THE INFLUENCE OF COMPUTER TECHNOLOGY ON THE DEVELOPMENT OF INTERACTIVE TEACHING METHODS FOR STUDENTS

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ABSTRACT

The article examines the influence of modern computer technologies on the development of interactive methods of teaching students in the higher education system. The main tasks that interactive methods solve in teaching students are considered and as one of the solution tools - the introduction of modern computer technologies into the educational environment. The main opportunities that computer technologies provide to the educational process are analysed. A form of collective design using cloud technologies was developed and tested, namely, from a large number of them, after analysis, a choice was made in favour of Google Drive. The authors analysed the results after a survey of students participating in the experiment and made conclusions about the advisability of introducing computer technologies into the educational process, which have a powerful stimulating effect on the development of interactive methods of teaching students.

Keywords: *computer technology, Google Drive, interactive teaching methods, Internet, student*

1. INTRODUCTION

Scientific and technological progress, the influence of which we see in almost all spheres of professional and social activity of people [1-4], including in the higher education system, as well as the processes taking place in the socio-economic sphere of modern Ukraine, dictate the need for a qualitatively new approach to the training of young specialists. The crisis of traditional methods used in education, which arose in connection with the growing volume of information and the increase in the informative capacity of classes, as well as the requirements for a competent approach in training specialists, create the need for a transition to fundamentally new technologies of vocational training [5-7]. Currently, the higher education system is undergoing profound, complex changes, which are aimed at training a highly qualified, competitive specialist capable of self-development and management of their own educational activities [8-11]. Interactive methods of teaching students fully meet these requirements. Learning with interactive methods ceases to be a one-way process of gaining knowledge from a teacher. Still, it is carried out in a form in which all participants in the educational process actively participate in it, interacting both with the teacher and with each other to jointly solve the tasks assigned to them, while evaluating actions of others and their participation in the resolution of the simulated learning situation.

Among the huge number of computer technologies, the expediency and efficiency of their use becomes a problematic task. Thus, the purpose of the study is to study the theoretical and methodological foundations of the influence of computer technologies on the development of interactive methods of teaching students, and also to consider the introduction of modern computer technologies into the educational environment by a practical example.

2.   INTERACTIVE TEACHING METHODS

With interactive teaching methods, the development of the ability to independently make decisions by analysing the situation that has arisen, finding the essence of the problem, finding ways out of it and putting them into practice, mastering the professional skills of a future specialist, the ability to adequately and quickly respond to changes that will arise in the process of work, the formation of skills for self-development and the willingness to improve their qualifications constantly [12-14]. Interactive teaching methods form and develop students' skills in working with information when from the entire volume it is necessary to independently select the necessary and reliable one for preparing for classes. The student does not receive ready-made knowledge but is involved in the process of cognition, becoming its active participant, which contributes to more effective assimilation of educational material, since it no longer acts as a passive recipient of knowledge. Interactive teaching methods develop students' skills of cooperation and interpersonal communication, which is expressed in the ability to analyse and accept other people's opinions, at the same time, be able to argue and defend their opinions, finding compromises in a conflict situation (Fig. 1) [15-16].
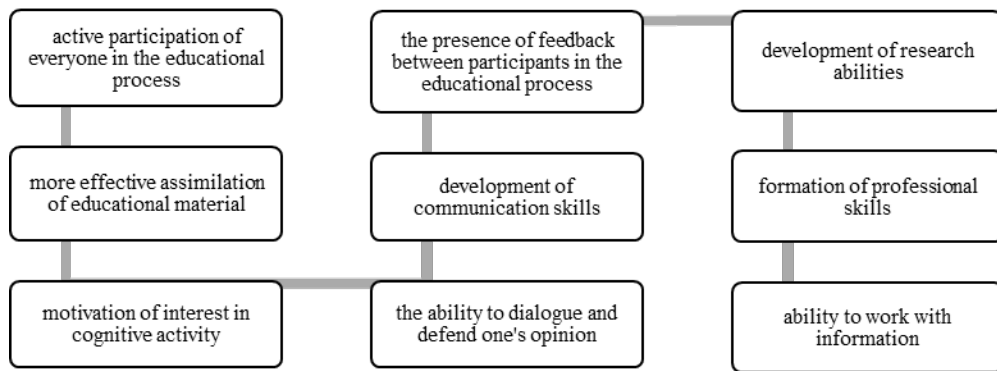

