The didactic potential of cloud technologies in professional training of future teachers of Ukrainian language and literature

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Abstract

The article deals with the peculiarities of the usage cloud technologies for the organization of students-philologists' individual and group work in studying the discipline "Scientific Research Basics". The relevance of the introduction of cloud technologies for formation the readiness of the future teachers of Ukrainian language and literature to the professional activity is substantiated. Analysis of the scientific sources suggested that the quality of professional training process of future teachers-philologists has reached a new level by the means of cloud technologies. The domestic and foreign experience of cloud technologies implementation into current educational practices is generalized. The features of blended learning organization for professional training students-philologists at the Mykhailo Stelmakh Faculty of Philology and Journalism of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University during the studying the discipline "Scientific Research Basics" by using cloud technologies are described. The practical aspects and experience of preparation the future teachers of Ukrainian language and literature to a fluent usage of innovative cloud-based means are detailed. It is specified that the educational process is based on the communication by Gmail, Viber and Telegram messengers, store on Google Drive resource, work with educational video on YouTube, conducting online classes in Google Meet, creation publication in any of the social networks (Facebook, Instagram, TikTok), formation the different styles of references design on The Cite This for Me resource, conducting literature search on various search engines, namely Google Scholar, ScienceDirect, Web of Science, creating multimedia presentation at Prezi or Canva, making MindMaps on Mindomo, infographics on interactive board Google Jamboard or Padlet, on services for graphic design Canva and Visme, etc. Prospects for experimental studying the effectiveness of using cloud technologies in learning discipline "Scientific Research Basics" are determined.

Keywords

cloud technologies, professional training, scientific research basics, cloud-based learning environment, the future teachers-philologists, visualization, didactic potential.

1. Introduction

The high-speed development of information and communication technologies is significantly ahead of the process of adaptation of these technologies to the pedagogical process. Significant changes in the education system are needed for adequate interaction of the tutor with the students of the new generation, for their training and development. This requires the tutor to take into account the peculiarities of the perception of educational information by modern students, the transition from mostly verbal teaching methods to the use of interesting for young people forms and methods of organizing educational activities. After all, now it is not enough to transfer only knowledge in the process of professional training, but it is important to involve the students into active learning and research activities in the media space, and to form the students' ability to critically interpret information in a cloud-based learning environment. Therefore, the problem of using cloud technologies in the educational process and finding effective tools for productive educational interaction becomes especially relevant.

Thus, it should be noted that there is still no comprehensive justification for the introduction of cloud learning technologies in the training of future teachers of Ukrainian language and literature, that would reveal the potential of cloud-based learning environment in forming of the students' key competencies, increasing their personal and creative potential.

The theory of the use of cloud technologies in the educational process was studied by Al-Sharafi et al. [1], Alshref et al. [2], Attaran et al. [3], Bykov and Shyshkina [4], Kiv et al. [5], Kobysia [6], Lytvynova [7], Marienko [8], Markova et al. [9, 10], Morze and Kusminska [11], Munk et al. [12], Nechypurenko et al. [13], Okai et al. [14], Oleksiuk et al. [15], Peras and Mekovec [16], Popel and Shyshkina [17, 18], Qasem et al. [19], Striuk and Rassovytska [20], Vakaliuk et al. [21, 22], Velychko et al. [23], Volikova et al. [24], Yadav [25], Yeh and Hsu [26], Zhaldak and Franchuk [27].

Popel and Shyshkina [17] determined the relationship between such concepts as "cloud-based systems" and "cloud-based environments".

Yadav [25] attracted the attention to a cloud education system and described how it is beneficial for students, faculty and the educational institutes for providing quality education. Attaran et al. [3] discussed potential strategic benefits of cloud technology in education, and highlighted its evolving trends.

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Lytvynova [7] convinces that implementation of a cloud-oriented learning environment at secondary schools provides endless opportunities both teacher and student, because it helps to create the conditions for innovation in learning.

