

## ПЕДАГОГІКА

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**Kateryna OSADCHA,**

*orcid.org/0000-0003-0653-6423*

*DSc, Professor,*

*Professor at the Department of Computer Science and Cybernetics*

*Bogdan Khmelnytsky Melitopol State Pedagogical University*

*(Zaporizhzhia, Ukraine) okp@mdpu.org.ua*

**Alona CHORNA,**

*orcid.org/0000-0002-0062-1144*

*Candidate of Pedagogical Sciences, Associate Professor,*

*Associate Professor at the Department of Computer Science and Cybernetics*

*Bogdan Khmelnytsky Melitopol State Pedagogical University*

*(Zaporizhzhia, Ukraine) chornaa@mdpu.org.ua*

### TRAINING OF SPECIALISTS IN THE FIELD OF DIGITAL DESIGN BY MEANS OF E-LEARNING

*The article addresses the pressing issue of effective professional training for future digital designers in Ukraine. The paper analyzes the challenges existing in higher education institutions responsible for training digital designers, particularly the mismatch with contemporary trends in digital design and the content of professional preparation for future designers.*

*The authors conducted an analysis of current trends in digital design, identifying areas such as 3D printing, artificial intelligence art, virtual and augmented art, game design, web design, 2D and 3D graphics, and more. Additionally, considering the development of the metaverse, the focus is placed on the skills of digital designers relevant for its advancement, including 3D modeling, 2D graphics, animation, VR development, and UX/UI design.*

*In the context of the coronavirus pandemic and Russian aggression in Ukraine, the article discusses the experience of adapting to changing conditions in higher education, including the utilization of blended and distance learning technologies. The use of electronic means such as video conferences, gamification, 3D modeling services, VR, AR, and cloud services is emphasized, particularly in areas with high-speed Internet and electricity availability. In regions lacking high-speed Internet and electricity, resources like the Moodle platform, mobile applications, Discord VoIP software, email, and instant messaging systems are employed.*

*The article highlights the issue of insufficient educational programs dedicated to the training of digital designers at Ukrainian universities, posing a challenge to comprehensive professional training. The authors underscore the necessity for future professionals to acquire not only digital skills but also traditional knowledge of visual arts, including composition, colors, and perspective.*

*The paper describes the use of electronic learning technologies, especially within the Moodle system, to ensure quality education during the pandemic and conflict. Examples of informational resources and self-learning exercises are provided to help future digital designers develop skills in quick sketching and art.*

**Key words:** digital design, e-learning, professional training, distance learning, contemporary trends.

**Катерина ОСАДЧА,**

*orcid.org/0000-0003-0653-6423*

доктор педагогічних наук, процесор,

професор кафедри інформатики і кібернетики

Мелітопольського державного педагогічного університету імені Богдана Хмельницького

(Запоріжжя, Україна) *okp@mdpu.org.ua*

**Альона ЧОРНА,**

*orcid.org/0000-0002-0062-1144*

кандидат педагогічних наук, доцент,

доцент кафедри інформатики і кібернетики

Мелітопольського державного педагогічного університету імені Богдана Хмельницького

(Запоріжжя, Україна) *chorna@mdpu.org.ua*

## ПІДГОТОВКА ФАХІВЦІВ У ГАЛУЗІ ЦИФРОВОГО ДИЗАЙНУ ЗАСОБАМИ ЕЛЕКТРОННОГО НАВЧАННЯ

*Стаття присвячена актуальному питанню ефективної професійної підготовки майбутніх цифрових дизайнерів в Україні. В роботі проаналізовано проблеми, що існують в закладах вищої освіти, які здійснюють підготовку цифрових дизайнерів, зокрема, невідповідність сучасним тенденціям у цифровому дизайні та змісту професійної підготовки майбутніх дизайнерів.*

*Автори провели аналіз сучасних тенденцій у цифровому дизайні, визначивши такі напрямки, як 3D-друк, мистецтво штучного інтелекту, віртуальне та доповнене мистецтво, геймдизайн, веб-дизайн, 2D- та 3D-графіка тощо. Крім того, враховуючи розвиток метавсесвіту, наголошено на навичках цифрових дизайнерів, корисних для розвитку цього середовища, таких як 3D-моделювання, 2D-графіка, анімація, розробка віртуальної реальності, UX/UI дизайн.*

*У контексті коронавірусної пандемії та російської агресії на Україну обговорено досвід адаптації до змінних умов вищих навчальних закладів, що використовували змішане та дистанційне навчання. Зазначено, що за наявності швидкого Інтернету та електроенергії широко використовуються електронні засоби, такі як відеоконференції, гейміфікація, 3D-моделювання, VR та AR, хмарні сервіси тощо. У відсутності високошвидкісного Інтернету та електроенергії використовуються ресурси, які можуть працювати при низькій швидкості Інтернету, такі як платформа Moodle, програми для мобільних пристроїв, VoIP-софт Discord, електронна пошта та системи миттєвого обміну повідомленнями.*

