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DIGITAL TOOLS IN TEACHING HIGH SCHOOL STUDENTS

Abstract. *The article examines the use of digital tools in teaching high school students. The purpose of scientific research is to analyze the current state of the use of digital tools in the education of high school students and determine the prospects for their implementation to improve the efficiency of the educational process. The objectives of the study are: to analyze modern approaches to the use of digital tools in the education of high school students; to classify digital tools by type according to their functional load in the educational process; to characterize the functional capabilities of digital platforms and services used in the education of high school students. To achieve the goal and the identified tasks, the following methods were used: analysis and generalization; comparative analysis; method of expert assessments; observation; and system analysis.*

Modern approaches to the use of digital tools in education that contribute to personalization, flexibility, and increased efficiency of the educational environment are analyzed. Digital tools are classified by type according to their functional purpose and role in forming students' key competencies: tools for creating visual and multimedia content; interactive learning and gamification; collaboration and project management; communication and sharing of materials; organization and storage of educational content.

The functional capabilities of the main digital platforms and services most often used in high school, particularly for organizing distance and blended learning, are described: Canva, Google services, Telegram, Pinterest, Genially, InShot, Trello, Wakelet, Mentimeter, Flip, Figma, and Kahoot. The importance of using digital technologies to ensure a high-quality and competitive educational environment is emphasized. It is concluded that the comprehensive implementation of these tools allows you to adapt the educational process to the needs of the modern generation, make it more flexible, personalized and effective.

Keywords: *digital environment, digital tools, digitalization of education, distance learning, learning platforms, high school students.*

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Introduction. The development of digital technologies in education is driven by modern societal needs and is supported at both the state and public levels. Digitalization is shaping a new social reality, accompanied by phenomena such as «digital divide», «digital citizenship», and «digital socialization».

The variety of factors influencing the scale and dynamics of society's digitalization determines the multi-vector nature of its development, one of the directions of which is the transformation of the educational process. Modern digital technologies – such as online learning, artificial intelligence, network practices, chatbots, BigData – significantly change their content and structure. Virtualization of education contributes to the practical implementation of one of the meanings of the concept of «digital» – discreteness, «discontinuousness» [12, p. 34].

The active introduction of digital technologies into all spheres of public life necessitates modernizing the educational process, particularly at the level of general secondary education. High school students, as a target audience at an intensive stage of professional self-determination, are

particularly in need of innovative approaches to learning that meet the requirements of the digital age.

Digital tools not only expand the possibilities for presenting and mastering educational material but also stimulate the development of critical thinking, media literacy, and teamwork skills. Their use contributes to the flexibility of the learning environment, the personalization of the educational trajectory, and increased motivation to learn.

In this regard, it is relevant to theoretically understand the current state of the use of digital resources in the education of high school students, analyze the practices of their implementation, and outline possible vectors of further development in the conditions of the New Ukrainian School.

Purpose and objectives. The purpose of the article is to analyze the current state of digital tool use in high school education and to characterize their capabilities and advantages for high-quality knowledge acquisition.

Research objectives:

– to analyze modern approaches to the use of digital tools in the education of high school students;

– to classify digital tools by type according to their functional load in the educational process;

– to characterize the functional capabilities of digital platforms and services used in the education of high school students.

Research methods. To achieve the goal and implement the tasks, the following methods were used in the work: analysis and generalization of scientific and methodological literature on the problem of introducing digital tools into teaching; comparative analysis of existing digital platforms and technologies in the educational process; method of expert assessments to determine the pedagogical effectiveness of digital tools; observation of the use of digital tools in the educational process; generalization of research results to formulate conclusions and recommendations; system analysis to develop prospects for the introduction of digital technologies in the education of high school students.

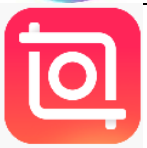
Research results. Research shows that the quality of the use of digital technologies is closely related to proper teacher training, because it is they who provide the conditions for students' active and conscious use of such tools. Teachers’ experience and professional motivation directly affect the level of organization of the educational process using digital resources. The main factors of high-quality learning using digital tools include students’ cognitive activity, pedagogical support, and effective classroom management, which enable the rational use of time and resources during lessons [5].