A considerable amount of research papers has been investigating the peculiarities of use the cloud technologies in higher educational institutions. Okai et al. [14] discovered that the higher education is skeptical in committing to cloud technology. They identified the reasons for the slow rate of adoption of cloud computing at university level, discussed the challenges faced and proposes a cloud computing adoption model that contains strategic guidelines to overcome the major challenges identified and a roadmap for the successful adoption of cloud computing by universities. According to Fedorenko et al. [28], the practice of implementing such technologies in the educational process of higher educational institutions are expanding every day and gives only positive results.

Al-Sharafi et al. [1] developed a theoretical model to explore the factors affecting cloud computing adoption at higher education institutions. Their model is based on the integration of four well-established models, including the technology-organizational-environmental framework, the fit viability model, the diffusion of innovations, and the institutional theory. Peras and Mekovec [16] identified the factors of the use cloud service in education institutions, and developed a conceptual model for the continuance intention to use cloud service in education institutions.

Qasem et al. [19] gave the systematic literature review and analyzed the existing research on adopting and using cloud computing in higher education institutions, reviewed background research to develop a coherent taxonomy and provide a landscape for future research on cloud computing in higher education institutions. One more systematic literature review was conducted by Alshref et al. [2]. It was focused on the e-learning technology acceptance theories and models and opened issues and challenges facing the Libyan higher education institutions.

Shakor and Surameery [29] analyzed the researchers' views in Iraqi universities on cloud computing and presented the impacts of the COVID-19 pandemic on cloud computing environment in higher education institutions in Iraq.

Yaroshenko et al. [30] pointed out that the main purpose of information and digital training in the pedagogical higher educational institutions is to ensure the formation of digital competence of future primary school teachers, to prepare them for developing primary students' digital literacy in classes on various academic subjects, for active use of ICT in primary school teachers' professional activities.

Moiseienko et al. [31] defined didactic conditions of digital formation competences of students of pedagogical universities: actualization of motivational value training of students of pedagogical universities; organization of interaction between students and teachers of pedagogical universities on the Internet through the creation of digital information educational environment; creation of individual educational trajectories of students.

Some aspects of the use of e-learning tools, cloud technologies for teaching the Ukrainian language and literature were considered in the works of Biychuk [32], Palamar and Nazarenko [33], Petrovych et al. [34], Skrynnik [35], Ulishchenko [36]. Skrynnik [35] created, scientific and theoretical grounded and experimental tested the methods of teaching Ukrainian literature with the use of cloud technologies and described it in her PhD thesis "Techniques of teaching Ukrainian literature in the 5th-6th grades using cloud technologies". The researcher defined

a cloud-based learning environment in the system of literature education as an artificially modeled environment of pedagogical interaction, which involves the use of cloud technologies, has a clearly defined didactic purpose, promotes the formation of key and subject competencies, development of readers' personal potential, promotes the creative self-expression of each of the subjects of educational interaction [35].

Palamar and Nazarenko [33] analyzed the content aspects of the competence approach to teaching literature with the use of booktrailer to increase students' interest in reading. But the usage of cloud technologies in the formation of the readiness of future teachers-philologists to professional activities are poorly explored.

Despite the interest of scientists in cloud technologies, the role of cloud-based learning environment in formation the readiness of future teachers of Ukrainian language and literature for professional activity requires further researches. Therefore, it is important to study methodologically and pedagogically appropriate ways of students' training by the means of cloud technologies.

The aim of the research is to elucidate the didactic capability of the usage of cloud technologies in the format of studying the discipline "Scientific research basics" for effective professional training of students-philologists.

2. Related work

2.1. Cloud technologies in higher education: the didactic potential of usage

Bondarenko et al. [37], Palamar and Nazarenko [33], Petrovych et al. [34], Skrynnik [35], Valko et al. [38] highlight that the professional training of future teachers should take into account the changes in the technological world.

Shakor and Surameery [29] underline that a lot of educational institutions have begun using cloud computing by outsourcing their student email provision and by using data storage. The authors point out the main benefit of using the clouds:

- availability (the ability to access the data from anywhere and by using any portable devices);
- save cost of installing IT infrastructure;
- outsourced development and maintenance;
- minimal training on the personnel;
- super-computing power.