Figure 1: The Main Tasks That Interactive Teaching Methods Of Students Solve

The main tasks that the interactive methods of teaching students solve prepare a specialist who is competitive in the labour market with professional knowledge, skills and qualifications, and the introduction of computer technologies into this process becomes a powerful tool for a qualitatively new development of interactive teaching methods at all levels. An analysis of the teaching methods used in the preparation of students in higher educational institutions shows that traditional education still accounts for 50% of the total number of technologies used, the use of computer technologies is with a minimum gap, they make up 45% of the total. When using computer technologies in education, a computer becomes a full participant in the educational process [17-18]. This is the main feature of education with the help of computer technology (Fig. 2).
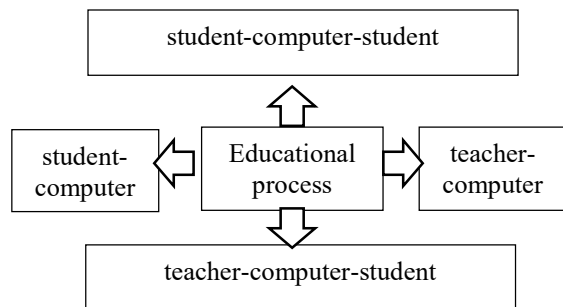

Figure 2: Educational process using computer technology

Computer technologies used in education include computer technology, telecommunications and software, which together allows you to get new opportunities with interactive methods of teaching students [19]. The possibilities that computer technologies open to the educational process are

wide and varied. They become not only a source of educational and methodological information for the teacher, but they are also used by him as a means of teaching when studying a new topic, in conducting practical and laboratory classes, to control students' knowledge, allow in real time to attract potential employers and leading specialists to the educational process other educational institutions, developing students' ability to conduct an interactive conversation. The use of electronic educational resources in interactive teaching of students makes it possible to brighter and more dynamically reflect the content of the studied material, which activates attention and interest in the subject under study. Teachers and students receive open access to information at any convenient time, and the availability of a modern database allows them to receive up-to-date and necessary information in their speciality through the electronic library, email, social networks, and keep abreast of new scientific achievements. The student can independently check and control their knowledge in the speciality, repeat and consolidate the material already passed. Computer technologies expand the possibilities of students' cognitive independence, which is the basis of interactive teaching methods, increasing the efficiency of mastering new material, leads to the development of thinking, abilities, revealing the potential of each student [20]. Modern computers are a demonstration tool, allowing you to illustrate any process and phenomenon. The clarity of the educational material allows to most firmly assimilate the theoretical knowledge obtained, which can be consolidated with practical skills by finding optimal solutions when simulating real conditions, specific operations, when modelling an appropriate workflow, creating an interactive model on a computer (Fig. 3).

Today, the use of computer technologies has become a reality in the interactive teaching of students, which, in combination with traditional methods, bring qualitative changes to the pedagogical process and contribute to its intensification.

With interactive methods of teaching students using computer technologies, an urgent problem arises of creating a single information space for students and teachers, which allows organising the learning process and the exchange of necessary information not only within the walls of the university but also outside it, which turned out to be especially relevant at present due to the emerging need to close universities for quarantine in connection with COVID-19 [21-22].
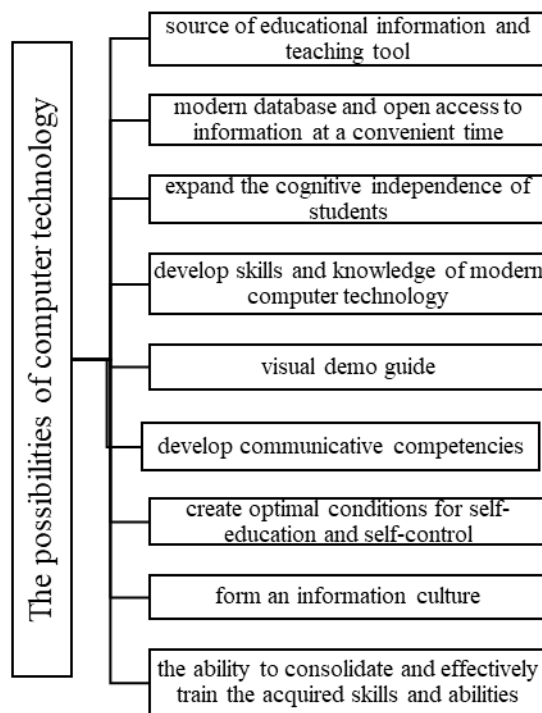

