.7
YouTube	60.7	56.1	4.6
Keep	7.5	8.4	-0.9
Jamboard	22.4	25.2	-2.8
Drawings	23.4	23.4	0

It can be seen from Table 1 that the percentage of tools used for lectures and practical/seminar classes does not differ a lot. The average indicator of such a difference is 3.3%. With the exception of Google Forms, no tool has broken the 10% barrier. Therefore, teachers use the same digital tools for lectures and practical classes. It is obvious that the wide implementation of distance learning in the last few years and the use of similar digital tools have led to teachers' use of identical methods and technologies for conducting lectures and practical classes. This "blurring" of the line between lectures and practical/seminar classes is expected to reduce the effectiveness of these classes. At the same time, it indicates the presence of a reserve for increasing the readiness of teachers to conduct online classes. In this context, an important recommendation for teachers is to diversify the Google tools and to expand the range of relevant teaching methods. For this, the number of possible combinations of different Google Workspace for Education tools should be increased.

While analyzing Fig. 2 and Fig. 3, we noticed a significant difference in percentage between Google Classroom (48.6%) and such applications as Google Meet (67% on average), Google Slides (77% on average), YouTube (58.4% on average). We should note that Google Classroom structurally and functionally integrates Google tools, and it has significant advantages in terms of GWfE technology. Therefore, it is advisable to use Google Classroom in combination with other applications like Google Meet, Google Docs, Google Sheets, Google Drive, Gmail, Google Forms, etc.

Out of doubt, they can also be used separately. For example, Google Meet is integrated into Google Classroom, but it can be used as a standalone application. However, the noticeable difference in percentage regarding the use of Google Classroom and other applications that are part of it shows that teachers do not fully trust the tools and solutions provided by Google. This conclusion is confirmed by the analysis of the answers to the open question Q5, which will be discussed below.

We managed to find out what forms of classes prevail when using Google Workspace for Education by offering the question Q4 (Fig. 4).

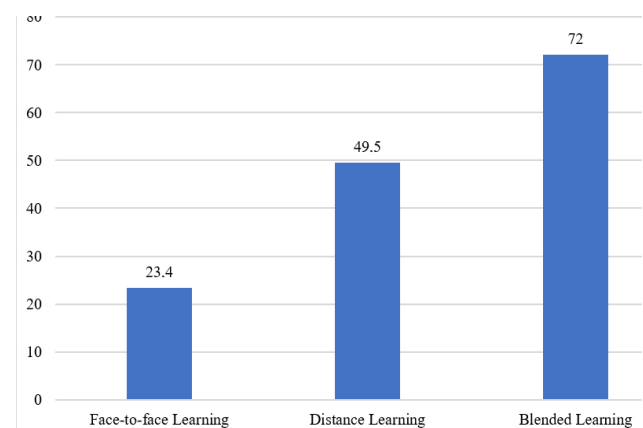


Figure 4. Forms of learning when using GWfE

The analysis of the answers distribution to the question Q4 revealed a somewhat unexpected result. One could expect the largest percentage of using Google tools in distance learning. However, it turned out to be a blended form, as reported by 72% of respondents. At the same time, only 50% of respondents reported the use of GWfE in distance learning. Also, we found a low percentage of those respondents who use GWfE at face-to-face classes (23.4%). On the other hand, it may indicate that teachers use nonstandard approaches and innovative methods in their work. For example, blended and classroom learning can involve the use of digital tools at offline classes and models such as the flipped classroom.

It should be noted that currently various forms of education are simultaneously applied on the territory of Ukraine, which is explained by objective reasons. For about two years it was the epidemiological situation in the country which influenced the form of conducting classes in educational institutions. Currently, the military situation has a significant impact on the form of conducting classes. Consequently, the vast majority of educational establishments implemented remote or hybrid instructional formats, while adhering to mask-wearing protocols.

Currently, the Learning Management Systems (LMS) Moodle and Google Classroom, along with video communication platforms Zoom and Google Meet, have achieved extensive dissemination [27]. In particular, in the frontline and temporarily occupied territories, the educational process is carried out only in a distance format.