Morze and Kusminska [11] categorize the didactic assignments of using the cloud computing in the higher education institutes: creation and further development of personal training and research environment of student and tutor, organization access it from anywhere at any time; saving large amounts of personal data, etc.; providing centralization and flexible control, minimization the need for maintenance, saving money to purchase new equipment, flexibility in the deployment of new systems etc.

Qasem et al. [19] list the benefits that inspire higher educational institutions to adopt cloud computing. Among them are:

- readily accessible online applications;
- flexible learning environments;
- mobile learning support;
- availability of specialized cloud-based systems;
- scalability of specialized cloud-based systems;
- cost reductions in hardware and operations;
- reduce the costs of software;
- collaborative working;
- virtualization;
- quality of service.

The researchers revealed in their study that cloud computing technology leads to modernize the way of work of teachers, educators in higher educational institutions. But the authors attracted the attention that despite several cloud computing studies in relation to higher educational institutions, other researchers have tended to focus minimally on the organizational aspects and on the individual perspectives of the usage of cloud technologies [19].

Qasem et al. [19] highlight that students are already familiar with the concept of cloud computing to some degree and are probably already used in cloud-based technologies, such as Google Apps and Dropbox, which are free, easy to use, and highly accessible. The authors proclaim that cloud-based systems are attractive to the education sector because they are readily available, quick to respond, and easy to roll out to numerous audiences.

At the same time, Valko et al. [38] notify that cloud technologies usage has several disadvantages that are to be considered at educational process supported with such a technology is being organized. For instance:

- depending on electricity availability;
- the cloud service provider is empowered with absolute access to and control on data;
- resource is being worked and supported until the cloud service provider does it;
- resources may change monetary policy and limit the functional or they are no longer available;
- the data typing and standards lacking limit the cross-platform transition between resources.

Yeh and Hsu [26] affirm that cloud technologies have much greater potential than other network infrastructures because they can overcome other computing limitations by offering great processing capability and data storage capacity given the servers where they are stored.

Varina et al. [39] draw our attention to the use of cloud computing, particularly Google Workspace for Education, in the educational process not only for formation of a competitive and successful personality in the electronic information society, but also for significantly improve and diversity the activity of a teacher, activization creativity of students, creation appropriate conditions for the formation and development of their relevant skills and abilities, improve the assimilation and reproduction of information obtained by them, promotion the development of students' adaptive potential.

According to Bondarenko et al. [37], modern students are "digitally born", because they live in a media environment. So, the use of computers, Internet resources and mobile devices is the part of students' everyday life. The researchers draw our attention to such "key properties" of this educational environment:

- immersion, the ability to be an active doer instead of a passive viewer;
- interactivity, the active interaction of education process participants among each other and with an artificial environment;
- dynamism, variability, transience of events;
- sense of presence;
- continuity, the ability for continuous interaction of participants in the educational process (offline, online, etc.);
- causality, the ability to identify the causal relationships among educational phenomena and processes, and to visualize them with multimedia.

The above mentioned should be taken into account in professional training of the students-philologists because of its didactic potential. Meaningful choice of educational tasks, the possibility of constant feedback and creating an atmosphere of cooperation allows developing of the comfortable learning environment.

Thus, future teachers of Ukrainian language and literature must be able to appropriately select and effectively apply cloud technologies in the educational process. It allows to personalize the learning process, bring it closer to the needs of modern students. Constant updating of such technologies requires a modern teacher to be reflective, able to critically assess their own abilities, to focus on self-development and self-improvement.

2.2. Peculiarities of application the cloud-based services in higher education

Falfushynska et al. [40] summed up the students' and faculty members' attitude towards e-learning and the most complicated challenges regarding distance education. According to their survey the online learning using Zoom, Moodle, Google Meet, BigBlueButton and Cisco has become quite popular among the students and faculty members' in Ukraine in time of COVID-19 pandemic.

