CHAPTER 4

PECULIARITIES OF FORMING A CULTURE OF FUTURE TEACHERS IN THE USE OF DIGITAL TOOLS IN THE EDUCATIONAL PROCESS

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DOI https://doi.org/10.30525/978-9934-26-696-6-4

INTRODUCTION

In today's schools, teachers use a wide range of digital tools. These include both devices and digital environments that simplify lesson preparation and classroom instruction. However, such use is sometimes merely formal in nature. There are also situations in which every stage of a lesson depends on online services and internet-based platforms. This excessive reliance may produce the opposite effect.

For various conscious or unconscious reasons, teachers' use of digital tools may be accompanied by violations of academic integrity principles, disregard for the norms of digital ethics, and insufficient attention to the critical evaluation of information. This highlights the need for the purposeful development of a culture of digital tool use.

It is especially important for future teachers to develop a solid foundation for the further growth of such a culture, to continue improving and updating it throughout their professional lives, and to acquire the ability to foster this culture in learners as well.

Although software tools and methodological approaches to their use have been studied for many years, courses aimed at developing the relevant knowledge and skills are still being designed and updated in higher education institutions. In particular, academic staff develop such courses in order to build the methodological competence of future teachers in the use of digital technologies[1].

This topic remains relevant and will continue to be relevant as long as digital technologies continue to evolve: software versions are updated, new digital tools are created, artificial intelligence develops, and new digital platforms emerge.

[1] Яцюк С., Хомяк М., Юнчик В., & Чепрасова Т. Методика використання цифрових освітніх ресурсів у процесі підготовки майбутніх учителів інформатики. *Професіоналізм педагога: теоретичні й методичні аспекти.* № 16. 2021. С. 15–25. https://doi.org/10.31865/2414-9292.16.2021.246263

Within the academic community, there are numerous studies devoted to the development of the digital (information, information-digital) culture of future teachers. Many researchers also examine both the positive aspects of using digital technologies and the negative consequences of prolonged use of digital devices. In addition, studies explore the concept of information culture, analyze the role of teachers in the use of digital tools during lessons, and address issues related to media literacy and academic integrity[2,3,4]. At the same time, in pedagogical practice there is still insufficient development of a comprehensive approach to the methodological features of forming a culture of digital tool use. Such an approach should take into account the current challenges of distance learning, the overuse and saturation of digital devices and tools, the deep immersion of young people in digital environments, and the significant amount of time they spend using digital technologies.

1. Theoretical Foundations of Forming a Culture of Using Digital Tools

1.1. The essence of the concept of "culture of using digital media"

Over the past decades, a broad range of approaches has emerged in academic discourse for conceptualizing the impact of digital technologies on the sociocultural space. To describe these transformations, researchers use terms such as “cyberculture”, “virtual culture”, “network culture”, and “digital culture”. All of them belong to so-called “umbrella” concepts that generalize different aspects of human interaction with the digital environment. At the same time, comparing these terms helps to avoid terminological redundancy and to define more precisely the meaning of each of them.

The growing academic interest in the phenomenon of digital culture dates back to the mid-2000s and is directly linked to the development of Web 2.0 technologies. Interactivity, orientation toward the mass user, and the hybridization of online and offline spaces contributed to the transformation of the Internet into a fully-fledged environment for communication, professional activity, and leisure. In these conditions, digital culture emerges as a complex

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[2] Дундар О. Формування цифрової культури майбутніх учителів: стратегічний вектор закладів вищої освіти. *Наукові записки. Серія: Педагогічні науки.* Вип. 219. 2025. С. 497-500. https://doi.org/10.36550/2415-7988-2025-1-219-497-500.

[3] Гринько В. Використання цифрових технологій для формування у майбутніх учителів умінь ххі століття. *Молодь і ринок. Науково-популярний журнал.* Вип. 5 (172). 2019. С. 56-62. https://doi.org/10.24919/2308-4634.2019.171023.

[4] Воронова Н. Професійна етика і культура використання цифрових архівів та інтерактивних платформ у підготовці майбутнього вчителя історії. *Професіоналізм педагога: теоретичні й методичні аспекти*. Вип.23(1). 2025. С. 17-30. https://doi.org/10.31865/2414-9292.23.2025.334007.

and multidimensional phenomenon encompassing both technological and sociocultural changes[5,6,7,8].

In contemporary scholarly literature, several main approaches to interpreting the concept of digital culture are distinguished. The technological (technocratic) approach views it as a result of the influence of information and communication technologies on the cultural sphere. Within this framework, digital culture is interpreted as a process of digitization of cultural practices, creative products, and forms of interaction between cultural institutions and audiences.

The second approach is associated with understanding digital culture as a component of the information society. In this context, it reflects changes in communication methods, in the production and consumption of information, as well as the formation of new patterns of user behavior in the digital environment. Digital culture is closely linked to the concepts of "information culture" and "computer culture", but it is not limited to them. While information culture primarily focuses on skills related to working with information and technologies, digital culture goes beyond an instrumental perspective, encompassing value-based, communicative, and worldview dimensions.

The cultural approach interprets digital culture as a component of global culture, which is formed under the influence of digitalization. Within its framework, it appears as a set of new cultural practices, artifacts and forms of interaction, in particular electronic art, digital media, virtual communities and interactive platforms[9].

A special place is given to the value-based approach, according to which digital culture is considered a system of norms, values, and behavioral models within the digital environment. In this context, it includes such components as the culture of digital activity, digital communication, individuals' information needs, and a digital worldview. It is precisely the digital worldview that determines a person's attitude towards information, the ways it is used, and one's own role in the information society.

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5 Henry Jenkins. Convergence Culture: Where Old and New Media Collide. New York : New York University Press, 2006. 308 p

6 Lev Manovich. The Language of New Media. Cambridge: MIT Press, 2001. 354 p

7 Manuel Castells. The Rise of the Network Society. 2nd ed. Oxford: Blackwell Publishing, 2010. 597 p.

8 O'Reilly T. What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. URL: http://www.oreilly.com (дата звернення: 18.04.2026)

9 Морзе Н. В., Кузьмінська О. Г. Інформаційна культура як складова професійної підготовки сучасного фахівця. *Інформаційні технології і засоби навчання*. 2011. № 5 (25). С. 3-12

In the context of the educational process, digital culture becomes particularly significant. It is viewed not merely as a set of technical skills and competencies, but as an integral characteristic of the individual that determines their ability to function effectively in a digital environment[10]. In particular, digital culture encompasses the ability to use digital technologies in educational and professional activities, the capacity to critically evaluate information, adherence to ethical norms of digital interaction, and the development of a responsible attitude towards the information space.

