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DEVELOPING UNIVERSITY STUDENTS' DIGITAL CULTURE THROUGH INTERACTIVE AND PRODUCTIVE ACTIVITIES WITHIN THE UNIVERSITY'S DIGITAL ECOSYSTEM

DESARROLLO DE LA CULTURA DIGITAL DE LOS ESTUDIANTES UNIVERSITARIOS A TRAVÉS DE ACTIVIDADES INTERACTIVAS Y PRODUCTIVAS DENTRO DEL ECOSISTEMA DIGITAL DE LA UNIVERSIDAD

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ABSTRACT

The article will identify the theoretical and methodological basis, which involves the application of the provisions of cultural, axiological, system-activity, environmental, contextual approaches to identify the principles and systematization of the substantive and organizational-pedagogical means of methodological support for the process of digital culture formation. The developed model, together with the pedagogical conditions, will ensure the purposefulness, consistency and flexibility of the inclusion of components of the university's information and educational environment in the process of forming the quality under study. Program and methodological materials will reflect the necessary educational content, as well as the sequence of application of pedagogical methods and information and communication technologies in the implementation of forms of interactive, productive and creative activities of students using the resources of the digital environment. The determined content of cognitive-procedural, value-motivational, reflexive-activity and personality-development criteria and indicators, the corresponding levels and diagnostic tools will be promising, ensure the success of the process and the sustainability of the result.

Keywords:

Pedagogical Methods, Digital Educational Resources, Cognitive-Procedural Criterion, Value-Motivational Criterion.

RESUMEN

El artículo identifica la base teórica y metodológica, que implica la aplicación de los postulados de los enfoques cultural, axiológico, sistémico-actividad, ambiental y contextual para determinar los principios y la sistematización de los medios sustantivos y organizativo-pedagógicos del soporte metodológico del proceso de formación de la cultura digital. El modelo desarrollado, junto con las condiciones pedagógicas, garantizará la intencionalidad, coherencia y flexibilidad en la inclusión de los componentes del entorno informativo y educativo de la universidad

en el proceso de formación de la cualidad en estudio. Los materiales programáticos y metodológicos reflejarán el contenido educativo necesario, así como la secuencia de aplicación de métodos pedagógicos y tecnologías de la información y la comunicación en la implementación de formas de actividades interactivas, productivas y creativas de los estudiantes utilizando los recursos del entorno digital. El contenido determinado de los criterios e indicadores cognitivo-procedimentales, valorativo-motivacionales, reflexivo-actividad y de desarrollo de la personalidad, junto con los niveles correspondientes y herramientas de diagnóstico, será prometedor, asegurando el éxito del proceso y la sostenibilidad del resultado.

Palabras clave:

Métodos Pedagógicos, Recursos Educativos Digitales, Criterio Cognitivo-Procedimental, Criterio Valorativo-Motivacional.

INTRODUCTION

In the modern world, technologies based on the use of digital information are actively used in all spheres of social, professional, and everyday life. Consequently, the labor market, culture, education, and other sectors are undergoing a rapid process of digital transformation (Baute-Rosales et al., 2026). Disruptive technologies are not only changing how knowledge is accessed and applied but are also reshaping the skills and competencies required for professional success. Higher education institutions play a central role in this transformation, as they are tasked with preparing students to navigate a digitalized society effectively (Cáceres-Mesa, 2026; Antonopoulou et al,, 2023).

At the same time, there are challenges that need to be addressed, such as underdeveloped information infrastructures, low levels of digital literacy among significant portions of the population, and a shortage of qualified professionals capable of supporting and advancing the digital economy (Baute-Rosales et al., 2026; Cáceres-Mesa, 2026; Timokhova et al., 2022). In this context, the education of future university graduates becomes a critical factor for the successful implementation of digitalization initiatives, as their ability to apply information skills confidently and competently will directly influence economic and social outcomes (Song et al., 2025).

Research shows that students' digital learning competence has a measurable impact on their academic achievement, professional readiness, and ability to engage with complex information systems effectively (Song et al., 2025). Additionally, universities that strategically implement digital transformation create an environment that fosters creativity, talent development, and innovation among students and staff (Timokhova et al., 2022). Case studies also indicate that even in contexts of extreme uncertainty, higher education institutions that adopt flexible and adaptive digital strategies can maintain operational continuity and support meaningful learning outcomes (Antonopoulou et al., 2023).