Digital tools for effective teaching of high school students in modern schools cover a wide range of technologies that contribute to increasing motivation, personalizing learning, and

developing key competencies. We highlight a number of the most effective ones and present them in Table 1.

Table 1

Digital tools for educational activities

№	Digital tools	Description	Examples of use in the educational process
1.		**Canva** is a multifunctional graphic design platform widely used in education due to its accessibility, simple interface, and variety of templates.	– Creation of eco-posters and infographics – Design of presentations and booklets for projects
2.		**Google services** provide numerous tools for effective organization of the educational process, contributing to increasing students' interest, developing their cognitive activity, and forming information competence.	– Google Classroom – a platform for distance learning – Google Docs – collaborative essay writing – Google Forms – online testing
3.		**Telegram** is one of the most popular digital tools that combines the functions of a messenger, a platform for distributing educational content, and feedback tools.	– Creating thematic study groups – Conducting surveys via bots – Promptly sending assignments and materials
4.		**Pinterest** is a free online platform and social network for storing, organizing, and sharing visual ideas in the form of images, videos, and infographics.	– Creating eco-themed collages – Inspiring visual collages for school projects
5.		**Genially** is an interactive platform for creating educational content that helps teachers make lessons visually engaging, dynamic, and interactive.	– Development of interactive knowledge maps – Cr, creation of virtual rooms or games on eco-themes
6.		**InShot** is a popular mobile video editing app that lets you quickly create high-quality multimedia content right from your smartphone.	– Editing videos for eco-campaigns – Creating video instructions for mini-projects
7.		**Trello** is an online platform for managing projects and tasks. Allows you to create lists, cards, add deadlines, files, and comments.	– Planning work on a team project – Maintaining individual learning routes
8.		**Wakelet** is a digital tool for storing, organizing, and sharing a variety of content, helping educators effectively manage learning materials.	– Collection of learning resources for topics – Student portfolio in ecology or biology
9.		**Mentimeter** is an online platform for creating interactive presentations that allows educators to engage students in real time through surveys, quizzes, and response visualizations.	– Conducting post-lesson reflections – Collecting anonymous student feedback on the topic
10.		**Flip** is a free educational platform for creating video discussions that is actively used in the classroom to develop communication skills, critical thinking, and reflection.	– Videos with your own opinion on the topic of the lesson – Discussions between students in the format of short videos

№	Digital tools	Description	Examples of use in the educational process
11.		**Figma** is a cloud-based tool for creating interface designs, prototypes, and visuals that allows multiple users to work on the same project simultaneously in real time.	– Designing an educational application – Team development of a digital poster
12.		**Kahoot** is a free online platform for creating interactive quizzes and surveys, used in education to engage students, test knowledge, and gamify the learning process.	– Gamified repetition of material – Conducting thematic eco-games

Source: created by the author

The overview of educational products (Table 1) aims to introduce the capabilities of modern digital tools that contribute to improving the quality of the educational process. Such products help teachers and students effectively use technology to create, share, and store educational materials. They also contribute to the development of digital literacy and the integration of information and communication technologies into everyday educational activities [15].

Let us describe the digital tools for educational activities listed in Table 1, starting with the Canva platform.

Canva's features in the educational process:

– interactive presentation creation – using ready-made templates, teachers can develop visually appealing presentations for lessons, integrating graphics, videos, and animations;

– visual materials development – posters, infographics, posters, diagrams, mind maps, etc., which can be used as illustrative material when presenting complex concepts;

– collaboration tools – Canva for Education allows students to work on projects in a shared environment, which helps build teamwork and collaborative editing skills;

– task and worksheet templates – teachers can create interactive tasks, flashcards, booklets, or their own templates for practical work;

– video and animation – the ability to create short educational videos, explanations of topics, quizzes in video format, which corresponds to modern educational trends of microlearning;

– publishing and sharing – finished materials can be downloaded in PDF, PNG, MP4 formats or shared via link, including integration with Google Classroom or Microsoft Teams.