In view of this, digital culture in the educational process can be defined as a complex personal characteristic that combines knowledge, skills, values, and behavioral practices necessary for effective, safe, and ethically grounded activity in a digital environment. Its formation is one of the key tasks of modern education, as it ensures an individual's adaptation to the conditions of the digital society and contributes to both professional and personal development. At the same time, it is important to clarify the structure of the culture of digital tool use as a component of digital culture. It is a complex construct that includes several interrelated components.

Information culture presupposes an individual's ability to effectively search for, evaluate, process, and use information in a digital environment. Digital culture (in the narrow sense) characterizes the level of mastery of digital technologies, software tools and platforms that ensure active participation in the modern information society[13]. Ethical culture defines a system of norms and principles of responsible behavior in the digital environment, including respect for privacy, copyright, and the principles of cyber ethics. Communication culture reflects the ability to interact effectively, appropriately, and safely within digital communication environments, including social networks and online platforms.

The culture of using digital tools is closely related to the concept of "digital competence", but it is not identical to it. Digital competence is defined as a set of knowledge, skills, and abilities required for the effective use of digital technologies in learning, professional activity, and everyday life[11]. Instead, the culture of using digital tools has a broader nature, as it also encompasses value orientations, ethical attitudes and behavioral models of the individual.

Thus, digital competence acts as the operational basis of activity in the digital environment, while the culture of using digital tools is an integrative

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[10] Гуржій А. М. Цифрова компетентність як складова професійної підготовки фахівця. *Освіта і суспільство*. 2018. № 2. С .45-50

[11] Биков В. Ю. Моделі організаційних систем відкритої освіти. Київ : Атіка, 2008. 684 с.

phenomenon that reflects the level of socialization of the individual in the conditions of a digital society[12].

1.2. Digital tools in the educational process

The digitalization of the educational process is a complex multidimensional phenomenon that involves the interdependent transformation of both the educational environment and the technical tools that ensure its functioning. In modern conditions, digital technologies serve not only as instruments for supporting learning but also as a determining factor in the organization, content, and effectiveness of educational activities.

The primary goal of the digitalization of the educational process is the effective use of the potential of digital technologies to improve the quality of education. At the same time, the development of technologies in the field of education is aimed at their adaptation to pedagogical needs and their integration into the educational process in accordance with the principles of accessibility, appropriateness, and ease of use. The implementation of digital technologies significantly expands the opportunities available to educational institutions. In particular, innovative forms of learning are developing actively, including online learning, blended learning, mobile learning, and microlearning. This ensures the mobility of the educational process, its independence from spatial and temporal limitations, and also contributes to increasing access to education.

The use of electronic educational resources provides access to a wide range of learning materials, promotes the integration of educational platforms, and supports the formation of a unified informational and educational environment. As a result, there is a transition toward competency-based learning models that correspond to the demands of the digital society[13].

In this context, digital didactics acquires particular importance as a branch of pedagogical science that studies the patterns and principles of organizing the educational process under conditions of digitalization. It is based on classical didactic principles, transforming them in accordance with modern technological possibilities. The main principles of the digital educational process include: the principle of the dominance of independent learner activity; the principle of personalized learning; the principle of the appropriate use of digital technologies; the principle of flexibility and adaptability; the principle of learning success; the principle of interaction and collaboration; the principle of practical orientation; the principle of the gradual complication of educational material; the principle of the richness of the educational

[12] Harry Rheingold. Net Smart: How to Thrive Online. Cambridge : MIT Press, 2012. 344 p.

[13] Жалдак М. І. Інформаційні технології в освіті : навч. посіб. Київ : НПУ ім. М. П. Драгоманова, 2012. 320 с.

environment; the principle of multimodality; and the principle of embedded assessment[14,15,16,17].

The implementation of these principles contributes to the effective organization of the educational process, the individualization of learning, and the development of learners' digital competence. Digital tools in the educational process are understood as electronic instruments, resources, and technologies used for learning, teaching, and knowledge assessment. The analysis of the above-mentioned and other scholarly sources[18,19] made it possible to generalize approaches to defining their essence and to classify them according to their didactic purpose (Table 1).

Table 1

Classification of electronic learning tools

Category of tools	Types of electronic devices	Appointment	Examples
1. Means of theoretical and technological training	electronic textbook, computer-based training program, knowledge control system	assimilation of theoretical knowledge, formation of basic skills, testing of knowledge	online textbooks, training courses, tests
2. Practical training tools	electronic problem book, computer simulator, expert learning systems, intelligent learning systems	formation of practical skills, modeling of professional situations	virtual training machines, simulators, AI systems

[14] Морзе Н. В. Цифрова компетентність педагогічних працівників. Київ : Київський університет імені Бориса Грінченка, 2018. URL: https://elibrary.kubg.edu.ua/ (дата звернення: 13.04.2026).

[15] Морзе Н. В., Кузьмінська О. Г. Цифрові освітні ресурси у сучасній школі. Київ : Університет, 2022. 180 с.

[16] Спірін О. М. Інформаційно-комунікаційні технології в освіті: проблеми впровадження та використання. Київ : ІІТЗН НАПН України, 2017. URL: https://lib.iitta.gov.ua/view/divisions/ict/ (дата звернення: 13.04.2026).

[17] European Commission. The Digital Competence Framework for Citizens (DigComp 2.2). Luxembourg : Publications Office of the European Union, 2022. URL: https://joint-research-centre.ec.europa.eu/digcomp_en (дата звернення: 13.04.2026).

[18] Биков В. Ю., Спірін О. М. Цифрові технології у професійній освіті: сучасні тенденції. Київ : ІІТЗН НАПН України, 2023. 210 с.

[19] Шишкіна М. П. Хмароорієнтовані системи відкритої освіти : монографія. Київ : ІІТЗН НАПН України, 2016. URL: https://lib.iitta.gov.ua/view/divisions/ccelab/ (дата звернення: 13.04.2026).