Specifically, in Ukraine, research highlights that undergraduate students and young professionals often exhibit a consumerist approach to information, focusing on reproductive rather than productive uses, and paying insufficient attention to ethical aspects of interaction in the digital environment. This reflects an underdeveloped digital worldview and a limited understanding of the potential of information resources, as well as weak skills in searching, analyzing, and synthesizing digital data to transform it into actionable knowledge (Kovalska et al., 2023).

Therefore, it is essential to teach future specialists not only technical digital skills but also the broader digital culture necessary for high-quality professional work. University graduates should be well-versed in current trends in the digital transformation of the economy and society, proficient in productive information and communication technologies, aware of ethical principles and social responsibility in digital interactions, and capable of critically analyzing, objectively using, and creatively transforming information relevant to their professional context. Students who develop a strong digital culture will be better equipped to become competitive specialists in the labor market, meeting the demands of a rapidly evolving digital economy (Kovalska et al., 2023).

Furthermore, it is worth noting that the opportunities and pace of digitalization often outpace users' skills in mastering them. Fundamental changes are already taking place in higher education: interorganizational forms of education are developing; online technologies and distance learning are becoming part of the educational process at universities; Open access to scientific and professional libraries and databases is expanding, and an electronic educational environment is emerging. This necessitates understanding and systematizing the new capabilities of the university's information and educational environment for fostering a digital culture. In light of the issues under study, it is crucial to study ways to support value-oriented professional education, identify ways to increase interest and motivation in studying professionally oriented elements of the digital environment, provide a pedagogical justification for integrating information resources into the educational process, explore the ethical aspects of e-learning, develop appropriate methodological support, etc.

These considerations suggest that modern pedagogical science faces a socially significant challenge related to understanding, developing, and testing a pedagogical system for fostering a digital culture among undergraduate students within the university's information and educational environment.

The scientific literature presents studies that highlight the foundations of digitalization of education and the formation of certain aspects of the digital culture of the individual. In complex studies (Gioffre, 2017; Lunenburg & Ornstein, 2012; Pellin & Bredenberg, 2015), the philosophical and social aspects of the development of the information society are examined. Researchers analyze the values of the information society, demonstrate the importance of information for the successful development of individuals and society, and demonstrate the effectiveness of sociocultural communication as a universal means of cognition (Iasechko & Iasechko, 2024; Littlejohn et al., 2016; Stevens, 2013).

In the context of the current study, publications reflecting the perceptions of students' and practicing professionals' information and communication competence are of particular interest. It can be argued that this aspect has been sufficiently well studied. Research is devoted to the development of ICT competencies among teachers and students in various fields of study (Alexandere et al., 2019; Balzer, 2020; Iasechko et al., 2021).

Scholars' publications clarify the content and structure of information and communication competence, taking into account the specifics of future professional activity, and examine approaches to its development during higher education (Wolfe & Andrews, 2014).

It is worth noting that various aspects of information and communication competence are an important component of digital culture, but they focus only on the technological aspect of the issue. From this perspective, studies that focus on the development and formation of an individual's information culture as an aspect of professional education are particularly important.

Despite the existence of substantial foundations, a comprehensive system for developing student digital culture in the university educational environment has not yet been developed. Furthermore, the scientific literature does not sufficiently provide methodological support for leveraging the potential of modern digital resources and information and communication technologies to support students' educational and self-educational activities. For example, the use of professionally oriented social networks to stimulate students' interest in educational and research activities has not been addressed, and technologies for developing students' basic digital etiquette through online communications have not been studied.

It is important to highlight several existing contradictions. First, the growing demands on professional activity in the context of the digital economy contrast with the insufficient development of undergraduate students' culture of productive information and communication processes within an educational and professionally oriented digital environment.

Second, there is a gap between the need for a scientific foundation to enhance the personal and professional qualities of undergraduates, qualities demanded in the digital economy, and the limited development in pedagogical theory of a comprehensive system for fostering students' digital culture within the educational process, aligned with the contexts of their future professional activities.

Third, despite the considerable potential of the university's information and educational environment to support the development of digital culture, methodological guidance for effectively utilizing modern digital resources and information and communication technologies in students' learning and self-learning activities remains underdeveloped.

Addressing these contradictions defines the core research problem and emphasizes the necessity of establishing theoretical, methodological, and scientific-methodological foundations for more effective use of the university's information and educational environment in cultivating undergraduate students' digital culture.

The objective of the article is to develop and experimentally validate a pedagogical model for fostering undergraduate students' digital culture within the university's information and educational environment.