The Google Workspace for Education platform combines several cloud applications that provide convenience in planning, communication, and collaboration:

– Google Classroom provides centralized management of the educational process: creating courses, providing and checking assignments, assessing, and providing feedback;

– Google Docs serves as a platform for creating and jointly editing text documents, which is especially convenient for writing essays, reviewing and joint projects;

– Google Sheets is used to work with numerical data and keep track of results, which also allows you to build graphs and analyze data;

– Google Slides is widely used to create presentations and implement student projects;

– Google Forms allows you to quickly create tests, questionnaires, and surveys, as well as automatically evaluate the results;

– real-time communication is implemented using Google Meet, which is used for video lessons, consultations, and meetings;

– file storage and sharing are carried out through Google Drive, which also allows the creation of students' electronic portfolios;

– Google Calendar is effective for planning events and deadlines;

– Google Jamboard for visualizing ideas in the process of collaborative creative activities.

The main features of *Telegram*, which are actively used in the educational process:

– creation of thematic channels – a teacher can create a channel for one or more classes, where educational materials, announcements, links to resources, class schedules, etc. are published;

– group chats – serve to discuss educational tasks, teacher-student interaction, organization of group projects, file exchange, and feedback;

– conducting surveys and voting – the built-in survey function allows you to assess students' opinions on the material quickly, choose a topic for a project, or conduct self-testing of knowledge;

– use of bots – educational bots can automatically send assignments, conduct tests, remind about deadlines or lessons;

– exchange of multimedia content – Telegram supports sending images, documents, videos, voice messages, and even large files (up to 2 GB), which is valuable for visual and audio learning;

– pinning of messages – important information can be pinned to the top of the chat so that it remains accessible;

– using Telegram Web and desktop versions – allows teachers to conveniently work with large amounts of information from a computer, while maintaining access to mobility.

Key features of using *Pinterest* in education:

– interactive boards – teachers can create thematic boards for each lesson or topic, where they will collect materials, which helps to systematize educational resources and make them easier for students to access;

– collecting ideas for lessons and projects, which helps to stay up to date with new pedagogical methods;

– developing students' creative abilities through the visualization of educational materials;

– creating their own collections of materials for different educational topics and tasks;

– interactive demonstrations and lessons using visual content;

– sharing experiences and working together through boards for team projects;

– accessibility on different devices, which provides convenient access to resources anywhere and anytime;

– personalization of content and integration with other platforms for ease of use in the educational process.

Key features of *Genially* in the educational process:

– interactive content – creation of dynamic presentations, infographics, tests, quests, and games with animation and clickable elements;

– active student engagement – interactive tasks promote motivation and participation in the educational process;

– flexibility and adaptation – easy to edit content, adjust to the level of students, and support individualized learning;

– integration with other platforms – support for inserts from YouTube, Google Docs, Kahoot, etc.; convenient to use in distance learning;

– collaboration – joint work on projects and convenient distribution of materials;

– assessment and feedback – creation of interactive tests and quizzes to test knowledge; built-in feedback elements – comments, hints, transitions depending on the answer;

– development of creativity – an extensive library of templates stimulates visual and critical thinking.

InShot's features in the educational process:

– editing educational videos – trimming, joining, and editing videos to create explanations, demonstrations, and summary videos;

– adding text and subtitles – text blocks and subtitles for explanations, convenient for students with special needs;

– audio – voiceover by the teacher or students, background melodies to create an atmosphere;

– photo collages and slideshows – visualization of projects, events, or works in a slideshow format;

– formats for online platforms – saving videos in formats for Google Classroom, YouTube, TikTok, etc.

– creating student projects – the ability to involve students in creating video presentations and creative tasks.

Trello features for organizing the educational process:

– planning and organization – boards for subjects, topics, and classes; calendar for lessons and deadlines;

– task management – cards with tasks, descriptions, files; checklists, deadlines, priorities;

– collaboration – work on projects with students online; comments and feedback;

– resource storage – attach files, videos, links; create a knowledge base or portfolio.