To find out what methods and technologies teachers use together with Google Workspace for Education, we offered the open question Q5. The obtained results are shown in Fig. 5 and Table 2.

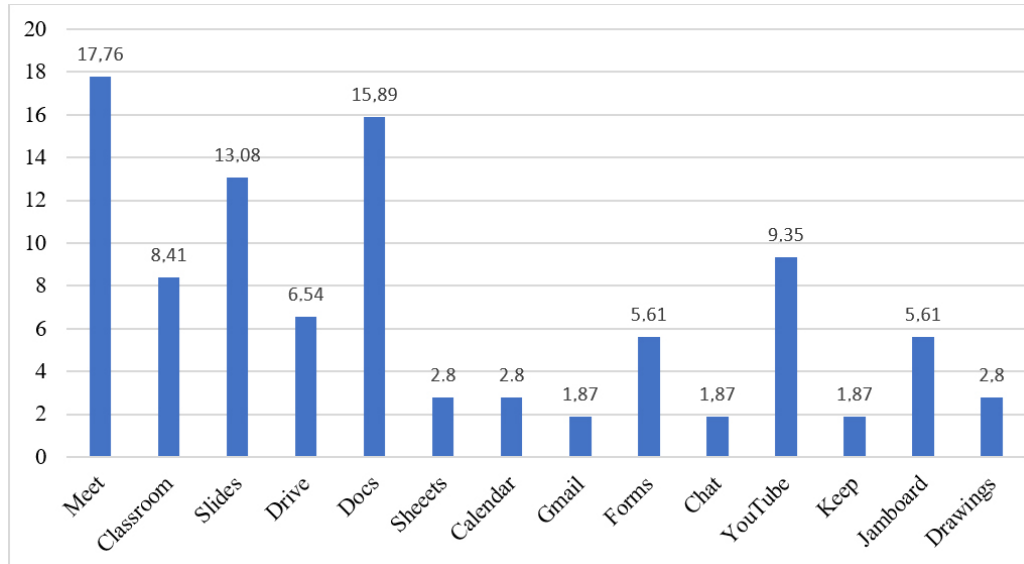


Figure 5. Frequency of mentioning GWfE applications in respondents' answers to the open question Q5 (in %)

Table 2. Frequency of mentioning methods and types of educational activities in respondents' answers to the open question Q5 (in %)

Methods	Frequency of mentioning
Narration, explanation	88.21
Conversation	44.93
Discussion	12.34
Interactive activity	15.87
Critical thinking	8.7
Questionnaire	54.95
Asking questions	77.93
Demonstration	89.28
Joint work	33.73
Group work	11.93
Feedback	54.93

Based on the analysis of the answers to the open question Q5 by keywords, we obtained the following results. The analysis of answers by the key words “learning methods”, “types of learning activities” allowed us to make an assumption that teachers are trying to transfer the methods of face-to-face classes to online classes. In other words, the methods used in the classroom are also used for distance learning. Among such methods there is narration, explanation (88.21%), demonstration of educational content (89.28% of answers). Sometimes it is successful, but in most cases it does not reveal the full range of possibilities which Google tools provide.

The analysis of the answers by the keywords “Google Workspace for Education Tools” and a comparative analysis of Figures 2, 3, and 5 shows that the frequency of mentioning digital tools correlates with similar responses to the questions Q2 and Q3. However, there are certain deviations (fluctuations). For example, if in the closed questions the maximum percentage is the use of Google Meet and Google Slides (67.3% and 76.6%), then in the question Q5 Google Meet and Google Docs are mentioned the most (17.76% and 15.89%) (Fig. 5).

The analysis of the answers by the keywords “Forms”, “testing”, “questionnaire”, “feedback” revealed that testing and questionnaires with the help of Forms are mainly used in practical and seminar classes (54.95% of answers) and they are practically not used at lectures. Most often, Forms are used to analyze the level of formation of students' knowledge. The teacher's response is typical, ‘... if we need to make up a survey or test to assess students' knowledge, I can use Google Forms. Applicants can fill out a form with questions, and the answers will be saved for the further analysis.’

