The review article highlights the essence of the concept of "digital competence" and establishes that it is an important component of general professional competence of a modern teacher. Its components and content are outlined, it is found that digital competence includes interaction with digital devices and modern technologies for learning, work and social activity. Particular attention is paid to the conditions for future primary school teachers to acquire digital competence in the modern digital information educational environment. The main advantages of the modern digital information educational environment are the following: ensuring wide access to learning at convenient time and, accordingly, increasing the speed of completing educational programs by individual students; creating conditions for implementing differentiated and comprehensive learning; changing the main role of designing educational tasks from the role of the teacher; transforming the organization, management and assessment of learning, presenting educational materials and managing the educational process. It is proven that digital competence requires constant development for effective professional activity in the modern minimal environment. Acquisition of digital competence increases the general development of the competencies of future primary school teachers, attaining their professional skills, ensuring the competitiveness of work, promoting personal development, continuous education. It also develops the ability to acquire knowledge and integrate it into existing knowledge, actively uses digital technologies in the educational process, enhancing its educational quality. The formation and development of digital competence is considered as the process of acquiring stable, integrated and systematized knowledge in pedagogy, psychology, computer science, computer technologies, teaching methods, changing them in new situations, personal qualities and the ability to achieve significant results in professional activity. It can be concluded that the introduction of digital technologies in education is not only the use of new digital tools, but first of all the creation of an environment that offers innovative learning opportunities, the design of individual educational routes and the creation of unique educational electronic/digital products.

Keywords: *competence; digital competence; digital literacy; digital technologies (DT); educational institutions (EI); Digital Vortex (DV); information and communication technologies (ICT), information and educational environment (IEE); massive open online courses (MOOC).*

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MODEL OF STEAM-ORIENTED TRAINING OF FUTURE MUSIC TEACHERS FOR THE DEVELOPMENT OF THEIR INFORMATION AND DIGITAL CULTURE

In the context of STEAM education (science, technology, engineering, art, mathematics), the problem of training music teachers lies in the need to integrate the art of music with other disciplines. This requires music teachers to have professional knowledge and skills in the field of music and understand technology, engineering solutions, and scientific approaches. The training of such teachers should consider the ability to use modern technological tools, interdisciplinary teaching methods, and integration of music into the overall STEAM context.

Developing teachers' critical thinking and skills to create innovative curricula is also essential. Therefore, the article aims to model and substantiate a model for the development of information and digital culture of music teachers in the context of STEAM-oriented professional training. We used the modeling method, based on which we developed and justified the corresponding model. The model consists of target, theoretical-methodological, substantive, and criterion and result blocks. The model is based on several methodological approaches (systemic, informational, digital, and cultural), provides for the observance of didactic principles in education (the principle of individualization of learning, interdisciplinary integration, creativity, the use of digital technologies), is implemented through the modernization of the content of the training (special course "Information and Digital Culture of Musicians and STEAM Education"), the use of forms (lectures, practical classes and work in pairs), methods (project, research, modeling, brainstorming, method of professional-problem reflection) and means (digital resources and STEAM projects) of training and, thanks to the developed diagnostic apparatus (criteria, indicators and levels), makes it possible to track the result – the development of the Information and Digital Culture of future music teachers.

***Keywords**: information and digital culture, music teachers, STEAM, model, STEAM-oriented professional training, vocational education.*

Statement of the problem. The task of a music teacher is to promote aesthetic education, the formation of the musical culture of the individual, his/her worldview and perception of the world through the student's immersion in the texts of spiritual culture, personal enthusiasm, artistry, improvisation, and effective pedagogical activity. Therefore, as V. Orlov rightly notes, professional training of future music teachers is aimed at "individualized development of professionally important qualities and abilities, professional knowledge and skills, transformation of the inner world of an individual, creative self-realization in the profession" (Orlov et al., 2012). These priorities determine the need for teachers to successfully build their professional activities based on the effective use of innovative technologies, among which STEAM is distinguished by the interdisciplinary interaction of art with scientific fields, which provides the basis for better and more comprehensive preparation of young people for self-realization in the technological world. STEAM, which combines Science, Technology, Engineering, Arts, and Mathematics, is becoming a methodological approach in education and a guiding principle for the formation of deep and comprehensive knowledge. Because of this, the question of STEAM education's impact on training a music teacher turns out to be especially relevant and potentially effective. That actualizes the need to develop information and digital culture of music teachers in the context of STEAM-oriented professional training.