Continuation of table 1

3. Auxiliary means	computer laboratory workshop, computer reference book, multimedia lesson, service software	support for the educational process, access to information, data processing	virtual laboratories, reference books, video lectures, Excel
4. Comprehensive tools	computer training course, electronic educational resource	integration of theory, practice and control	online courses, educational platforms

The conducted analysis demonstrates that electronic learning tools possess a systemic, hierarchically organized, and multifunctional nature. The identification of four main categories reflects the logic of educational activity – from knowledge acquisition to competency formation and the assessment of learning outcomes. Tools for theoretical training form the foundation of knowledge, while tools for practical training ensure the development of professional skills through the simulation of real-life situations. Supplementary tools perform a service function by supporting the educational process and increasing its effectiveness. Of particular importance are integrated tools, which combine all stages of learning and ensure the integrity and continuity of the educational process. Their use contributes to the implementation of an individualized approach and to the development of learners' digital competence.

At the same time, it is advisable to consider classifications that reflect the evolution of digital technologies in education. In particular, George Siemens proposes an approach that makes it possible to examine the development of digital technologies as a sequence of stages in the formation of the digital educational environment.[20].

The development of digital technologies in education can be conventionally divided into four stages:

- the use of computers and websites in education;
- the implementation of learning content management systems (LCMS);
- the development of social networks, electronic portfolios, and distance learning;
- the formation of a comprehensive digital infrastructure that supports adaptive learning and competency modeling.

At each of these stages, the key factors in organizing the educational process undergo changes, including the level of control over interaction among

[20] Siemens G. Connectivism: A Learning Theory for the Digital Age. 2005. URL: http://www.elearnspace.org/Articles/connectivism.htm (дата звернення: 13.04.2026).

participants, ownership of educational data, methods of information exchange, and the balance between centralized and decentralized approaches. The evolution of digital technologies in the education system demonstrates a transition from the fragmented use of individual tools to the creation of integrated adaptive educational systems. This significantly enhances their didactic potential.

Therefore, it is advisable to consider digital learning tools not only as a tool, but as a structural component of the modern information and educational environment, which ensures an increase in the quality of education in accordance with the requirements of the digital society. The didactic potential of digital technologies significantly affects pedagogical activity, in particular through[21]:

- expanding learning opportunities;
- individualization of the educational process;
- strengthening cooperation and exchange of experience;
- increasing the motivation of education seekers;
- developing digital competencies of teachers.

Thus, digital technologies provide a more effective organization of the educational process, contribute to its individualization and improve the quality of educational results. At the same time, along with the significant advantages of using digital tools in the educational process, their implementation is accompanied by a number of risks and challenges that need to be taken into account when organizing training.

One of the most pressing issues is digital inequality, which manifests itself in unequal access of learners to technical devices and internet resources. Another significant risk is information overload, which can negatively affect the quality of knowledge acquisition and concentration. Important challenges also include issues of cybersecurity and the protection of personal data in the digital educational environment. In addition, the risk of excessive dependence on digital technologies should be noted, as it may reduce the level of independent thinking and traditional learning skills.

Thus, the effective use of digital tools is possible only under the condition of a pedagogically grounded approach, adherence to the principle of the appropriateness of their use, and ensuring an adequate level of digital competence among all participants in the educational process.

1.3. Normative and ethical aspects of using digital tools

Digital ethics is an interdisciplinary field of scientific knowledge that studies the moral, social, and cultural aspects of the functioning of digital technologies

[21] Дидактика цифрової освіти: теоретичні та практичні аспекти : посібник/ за ред. О. П. Пінчук. Київ : ІІТЗН НАПН України, 2020. 220 с.

in contemporary society. It emerges at the intersection of philosophy, ethics, sociology, law, and information technologies and is aimed at conceptualizing the normative foundations of human interaction with the digital environment. In a broad sense, digital ethics encompasses issues related to the use of computer systems, the Internet, artificial intelligence, big data technologies, as well as cybersecurity tools. Its central object of study is the system of moral principles that regulate the creation, implementation, and use of digital technologies.

The main categories, which in some sources are classified as principles of digital ethics, include privacy, fairness, equal access, data security, transparency, responsibility, and digital literacy. These categories form the normative basis for regulating the digital space and define the boundaries of ethically acceptable behavior for users, developers, and regulators.

The principle of privacy implies an individual's right to control their personal data and protection against unauthorized intrusion into private life. Its implementation is a key condition for ensuring trust in digital technologies[22,23].

The principle of fairness and equality is focused on preventing digital inequality and ensuring equal access to information resources and technologies regardless of the social status of users[24,25].

The principle of data security outlines the protection of information from unauthorized access, interference and leakage, as well as ensuring the accountability of entities that process data.

The principle of transparency and consent is based on the need to inform users about the ways in which their data will be used and to obtain informed consent for its processing[26].

The principle of responsibility and integrity determines the need for ethical use of digital technologies by all participants in digital interaction – from developers to end users [27,28].

The principle of digital literacy reflects the need of society to develop skills for the safe, critical and effective use of digital technologies. Cabinet of Ministers of Ukraine [29].

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[22] UNESCO. *Recommendation on the Ethics of Artificial Intelligence*. 2021. https://unesdoc.unesco.org/ark:/48223/pf0000381137. Michael J. Quinn. *Ethics for the information age* (7th ed.). 2019. Pearson.

[23] Michael J. Quinn. Ethics for the Information Age. 7th ed. Boston: Pearson, 2019.

[24] OECD Principles on Artificial Intelligence. Paris, 2019. URL: https://oecd.ai/en/ai-principles.

[25] Mittelstadt B. D. et al. The ethics of algorithms. *SSRN Electronic Journal*. 2016.

[26] Floridi L. et al. AI4People-An Ethical Framework for a Good AI Society // Minds and Machines. 2018. Vol. 28.

[27] Deborah G. Johnson. *Computer Ethics*. 4th ed. Upper Saddle River: Prentice Hall, 2009.