METHODOLOGY

The study was guided by four main objectives. First, it aimed to identify the essence, content, and structure of undergraduate students' digital culture, while exploring the psychological and pedagogical factors influencing its development within the university's information and educational environment. Second, the study sought to design and validate a pedagogical model specifically tailored to foster undergraduate students' digital culture within this environment. Third, it focused on developing a detailed methodology for implementing the pedagogical system, ensuring its practical applicability. Finally, the research aimed to test the effectiveness of the proposed pedagogical model through a structured pedagogical experiment, using established criteria and methodological guidelines to evaluate outcomes.

A comprehensive and systematic set of research methods was employed to achieve the study's objectives at every stage. To support the theoretical foundations, methods included the analysis of scientific literature, academic periodicals, and electronic resources, as well as the examination of regulatory documents and methodological frameworks related to the development of the information society and the digitalization of education. These methods were complemented by generalization and modeling techniques to conceptualize the structure and components of undergraduate students' digital culture.

To address the practical and experimental aspects of the study, empirical methods were applied. These included questionnaires and testing instruments to assess students' competencies and attitudes, evaluation of methodological resources for professional training, and detailed analysis of empirical data. Statistical processing was used to ensure the reliability and validity of the findings, allowing for an objective assessment of the effectiveness of the pedagogical model in fostering digital culture among undergraduate students.

The theoretical foundations for designing a pedagogical system for developing undergraduate students' digital culture in the university's information and educational environment present an analysis of information society development trends, outlines the scientific and pedagogical foundations for developing undergraduate students' digital culture in the university's information and educational environment, and describes the model and pedagogical conditions developed for this purpose.

Based on an analysis of the researchers' ideas, the thesis on the increasing role of culture, knowledge, and education for the successful development of the modern information society is confirmed. The socioeconomic prerequisites for the relevance of the problem under study include the development of the digital economy, the digitalization of education, and the developing need for digital competencies. Particular attention is paid to the analysis of the regulatory framework for the study, which places the training of highly qualified personnel among the priorities for the development of the digital economy. It is noted that the digitalization of modern society necessitates interaction between entities in the information space based on digital information, knowledge, and communication. It is concluded that graduates of universities must possess high levels of information competencies and digital culture to become competitive specialists in the developing knowledge society.

It is revealed that scientific and pedagogical foundations are most significant for clarifying the personal content of the concept of «digital culture.» A periodization of the development of concepts of ICT competencies is presented, drawing on scientific research, as well as domestic and international experience in organizing higher education. A summary of the research results is presented (Bray, 2007; Leighton & Griffioen, 2023), this study allowed us to recognize a fundamentally new stage in the transition from the informatization process to the digitalization of education. It was revealed that the content of scientific categories changes with the shift from information carriers to digital formats. In particular, the transformation of the category «information culture» as a personal quality uniting various competencies in the use of information resources into the category of «digital culture» is examined.

An analysis of the economic, philosophical, and sociocultural foundations allowed us to identify the essential features of the concept of «digital culture» and refine it in relation to the specifics of students' cognitive, educational, practical, and research activities. As a result, the concept of «digital culture of university students» was formulated as a system of personal qualities, including the following components: knowledge, skills, and abilities in working with information in a digital environment; the ability and readiness for effective educational and professional information activities; and a digital worldview consistent with the current stage of societal development. It is concluded that digital culture is a fundamental, integral quality of a future competitive specialist. Possessing this quality enables effective academic and, subsequently, professional information activities.

The dynamics of digital culture formation have been studied, allowing us to establish the relationship between the concepts of «digital literacy,» «digital competence,» «digital culture,» and «digital skills.» The first stage involves acquiring digital literacy: a basic set of knowledge and skills necessary for working with information and communicating in the digital environment. The second stage involves developing digital competencies that ensure readiness to search, critically analyze, objectively utilize, and creatively transform professionally significant information. The third stage involves the emergence of digital culture, which represents the ideological, axiological, and reflective level of information preparation. Its further development is linked to the refinement of the skills necessary for life and work in the digital economy.

It has been revealed that the development of digital culture among university students is manageable. This allowed us to propose a unique definition of the concept of «developing a digital culture,» which is interpreted as the process and result of the targeted development of a holistic and sustainable system of information worldview,

value-motivational orientations, and a basic set of competencies for independent student information activity using pedagogical resources and self-development tools. Taking into account the specifics of the organization of undergraduate programs, the necessary pedagogical resources for the success of this process have been identified: the content of professional education, forms, methods, and means of professional training.