Analysis of current research. With the development of IT and the consequences of humanization and humanitarianization of education, one of these promising areas is the direction of STEM (Semenikhina et al., 2022) and STEAM, recognized as effective and innovative for developing the educational industry. The problems and prospects of STEM and STEAM education are considered in recent scientific research (Andrievska & Bilousova, 2017; Özer & Demirbatır, 2023; Yurchenko & Semenikhina, 2023; Ramsey, 2022). Scientists highlight the theoretical and methodological foundations of the development of STEAM education, analyze the scientific and pedagogical experience of implementing the ideas of STEAM education, and identify the features of training STEAM teachers.

Many scientists were also engaged in pedagogical modeling of music teacher training. In particular, T. Plyachenko (2012) considered the essence, content, and significance of the competence model in the professional training of future music teachers. He reviewed the groups of competencies that ensure the success of the professional activity of a music teacher in secondary schools.

V. Zhelanova (2020) substantiated and developed a model of professional competence for a future music teacher. The author shows that the value, spiritual, and aesthetic priorities objectively determine the need for competent music teachers in contemporary educational art institutions. N. Evstigneeva (2005) investigated the model of

preparing a future teacher to use music as a means of self-regulation of the functional state of students. I. Shcherbak (2018) notes that the training of future teachers of musical art is a general education of a professional as an integration of knowledge, thoughts, feelings, and activities. It is based on spirituality, a high level of intellectual, ethical, and human qualities and needs of the individual. A model was proposed for teacher training, the result of which is the readiness of future teachers of musical art for students' civic education.

Scientists I. Shvets and N. Kravtsova (2019) in the developed organizational and methodological model prove that the features of the implementation and formation of the vocal and performing culture of the future teacher of musical art are due to creative, individual, psychological, physiological and musical characteristics, the presence of personal musical experience. E. Provorova and C. Jingjing (2017) in their publication characterize the practical implementation of the model of methodological training of a future music teacher in the aspect of artistic reflection. The authors' model of the formation of artistic reflection in the process of teaching vocals contributes to the formation of a positive attitude toward artistic reflection in future music teachers, the desire for self-realization in musical performance, awareness by future music teachers of the nature and features of artistic reflection and peculiarities of their own thought processes, possession of appropriate reflective skills and professionalism in musical performance. At the same time, the generalization of scientific research on modeling the training of music teachers showed the lack of models that would substantiate the development model of information and digital culture of music teachers in the context of STEAM-oriented professional training.

The article aims to model and substantiate the development model of information and digital culture of music teachers in the context of STEAM-oriented professional training. The information and digital culture of a music teacher is a holistic quality of his/her personality, which is based on a critical look at information processes and the possibilities of using digital technologies in music and music teaching, and combines knowledge and skills to work with information and digital technologies within the framework of professional activity and for one's own self-development.

Methods. We used the modeling method. From a philosophical point of view, "modeling" is interpreted as a way of studying objects through the perception of their models and as a process of constructing and studying models of real objects, phenomena and objects that are built to determine, improve and rationalize the properties and structure of these phenomena and objects, as well as to control them (Shynkaruk et al., 2002). Theoretical and methodological foundations of modeling in pedagogical science are revealed in the works of I. Ziaziun (2004), Y. Lodatko (2007) and others. Scientists emphasize that modeling allows for combining theoretical and practical ideas about the phenomenon and establishing the structure and stages of the process, object or phenomenon under study to improve its quality and efficiency further. The analysis of scientific research made it possible to conclude the importance of the method of pedagogical modeling. It makes it possible to create a specific analog of the phenomenon under study and is a conceptual tool for its recognition. It provides understanding of the connections and relationships between the various components of the process under study, the ability to determine goals, ways, and means of achieving them, the possibility of obtaining effective (qualitative) results, and creates conditions for identifying internal resources to improve the simulated process. (Yagupov, 2003).