[28] Helen Nissenbaum. Privacy as contextual integrity // *Washington Law Review*. 2004. Vol. 79

[29] Концепція розвитку цифрової економіки та суспільства України на 2018–2020 роки. 2018. URL: https://zakon.rada.gov.ua/laws/show/67-2018-p/

The formation of digital ethics took place in parallel with the development of information and communication technologies. In the 1940s–1970s, a technocratic approach focused on the development of cybernetics and information processing prevailed, while ethical issues remained secondary[30].

In the 1970s and 1980s, with the development of computer systems, the need for professional ethical regulation became more urgent. An important stage was the adoption of the ACM Code of Ethics (1972), which laid the foundations of professional responsibility in the field of information technology[31]. In the 1990s and 2000s, with the mass spread of the Internet, problems of personal data protection, privacy and cybersecurity arose. During this period, the first regulatory mechanisms for regulating the digital environment were formed. In the 2000s–2010s, the development of artificial intelligence led to the emergence of new ethical challenges related to autonomous systems, algorithmic decisions, and responsibility for their consequences[32].

Since the 2010s, digital ethics has become global, as evidenced by the growing role of corporate social responsibility and international initiatives. The current stage (since 2020) is characterized by the institutionalization of global digital ethics, in particular through the activities of international organizations such as UNESCO, which formulate recommendations for the ethical development of a digital society.

The development of digital technologies gives rise to complex ethical challenges, including the above and new ones: privacy violations and unauthorized collection of personal data; digital inequality and limited access to technologies; algorithmic discrimination and bias of automated systems; problems of ethical responsibility of artificial intelligence; the spread of disinformation in the digital environment; risks of biometric control and loss of anonymity; bioethical problems associated with the development of genetic engineering and biotechnology. These problems demonstrate the need for a comprehensive approach to regulating the digital environment, combining legal, ethical and technological mechanisms.

The study of digital ethics is based on the use of various philosophical and interdisciplinary approaches that allow for a comprehensive analysis of digital transformations[33]:

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30 Luciano Floridi. The Ethics of Information. Oxford: Oxford University Press, 2013.

31 Association for Computing Machinery. *ACM Code of Ethics and Professional Conduct*. New York, 1972 (оновлена версія 2018). URL: https://www.acm.org/code-of-ethics

32 Nick Bostrom. *Superintelligence: Paths, Dangers, Strategies*. Oxford : Oxford University Press, 2014.

33 Шевченка Л. П. Інформаційна етика: теоретико-методологічні засади. Київ : Інститут філософії НАН України, 2015. 312 с.

- deontological approach – focuses on moral rules and principles;
- utilitarian approach – evaluates the usefulness and consequences of technologies;
- contractarian approach – analyzes social agreements and mutual obligations;
- feminist approach – considers gender equality and non-discrimination;
- existential approach – emphasizes personal autonomy;
- posthumanist approach – examines the interaction between humans and technologies;
- critical approach – analyzes social inequality;
- ecological approach – assesses the impact of digital technologies on the environment.

The application of these approaches allows us to reveal the multidimensionality of digital ethics and its social significance. The essence of academic integrity, enshrined in the Law of Ukraine "On Education"[34], is the observance of ethical norms and established rules by all participants in the educational process during educational and scientific activities. It involves respect for intellectual property, copyright, as well as the prevention of any forms of violations, in particular plagiarism, falsification of results and the use of dishonest methods in teaching or research. Academic integrity is a system of ethical principles that regulate educational and scientific activities and include honesty, responsibility, transparency, independence and correct citation of sources[35,36].

In the context of the digital transformation of education, the content of academic integrity is significantly expanding, which is due to [37,38]:

- instant access to large amounts of information;
- the emergence of automatic text generation tools;
- the increase in the number of digital sources;
- the difficulty of detecting plagiarism.

Effectively ensuring academic integrity in the digital age involves:

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[34] Про освіту: Закон України від 5 вересня 2017 р. № 2145-VIII. URL: https://zakon.rada.gov.ua/laws/show/2145-19#Text (дата звернення: 18.04.2026).

[35] Академічна доброчесність. МОН України. URL: https://mon.gov.ua/ua/tag/akademichna-dobrochesnist (дата звернення: 18.04.2026).

[36] Національне агентство із забезпечення якості вищої освіти. Академічна доброчесність. URL: https://naqa.gov.ua/akademichna-dobrochesnist/ (дата звернення: 18.04.2026).

[37] UNESCO. Academic Integrity. URL: https://www.unesco.org/en/education/academic-integrity (дата звернення: 18.04.2026).

[38] Fishman T. The Fundamental Values of Academic Integrity. International Center for Academic Integrity, 2014. URL: https://www.academicintegrity.org/resources/fundamental-values/ (дата звернення: 18.04.2026)

- implementation of educational programs on digital ethics;
- formation of critical thinking skills and information literacy;
- regulatory regulation of the use of artificial intelligence in education;
- development of anti-plagiarism and ethical audit systems;
- increasing the level of digital competence of participants in the educational process;
- strengthening academic responsibility.

Digital ethics is a key theoretical and methodological foundation for the formation of a modern system of academic integrity. Its development reflects the transformation of society under conditions of digitalization and the growing influence of information technologies on all spheres of life. In the digital era, academic integrity acquires a complex nature, as it requires the integration of ethical, legal, and educational mechanisms. Ensuring its effective implementation is a necessary condition for maintaining the quality of education, the reliability of scientific research, and the sustainable development of the information society.

The modern educational and scientific system faces a number of problems, including:

- academic plagiarism and unauthorized copying of digital content;
- uncontrolled use of generative artificial intelligence;
- fabrication or automatic creation of scientific data;
- copyright infringement;
- dissemination of false information;
- insufficient level of digital literacy of education seekers.

These phenomena require a systematic response through educational, regulatory, and technological mechanisms. In this context, copyright acts as a key institution of legal regulation in the digital educational environment, as it ensures the protection of the results of intellectual activity and defines the legal foundations for the use of educational and scientific materials. Its role is significantly strengthened under conditions of educational digitalization, when educational resources take on electronic forms, are distributed through digital platforms, and are integrated into open educational environments.