Wakelet's main functionalities for organizing the educational process:

– creation of resource collections – teachers can collect links, articles, videos, images, and documents into thematic collections (vokets), which facilitates access to educational materials for students;

– collaboration – Wakelet allows you to work on collections together with colleagues or students, which facilitates the organization of group projects and exchange of experiences;

– integration with other platforms – you can easily add content from YouTube, Twitter, Google Docs, OneDrive, etc., which makes the process of preparing materials more convenient;

– personalization and adaptation – collections can be customized in style and format, which helps to better structure information for the needs of a specific lesson or class;

– portfolio creation – teachers can form digital portfolios of students, collecting work and achievements in one place;

– distribution of materials – ready-made collections can be easily published or shared via links, social networks, or email.

Key features of *Mentimeter* for organizing the educational process:

– interactive surveys: collecting students' opinions in real time, using open-ended questions, scales, etc.; anonymity increases objectivity;

– quizzes and tests: automated assessment and gamification through ratings;

– word cloud: visualization of the most common answers, convenient for discussions;

– open discussion: a tool for feedback and reflection;

– analysis of results: saving data for further analysis of engagement;

integration with presentations: the ability to insert slides into PowerPoint/Google Slides;

– remote participation: accessibility from any device, which is especially useful for online lessons.

Flip's main features for organizing the educational process:

– video discussions and answers – teachers can ask topics or questions to which students respond with short videos, which helps to engage even those students who are not active orally in the classroom;

– creating a safe learning environment Flip allows you to control who has access to videos, ensuring safe interaction between students;

– development of speech and presentation skills students practice expressing opinions, public speaking, and interpreting material in a convenient format;

– assessment and feedback, teachers can provide written or video comments, grades, or create rubrics for formative assessment;

– individualization of learning, you can create topics with different levels of complexity, adapting to the needs of students;

– support for inclusive learning. Flip supports students with special educational needs through multiple recordings, subtitle addition, and the use of visual aids.

– integration with Microsoft Teams, Google Classroom, OneNote facilitates implementation into existing digital school environments;

– reflection and self-assessment – the video format allows students to analyze their own answers and see their own progress.

Figma's main features for use in the educational process:

– interactive content development – creating prototypes of websites, applications, or visual learning platforms;

– visualization of educational material – infographics, diagrams, concept maps, templates;

– collaboration – organizing project activities when students work on the same layout together with the teacher;

– digital presentations – the ability to create modern, adaptive slides without PowerPoint;

– development of students' digital skills – through creating designs and using modern cloud services;

– templates for interactive textbooks or online courses – with the ability to animate and navigate.

Kahoot's functionality in the educational process:

– interactive learning – conducting quizzes, surveys, and discussions in a game format contributes to the active involvement of students;

– gamification of the lesson – competitions between students increase motivation, interest in the subject, and the desire to achieve better results;

– instant feedback – the teacher immediately sees the students' answers and can quickly respond to errors or misunderstandings;

– knowledge assessment – Kahoot – allows you to effectively conduct formative assessment and determine the level of material mastery.

– flexibility of use – the platform is suitable for both classroom work and distance or independent learning;

– analysis of results – automatic creation of reports allows you to track the success and progress of each student;

– visual appeal – a bright interface and multimedia support make the learning process dynamic and engaging;

– access to a library of ready-made games – the teacher can use a large number of templates or adapt them for their lesson.

These tools help modernize, make interactive, and focus on students' needs and the challenges of the digital world.

Modern approaches to the use of digital tools in high school aim to modernize the educational process, enhance its flexibility and individualization, and ensure the effective use of information and communication technologies. This meets the requirements of digital education transformation and contributes to the formation of a competitive graduate. Among the key approaches, a number of the most widely used can be distinguished (Table 2).

Table 2.

