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## **USING DIGITAL SERVICES AND TOOLS IN THE PROCESS OF SCIENTIFIC RESEARCH**

**Abstract** *The new millennium clearly demonstrates the rapid development of new technologies. Education should become one of the areas with the most rapidly updated content, technologies and teaching methods. The rapid development and emergence of new digital technologies and their introduction into the education system, openness and transparency of educational systems, the transition of the educational process to a virtualized space requires the development of balanced pedagogical models to ensure mobility of educational participants and optimal use of new digital services and tools in the process of learning.*

*The purpose of the study is to familiarization with a variety of digital services and tools in the information and educational environment. It is worth emphasizing the relevance of the chosen topic right now, when quarantine restrictions are being introduced around the world, and educational institutions are moving to distance learning.*

**Key words:** *digitization, digital educational learning environment, digital competence, distance education, blended learning, research projects, digital services and tools*

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## **ВИКОРИСТАННЯ ЦИФРОВИХ СЕРВІСІВ ТА ЗАСОБІВ У ПРОЦЕСІ НАУКОВОГО ПОШУКУ**

**Анотація.** *Нове тисячоліття яскраво демонструє стрімкий розвиток нових технологій. Освіта має стати однією зі сфер із найшвидшим оновленням змісту, технологій і методів навчання. Стрімкий розвиток і поява нових цифрових технологій та їх впровадження в систему освіти, відкритість і прозорість освітніх систем, перехід освітнього процесу у віртуалізований простір вимагає розробки збалансованих педагогічних моделей для забезпечення мобільності учасників освіти та оптимального використання нових цифрових сервісів та інструментів у процесі навчання.*

*Мета дослідження – ознайомлення з різноманітними цифровими сервісами та інструментами в інформаційно-освітньому середовищі. Варто наголосити на актуальності обраної теми саме зараз, коли в усьому світі вводяться карантинні обмеження, а навчальні заклади переходять на дистанційне навчання.*

**Ключові слова:** *дигіталізація, цифрове освітнє навчальне середовище, цифрова компетентність, дистанційна освіта, змішане навчання, дослідницькі проекти, цифрові послуги та інструменти*

The transformation of modern society requires the modernization of education and educational activities, which must work ahead, for the future. These include rethinking and prompt updating of strategic goals and areas of education in the context of digitalization, determination of its actual content, purpose and learning outcomes. Under the current conditions of education development, there are increased requirements for the formation of digital competencies of applicants.

Actual problems of the use of digital technologies in the educational process and the development of digital competences are revealed in the works of V. Bykov, I. Vorotnykova, R. Hurevych, A. Hurzhii, L. Kalinina, L. Kartashova, V. Kuharenko, V. Lapinsky, S. Lytvynova, N. Morze, V. Palii, I. Plish, O. Spirin, M. Shishkina and others.

To create conditions for educational mobility, communication and cooperation, modern subjects of educational activity need a new digital educational environment, which is provided by a set of interconnected educational and methodological, psychological and pedagogical, organizational, technical, technological, software, socio-economic, normative and ergonomic tasks aimed at forming a future specialist as a creative person. The implementation of such a model will address the educational needs of all participants in the educational process [1]. Currently, there is an objective need to improve the quality of training of skilled workers, taking into account educational and social challenges, the requirements of the global and domestic labor market, key stakeholders.

The synthesis of legally defined forms of organization of the educational process of future professionals initiated the creation of modern educational technology based on the principle of blended learning, which involves combining elements of classroom work with distance learning technologies, using didactic opportunities of innovative ICT and modern learning tools. An important component of the effective use of modern educational technologies for the organization of learning and cooperation in the classroom is the ability to select appropriate tools.

We live in an era of media revolution. Blended learning requires a transition from knowledge transfer to interactive cooperations between participants in this process. Interactivity and multimedia clarity of the learning process contributes to the didactic expediency of presenting information through its visualization, which contributes to better learning [5].

For educational content, this means that uninteresting materials are rapidly losing

popularity and trust of listeners. They are replaced by well-structured, quantized, dynamic, interactive and multimedia content.

Applicants are introduced to tools for creating, managing and structuring visual online content, which, in turn, contributes to the formation of digital competencies. It will also help to increase the effectiveness of online learning, learn to work with useful online services and applications, use visual images of educational products that will be clear and motivating.

Today, there is a question of updating and encouraging applicants to participate in scientific research activities and educational projects for the development of creative, practical, non-standard thinking, using various digital learning technologies, digital services and tools [3].

There are many innovative tools for data visualization now.

OpenRefine is a free powerful open source tool for working with data that runs through a web browser or can be downloaded. OpenRefine requires Java to work.