The legal regulation of copyright in Ukraine is carried out through a system of normative legal acts, including the Law of Ukraine “On Copyright and Related Rights,” the Law of Ukraine “On Education,” the Law of Ukraine “On Higher Education,” the Law of Ukraine “On Information,” the Law of Ukraine “On Personal Data Protection,” and the Law of Ukraine “On Electronic Communications,” which collectively form a comprehensive legal framework for digital education and the protection of intellectual

property[39,40,41,42,43]. In practical terms, this involves adhering to the principles of fair use or licensing of educational materials, which ensures a balance between open access to knowledge and protection of intellectual property rights, while the most common forms of violations remain plagiarism, unauthorized copying of digital content, and non-compliance with license terms.

Intellectual property, in a broader sense, also includes patent law and trademarks, which play an important role in the field of education. Patent law ensures the protection of educational innovations, teaching methodologies, and technological solutions, although its application is complicated by the high cost of procedures and the need to maintain a balance between the protection of rights and the openness of knowledge. Trademarks, in turn, perform the function of identifying educational institutions, protect their symbols, and contribute to the formation of educational identity and competitiveness in both national and international educational spaces.

In the context of the digital transformation of education, the creation of a safe educational environment is one of the priority directions of Ukraine's state educational policy. It involves the development of digital literacy, the formation of responsible online behavior among learners, as well as the development of socio-emotional competence. These requirements are integrated into both state educational standards and professional standards of pedagogical activity, ensuring a systematic approach to the development of digital competencies among all participants in the educational process. An important component of this process is raising awareness of cyber threats, in particular cyberbullying, online fraud, and other forms of digital aggression, which contributes to the formation of safe and responsible behavior in the digital environment.

Scientific research emphasizes that a safe educational environment is a necessary condition for effective learning, socialization, and self-realization of students[44,45]. In the context of the widespread use of digital platforms, electronic gradebooks, cloud services, and mobile applications, issues of

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[39] Про авторське право та суміжні права : Закон України від 1 грудня 2022 р.№ 2811-IX. URL: https://zakon.rada.gov.ua/laws/show/2811-20#Text (дата звернення : 18.04.2026)

[40] Про вищу освіту : Закон України від 1 липня 2014 р. № 1556-VII URL: https://zakon.rada.gov.ua/laws/show/1556-18#Text (дата звернення :18.04.2026)

[41] Про інформацію : Закон України від 2 жовтня 1992 р. № 2657-XII URL: https://zakon.rada.gov.ua/laws/show/2657-12#Text (дата звернення : 18.04.2026)

[42] Про захист персональних даних : Закон України від 1 червня 2010 р. № 2297-VI URL: https://zakon.rada.gov.ua/laws/show/2297-17#Text (дата звернення : 18.04.2026)

[43] Про електронні комунікації : Закон України 16 грудня 2020 р. № 1089-IX від URL: https://zakon.rada.gov.ua/laws/show/1089-20#Text

[44] UNESCO. Safe Learning Environments. Paris, 2021. URL: https://www.unesco.org/en

[45] World Bank. Safe Schools: Global Evidence. Washington, 2020.

personal data protection and information security are becoming increasingly important.

At the same time, the digital educational environment is being affected by new cyber threats, including phishing attacks, malicious links, manipulative content, and "deepfake" technologies, which necessitates a comprehensive approach to its protection and the integration of cybersecurity into the educational process.

In this context, the higher education system plays a key role in shaping digital ethics and ensuring academic integrity. Higher education institutions act as leading institutions in the formation of the moral and ethical values of students. Digital ethics, as a system of principles and norms of behavior in the digital environment, is becoming an important factor in the development of a responsible individual. At the same time, digital technologies create both new opportunities and new challenges for ensuring academic integrity, highlighting the need for the responsible use of information resources, respect for copyright, and the prevention of plagiarism.

The use of digital monitoring tools, particularly plagiarism detection software, is an important mechanism for supporting academic integrity. However, the development of a strong culture of ethical use of digital resources among students remains equally significant. In this regard, digital competencies have been defined as a mandatory component of state educational standards and integrated into all levels of the educational process.

Further analysis indicates that the digital transformation of education is accompanied by an increase in cyber risks. According to the State Service of Special Communications and Information Protection of Ukraine (CERT-UA), since 2022 there has been a significant increase in cyber incidents, particularly phishing attacks targeting governmental and educational resources[46,47].

Research by the Ministry of Digital Transformation of Ukraine ("Diya. Osvita") shows that the level of digital literacy of teaching staff is 55-60%, which corresponds to the average level of digital competencies and is insufficient for full-fledged cyber risk management[48]. This affects the ability to timely detect and prevent cyber threats in the educational environment.

Analytical data from UNICEF Ukraine confirms that 30-40% of children and adolescents have encountered online risks, and 20-30% have directly

[46] Державна служба спеціального зв'язку та захисту інформації України. CERT-UA. Офіційний вебсайт. URL: https://cert.gov.ua/ (дата звернення: 18.04.2026).

[47] Міністерство освіти і науки України. Цифровізація освіти в Україні. URL: https://mon.gov.ua/ua/tag/cifrovizaciya-osviti (дата звернення: 18.04.2026).

[48] Міністерство цифрової трансформації України. Дія. Освіта: платформа цифрової грамотності. URL: https://osvita.diia.gov.ua/ (дата звернення: 18.04.2026).

become victims of cyberbullying. At the same time, up to 60-70% of cases are not reported to adults, which complicates the response to incidents[49]. According to StopSexting, over 50% of teenagers witness cyberbullying, indicating the high prevalence of aggressive digital behavior among young people[50].

The generalization of statistical data provides grounds to assert that Ukraine is undergoing active digitalization of education while simultaneously maintaining a high level of cyber risks. The main challenges remain the insufficient level of cyber literacy among educators, the lack of systematic cybersecurity policies in some educational institutions, as well as the widespread occurrence of cyberbullying and other forms of online threats among students. This necessitates the further development of digital culture, the integration of cybersecurity into the educational process, and the strengthening of teacher training.

2. Features of Forming a Culture of Using Digital Tools Among Future Teachers

2.1. The problem of forming and developing communication competence in students in conditions of oversaturation of the educational process with digital devices and distance education

The use of electronic educational environments, social networks, and messaging applications for communication between teachers/lecturers and students, as well as among students themselves, reduces the need for communication in real-life settings during face-to-face learning. In the context of distance education and predominantly electronic communication, modern youth demonstrate a lower level of developed communication skills (such as responding quickly during conversations or answering immediately without the opportunity to edit responses), emotional skills (such as expressing emotions without emojis, recognizing and understanding one's own emotions, identifying the emotions of others, and using nonverbal communication skills), tolerance, and other related abilities.