Results. The development model of information and digital culture of music teachers in the context of STEAM-oriented professional training is a structure characterized by features inherent in the system – a set of its constituent elements. Its important characteristic is integrity and completeness, ensured by systemic-creative connections and relations between elements.

The development model of information and digital culture of music teachers in the conditions of STEAM-oriented professional training has determined its multi-level structure, expressed in blocks: target, theoretical and methodological, content, and criterion and result (Fig. 1).

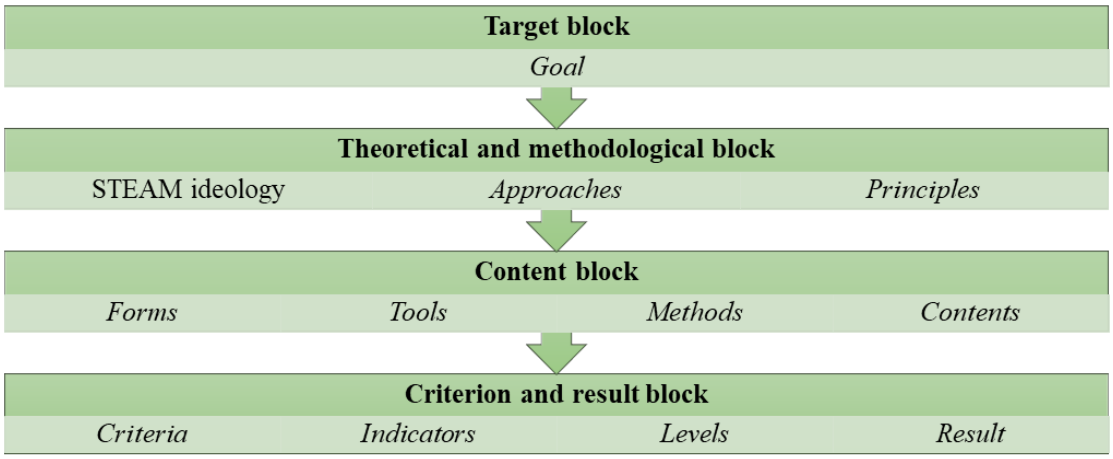

Fig. 1. Blocks of the development model

Thus, the target unit performs the functions of goal-setting and forecasting. Goal-setting involves setting a goal and tasks related to its achievement. The predictive function is to orient the learning process towards the expected result. This block emphasizes the purpose of the model implementation – the development of the IDC of music teachers in the context of STEAM-oriented professional training. Achieving the goal involves awareness of the importance of forming this phenomenon among teachers and the ability of universities and teachers who implement educational and music teacher training programs to create conditions for STEAM-oriented professional training. That means they must be able to implement interdisciplinary connections, organize a group project, and interact in offline learning and the digital environment of their educational institution.

The target block determines the purpose of the next, theoretical and methodological block, which performs a regulatory function about the content, forms and methods, and the activities of a subjects of the designed process. A set of methodological approaches to the purpose of the simulated process represents that block. We found the following to be optimal for the development of information and digital culture (IDC) of music teachers in the context of STEAM-oriented professional training:

– systemic (this approach demonstrates the theoretical and practical foundations of the IDC of music teachers, the relationship between the model components, and the general view of the problem of professional training of future music teachers and the development of the IDC of music teachers. At the same time, the problem can be considered within the framework of a continuous pedagogical education in the process of studying students in higher education institutions);

– informational (imitation of the information approach will provide a set of scientific knowledge, principles, conditions, and functions that reflect the information aspects of reality, which are provided by informatics and implemented during information and analytical activities. The information approach helps future music teachers develop a deep understanding of musical concepts, develop critical and creative thinking, and use these skills in practical work with students. This approach contributes to creating conditions for comprehensive and deep development of music education and improves future music teachers' training quality. It allows students to access diverse and up-to-date information, which is key to their success in their professional endeavors);

– digital (the digital approach is aimed at creating a dynamic and interactive learning environment that meets the needs of modern education and contributes to the effective assimilation of knowledge by students, and also, the digital approach helps to make the training of future music teachers more accessible, interesting and effective, expanding opportunities for creativity and self-expression of students);

– cultural (cultural approach is aimed at solving important pedagogical tasks: formation of a worldview, deepening of the student's artistic thesaurus, provision of cultural knowledge, development of the valuable personal and intellectual sphere, promotion of a deeper understanding and

experience of the emotional and figurative content of works of various types of art, development of skills in creating an artistic dialogue, activation of direct emotional reactions, expansion of the boundaries of formative self-expression, and thereby promoting creative self-expression) approaches.