Figure 3: Possibilities of computer technologies in interactive methods of teaching students

Such an information space can be created thanks to cloud technologies. The introduction of computer technologies in the process of teaching students requires high, often unbearable costs for higher education, not every educational institution can afford it; however, modern technologies provide an opportunity to significantly save on the purchase of expensive computer equipment, as well as on expensive software, through the use of cloud technologies that provide access for many users to remote resources from any place and equipment connected to the Internet and, within the allocated limits, place files for free on the servers of hosting providers.

3. METHODOLOGY

To find the optimal tool for organizing group design, the authors were faced with the task of choosing the most optimal one in terms of such characteristics: free, availability for use, from 10 GB of volume. Additional services are also welcome. After the authors chose a suitable tool at their own discretion, an experiment was carried out on the convenience of its use, the possibility of its use in the future, and the complete replacement of online learning with online.

4.   CARRYING OUT THE EXPERIMENT

From a large number of cloud storages, we made a choice in favor of Google Drive, since from our point of view it has a number of significant advantages: it does not require specialised knowledge from the teacher and students; ease of connection and use of its capabilities; 15 GB of free space for storing data on the server, which allows you to place large files, with the possibility of purchasing additional space; available on all major platforms – laptops, smartphones, tablets and computers; the ability to edit and store files in more than 100 formats; a large number of available services: sites, forms, calendar, translator, maps, which have no analogues on any "cloud"; the ability to differentiate the rights to create and edit files and folders; allows you to create, view and edit documents simultaneously for several users online, and there is no need to copy and send documents; provides the ability to connect an unlimited number of users; a set of possibilities for drawing up diagrams for data analysis, graphs for visual illustration of the work performed; the absence of annoying contextual advertising is also essential, as well as ensuring the security of stored data; there is also an option to autosave when exiting the application. Working with Google Drive greatly facilitates the work of the teacher since through an expected resource for students and teachers, on which all the necessary materials for training are uploaded, the teacher gets the opportunity to monitor the progress of work, check them with the addition of their comments and put grades, keep in touch with students not only in the classroom but also at any time and from any convenient place [23].

Our goal was to explore the educational capabilities of Google Drive while performing joint project work to create a website for an educational institution or create a distance course in a subject and choose which is better, using the group form of the project.

The group design sessions were divided into traditional classroom work and work with Google Drive, with most of the time devoted to this part of the work. For the experiment, two groups of second-year students were selected in the amount of 35 and 40 people. By this time, the teachers had already basically formed an opinion about the abilities and capabilities of students, their psychological compatibility with each other, which facilitated the formation of subgroups, into each of which students with different levels of academic performance were selected.

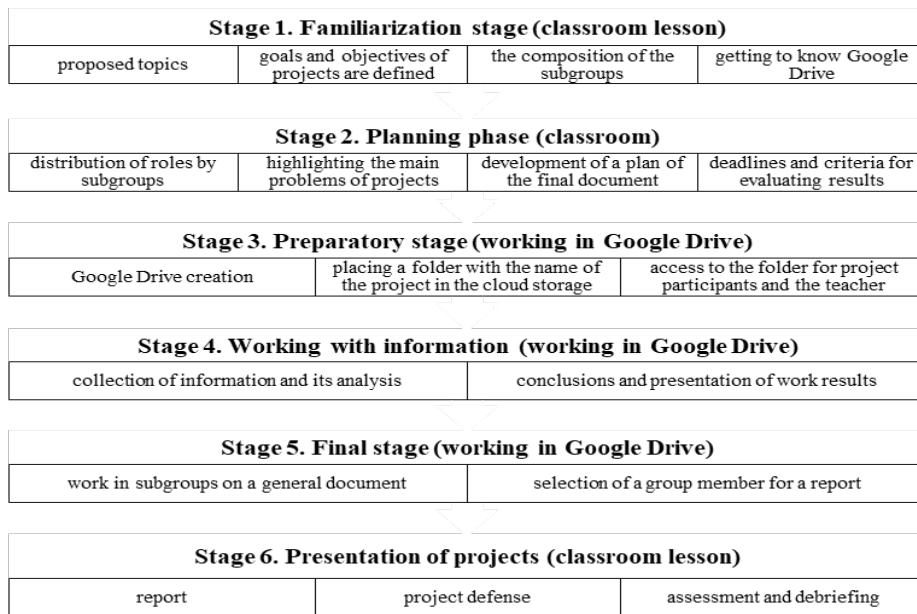The joint design work was carried out in several stages (Fig. 4).