The authors of this study conducted several surveys and organized meetings with focus groups in order to investigate the level of development of communication competencies. A total of 51 students aged 14–19 from general secondary education institutions and pre-higher education institutions participated in the surveys.

The first stage of the research aimed to determine the level of self-assessment regarding participants' own communication competencies. An

[49] UNICEF Ukraine. Захист дітей в інтернеті та кібербулінг: аналітичні матеріали. URL: https://www.unicef.org/ukraine/ (дата звернення: 18.04.2026).

[50] StopSextинг. Дослідження кібербулінгу серед підлітків в Україні. URL: https://stop-sexting.in.ua/ (дата звернення: 18.04.2026).

adapted interpersonal communication questionnaire was used as the basis for the study. The questionnaire included statements such as: “It is easy for me to start a conversation with new people,” “I feel uncomfortable when I need to express my opinion in a group,” “I respect the opinions of others even if I disagree with them,” and similar statements. Respondents were asked to choose the response that best reflected their typical behavior from the following options: “not at all about me,” “rather no,” “difficult to say,” “rather yes,” and “completely about me.” The results were collected through a questionnaire created in Google Forms. The questions were designed in such a way as to determine the degree of objectivity with which students were able to evaluate themselves.

Approximately 72% of respondents believed that it was easy for them to start a conversation with unfamiliar people. Among them, 56.9% selected the response “rather yes,” while 15.7% chose “completely about me.” The results are presented in Figure 1.

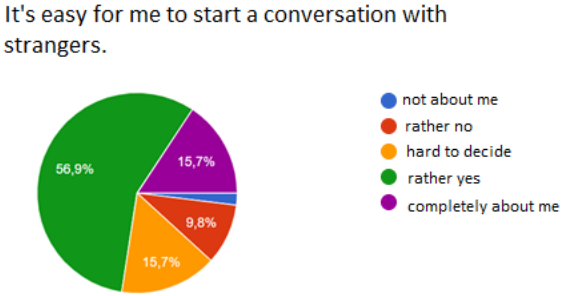

Fig. 1. Distribution of responses to the statement about whether it is easy for the respondent to start a conversation with new people

The survey was conducted in Ukrainian. Therefore, the figures present the original results. The translated version of the legend is shown alongside.

The next statement was “I feel uncomfortable when I have to express my opinion in a group” (Fig. 2). 25.5% of respondents believe that this statement is not about them at all, 35.3% – rather not about them, 27.5% of respondents found it difficult to decide on this issue, 9.8% chose the answer “rather yes”, and 1.9% believe that this statement fully corresponds to their reaction.

This demonstrates the opinion that the respondents do not experience difficulties when communicating with unfamiliar people or speaking in a group. At the same time, after conducting the questionnaire survey, we organized meetings with focus groups. Together with a teacher or lecturer, both face-to-face and online meetings were held during which participants were invited

to express their opinions regarding specific situations. The meetings were conducted by the teacher in a familiar classroom setting or online. One of the authors was also present. Examples of the tasks are provided below.

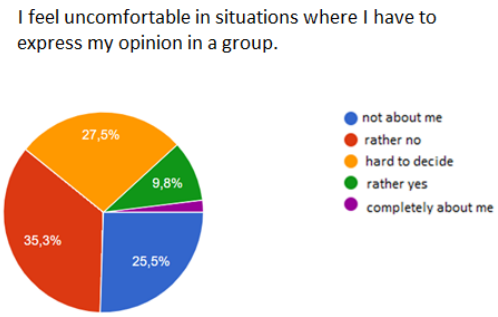

Fig. 2. Distribution of responses to the statement about whether one feels uncomfortable expressing one's opinion in a group

Example Task 1. During the preparation of a group project, one of the classmates/groupmates rarely expresses their opinion. However, this person always has good ideas, and all participants know this from previous experience. Due to their lack of activity, the other project participants consider them indifferent and do not involve them in discussions. Later, it becomes clear that the person is afraid of criticism and feels insecure within the group.

Questions for discussion:

1. How could the group help this person become more actively involved in the work?
2. If the group members do not know the participant well, how can such a situation be prevented?
3. When can it be assumed that a silent person has no ideas or is not interested?
4. Do such situations influence the success of teamwork?

Example Task 2. During a lesson, the teacher/lecturer was explaining a new topic but noticed that some pupils/students were sitting with crossed arms, avoiding eye contact, and constantly looking at their phones. After the lesson, the students said that the topic had been interesting, but the teacher concluded that they were not interested and unwilling to work.

Questions for discussion:

1. What role does nonverbal communication play in interaction?
2. Can gestures and facial expressions be misinterpreted?

3. How does nonverbal behavior influence mutual understanding between people?

In discussions of such tasks, active participation in different focus groups was demonstrated by only 10% to 15% of participants. Let us compare the results of self-assessment with the results observed in real situations. More than 60% of respondents stated that they did not feel uncomfortable expressing their opinions in a group (Figure 2). In addition, more than 60% reported that they could easily start conversations with unfamiliar people. However, no more than 15% actually participated in discussions within their groups.

At the end of the focus group meetings, we asked participants to explain why they did or did not take part in the discussions. In different groups, up to 40% noted that they found it difficult to formulate their opinions about the situations, did not feel a desire to communicate, or were unable to find arguments to support their viewpoints. Nevertheless, let us present several additional results from the questionnaire survey that had been conducted before the meetings and described above.

Approximately 59% of respondents disagreed with the statement: "I avoid situations where a lot of communication is required" (Figure 3).

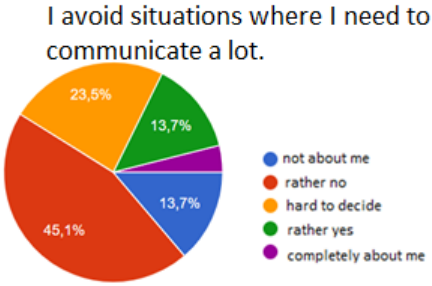

Fig. 3. Distribution of answers to questions about comfort with communication

More than 72% agreed with the statement "I can express my thoughts clearly and understandably." More than 76% agreed with the statement "I can convincingly argue my point of view." The results are presented in Figures 4 and 5.