Based on the analysis of the occurrence of the keywords “interactive”, “interactive materials”, “interactive technologies” it was found that only 15.87% of respondents mentioned these terms. It can be concluded that a small part of teachers use interactive learning technologies.

Thus, one of the teachers noted, ‘*I use all the specified digital tools to organize interactive activities*’, referring to the 14 tools that were specified in the questions Q2 and Q3. However, the respondent did not disclose or give examples of how exactly he does it.

The keyword “YouTube” is found in the answers of 107 respondents (64% of the total number of respondents) to the question Q5. The content analysis of these responses showed that teachers use video hosting to display educational videos. Also, some respondents create videos and upload them to YouTube. Such activity is quite promising and allows the teacher to fully realize the creative potential of this tool.

The analysis of the answers by the keywords “joint use”, “joint work”, “work in groups” revealed that these terms are mentioned by 24.66% of respondents. This indicator is somewhat lower compared to traditional methods. Table 1 shows a shift in the frequency of using methods and activities that represent traditional (reproductive) activities. Instead, innovative learning technologies (critical thinking, blended learning, interactive technologies, group work, mobile, and electronic learning) are used more actively.

To evaluate the effectiveness of using Google applications in the educational process of higher education institutions, we asked the question Q6 (Fig. 6).

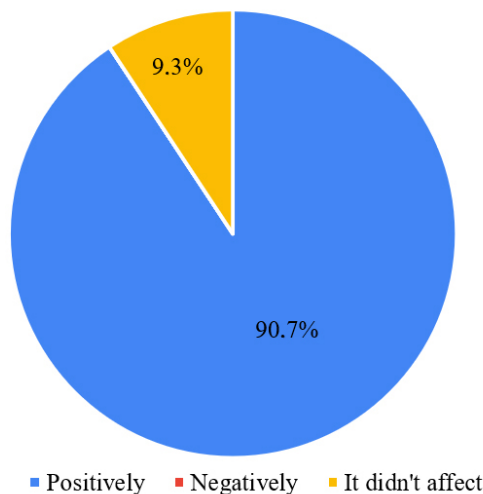


Figure 6. Expert assessment of the effectiveness of GWF/E tools in the educational process of universities

The answer to the question Q6 clearly indicates a positive expert assessment of Google Workspace for Education, (91%). Only 9.3% of respondents pointed that teaching results remained unchanged.

5. Discussion

In our opinion, the emergence of cloud technologies is a natural step in the development of the information society. In everyday life, they are constantly used to share and store files of various types, as indicated in the work [3]. Due to cloud technologies, including Google Workspace for Education, the staff and students of educational institutions get access to modern tools and communication channels, which allows them to communicate easily and to perform the assigned tasks together [10].

Like any other technology, cloud services have their limitations that need to be taken into account in the educational process. The main disadvantage of cloud services is data security. Users (administration, teachers, students) do not know where information is stored in the cloud and who has access to it [4]. The works [21], [22] indicate the existence of successful business models and companies’ marketing initiatives that develop cloud services. On the one hand, they make cloud services free or low-cost, which is very useful for educational institutions with limited budgets. At the same time, companies-developers apply procedures for collecting and analyzing users’ personal information in order to form personalized advertising on this basis. In this case, it is recommended to be familiar with the methods of protecting personal information, to be responsible for the data that will be stored in the clouds. Another disadvantage of cloud services is availability. Since cloud technologies are based on the use of the Internet, users may experience certain difficulties when connecting and working with services [3]. In case there is no Internet connection due to repairs or damaged means of transmission, work will be suspended altogether. As a result, productivity decreases, which will further affect perceived benefits [5].

Our research confirmed the benefits of using Google Workspace for Education Tools both for organization of the educational process and teaching. At practical classes, most teachers use Google Slides (73.8%), Google Meet (65.4%), and YouTube (51.6%). The least popular tools are Google Keep (7.5%), Chat (18.7%), and Calendar (19.6%). Almost similar results are reflected in the studies of other researchers. Such tools as Google Classroom, Google Meet, Google Mail, Google Drive are most often used in the educational process [20]. Google Slides and Google Documents are highly important for learning. At the same time, Keep and Jamboard turned out to be less useful [7], [28].