The connection between theoretical provisions and educational practice in the development of the model was built basing on principles that reflect the main regularities of the programmed process – the dependence of the educational process on the needs of society and the individual; dependence of learning on the individual characteristics of a student; interconnection of the purpose, objectives, content, methods, forms, and results of the educational process. Our model considers the principles of individualization of learning, interdisciplinary integration, creativity, and using digital technologies without focusing on general didactic ones.

Implementing the model for developing music teachers' information and digital culture in the context of STEAM-oriented professional training required attention to numerous aspects, including the development of content and the choice of teaching forms, means, and methods. Therefore, the third, substantive block of the model emphasizes the peculiarities of the organization of the educational process, which, in our opinion, is supported by digital means of Internet resources and STEAM projects. This unit performs formative, organizational, and motivating functions due to the involvement of specific means. Many digital tools can be used to develop future music teachers' information and digital culture. The most common, in our opinion, are the following:

– Specialized music programs and applications. These can include music production programs (e.g., GarageBand, FL Studio), audio and video editors (e.g., Audacity, Adobe Premiere Pro), music graphics and music theory programs (e.g., MuseScore, Sibelius), and programs for learning instruments or vocals.

– Interactive websites and apps. Some websites and apps offer interactive exercises and games to learn music, recognize notes, acoustic and rhythmic skills, and develop hearing and vocal skills.

– Virtual and augmented reality: The use of virtual reality or augmented reality can be an effective tool for learning musical instruments, arrangements, and composition, as well as interacting with musical material.

These digital learning tools can help future music teachers expand their knowledge and skills in music education and prepare them to use digital technologies effectively in the educational process.

Internet technologies may be used as a means of learning in order to provide access to educational material, communication, cooperation, and interactive learning. They include a variety of online resources, platforms, tools, and services that can be used to learn on your own. Such Internet technologies include:

- Online courses and video tutorials. The Internet contains many resources for teaching music, from video tutorials on YouTube to specialized online learning platforms such as Coursera, Udemy, or Khan Academy, which provide access to various courses on different topics – from music courses to math to programming. Some may also offer classes in music theory, music history, arrangement, and other aspects of music education.

- Virtual classes and webinars. Webinars and online courses allow teachers to deliver lessons and lectures in real time over the Internet, providing an opportunity to interact with students and discuss the material.

- Electronic textbooks and resources. Electronic books, magazines, and articles available online allow future music teachers to access up-to-date and interactive teaching materials.

– Online forums and communities. Online forums and communities provide an opportunity to share experiences and knowledge with other participants, get answers to questions, and help solve problems.

– Interactive exercises and games. Interactive learning exercises and games create interesting and engaging ways to learn the material, promoting the assimilation of knowledge through gameplay.

Internet technologies can make learning more accessible, effective, and engaging for students.

STEAM projects are the leading teaching tool

for developing information and digital culture of music teachers in the context of STEAM-oriented professional training. In STEAM projects, the emphasis is on developing scientific and technical skills and including the artistic and creative component. That contributes to creating more integrated and comprehensive learning processes where students can apply different types of knowledge to solve real-world problems.

STEAM projects can include the creation of musical compositions, the development of visual effects for presentations, the production of interactive exhibitions, or the exploration of the interaction of art and mathematics in creating visual works. This approach is designed to develop students' versatility of personality, manifested through a combination of different types of knowledge for creative and innovative problem-solving. The structural unit of the model is a set of teaching methods aimed at developing future music teachers' information and digital culture in the context of STEAM-oriented professional training. When choosing teaching methods, we were guided by the goal, the way of assimilating the content, and the nature of the interaction of the subjects in the projected process. We considered the complex combination of problem-search methods (project, research, modeling, brainstorming) and the technique of professional problem reflection (the method is based on the ability to identify the most critical problems of the development of music education and use innovative pedagogical experience in solving them, to discuss and justify personal and professional positions on various musical and pedagogical phenomena) as optimal. The training of future music teachers is characterized as a systematic approach to the study of pedagogical situations in which students encounter real or potential problems of professional nature. The method also allows future music teachers to actively learn from practical experience, and develop critical thinking and reflexivity, which is important for their professional development.