According to Symonenko et al. [41], both students and teachers can use the following basic tools on Google Workspace for Education cloud platform: Gmail with support for text, voice (Google Talk) and video chat; Google Drive for saving files and providing access rights to them; Google Docs for creating documents, spreadsheets and presentations of any complexity with the ability to use templates. Varina et al. [39] state that future teachers use information technology in almost any activity, and propose to take into account huge popularity and versatility of Google, because this cloud service allows to organize the learning process in such a way that students actively and enthusiastically master the educational materials. A group of researchers point out the advantages of such learning management system as Google Classroom. These benefits are such as:

- access to materials from any place;

- creation of a task and distribution of its individual copy for each student;
- joint work on tasks, implementation of project activities;
- real-time communication;
- possibility of conducting interactive classes online;
- tasks assessment.

One more important statement is that Google Classroom e-learning environment also allows future teachers to import elements from other services, for example LearningApps.org modules, which can be used directly as educational or training resources and allow students to learn the most important categories of the course in a form of a game. A group of researchers sums up the advantages of cloud computing in the educational environment that provide an opportunity to consider them as a deterministic component of the impact on professionally important and personality-oriented competencies development [38].

Nazarenko and Palamar [42] draw our attention to the importance of blended learning and the possibilities of introducing new types of ICTs into educational process. The authors outline that in the process of study the most popular in using become such on-line resources as LearningApps, Prezi, Emaze, PoowToon, Kizoa, Padlet, Thinglink, Piktochart, Tagul, Canva, Realtimeboard, Mindmeister, Mindomo, Ilovefreesoftware, Zaption etc. The researchers emphasize that it is also crucial for students to use Google as a searching tool in the process of their educational activity.

Aliagas-Marín and Margallo [43], Basaraba [44], Brössel [45], Dimova et al. [46], Ehret et al. [47], Ibarra-Rius and Ballester-Roca [48], Romero Oliva et al. [49], Rosa [50], Rius and Roca [51], Simões and Costa [52], Virani [53], Vollans [54] examine the problem of the usage of book trailers as a new form of media communication and involvement the students in reading. Therefore, future teachers-philologists need to master this method, which belongs to cloud technologies [33]. Besides Borys Grinchenko Kyiv University initiated the All-Ukrainian Festival "Bookfashion" and the students of Mykhailo Stelmakh Faculty of Philology and Journalism constantly take part in and regularly win prizes in various categories. Samples of book trailers can be found on the university website or in YouTube.

Tosheva [55] underlines the didactic and technological aspects of cloud-based services for creating MindMaps. The researcher assures that they are seen as an adaptive tool for planning, organizing, creating, presenting, solving problems, such as communication and a method of memorizing information, making them a powerful tool for visualizing processes and occurrence studied in higher education. Ivanova et al. [56] gives the list of the most common MindMaps servises, such as iMindMap Cloud, MindMeister, Mind42 and Goggle which have an easy and intuitive interface and can be used in blended learning.

Santiana and Fatimah [57] trace the improving of the effectiveness of training by the means of Prezi cloud-based presentation rather than Power points. In the article such advantages of using Prezi for educational purposes, were identified: increasing teacher's confidence, decreasing his/her teaching anxiety, helping the students to visualize the studying material, giving motivation to study and producing better learning experience. Besides, it encourages the future teachers-philologists to have high quolity Internet and be creative on making Prezi presentation.

Kravtsov and Gnedkova [58] attract the attention to cloud technologies which provide opportunities to integrate various methods of interactive learning into the cloud based learning

environment. The authors consider the most popular and user-friendly Internet services, among them are:

- Google Docs is an online office where you can create different documents, and also allows you to conduct the joined work with documents [59];
- OneDrive is Microsoft service, similar to Google Docs service;
- Scribd is an online cloud storage service that allows you to publish documents prepared in popular formats: Microsoft Office, Open Office, Adobe Acrobat etc.;
- Slideshare is online repository of presentations;
- Google Scholar is search engine for educational and scientific publications;
- YouTube is a service that allows you to download and watch videos in the browser [60];
- Skype is a service that provides audio and video communication of users, in particular in video conferencing format;
- Wikipedia is an online encyclopedia based on wiki technologies;
- Blogger is Internet service in the form of an online diary (or blog) [61];
- Facebook, Viber are social networks that allow you to create study groups, communities, etc [62].