The result of such a discrepancy is that young people tend to assess their communication skills less critically or respond in accordance with how they would like to be rather than how they actually are. Another possible explanation may be online communication. Indeed, when communicating via messaging

apps and social media comments, people often rely on established phrases. In addition, when writing messages, there is time for reflection, the stress of group presence is absent, and even a sent message can be edited. During online classes, students may keep their cameras turned off and stay in a familiar environment.

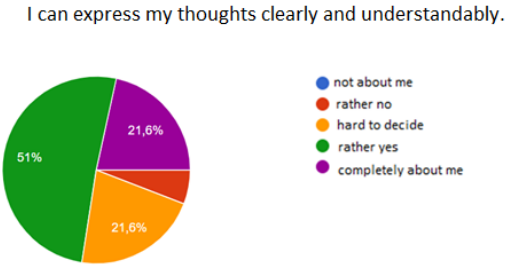

Fig. 4. Distribution of answers to the question about the ability to express one's thoughts clearly and understandably

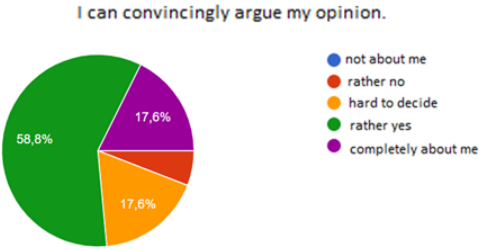

Fig. 5. Distribution of answers to the question about the ability to argue one's own point of view

In face-to-face communication in the street, at an educational institution, or in public places, there is a certain level of discomfort and the need to remain attentive. One must control much more than a single response: one's behavior, the surrounding environment, and maintain eye contact with the interlocutor. In addition to the above, we also believe that the large number of video materials on how to respond or behave correctly creates a general idea, but this is not supported by students' personal experience.

Thus, it can be stated that self-assessment of communication skills among young people aged 14 – 19 is somewhat overestimated. We consider the reason for this to be the lack of sufficient real-life communication experience and the excessive immersion in digital devices.

2.2. Psychological and pedagogical prerequisites for forming a culture of using digital tools

In light of the above research results, there are grounds to state that, in order to overcome such consequences of distance learning and the excessive use of digital environments, it is necessary to develop a culture of using digital tools in lessons during the training of future teachers of various subjects. In the classroom, it is important for a teacher to be able to encourage students to engage in discussion and to become active participants in the educational process. It is also essential for teachers to develop students' mental operations. This creates a foundation for a deeper understanding of reality and fosters critical thinking.

The use of digital technologies in lessons should be justified and purposeful. If there is a choice between using digital tools and creating conditions for active student engagement in communication and collaborative work in groups or pairs, preference should be given to the latter. This does not mean that digital tools should be excluded. Such an approach is impossible in today's information society. Rather, it means that digital tools should be used in a well-reasoned manner. It is necessary to seek a balance between engaging students in real-life communication and communication mediated by digital tools. Work with digital technologies can also be combined with active group collaboration, where both communicative and digital competencies are developed. Therefore, future teachers must possess well-developed digital and communication competencies, which are integral components of information culture. In scientific research, digital competence is considered as an integrative characteristic of a person, which includes not only knowledge and skills, but also motivational and value attitudes towards the use of technologies[51]. Accordingly, motivation is a system-forming factor of digital activity. Internal motivation is based on cognitive interest, the desire for self-development and awareness of the significance of digital technologies for personal and professional growth. Studies show that it is internal motivation that ensures sustainable and productive use of digital tools in educational activities[52].

Instead, extrinsic motivation is determined by the requirements of the educational environment, the assessment system and social expectations. It is important in the initial stages of mastering digital technologies, but requires a gradual transition to intrinsic motivation to ensure a long-term effect.

Psychological and pedagogical research shows that the level of motivation is significantly influenced by factors such as self-efficacy, emotional attitude

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[51] Морзе Н. В., Глазунова О. Г., Буйницька О. П. Цифрова компетентність як умова модернізації освіти. Інформаційні технології і засоби навчання. 2019. Т. 74, № 6. С. 1–17.

[52] Лаврентьєва Г. П. Мотиваційні чинники використання цифрових технологій у навчанні здобувачів освіти. Освіта і розвиток обдарованої особистості. 2021. № 3. С. 28–34.

towards technology, level of digital anxiety and previous experience in using information and computer technologies[53]. In particular, a high level of self-efficacy contributes to a more active use of digital tools in learning.

An important aspect of motivation formation is the creation of appropriate pedagogical conditions. These include: integration of digital technologies into the content of education, use of interactive methods, creation of situations of success, development of independence of education seekers and support of their research activity.[54]. It is also important to highlight the significance of the digital educational environment, which provides access to resources, collaboration tools, and individualized learning pathways. Such an environment strengthens the motivational component through the practical orientation of learning activities.

In the context of the digital transformation of education, motivation is viewed as a dynamic construct that can change under the influence of pedagogical interventions and the organization of the educational process. Therefore, the task of educators is not only to form external incentives but also to develop an internal need for the use of digital technologies. Thus, motivation for the use of digital technologies is a fundamental psychological and pedagogical prerequisite for the formation of a culture of digital activity. Its development requires a comprehensive pedagogical impact aimed at fostering intrinsic motivation, increasing self-efficacy, and creating a supportive digital educational environment.

One of the key aspects of the teacher's role is the organization of effective communication with students in the digital environment. In distance learning conditions, traditional "teacher–student" interaction is transformed but does not lose its significance. On the contrary, it requires new approaches, including the use of modern learning platforms, video conferencing, interactive tools, and feedback mechanisms. The teacher must ensure not only knowledge transfer but also the maintenance of student motivation, the creation of a positive psychological climate, and conditions for active participation in the educational process.

Equally important is the consideration of factors influencing students' academic and psychological well-being in the digital environment. The teacher should monitor students' level of engagement, activity, and learning conditions, and adjust the educational process when necessary. The organization of group

[53] Хом'юк І. В. Психолого-педагогічні умови формування мотивації навчальної діяльності здобувачів освіти в умовах цифровізації. Науковий часопис НПУ імені М. П. Драгоманова. 2022. Вип. 85. С. 112–118.