Based on the analysis of the answers to the question Q2 (Fig. 2), we hypothesized that the respondents more often use traditional teaching methods. To verify this assumption, we analyzed the answers to the open question Q5. They confirmed the conclusion about the frequent use of such methods as narration and explanation (88.21%), demonstration (89.28%). At the same time, we observe a somewhat lower number of respondents who practice interactive lectures (15.87%), use feedback (54.95%), and organize discussions (12.34%).

The uneven distribution of the frequency of using Google tools can be considered from different points of view. The objective reason is that students and teachers may lack necessary digital gadgets. Indeed, if the user has an old phone or a low-end computer, it is difficult / impossible to use certain services. As a result, modern software and hardware, as well as the high-quality Internet are considered an important condition for the introduction of information technologies in educational activities and online learning in particular [20], [24]. At the same time, according to our research, teachers have sufficient hardware capabilities to use GWfE applications. However, not all users are aware of the capabilities provided by Google Workspace for Education Tools, which is confirmed in the research [13]. Teachers' low awareness directly affects their ability and willingness to use the full potential of GWfE. If participants of the educational process demonstrate insufficient level of digital competencies development, it makes another problem. It is known that the possession of digital skills is a mandatory characteristic of a modern person. Unfortunately, not all teachers understand it and minimize the use of ICT in their professional activity.

It should be noted that the above-mentioned problems ought to be considered as a whole, since the solution of one problem will have a positive effect on the solution of the other. We can use various tools to do that. In universities, it is important to facilitate the work with Google tools. As for hardware, there are currently many government programs in Ukraine aimed at purchasing a significant number of laptops and Chromebooks for educational institutions. In order to successfully implement all the solutions provided by Google digital tools, it is necessary to strengthen teachers' training on the use of these tools in the educational process. Raising teachers' awareness of GWfE opportunities and improving their digital competencies may involve advanced training, the success of which has been confirmed in the work by [1]. Advanced training can help teachers develop all the necessary skills to work with various Google applications; it can help them consider the main methods of increasing the educational motivation of students, and ensure the exchange of ideas between practicing teachers. Massive open online courses,

which have now become quite popular, will be useful for teachers' self-development [29]. The work by [9] offers teachers to take online trainings in order to increase their awareness regarding the possibilities of Google Workspace. Currently, there are various volunteer-based educational initiatives in Ukraine that highlight the possibilities of GWfE and provide practical advice on their use. For example, in August 2023, the public organization "Innovative Horizons of Ukraine" held a summer online school "I choose digital tools" for everyone interested. Various information resources and services were discussed there, including the capabilities of Google Workspace for Education.

6. Conclusion

Thus, the use of cloud technologies in education allows users to get many advantages related to the joint use of resources, minimization of financial costs for hardware and software, and scaling of the educational environment. Google Workspace for Education is one of the most famous and powerful online educational environments based on the use of cloud technologies. Due to a large number of different digital tools, GWfE provides the opportunity to diversify the educational process, to provide online work, to share educational materials, and to communicate with each other, etc.

To determine the frequency of using Google Workspace for Education Tools by teachers of higher educational institutions of Ukraine, we conducted a questionnaire, in which 167 respondents took part. The processing of the questionnaire results made it possible to conclude that for the organization and conducting of lectures and practical classes, teachers quite actively use Google Meet, Google Slides, Google Docs, Gmail, Google Forms, Google Classroom, YouTube (all together 76.64%). Google Sheets, Google Calendar, Google Chat, Google Keep, Google Jamboard, Google Drawings appeared to be less popular (all together 17.75%). Google applications are most often used in blended learning (72%).