Stage 1. Familiarization stage (classroom lesson)			
proposed topics	goals and objectives of projects are defined	the composition of the subgroups	getting to know Google Drive

Stage 2. Planning phase (classroom)			
distribution of roles by subgroups	highlighting the main problems of projects	development of a plan of the final document	deadlines and criteria for evaluating results

Stage 3. Preparatory stage (working in Google Drive)		
Google Drive creation	placing a folder with the name of the project in the cloud storage	access to the folder for project participants and the teacher

Stage 4. Working with information (working in Google Drive)	
collection of information and its analysis	conclusions and presentation of work results

Stage 5. Final stage (working in Google Drive)	
work in subgroups on a general document	selection of a group member for a report

Stage 6. Presentation of projects (classroom lesson)		
report	project defense	assessment and debriefing

Figure 4: Stages of collaborative design work

• At the first, familiarisation stage, which took place in a classroom practical lesson, the teacher told about the main ideas for the development of joint projects, suggested topics, defined the goals and objectives of future projects. Students were offered for consideration the composition of subgroups formed by the teacher, with whom the students generally agreed. The teacher introduced the students to Google services and the opportunities that they provide in the process of working with them, with particular attention paid to acquaintance with the Google Drive service, which includes the built-in Google Docs office suite, designed for collaboration on the web in real-time, and it was also suggested to save all completed tasks to the cloud file storage of Google Drive.

• In the second lesson, at the planning stage, also in the classroom, the students, already divided into subgroups, chose the topic of the project and the leader, who, if necessary, will provide organisational and technical support to the project participants, edit the collective document and prepare it for defence, and the students divided the roles between project participants within their subgroup. At this stage, it is essential to explain to the students that each of them not only collects information according to their assigned role in the project but also studies and analyses the materials of other members of the project group, takes an active part in the discussion and editing of the final document drawn up by the group leader, since it is a collective project and everyone takes an equal amount in it. The teacher highlighted the main problems that should be resolved in the process of implementing projects, familiarised him with the plan for drawing up the final document and with the methods of collecting and analysing information. At the same time, students suggested their own directions for finding information. Also, the deadlines for the delivery of projects, criteria for evaluating the results were determined. In general terms, it was described how to create Google Drive.

• At the third stage, preparatory, as at all subsequent ones, the work was carried out already on Google Drive. Students in subgroups who did not have a Google account created accounts with installation on a computer and/or any mobile device at their discretion, which allowed them to work with the project everywhere. The group leaders created Google Drive, created and placed folders with the names of projects in the cloud storage and made them available to the members of their subgroup, and to each folder for the teacher with the levels of viewing, moving and editing.

• At the fourth stage, filling in the folders with information, work was carried out with sources to collect data, with its subsequent analysis, conclusions were formulated, and the results of the work were formalised. At this stage, the teacher's control over the performance of independent work by each student, compliance with the agreed deadlines, advising students in case of difficulties in formalising the results of work and formulating conclusions is required.

• At the fifth stage, the final one, the students together, according to their subgroups, work on a standard document, compiled, from the fragments proposed by them, by the group leader. At this stage, the teacher should remind students about mutual assistance in work, about the right to freely express their thoughts and ideas, about the ability to listen to someone else's opinion, express their own and for the benefit of the common cause, choose the optimal one.