Particular attention is paid to the role of the university's information and educational environment, which is represented as a system of hardware and software, information and communication technologies, pedagogical conditions, specialists, and users, creating the opportunity to provide information support for the educational process, improve the quality of education, and promote the general cultural, professional, and personal development of participants in educational relationships. The potential of the university's information and educational environment to contribute to the development of students' digital culture is identified. It is proven that the flexible use of digital resources and the potential of information and communication technologies ensures the success of the process and the sustainability of the results of developing undergraduate students' digital culture.

To support the objectives of the study, a modeling method was used. The pedagogical system ensures the purposefulness and manageability of the process of developing undergraduate students' digital culture.

The sociocultural prerequisites for the model's design were: the current stage of development of the information society; the level of accessible information and communication technologies; the requirements of the digital economy; and society's social demand for personnel training, reflected in the requirements of state educational standards for higher education. The target component of this model is supported by a system of goals and objectives, which are defined based on the stages of ascent to the main expected result: the development of digital literacy, digital competencies, and digital culture at the axiological, ideological, and reflective levels. A set of subgoals is provided, as well as their detailed breakdown into tasks.

The target component predetermines the development of the theoretical and methodological component. The design of a pedagogical system for developing digital culture in undergraduate students is based on the following methodological foundations: the philosophy of the formation and development of the information society and its transformation into a digital society, as well as a set of methodological approaches: cultural, axiological, system-activity, environmental, and contextual. The cultural approach presupposes the use of a wide range of information sources in teaching, enriching the individual's worldview, broadening horizons, satisfying the need and readiness for research activities, and fostering an awareness of the values of information society culture. The axiological approach guides students toward professional, moral, and creative values, and, consequently, toward successful independent learning, practical, and research activities. A systemic-activity approach enables the organization of a holistic educational process and ensures systemic readiness for future professional activity. The environmental approach enables teachers and students to apply environmental learning methods based on the digital environment, as well as use it to understand, memorize, and assess knowledge, skills, and abilities. The contextual approach is implemented through active learning methods, the personal involvement of students and teachers, and their interpersonal interactions.

When developing the model, general scientific and pedagogical principles were taken into account. Principles specific to the process of developing students' digital culture were also formulated: updating the value-based and ideological aspects of educational content; the leading role of social and pedagogical interaction between participants in the educational process; Active, action-oriented development of students based on the unity of cognitive, research, and educational-practical activities. It has been proven that these principles, applied in combination, can form the basis for designing the substantive and organizational-pedagogical tools for a model for developing a digital culture among university students.

The substantive component of the model characterizes the educational, educational-methodological, scientific-methodological, reference, and other elements that support the achievement of the goal, subgoals, and objectives. The development of digital culture is possible within the framework of the study of philosophy (the foundations of the ideological component), pedagogy and psychology (the ideological component, the unity of education and self-education), information science disciplines (digital literacy, ICT competence), as well as a number of professional disciplines that can be implemented as an e-learning course. Therefore, the substantive component includes information resources that support the development of the aforementioned disciplines (Kniazian & Khromchenko, 2019). Various means of educationally significant communication are proposed as sources of information: online journals, diaries, forums, wikis, professional social networks, and social media groups. Open educational resources (educational materials) are also proposed, either publicly available or distributed under an open license, and can be freely used, copied, and adapted. The procedural component provides access to digital educational

environment resources, prepares students for the effective use of electronic tools, and develops independent learning. Elements of the procedural block include methods, forms, and techniques for organizing learning and learning activities in various forms of individual and teamwork; asynchronous (notification board, blog, forum, wiki, podcast, interactive video lecture) and synchronous (chat, video conferencing on mobile phones and tablets) pedagogical communication tools; tools for ongoing knowledge assessment and testing; tools for conducting final assessments in individual disciplines; tools for tracking student attendance, etc. Table 1

Table 1: Model of Forming Digital Culture of University Students.