Modern approaches and digital tools in teaching high school students

№	Approach	Brief description	Examples of digital tools
1.	Personalized learning	Individual educational trajectories, adaptation to the student's level of knowledge, pace, and interests	Google Classroom, Moodle, AI platforms
2.	Competency-based approach	Building 21st-century skills: critical thinking, collaboration, digital literacy	Kahoot, Mentimeter, Canva, Flip
3.	Project and research learning	Search, processing, and presentation of information; teamwork	Padlet, Trello, Figma, Canva
4.	Gamification of the educational process	Using game elements to motivate and engage	Kahoot, Quizizz, Genially
5.	Blended and distance learning	A combination of in-person classes and online resources for flexibility	Google Classroom, Moodle, Zoom, Teams

Source: created by the author

To classify digital tools by their functional purpose in the educational process, a figure is provided that conditionally divides them into groups. We visualize the specified material in Fig. 1.

Fig. 1. *Types of digital tools*

Source: created by the author

The comprehensive implementation of these tools enables the educational process to adapt to the needs of the modern generation, making it more flexible, personalized, and effective [4].

Discussion. Digital tools significantly increase the effectiveness of learning, making it accessible, diverse, and interactive. Infographics, videos, and multimedia materials help better absorb new information, and interactive exercises and simulations help consolidate knowledge in practice. Students can independently search for answers, developing critical thinking skills. Collaboration and video communication services promote cooperation and collective learning. Online tests, electronic journals, and distance education resources provide effective assessment and support the learning process under any conditions.

Yes, we fully share the opinion of a team of scientists led by J. Meuleners, who believe that digital tools are defined as computational programs or related representation systems that support learning and teaching processes, regardless of the device that students use to access them. The authors also emphasize that the growth of digitalization across all aspects of life requires preparing education seekers to use digital tools appropriately in the future [5].

In accordance with the topic of our study, the views of R. Gurevich, M. Kademia, N. Opushko, T. Ilnytska, and G. Plahotniuk are of interest to us, who focus on a wide range of factors that influence the nature and intensity of the processes of digitalization of society and determine the diversity of ways of their development. One of such directions is the transformation of the educational process. The use of modern digital technologies (online learning, Big Data, network practices, artificial intelligence, chatbots, etc.) has significantly modified its structure. Virtualization of education, in turn, reflects one of the key semantic aspects of the concept of «digital» – discreteness, fragmentation, «discontinuousness» of educational practices [12].

The views of L. Mironets and S. Tolochko, who note that the basis for ensuring the use of digital technologies is the presence of a set of conditions, namely: the readiness of teachers to use modern online platforms and resources in professional pedagogical activities (online platforms and various online resources for learning: Google AppsEducation Edition, Google Classroom, Google Meets, Teams, Moodle, Zoom, Classtools, LearningApps, Edmodo, etc); continuous improvement of knowledge, skills and competencies in the field of digital technologies; systematic use of acquired skills in educational and cognitive activities; improvement of the organization of pedagogical practice with the involvement of digital tools; increasing the level of mastery of modern digital tools and constant updating of digital competence [6].

We agree with the position of M. Antonchenko and I. Pavlenko, who emphasize that the development of a teacher’s digital competence should occur continuously and purposefully throughout their professional activities. This is due to the dynamic development of the digital environment and the growing demand for educational quality. Continuous improvement of digital

competences enables a teacher to effectively integrate modern technologies into the educational process, enhance their effectiveness, and contribute to the development of students' skills necessary for successful socialization in a digital society [8].

We are also impressed by the opinions of V. Bazelyuk and O. Bazelyuk, who argue that educational goals and the content of education seekers' training primarily determine the selection of digital tools and technologies for creating educational tasks. The use of digital technologies in the process of educational interaction increases its flexibility, accessibility, and personalization, ensuring that individual educational needs and opportunities of students are taken into account. This approach addresses the key challenges of modern society, in which education is considered not only a means of acquiring knowledge but also a tool for personal self-realization, professional development, and successful integration into the digital environment [9].

We agree with the conclusions of S. Tolochko and A. Godunova that neural networks can be used to create intelligent learning support systems that provide students with personalized recommendations and help them learn the material more effectively [18].