On the basic of the considered services Kravtsov and Gnedkova [58] define didactic possibilities of cloud technologies which confirm expediency of their application in the higher education:

- simplicity and convenience of joint work of tutors and students;
- quick inclusion of the created products into the educational process;
- organization of interactive learning and students' group work;
- access to documents anywhere and anytime;
- organization of various forms of control;
- moving the learning management system in the cloud (for example, LMS Moodle, etc.).

Thus, according to the results of analyzed scientific works about cloud services, we chose to use Gmail, Viber and Telegram messengers for communication, Google Drive resource as online cloud storage service, YouTube for work with educational video, Google Meet for conducting online classes, social networks (Facebook, Instagram, TikTok) for creation publication, Google Scholar, ScienceDirect, Web of Science for literature search, Prezi or Canva for creating multimedia presentation, Mindomo for making MindMaps, Google Jamboard or Padlet as interactive board, Canva and Visme for graphic design etc. In our opinion, the didactic possibilities of chosen cloud services help in formation the professional readiness of future teachers-philologists, in particular their information and communication competency.

3. Features of using cloud technologies in the professional training of students-philologists

Today, a blended learning is gaining wide development in the field of education and it provides an opportunity to individualize the process of acquiring knowledge, skills, abilities and ways of

students' cognitive activity [63, 64, 65, 66, 67]. This type of learning occurs mainly through indirect interaction of distant participants in the educational environment, which is based on modern information and communication technologies. As practice and a number of researches show, blended learning is aimed at creating a comfortable informational educational environment, communication systems, which provide all the necessary educational information. Following Kobysia [6], we state that in blended learning a significant part of traditional learning time is replaced by online learning activities and may include providing links to resources, downloading texts and materials, facilitating the submission of tasks for independent work. Thus, a blended learning is a model of using distributed information and educational resources in educational process with the usage of asynchronous and synchronous distance learning elements. It is practiced as an element of stationary training during classes and in independent students' work. Based on this, blended learning inherits elements of distance learning, but eliminates its shortcomings. This is the educational model which is used in our professional activities at the Mykhailo Stelmakh Faculty of Philology and Journalism of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University during the studying the discipline "Scientific Research Basics".

The development of cloud technologies provides the tutors with new opportunities for effective organization of the educational process. Let's try to detail the use of didactic possibilities of cloud technologies during the study of the discipline "Scientific Research Basics". First of all, it is worth noting the benefits of these technologies for establishing educational communication, in particular through Gmail, Viber and Telegram messengers. So, these resources help in the full exchange of messages, sending images, text documents and even videos, providing feedback between teacher and student. Learning content is often stored as files on Google Drive resources, which are linked via a hyperlink system, and the level of access can be changed by the owner. YouTube features are used to work with the educational videos. Google Meet features are widely used for online classes, group consultations, collaboration, discussions, presentations of mini-projects.

While studying the discipline "Scientific Research Basics", students-philologists do creative tasks using social services of Internet, Web 2.0 technologies, distributed computing technologies (cloud technologies). Each student does tasks both individually and in groups, creates a significant amount of visual didactic materials (crossword puzzles, multimedia presentations, booklets, MindMaps, booktrailers, instructions etc.).

Here are some examples of educational tasks of the discipline "Scientific Research Basics" and samples of student work which they have done with the usage of cloud technologies. Thus, before the practical class "Science as a productive force in the development of society" students-philologists were asked to do the following creative tasks (optional):

1. Watch the video "Scientific Research - Part 1: Introduction" at https://www.youtube.com/watch?v=OeBvL2zuaKs. Make a MindMap based on video information. An example of one of the created MindMap on Mindomo resource can be seen in figure 1.
2. Choose the person of one outstanding scientist. Prepare a publication for any of the social networks (Facebook, Instagram, TikTok) with brief information about this researcher. Examples of created publications can be seen in figure 2.