Component	Content
Information Society, Digital Technologies, Digital Economy	Social demand: a university graduate possessing digital culture; Federal State Educational Standards (FSES HE); Professional Standards
Target Component	Goal: To form in students the level of digital culture necessary for learning in a digital environment and further professional activity in the digital economy, using pedagogical resources of the university and student self-development tools.
Theoretical and Methodological Component	Subgoals and approaches: cultural, axiological, system-activity, environmental, contextual. Principles: actualization of value-worldview aspects of education; leading role of socio-pedagogical interaction; active developmental work based on unity of cognitive, research, and practice-oriented activities.
Content Component	Educational and instructional materials; Elective course: "Digital Culture of a Specialist"; Digital communication educational resources; Open educational resources.
Processual Component	Methods of organizing learning; asynchronous and synchronous tools; ongoing assessment; final assessment tools; attendance monitoring tools.
Component of Subjects of the Educational Process	Students and teachers
Assessment and Result Component	Components of digital culture: cognitive-procedural, value-motivational, reflexive-activity, personal-developmental. Indicators and criterion-level characteristics.
Prognostic Component	Students' understanding of future professional activities and the role of digital culture in performing labor functions.

The process component is closely linked to the component of the educational process's subjects, represented by faculty and students. By organizing educational and pedagogical interactions in accordance with the target, content, and organizational guidelines defined within the pedagogical system, the primary expected outcome—the digital culture of undergraduate students—is achieved (Mokliuk et al., 2022).

The assessment and outcome component is a diagnostic tool for determining the development of students' digital culture. It includes the following criteria: cognitive-processual, value-motivational, reflective-activity, and personal-developmental. These criteria are defined and formulated in accordance with the previously identified structural components of undergraduate students' digital culture. Criterion-level characteristics and indicators are specified for these criteria.

The identification of the prognostic component is aimed at considering the prospects for students' personal and professional development in the system of continuous education and future work activities. This component helps students develop understanding of subsequent professional activities and continuing education, and clarifies the role of acquired digital culture in the implementation of work functions and work activities.

Particular attention is given to the characteristics of pedagogical conditions, the basis for which is the focus on developing the university's information and educational environment, which facilitates interaction between participants in the educational process, access to educational resources, and the recording of the progress and results of mastering the curricula. The identified conditions contribute to the enrichment and flexible use of forms of pedagogical interaction, methods of accessing educational and scientific-professional tools to support students' cognitive, research, and practical learning. These include:

- the use of educationally significant communication tools to popularize modern scientific knowledge among students;

- developing the fundamentals of digital etiquette among students through online communication with university faculty;

- engaging students in the design of distance learning courses;

- harnessing the potential of scientific social networks to stimulate student motivation for research.

The first pedagogical condition involves the use of digital means of professionally relevant communication between participants in the educational process: online journals, blogs, wikis, forums, scientific and educational networks, and social media. Implementing this condition will engage students in academic research, as defined by the teacher, and will foster the development of the cognitive-processual component of digital culture (Ponomarenko et al., 2025).

The second pedagogical condition is emphasized because the use of online communication tools with university faculty and students requires adherence to digital etiquette. Communication and interaction in the digital environment, including the sharing of resources, presupposes conscious information behavior. Implementation of this condition is aimed at developing the value-motivational component of digital culture, specifically, emphasizing the values of interaction in the digital environment and digital ethical principles.

The third pedagogical condition focuses on the creation of information products and the accumulation of experience in the digital age within the Web 2.0 environment. Visualization and clarity of educational material, as well as virtual and augmented reality technologies, are attractive to students, creating additional opportunities for understanding the topic being studied. Skills in creating digital resources influence the development of the ability and willingness to update information and transform educational information into professional knowledge. They also contribute to the improvement of the reflective-activity component of university students' digital culture. The fourth pedagogical condition relies on leveraging the potential of scientific social networks to stimulate students' motivation for research and expand its potential. The digital environment offers the opportunity to openly discuss scientific problems and research results, comment on them, and collaborate effectively online. As users of scientific networks, students can participate in a variety of research projects, job searches, competitions, and grants. Familiarization with the capabilities of scientific social networks fosters the development of a personalized digital culture, based on the use of various forms of learning and self-education, and the fulfillment of the need for self-expression.

RESULTS:

1. The feasibility of leveraging the potential of the university's digital information and educational environment and e-learning tools for pedagogical support in transforming students' digital literacy and information and communication competencies into the personal and professional quality of «digital culture» is demonstrated. The role of undergraduate students' mastery of the cognitive, procedural, value, and ideological aspects of digital culture in improving the quality of information processes and enhancing graduates' competitiveness in the labor market in the context of the developing digital economy is demonstrated.

2. A model of a pedagogical system for developing undergraduate students' digital culture is developed. A description of the target and theoretical-methodological components of the model allows for the application of scientific and pedagogical methodology and the formulation of the principles of the process under study. The characterization of the substantive, procedural, and subjective components demonstrates the potential for incorporating the resources of the information and educational environment into the educational interactions between faculty and students. The introduction of an evaluative-results component ensures the sustainability of the results. The identification of the predictive component is aimed at considering the prospects for students' personal and professional development in the system of continuous education and future employment.