The efficiency and effectiveness of the educational process for developing information and digital culture of future music teachers in the conditions of STEAM-oriented professional training is determined by the choice of the necessary forms of training organization. The forms of organization of training within the framework of our model were determined by the types of interdisciplinary activities organized to develop the information and digital culture of future music teachers in the conditions of STEAM-oriented professional training, namely: group classes such as lectures, practical classes, and work in pairs.

The core of the content part is due to the set of characteristics of the components of the professional and informational-digital culture of a music teacher (the system of professional and value orientations; the system of knowledge, skills, and abilities related to instrumental and performing activities in the conditions of general music education; the ability to use various digital means in the professional activity of a music teacher, competence of both general professional and special nature; professional and personal qualities of a music teacher, the need for constant self-development and self-improvement in professional activity, an integral part of which is instrumental performance).

The content component involves, along with mastering professional disciplines, the study of the special course "Information and Digital Culture of Musicians and STEAM Education" (Liu, 2024). The study of this special course is provided for students of 2nd-3rd years. The scope of the discipline is 4 credits (120 hours), of which 10 hours of lectures, and 30 hours of practical classes. This particular course aims to provide future music teachers with comprehensive preparation for using digital technologies and integrating information and digital culture into the educational process in STEAM education. The main task is to train teachers to successfully implement innovative teaching methods and use digital resources to improve the quality of music education.

The course provides for mastering the following topics: STEAM education of musicians. The influence of information and digital culture on musical thinking. Development of information and digital culture of musicians based on interdisciplinary integration of knowledge. Innovative learning technologies and projects. A project for the creation and use of music software products.

The study of the discipline involves the implementation of various STEAM projects:

– Project "Virtual Music Laboratory" (task: to create a virtual environment for experimenting with musical effects and arrangements using software tools);

– Project "Virtual Orchestra" (task: to create a virtual orchestra using music programs and interactive technologies);

– Project "Musical Signal Processing" (task**:** to research and use digital technologies for processing sound signals to create new sound effects);

– Project "Music and Graphics in Interactive Spaces" (task**:** to create an interactive visualization for musical compositions in three-dimensional space);

– "Music and Artificial Intelligence" project (task**:** to use artificial intelligence algorithms to create musical compositions and arrangements).

Each of these projects has the potential to broaden future music teachers' understanding of how technology can enhance and enrich their musical and educational practices and thus develop their digital information culture.

The fourth, criterion and result block of the model includes a description of the components of information and digital culture and the criteria for its development, which we express through the indicators of "knowledge in the fields of music and DT," "ability to involve DT in solving creative problems," "ability to reflect," which make it possible to characterize the levels of development of information and digital culture of future music teachers – primary, medium, high, expert.

The result of implementing the model will be positive changes in the levels of development of the IDC of music teachers.

Conclusions. We have developed and substantiated a model for the development of information and digital culture of music teachers in the context of STEAM-oriented professional training, which consists of targeted, theoretical-methodological, content-based, and criterion and result blocks. The model is based on some methodological approaches (systemic, informational, digital, and cultural), provides for the observance of didactic principles in education (the principle of individualization of learning, interdisciplinary integration, creativity, the use of digital technologies), is implemented through the modernization of the content of the training (special course "Information and Digital Culture of Musicians and STEAM Education"), the use of form (lectures, practical classes and work in pairs), methods (project, research, modeling, brainstorming, method of professional-problem reflection) and means (digital resources and STEAM projects) of training and, thanks to the developed diagnostic apparatus (criteria, indicators and levels), makes it possible to track the result – the development of the IDC of future music teachers.

References

Andriievska, V.M., & Bilousova, L. I. (2017). BYOD concept as a tool for implementing STEAM education. *Physics and Mathematics Education, 4*(14), 13–17 (ukr).