Future teachers of Ukrainian language and literature worked out the theoretical issues of the next practical class "Psychology and technology of scientific creativity" in the format of group
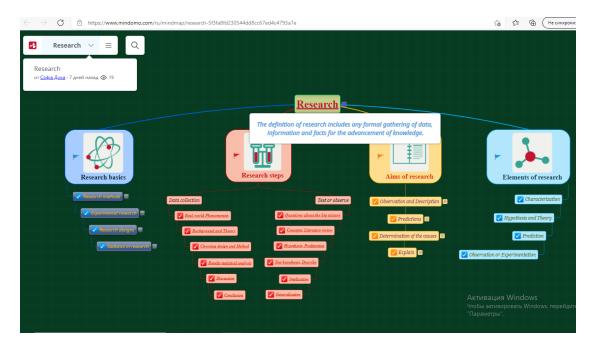
Figure 1: MindMap made by a student.

work. A separate question was proposed to each group. As a result of their teamwork, the students created a MindMap on Mindomo or any other resource and made a video presentation of this issue and uploaded it to YouTube. One of the presentations of "Organization of creative activity" can be viewed on YouTube at https://youtu.be/w3JcjYiaN2k.

Working out the tasks for the practical class "Scientific research on the methodology of philological disciplines. Modeling and its role in research" students-philologists were asked to get acquainted with different styles of references design (MLA style, APA style, Harvard style, IEEE style etc.). In such a way they highlighted the differences between different styles. The Cite This for Me resource (https://www.citethisforme.com/) helped to master the students' practical skills. Besides students searched for literature by keywords in various search engines that index scientific publications of all formats and disciplines, namely Google Scholar (https://scholar.google.com.ua/), ScienceDirect (https://www.sciencedirect.com/), Web of Science (https://www.webofscience.com/wos/woscc/basic-search), and they practiced in setting the necessary filters during the search, learned lifehacks on copying different styles citation etc.

Another task was to watch 2 educational videos about Scientific Models on YouTube (https://www.youtube.com/watch?v=BSU4_k_5pGE, https://www.youtube.com/watch?v=nGauq57P5Bg) and prepare a multimedia presentation or infographics with information about modeling learned from the video. For example, one of the multimedia presentations was prepared by a student at Prezi (https://prezi.com/). Several images from this presentation can be seen in figure 3.

Future teachers of Ukrainian language and literature also prepared infographics with information about modeling using various Internet resources, such as the online board Padlet (https://padlet.com/dashboard) and cross-platform service for graphic design Canva (https:
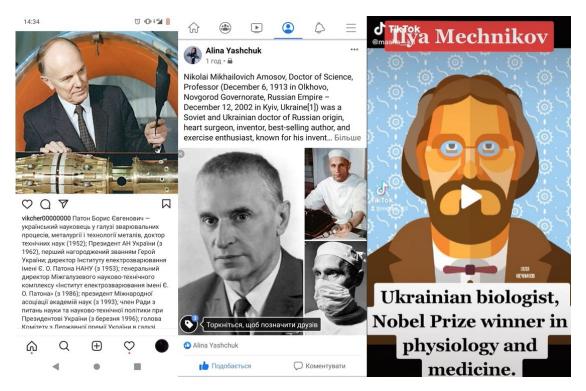
Figure 2: Publication in social networks.

Figure 3: Images from the student's multimedia presentation.

//www.canva.com/uk_ua/). Samples of student work you can see in figure 4.

The creative tasks of the next practical class also included watching the educational video and further work with it, ie creating a visual graphic information image using various cloud technologies. So, after watching the video "How to Write a Research Methodology in 4 Steps" at the link https://www.youtube.com/watch?v=yplWZs3dqNQ&list= PLbaAPLFGKWYbobxJt0MS601d_hPKlz1wx&index=12 students-philologists prepared an instruction for the researcher about the research methodology with the usage of online board Padlet (https://padlet.com/dashboard) and graphic design service Visme (https://www.visme.co)
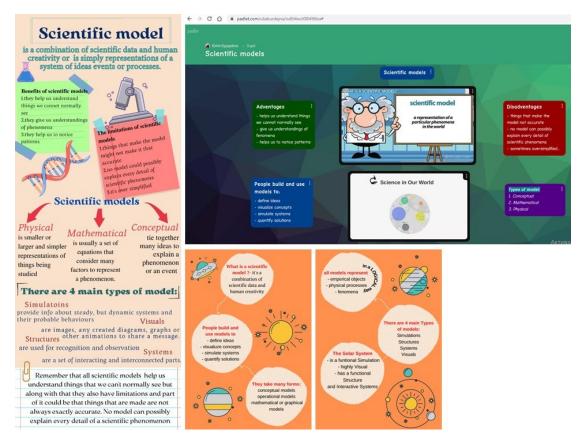
Figure 4: Examples of infographics created by students using cloud technologies.