The vast majority of teachers (91%) positively assess the impact of GWfE tools on the effectiveness of teaching methods. When using Google Workspace for Education a significant number of respondents turn to verbal methods of presenting educational material, demonstration of educational content, student viewing of video fragments, testing. Respondents mention methods and technologies of interactive learning (15.87%), organization of discussions (12.34%), technologies for developing critical thinking (8.7%), and organization of group work (11.93% of respondents). In the future, it is planned to research students' opinions regarding the use of Google Workspace for Education while studying at university.

References:

- [1]. Oliynyk, V. V., Gushchina, N. I., Kondratova, L. G., and Kasyan, S. P. (2021). Development of digital competence of pedagogical staff in distance learning based on cloud services. *Information Technologies and Learning Tools*, 86(6), 268-288. Doi: 10.33407/itlt.v86i6.4722
- [2]. Attaran, M., & Attaran, S. (2017). Promises and Challenges of Cloud Computing in Higher Education: A Practical Guide for Implementation. *Journal of Higher Education Theory and Practice*, 17(6), 20-38.
- [3]. Korucu, A. T. (2016). The Views of Teacher Candidates on Using Cloud Technologies in Education. *International Journal of Higher Education*, 6(1), 84-100. Doi: 10.5430/ijhe.v6n1p84
- [4]. Al-Rasheedi, G., & Khan, N. (2021). The Role of Cloud Computing in Education: Saudi Arabian Study. *International Journal of Interactive Mobile Technologies*, 15(24), 191-200. Doi: 10.3991/IJIM.V15I24.27363
- [5]. Amron, M. T., Noh, N. H. M., & Mohamad, M. A. (2022). Predicting the Acceptance of Cloud Computing in Higher Education Institutions by Extending the Technology Readiness Theory. *Asian Journal of University Education*, 18(3), 767-779. Doi: 10.24191/ajue.v18i3.18968
- [6]. Khuntari, D. (2022). Analisis Usability Google Workspace for Education di Universitas dengan System Usability Scale. *Tech.Com*, 21(1), 75-87. Doi: 10.33633/tc.v21i1.5537
- [7]. Martín-Herrera, I., Micalotto-Belda, J. P., & Polo Serrano, D. (2021). Google Workspace as a b-learning platform. Analysis of the perceptions of the Degrees in Communication. *Apertura*, 13(2), 106-123. Doi: 10.32870/ap.v13n2.2029
- [8]. Akcil, U., Uzunboylu, H., & Kinik, E. (2021). Integration of technology to learning-teaching processes and google workspace tools: A literature review. *Sustainability (Switzerland)*, 13(9), 1-13. Doi: 10.3390/su13095018
- [9]. Malukah, S. (2022). Pembelajaran Matematika Kolaboratif Berbasis Online dengan Google Workspace for Education. *Jurnal Cendekia: Jurnal Pendidikan Matematika*, 6(3), 2857-2871. Doi: 10.31004/cendekia.v6i3.1624
- [10]. Thuan, P. D. (2022). Employment of Google Tools in English Language Education: A Review. *British Journal of Multidisciplinary and Advanced Studies*, 3(2), 70-77. Doi: 10.37745/bjmas.2022.0073
- [11]. Kara, S. (2019). Learning autonomy, digital learners and Google Education: a rhizomatic English syllabus framework. *The EuroCALL Review*, 27(1), 30-47. Doi: 10.4995/eurocall.2019.10709
- [12]. Dewi, C. A. et al. (2022). The impact of Google Classroom to increase students' information literacy. *International Journal of Evaluation and Research in Education*, 11(2), 1005-1014. Doi: 10.11591/ijere.v11i2.22237
- [13]. Sidhu, G. K., Chen, M. K. W., Shamida, A., & Wen, C. S. (2022). Embracing the New Norm in Teaching and Learning via G Suite for Education: A Multidimensional Perspective. *Asian Journal of University Education*, 18(4), 1062-1075. Doi: 10.24191/ajue.v18i4.20015
- [14]. Barun, A. N., Dauhiala, N. V., Dauhiala, D. A., & Dzatilau, U. U. (2020). Peculiarities of using G Suite for Education services in the educational process of Polotsk State University. *Journal of Physics: Conference Series*, 1691, 1-6. Doi: 10.1088/1742-6596/1691/1/012161
- [15]. Bervell, B. et al. (2022). Remodelling the role of facilitating conditions for Google Classroom acceptance: A revision of UTAUT2. *Australasian Journal of Educational Technology*, 38(1), 115-135. Doi: 10.14742/ajet.7178
- [16]. Al-Marroof, R. A. S., & Al-Emran, M. (2018). Students acceptance of google classroom: An exploratory study using PLS-SEM approach. *International Journal of Emerging Technologies in Learning*, 13(6), 112-123. Doi: 10.3991/ijet.v13i06.8275
- [17]. Ansong-Gyimah, K. (2020). Students' perceptions and continuous intention to use elearning systems: The case of google classroom. *International Journal of Emerging Technologies in Learning*, 15(11), 236-244. Doi: 10.3991/IJET.V15I11.12683
- [18]. Uaidullakyzy, E. et al. (2022). Determining the Knowledge Levels of University Students on Distance Education and the Google Meet Application Programme. *International Journal of Engineering Pedagogy*, 12(2), 75-87. Doi: 10.3991/IJEP.V12I2.29323
- [19]. Alturki, U., & Aldraiweesh, A. (2022). Adoption of Google Meet by Postgraduate Students: The Role of Task Technology Fit and the TAM Model. *Sustainability (Switzerland)*, 14(23), 1-22. Doi: 10.3390/su142315765
- [20]. Lanzon, R. C. (2022). Frequency Level and Problems encountered by the IBED Faculty in Utilizing the Google Workspace for Education. *JPAIR Institutional Research*, 18(1), 47-62. Doi: 10.7719/irj.v18i1.827
- [21]. Vetter, M. A., & McDowell, Z. J. (2023). A spectrum of surveillance: Charting functions of epistemic inequality across EdTech platforms in the post-COVID-19 era. *Journal of University Teaching and Learning Practice*, 20(2), 1-18. Doi: 10.53761/1.20.02.02
- [22]. Krutka, D. G., Smits, R. M., & Wilhelm, T. A. (2021). Don't Be Evil: Should We Use Google in Schools? *TechTrends*, 65(4), 421-431. Doi: 10.1007/s11528-021-00599-4
- [23]. Lindh, M., & Nolin, J. (2016). Information We Collect: Surveillance and Privacy in the Implementation of Google Apps for Education. *European Educational Research Journal*, 15(6), 644-663. Doi: 10.1177/1474904116654917