Evstignieieva, N. (2005). Preparation of the future teacher for the use of music as a means of self-regulation of the functional state of students. Thesis for the degree of Cand. of Ped. Sciences. Vinnytsia Mykhailo Kotsiubynskyi State Pedagogical University (ukr).

Liu, D. (2024). STEAM Education and its potential impact on music teacher training outcomes. *IT and Educational Analytics*, *1*(2), 44–51 (eng).

Lodatko, E. O. (2007). Modeling of educational systems in the context of the value orientation of socio-cultural space. *Bulletin of Cherkasy University. Series: Ped. Science.* Cherkasy, *112*, 32–40 (ukr).

Orlov, V. F., Fursa, O. O., & Banit, O. V. (2012). Pedagogical skills of a teacher of art disciplines: method. Manual : Edelweiss (ukr).

Özer, Z., & Demirbatır, R. E. (2023). Examination of STEAM-based digital learning applications in music education. *European Journal of STEM Education, 8*(1), 02. https://doi.org/10.20897/ejsteme/12959 (eng).

Pliachenko, T. (2012). Competence model in the structure of professional training of the future music teacher. Modern strategies of university education: qualitative dimension: materials of International scientific and

practical conferences, 722–729. https://elibrary.kubg.edu.ua/id/eprint/570/1/T_Plyachenko_Kompetentnisna%20model.pdf (Date of access: 04.04.2024) (ukr).

Provorova, E. M., & Jingjing, Zh. (2017). Substantiation and implementation of the model of methodological training of the future music teacher in the aspect of artistic reflection. *Bulletin of Zhytomyr Ivan Franko State University, 2* (88), 224–230 (ukr).

Ramsey, G. P. (2022). Integrating science, technology, engineering, and math (STEM) and music: Putting the arts in science, technology, engineering, arts, and math (STEAM) through acoustics. *Journal of the Acoustical Society of America, 152*(2), 1106-1111. https://doi.org/10.1121/10.0013571 (ukr).

Semenikhina, O., Yurchenko, K., Shamonia, V., Khvorostina, Y., Yurchenko, A. (2022). STEM-Education and Features of its Implementation in Ukraine and the World. Paper presented at the 2022 *45th Jubilee International Convention on Information, Communication and Electronic Technology, MIPRO 2022* – Proceedings, 690-695. https://doi.org/10.23919/MIPRO55190.2022.9803620 (ukr).

Shcherbak, I. V. (2018). Prepar*ation of a teacher of musical art to civic education: a teaching aid* : Ilion (ukr).

Shvets, I., & Kravtsova, N. (2019). Organizational and Methodological Model of Formation of Vocal and Performing Culture of the Future Teacher of Musical Art. *Collection of scientific papers of the National Academy of the State Border Guard Service of Ukraine. Series: Pedagogical Sciences, 19* (4), 440–453 (ukr).

Shynkaruk, V.I., Bystrytsky, E.K., Bulatov, M.O., & Ishmuratov, A.T. (2002). Philosophical Encyclopedic Dictionary : Abrys (ukr).

Yagupov, V. V. (2003). Modeling of the educational process as a pedagogical problem. *Continuous professional education: theory and practice, 1*, 28–37 (ukr).

Yurchenko, K. V., & Semenikhina, O. V. (2023). STEM-education on open educational platforms. *Scientific Notes. Series: Pedagogical Sciences.* Kropyvnytskyi: Volodymyr Vynnychenko Central Ukrainian State Pedagogical University, 208, 282-287. https://doi.org/10.36550/2415-7988-2023-1-208-282-287 (ukr).

Zhelanova, V. (2020). Model of professional competence of the future teacher of musical art. *Pedagogy and Psychology*, 63, 51-59. https://doi.org/10.34142/2312-2471.2020.63.06 (ukr).

Ziazyun, I. A. (2004). Philosophy of Pedagogical Worldview. *Professional Education: Pedagogy and Psychology,* 4, 209–221 (ukr).