[54] Гуржій А. М., Шишкіна М. П. Відкрите освітнє середовище і цифрова трансформація навчання. Інформаційні технології і засоби навчання. 2022. Т. 88, № 2. С. 1–14.

online meetings, interactive sessions, and informal communication contributes to maintaining social connections and preventing student isolation.

2.3. Methodological recommendations for the use of digital tools in the educational process

Awareness of the problem of excessive use of digital tools in lessons, everyday life, and leisure among modern Ukrainian students encourages the search for a balance between the use of digital devices and the acquisition of communicative experience outside the online environment. Such recommendations may be used in the training of future teachers. They also make it possible to combine different types of activities in the classroom.

1. Combine digital tools with traditional forms of learning: use not only online resources but also printed materials, oral discussions, pair and group work. Create conditions for the development of live communication even in a distance learning format by organizing discussions, oral responses, collaborative projects, and video meetings with active participant interaction.

Thus, written correspondence via traditional postal mail has already become something unusual. While textbooks previously used it as an analogy for electronic communication, today it is easier to explain the concept of correspondence through the example of email. Naturally, encouraging students to return to postal correspondence is not appropriate. However, the use of printed paper materials can shift attention and help students focus on a specific stage of the lesson. Discussion and engagement in oral communication contribute to the acquisition of real communicative experience. Discussion, oral responses, and essay writing without the use of generative language models are essential elements in the development of various components of communicative competence.

2. Limiting the duration of continuous screen time in accordance with the age characteristics of learners, alternating digital activities with physical breaks and practical tasks.

This statement is self-evident and is supported by the requirements and recommendations of the sanitary regulations.

3. Selecting digital tools based on the principle of appropriateness: using only those tools that truly improve understanding of the material rather than overloading the learning process with unnecessary functions.

This is an important professional skill of a teacher. It involves the conscious use of digital tools with the aim of making the educational process more effective. The focus should not be on the popularity of a digital tool or external requirements to use electronic environments, but rather on determining its appropriateness with a clear purpose: simplifying comprehension, increasing

student engagement, shifting attention, or explaining the functioning principle of a digital tool.

4. During distance learning, ensuring a clear structure of lessons: defining time limits, task instructions, and communication channels to reduce information overload.

When face-to-face classes are not possible, consultation may be conducted in real time. It is important to emphasize that messaging applications should not replace communication, but rather complement asynchronous consultations with real-time interaction, both online and face-to-face when possible.

5. Fostering a culture of digital interaction: teaching students digital etiquette, rules of online communication, and responsible use of devices during lessons.

The BYOD (Bring Your Own Device) method has already become an established teaching approach and is effective when used appropriately. Its application within lessons as part of the overall learning process can be beneficial.

6. Using interactive digital tools in moderation, avoiding the simultaneous use of a large number of platforms, tabs, and services that reduce attention span.

Attention is maintained through the alternation of teaching methods, forms of work, and learning tools. Therefore, alternating between digital tools and active group work can contribute to effective learning. It is important to pay attention to the psycho-emotional state of learners, as excessive use of digital devices may cause fatigue, reduced motivation, and feelings of isolation. It is recommended to follow digital hygiene practices: taking breaks during work, ensuring proper lighting, maintaining correct posture, and limiting gadget use beyond learning needs.

7. Conducting regular reflection on the effectiveness of digital tool usage in order to determine which instruments support learning and which only create "digital noise." Focused attention on this issue among students will help form a responsible attitude toward their own mental and physical health.

CONCLUSIONS

Digital culture in the educational process is a complex characteristic of an individual that combines knowledge, skills, values, and behavioral practices necessary for effective, safe, and ethically responsible activity in the digital environment. Creating favorable conditions for the formation of students' digital culture is the responsibility of the teacher/lecturer. For this purpose, during their professional training, future educators must understand the need for conscious use and selection of digital tools in their future professional activities.

The use of digital devices occurs in all spheres of human life: in learning, work, everyday activities, and leisure. As a result, each person experiences

a sense of digital overload. Among young people, this feeling is not yet fully developed; therefore, it is the future teacher who is responsible for forming a culture of digital tool usage among students. This includes selecting appropriate devices or software, adhering to online communication etiquette, and minimizing the negative effects of digitalization.

Awareness of the problem of excessive use of digital tools in lessons, everyday life, and leisure among modern Ukrainian students encourages the search for a balance between the use of digital devices and the acquisition of communicative experience outside the online environment. Therefore, the following methodological recommendations may be used in the training of future teachers:

1. Combine digital tools with traditional forms of instruction. Create conditions for the development of live communication in both face-to-face and distance learning formats.

2. Limit the duration of continuous screen time according to the age characteristics of learners, alternating digital activities with physical breaks and practical tasks.

3. Select digital tools based on the principle of appropriateness: use only those that truly enhance understanding of the material rather than overloading the learning process with unnecessary functions.

4. During distance learning, ensure a clear structure of lessons: define time limits, task instructions, and communication channels to reduce information overload.

5. Foster a culture of digital interaction: teach students digital etiquette, rules of online communication, and responsible use of devices during lessons.

6. Use interactive digital tools moderately, avoiding the simultaneous use of a large number of platforms, tabs, and services that reduce concentration.

7. Conduct regular reflection on the effectiveness of digital tool usage in order to identify which instruments support learning and which only create "digital noise."

SUMMARY

Modern school education widely uses digital tools and environments that support lesson preparation and instruction. However, their use is sometimes formal or overly dependent on online platforms, which may reduce rather than improve learning effectiveness. In some cases, insufficient attention to academic integrity, digital ethics, and critical evaluation of information accompanies teachers' use of digital technologies. This highlights the need to purposefully develop a culture of responsible digital tool use in education. Future teachers should not only master digital technologies but also continuously develop

these competencies and foster them in students. Higher education institutions continue to update relevant courses aimed at improving methodological competence in digital pedagogy. The relevance of this issue is sustained by the rapid development of digital technologies, including new software, platforms, and artificial intelligence.

Practical significance: The study supports teacher education by guiding the development of courses on the effective and ethical use of digital tools. It promotes balanced integration of technology in teaching and contributes to students' digital literacy, academic integrity, and critical thinking.

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