In accordance with the topic of our study, the views of I. Kolesnikova and G. Kharchenko are of interest, as they emphasize that the success of the digitalization of the educational process depends on the creation of an appropriate infrastructure, the development of high-quality digital resources, the training of teaching staff, and the active involvement of students in creating digital content. Among the main advantages of the digitalization of education, researchers highlight increased student motivation, individualized learning, and the development of digital literacy. The use of information and communication technologies makes learning more flexible and contributes to the formation of individual educational trajectories for students, taking into account their needs and interests, thereby increasing the effectiveness of educational interaction [14].

Taking into account modern educational trends, the following areas of use of digital tools are promising: development of adaptive learning using artificial intelligence; creation of educational chatbots for individual support; application of elements of augmented and virtual reality; implementation of interdisciplinary STEAM approaches using digital platforms. Such solutions allow integrating the latest technologies into the educational space and developing 21st-century skills in high school students.

Conclusions. Thus, digital tools are an integral part of modern education and should be prioritized in the development of educational practices in high schools. Contemporary approaches to their application are analyzed, which contribute to the intensification of educational activities, the development of key competencies, and the formation of 21st-century skills. A classification of digital tools by functional purpose is carried out, allowing us to systematize their roles in the learning process. The described capabilities of digital tools demonstrate advantages, in particular,

personalization of learning, increased student motivation, enhanced cognitive activity, and greater access to educational resources. Promising directions for the use of digital tools in the education of high school students are identified, which contribute to the effective integration of the latest technologies into the educational process, increasing its quality and adaptability.

Further scientific research on the topic should focus on a deeper study of the effectiveness of digital tools in developing key competencies among high school students, with practical application in the educational process taken into account.

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ЦИФРОВІ ІНСТРУМЕНТИ В НАВЧАННІ СТАРШОКЛАСНИКІВ

Анотація. *У статті розглянуто використання цифрових інструментів у навчанні старшокласників. Метою наукової розвідки є аналіз сучасного стану використання цифрових інструментів у навчанні старшокласників та визначення перспектив їх впровадження для підвищення ефективності освітнього процесу. Завданнями дослідження визначено: здійснити аналіз сучасних підходів до використання цифрових інструментів у навчанні учнів старшої школи; класифікувати цифрові інструменти за типами відповідно до їхнього функціонального навантаження в освітньому процесі; охарактеризувати функціональні можливості цифрових платформ і сервісів, що використовуються в навчанні старшокласників. Для досягнення поставленої мети й визначених завдань були застосовані такі методи: аналіз і узагальнення; порівняльний аналіз; метод експертних оцінок; спостереження; узагальнення; системний аналіз.*

Проаналізовано сучасні підходи до використання цифрових інструментів у навчанні, що

сприяють персоналізації, гнучкості та підвищенню ефективності освітнього середовища. Здійснено класифікацію цифрових інструментів за типами відповідно до їхнього функціонального призначення та ролі у формуванні ключових компетентностей учнів: інструменти для створення візуального й мультимедійного контенту; інтерактивного навчання і гейміфікації; співпраці та управління проєктами; комунікації й обміну матеріалами; організації та збереження навчального контенту.

Охарактеризовано функціональні можливості основних цифрових платформ і сервісів, які найбільш часто використовуються у старшій школі, зокрема для організації дистанційного та змішаного навчання, а саме: Canva, сервіси Google, Telegram, Pinterest, Genially, InShot, Trello, Wakelet, Mentimeter, Flip, Figma, Kahoot. Підкреслено важливість використання цифрових технологій для забезпечення якісного й конкурентного освітнього середовища. Підсумовано, що комплексне впровадження цих інструментів дає змогу адаптувати освітній процес до потреб сучасного покоління, зробити його більш гнучким, персоналізованим і ефективним.

Ключові слова: *цифрове середовище, цифрові інструменти, цифровізація освіти, дистанційне навчання, навчальні платформи, старшокласники.*

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