МОДЕЛЬ STEAM-ОРІЄНТОВАНОЇ ПІДГОТОВКИ МАЙБУТНІХ УЧИТЕЛІВ МУЗИКИ ДЛЯ РОЗВИТКУ ЇХ ІНФОРМАЦІЙНО-ЦИФРОВОЇ КУЛЬТУРИ

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В умовах STEAM-освіти (наука, технології, інженерія, мистецтво, математика) проблема підготовки вчителів музики полягає в необхідності інтеграції музичного мистецтва з іншими дисциплінами. Це вимагає від вчителів музики не лише професійних знань і навичок у галузі музики, але й розуміння технологій, інженерних рішень і наукових підходів. Підготовка таких учителів повинна враховувати здатність використовувати сучасні технологічні інструменти, міждисциплінарні методи навчання та інтеграцію музики в загальний STEAM-контекст. Важливо також розвивати в учителів критичне мислення та креативність для створення інноваційних навчальних програм. Тому метою статті є змоделювати та обґрунтувати модель розвитку інформаційно-цифрової культури вчителів музики в умовах STEAM-орієнтованої професійної підготовки. Ми використовували метод моделювання, на основі якого розробили і обґрунтували відповідну модель. Модель складається з цільового, теоретико-методологічного, змістовного та критеріально-результативного блоків. Модель базується на низці методологічних підходів (системний, інформаційний, цифровий та культурологічний), передбачає дотримання дидактичних принципів у навчанні (принцип індивідуалізації навчання, міжпредметної інтеграції, креативності, використання цифрових технологій), реалізується через модернізацію змісту навчання (спецкурс «Інформаційно-цифрова культура

музикантів та STEAM-освіта»), використання форми (лекції, практичні заняття і робота в парах), методів (проєктний, дослідницький, моделювання, мозковий штурм, метод професійно-проблемного рефлексування) і засобів (цифрові ресурси та STEAM-проєкти) навчання та завдяки розробленому діагностичному апарату (критерії, показники й рівні) дає можливість відслідкувати результат – розвиток ІЦК майбутніх учителів музики.

***Ключові слова**: інформаційно-цифрова культура, учителі музики, STEAM, модель, STEAM-орієнтована професійна підготовка, професійна освіта.*

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МОЖЛИВОСТІ НЕЙРОМЕРЕЖ ДЛЯ ВИВЧЕННЯ ІНОЗЕМНИХ МОВ У ЗАКЛАДІ ВИЩОЇ ОСВІТИ

В оглядовій науковій розвідці проаналізовано можливості використання нейромереж при вивченні іноземних мов у закладах вищої освіти. Визначено, що нейромережа є комп'ютерною програмою, яка функціонує за принципом людського мозку. Вона обробляє вхідні дані через систему «нейронів» – простіших програм, що взаємодіють між собою, і на основі цієї взаємодії генерує результат обчислень, враховуючи попередній досвід та помилки, зроблені під час попередніх запусків. Сьогодні нові інструменти активно впроваджуються в освітній процес для вивчення іноземних мов у закладах вищої освіти. Нейромережі є чудовими помічниками для викладачів у створенні та підготовки матеріалів до занять, які є оригінальними, цікавими та мотивуючими студентів у вивченні іноземної мови. До того ж можна використовувати для самостійної роботи студентів над власними помилками та як гарний спосіб урізноманітнення занять, тому що може замінити живого співрозмовника.

***Ключові слова:** нейромережа, нейрон, чат-бот, іноземна мова, заклад вищої освіти.*

Вступ. Штучний інтелект (далі – ШІ) сьогодні є одним із сучасних потужних факторів економічного та технічного розвитку. Світовий вплив штучного інтелекту передбачає трансформацію як у загальних підходах до перебудови суспільного устрою, так і в процесах навчання та управління в освіті. Штучний інтелект, що дозволяє машинам або комп'ютерам мислити та діяти подібно до людини, стає невід'ємною частиною сучасного життя. Нові форми технологій заповнюють усі сфери життя суспільства, не залишаючи при цьому галузь освіти осторонь. Відтак, сучасний процес навчання сьогодні складно уявити без ШІ, з появою якого з'явилися й нейромережі, котрі стали доступними широкому колу людей.

Одним із напрямків використання нейромереж є викладання іноземних мов у закладах вищої освіти. Завдяки персоналізованому підходу нейромережі дають змогу створювати індивідуальні навчальні плани для кожного здобувача вищої освіти з