(figure 5).

After watching the video "A Level Psychology - Experimental Designs" at the link https://www.youtube.com/watch?v=9eZYufPP2-o students-philologists created a comparative table with the advantages and disadvantages of each of the 3 experiment designs (figure 6). Resources such as the interactive board Google Jamboard (https://jamboard.google.com/) and the graphic design service Canva (https://www.canva.com/uk_ua/) helped to do this task.

These examples demonstrate the steady interest of students in innovative technologies in educational process. The cloud-based learning environment is familiar and usual for them, so involving students in doing learning tasks in this environment does not cause their resistance, but on the contrary serves as an incentive for creativity, solving cognitive problems, research activities.

4. Conclusions and prospects for further research

Based on the analysis of scientific research and our own practical experience, we can formulate the following didactic possibilities of cloud technologies in the professional training of future teachers of Ukrainian language and literature:
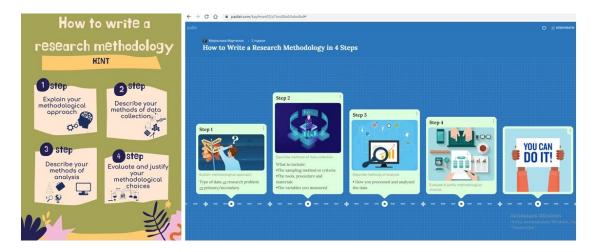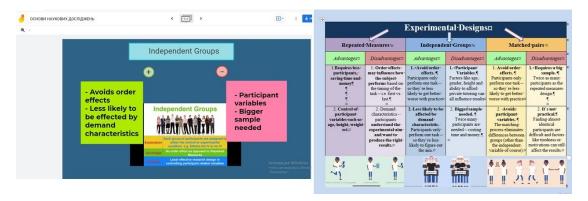
Figure 5: Samples of students' works.

Figure 6: Samples of students' works.

- activation of students' cognitive activity and motivation, productivity of educational activity;
- mobility, which gives opportunities for research, project activities and adaptation of educational material to real life;
- formation of new ways of knowledge transfer for the implementation of blended learning;
- the ability to store large amounts of data in various formats (audio, video, graphics, text, databases) and simplify the publication of materials, uploading them online for quick access to it by both students and tutor;
- interactivity and continuity of the educational process even in the conditions of temporary and geographical separation of subjects of study;
- the ability to organize the group work;
- the possibility of organizing collective work of tutor and students;
- innovation and the possibility of modifications - expanding the limits of applicability of existing forms and methods of learning, fast presentation of created products in

educational process, stimulation of independent activity and obtaining a specific visual result;

- the possibility of integration of academic disciplines;
- organization of student-oriented learning;
- improving the skills of finding the necessary information, its evaluation;
- formation and increase of the level of media literacy.

The usage of cloud technologies in educational process during studying the discipline "Scientific Research Basics" helps in the practice-oriented and competence-oriented professional development of students-philologists at the Mykhailo Stelmakh Faculty of Philology and Journalism of Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University. Thus, with the help of cloud technologies the future teachers of Ukrainian language and literature master the skills needed for a teacher of the 21st century, improve their knowledge and abilities both in professional subjects and in English, organize their self-development and self-education.

A prospects areas for further research are the experimental study of the effectiveness of using cloud technologies in studying discipline "Scientific Research Basics" and investigation of the psychological aspects of the problem of the using the cloud technologies in competence-oriented professional development of students-philologists.

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