• Sixth stage – presentation of design works and summing up. The project was presented by a representative chosen by the students themselves in each subgroup, and this was not necessarily the project leader, the report lasted 10 minutes. After that, the students answered the questions; all the project participants took part in the answers in their subgroups. Students of parallel courses were invited to the defence, who could also participate in the discussion of the presented projects. During the defence, students must be able to defend their work, convince and prove its significance, show their competence, the ability to integrate data from various fields of knowledge to solve the problem posed in the project, the ability to work in a team. We decided to evaluate the work of the entire subgroup without evaluating each member separately. After assessing and summing up the results, the best projects were selected, for one of which it was proposed to write an article in a scientific journal, on the second project - to speak at a student scientific conference.

During the entire process of working on the project, the teacher monitored the progress of the work, expressed his opinion on the sections of the project, pointed out errors so that students could correct its content before the completion of the project.

5. EVALUATION AND ANALYSIS OF RESULTS

After the experiment on the organisation of group design using cloud storage technology Google

Drive, we surveyed students who took part in the project.

Students rated the work on the project according to the following criteria (Fig. 5).

As you can see from Figure 6, the students positively assessed the experience of working with group design using Google Drive. They noted that they did not experience any significant difficulties in technical terms: they did not require special knowledge to connect and create documents, and

the students easily coped with the task, positively assessed the intuitive and straightforward interface of Google Drive. Working with Google Drive was convenient and comfortable - this is both round-the-clock access to documents, and the ability to work from anywhere with Internet access and from any device, the ability to edit the same file simultaneously for several project participants, and there is no need to copy and send the document by email.
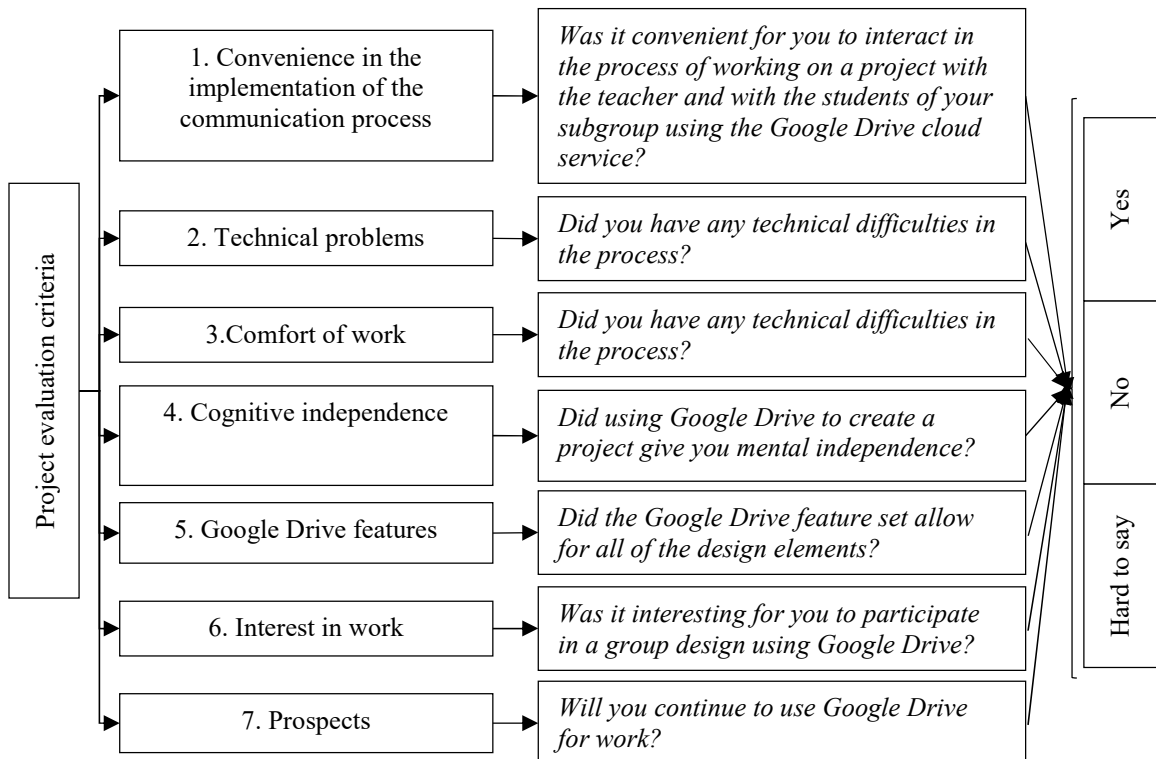