3. The pedagogical conditions are characterized, the basis for their definition being the focus on expanding the opportunities for the practical application of components of the university's information and educational environment and professionally oriented digital resources in developing the digital culture of undergraduate students. The identified conditions contribute to the enrichment and flexible use of forms of pedagogical interaction, methods of accessing educational and scientific-professional resources to support students' cognitive, research, and practical learning activities.

4. A methodology for developing the digital culture of undergraduate students in the university's information and educational environment has been developed. The components of the methodology describe the goals, content, sequence, organizational measures, digital resources, and monitoring tools used in the study of general and professional disciplines.

The theoretical significance of this study lies in its systematization of scientific and pedagogical knowledge regarding the phenomenon of digital culture and the process of its formation among undergraduate students in the university's information and educational environment. Clarifying the content and structure of the concepts of «digital culture of undergraduate students,» «development of digital culture,» and «university information and educational environment» allows us to expand the categorical apparatus of scientific knowledge and outline prospects for the personal and professional development of students as active participants in the information society. Correlating the concept under study with scientific

knowledge about educational outcomes offers potential for designing evidence-based strategies for continuous education in various areas of professional activity. A theoretically sound model, integrated with pedagogical conditions, can be considered when studying support systems for the development of personal and professional qualities of students and young professionals in digital information, educational, and scientific and professional environments.

CONCLUSIONS

The digital culture of undergraduate students is considered a pedagogical concept and is considered a set of fundamental personal qualities developed through the transformation of digital literacy and information and communication competencies. This quality presupposes students' knowledge, skills, and abilities in working with information in a digital environment; the ability and readiness for effective educational and professional information activities; and a digital worldview consistent with the current stage of societal development. Students' mastery of the cognitive-processual, value-motivational, reflective-activity, and personality-development components of digital culture is aimed at ensuring the success of their future professional activities in the context of the digitalization of the economy.

The development of digital culture in undergraduate students presupposes the purposeful achievement of an information-oriented worldview, value-motivational orientations, and a basic set of competencies for professionally oriented information activities. This process is supported by the extensive capabilities of the university's information and educational environment, which consists of: a set of electronic information, educational, and methodological resources, supported by technical and software access tools; information and communication technologies that organize interaction between specialists, faculty, and students; and interactive tools to support students' productive cognitive, educational, research, and self-educational activities. Flexible use of the resources of the information and educational environment ensures the success of the process and the sustainability of the results of developing the digital culture of undergraduate students.

The model of the pedagogical system under study is aimed at developing in students the level of digital culture necessary for learning in a digital environment and further professional activity in the digital economy. This is facilitated by reliance on cultural, axiological, system-activity, environmental, and contextual approaches and corresponding principles. The model systematizes the goal and objectives at different stages of digital culture development. Its substantive content involves identifying the necessary educational content, including an elective course in the form of an electronic course; A description of the types of digital educational resources used, both limited and open access (electronic databases, online journals, diaries, forums, wikis, and professional social networks). The practice-oriented nature of the model is ensured by defining methods for supporting face-to-face learning, identifying means of asynchronous (notice board, blog, interactive video lecture) and synchronous (chat, video conference) electronic interaction, and developing tools for monitoring student results and attendance based on criteria and indicators of digital culture development. The predictive elements of the model allow students to gain a general understanding of the role of digital culture in the implementation of work functions and work activities.

Expanding the practical application of components of the university's information and educational environment is ensured by the following pedagogical conditions: the use of educationally significant communication tools to popularize modern scientific knowledge among students; the development of the fundamentals of digital etiquette among students through online communications with university faculty; student involvement in the design of distance learning courses; and the use of the potential of scientific social networks to stimulate student motivation for research.

The implementation of the methodology for developing the digital culture of undergraduate students is carried out taking into account the following principles: updating the value-based and ideological aspects of educational content; the leading role of social and pedagogical interaction between participants in the educational process; and the active development of students based on the unity of cognitive, research, and educational-practical activities. During the development of the developed educational content, extensive use is made of the capabilities of the information and educational environment: electronic educational resources, digital communication technologies, information visualization tools, online collaborative services, tools for creating links to additional information sources using QR codes, and electronic diagnostic tools. Students are engaged in various forms of interactive, productive, and creative activities using digital resources.

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