Google Sheets is an online spreadsheet application that allows users to create and format spreadsheets while working with other people.

Datawrapper is a data visualization tool that helps you to create and publish charts, maps, and tables from your data.

Tableau Public is a free platform for public exchange and study of data visualizations on the Internet.

Illustration tools: sliders, slide shows, galleries, collages, comparisons, pop-up illustrations (JuxtaposeJS service, Tilda blocks); screenshots and tools for working with them (Clip2net application). With ACDSee or IrfanView, you can convert a downloaded set of artwork to a single format and size, create a slide from this artwork in Tilda, and complete the page you created in previous tasks. Wikimedia Commons provides additional selection and search for illustrations. To create infographics, it is convenient to use the infogram, Datawrapper and other services.

With the help of visual graphs and dashboards, even complex data sets can be made clear. Visualization tools such as Tableau, Google Data Studio, and Power BI help turn complex data into stunning charts and reports that are easy to use. Visual tools often support integration with most basic analytics tools. To add the necessary data to the visualization you can use Google Data Studio, which offers a merger with other Google tools such as Google Analytics, Google Ads, Google Sheets and Google Ads Manager.

A very popular service for the learning process is flourish with many typical templates: graphs and static charts, interactive maps, scatter and bubble charts, hierarchical charts, race charts, filter cards, Sankey diagram, three-dimensional globe, chart charts, parliament charts, inters charts network diagrams, chord diagrams, slanted

diagrams, sports visualizations, elections and coalitions, quizzes, regional maps, arc maps, image comparisons, pop-up maps.

To create visual content, you can use services: Canva, Infogram, Crello, AmCharts Live. The Timetoast tool is used to visualize the progress of the scientific research project, to describe each stage, with the need to jointly create timelines online. With its help it is convenient to share the schedules with other users. Regarding the visualization of the opinions of several teams in a network project, a virtual board with stickers - Scrumlr. It is a tool for working together with the ability to make changes in each participant in real time.

To gather ideas (determine the relevance of the problem) it is better to conduct a survey using the service Tricider. To start a project, first of all, you need to start planning your actions using digital tools (TimeLine service). The path to success begins with a goal. It is possible to correctly formulate the purpose of the project, to define the tasks of the project, to put forward a hypothesis with the use of a digital tool - an online board (Trello). There are integrations with many other services on the Internet: Google Drive, Google Calendar, GitHub, Slack, Miro and others.

The tool, assistance and advice in case of difficulties in the work of applicants, is an online board and the use of tables and charts of the Google service “Gantt Diagram”. Using various services (Wakelet), you can bookmark and create collections of materials - videos, documents, links and other resources for your project. You can create as many collections as you want and all in one place. If you need to analyze, formulate conclusions, justify your point of view, understand the content of concepts and terms, communicate effectively with the team you should use a set of cards that allows you to acquire skills to design, to perform non-standard tasks to apply knowledge in practical, life situations. MindMeister is free tool for collective creation of intelligence maps. It is possible to exchange cards with an unlimited number of users in real time. Visualization of the idea is demonstrated in a built-in presentation with dynamic slide shows.

The obtained results should be useful, ready for use in the classroom, at school, in everyday life. It is possible to place your results of work on the project using a digital resource - an online board Padlet. [view.genial.ly](http://view.genial.ly). With its help you can leave comments and ask questions to the audience in real time [4].

The results of the study should be designed in the form of a specific product: photo report, video, almanac, report, scientific article, abstract, multimedia presentation, exhibition, collection, brochure, design project, etc. One of the stages of project activity is the project protection stage. Using Google Slides, you can create memorable and informative presentations that you can work with collectively. The introduction of animated videos, programs that allow you to work with augmented and virtual reality

technologies in the educational process, acquaintance with 3D models, microphotographs give students the opportunity to get new ideas for their further research.

The article systematizes the results of the analysis of scientific and methodological literature, publications, materials of conferences, seminars, webinars, on the possibility of using online services with which you can create web-quests or various interactive tasks to fill them.

During the classes, modern teachers actively use the possibilities of modern digital technologies. Therefore, the organization of the educational process in modern conditions requires a combination of different technologies, a creative approach to the use of each of them, as well as the creation of new educational technologies using digital tools.

Based on this, we can identify the basic requirements for digital services and tools of education, namely, they must be flexible, mobile, interactive and socialized, to allow for a short time to get the maximum result [2]. The availability of the described digital services and tools makes them the most popular ways to gain knowledge for education today.

Training in modern universal methodological techniques, innovative technologies, digital tools that can be used for both personal and professional growth, will make the movement on the path to self-development more comfortable.

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