FIGURE 5: Project evaluation criteria

12% of students considered working with Google Drive uncomfortable, pointing out that the connection to the Internet did not always work stably, and there was no way to deal with a document. Through Google Drive, on one common resource, you can implement all the design components - this is data placement, discussion, editing and creation of a single document, a wide range of possibilities for drawing up diagrams and graphs, presentations, which were appreciated by 87% of students. 10% indicated compatibility issues between Microsoft Office and Google Drive

formats. Students also noted (92%) that working with Google Drive allowed them to realise cognitive independence and they consider this function of Google Drive one of the most important, and cognitive independence made the process of group design using Google Drive exciting and productive. In the future, 75% of students believe that they will definitely return to this form of work in the future when working on individual term papers, projects, reports, since this form of work allows, without wasting time, to do with the necessary documents anywhere.
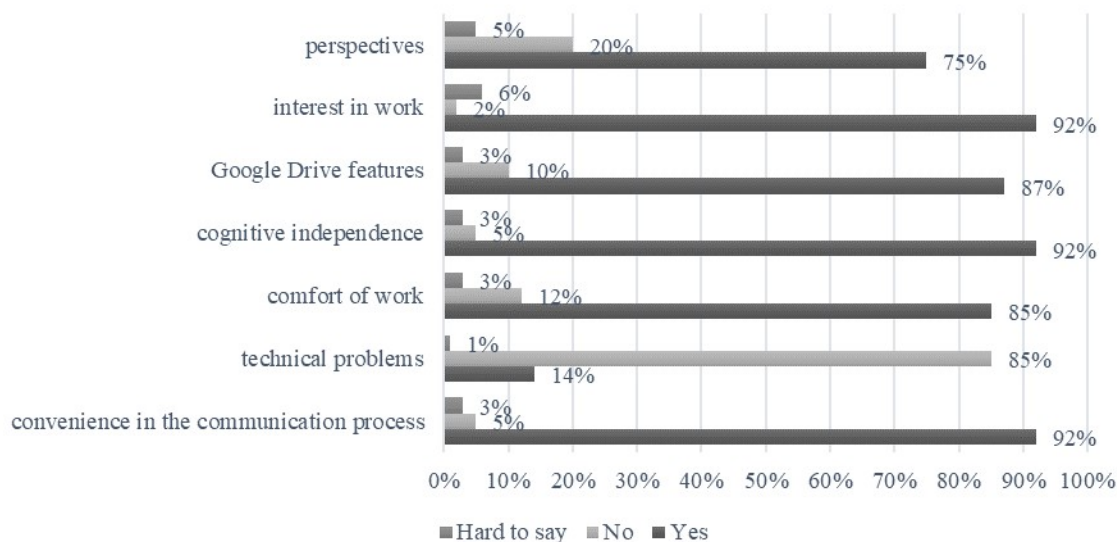
Figure 6: Results Of The Survey Of Project Participants

6. CONCLUSIONS

Analyzing the students' responses to the survey, we can conclude that the students positively assessed the work and the experience gained in the process of work in group design using Google Drive. Project activities using Google Drive allowed them to achieve in the educational process such goals as mastering the skills of searching for information, working with modern computer technologies, expanding cognitive independence, collecting, analysing and summarising data, planning their independent educational activities and developing skills for self-discipline and responsibility when the work of the whole team depends on your actions. An essential advantage of working with computer technologies, in particular working with the use of Google Drive, is, thanks to the common resource of the work of all participants, the opportunity to see and evaluate the contribution of each to the teamwork.

Cloud technologies, of course, are quite diverse, as are computer technologies used in interactive methods of teaching students, out of all the diversity we examined the capabilities of the Google Drive cloud storage of information and came to the conclusion that its application provides new ample opportunities for organising the educational process. However, no computer technology can replace the teacher with his didactic skills and only in the aggregate can have a powerful influence on the development of interactive teaching methods for students.

The conducted theoretical and empirical analysis opened the way for further study of the practice of the influence of computer technologies on the development of interactive teaching methods for students, namely, the use of such a tool as Google Class - how convenient it is for the teacher and separately for students. Are all disciplines suitable for such an online lesson, what is the optimal ratio of online and offline?

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