- [24]. Adedoyin, O., & Soykan, E. (2020). Covid-19 pandemic and online learning: the challenges and opportunities. *Interactive Learning Environments*, 31(2), 863-875.
Doi: 10.1080/10494820.2020.1813180
- [25]. Jacques, S., Ouahabi, A., & Kanetaki, Z. (2023). Post-COVID-19 Education for a Sustainable Future: Challenges, Emerging Technologies and Trends. *Sustainability (Switzerland)*, 15(8), 1-4.
Doi: 10.3390/su15086487
- [26]. Hidayah, A., & Syahrani, S. (2022). Internal Quality Assurance System Of Education In Financing Standards and Assessment Standards. *Indonesian Journal of Education (INJOE)*, 2(3), 291-300.
- [27]. Shevchenko, V., Malys, N., & Tkachuk-Miroshnychenko, O. (2021). Distance learning in Ukraine in COVID-19 emergency. *Open Learning*, 39, 1-16. Doi: 10.1080/02680513.2021.1967115
- [28]. Nuraeni, N. (2021). Is Face-to-Face Learning Better than Online Learning? Teachers' voice on the Use of Google Workspace. *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 9(2), 37-52.
- [29]. Sharov, S., Zemlianskyi, A., Sharova, T., & Viktor, H. (2021). Ukrainian MOOC: Quantitative and Thematic Analysis of Online Courses. *International Journal on Advanced Science, Engineering and Information Technology*, 11(3), 1143-1149.
Doi: 10.18517/ijaseit.11.3.13705