*В статті порушено проблему відсутності достатньої кількості навчальних програм, присвячених саме підготовці цифрових дизайнерів, що може бути перешкодою для повноцінного професійного навчання. Автори вказують на необхідність засвоєння майбутніми фахівцями не лише цифрових навичок, але й традиційних знань образотворчого мистецтва, таких як композиція, кольори, перспектива та інші.*

*У роботі описано досвід використання електронних засобів навчання, зокрема в системі Moodle, для забезпечення якісного навчання в умовах пандемії та військової агресії. Автори наводять приклади вправ інформаційних ресурсів та самостійного навчання, які допомагають майбутнім цифровим дизайнерам розвивати навички швидкого малюнка та мистецтва.*

**Ключові слова:** *цифровий дизайн, електронне навчання, професійна підготовка, дистанційне навчання, сучасні тенденції.*

**Formulation of the problem.** Ukraine has a developed digital design industry, so the professional training of digital designers is an important part of the national educational system. It functions at different levels of education. At secondary schools of Ukraine, there are specialized classes and specialized areas where students can learn the basics of computer design, web design, video editing, three-dimensional graphics, augmented and virtual reality, etc. In professional (vocational and technical) education, training is mainly carried out in the field of graphics and industrial design. Programs occasionally include the study of disciplines dedicated to digital design (for example, computer-aided design of products).

Ukrainian universities offer training programs for digital designers in the following programs: IT design, web design, computer design of interior and furniture, photo and video design, and motion design. Design and graphic design educational programs may include disciplines such as computer design, web design, UX/UI design, video editing, animation, and more. In addition, in the field of non-formal education, private training centres offer digital design learning. These courses can include various disciplines, from the basics of graphic design to advanced techniques of creating visual effects and 3D modeling.

**Analysis of recent research.** In general, the professional training of digital designers in Ukraine

is quite developed, and young people have access to a variety of information and learning opportunities. Scientists and practitioners of design education emphasize that the development of digital technologies affects art and design, in particular in Ukraine: every year more and more information is transferred to media, which requires an illustrative basis for creation thanks to graphic editors; developing digital painting and drawing; numerous illustrators who work in the field of digital painting in Ukraine and abroad offer their own techniques for creating images (Храмова-Баранова, Галенко, 2017). Also, other types of presentation of traditional design are developing thanks to digital technologies, in particular, the impact of digital technologies and modern tools of 3D modeling of products on the development of virtual fashion has been studied (Борщевська, Зіркевич, 2021). Scientists (Sokolyuk, Kasianenko, Bilozub, Chursin, Shaulis, 2022) have concluded that the Internet and cyberspace provide new opportunities for artists to make the global art trade more universal and efficient, and for artists themselves to be more competitive in the art market. The influence of modern trends in digital art leads to the fact that to successfully work with computer graphics, students need to master traditional knowledge of pictorial arts (the concept of composition, colour, perspective, proportions, shadows) and the ability to use them to create digital products using computer software (2D graphic editors and 3D graphics) and digital technology (graphics tablets, personal computers, projection equipment, cameras, devices for VR and AR reality, scanners and printers, including 3D scanners and 3D printers) (Osadcha, Baluta, 2021).

Despite the fact that the professional training of digital designers in Ukraine has a fairly high level, there are some problems that are an obstacle to their successful professional training. At Ukrainian universities, there are not enough educational programs dedicated to the training of digital designers. Certain aspects of the training of digital designers are implemented in educational programs for the training of IT specialists or graphic designers. In addition, due to the outbreak of the coronavirus pandemic, and then due to the military aggression of Russia, the issue of the use of electronic learning tools in the professional training of future specialists in the field of digital design is being updated in Ukraine.

**The purpose of the research** is to analyze the problem of using appropriate means of e-learning in the professional training of future specialists in the field of digital design.

To achieve this purpose, it is necessary to solve the following tasks: 1) to analyze modern trends in

digital design; 2) to determine which of them can be implemented in the training process of future specialists in the field of digital design; 3) to identify and test the means of e-learning in the professional training of future digital designers.

**Presenting main material.** The analysis of information resources (websites, portals, platforms) on the topic of digital art has made it possible to determine the following trends in this field: virtual art, 3D printing, open source software, art of artificial intelligence, a combination of 2D animation and modern technologies, 3D painting, and game design (Osadcha, Baluta, 2021). IT analysts also identify such trends as pixel art, video game art, media art, virtual art, cybernetic art, art of artificial, space modeling for virtual simulators and for training programs, fractal graphics, digital painting, web design, illustrations in interfaces, character design, three-dimensional graphics, etc.

The professional training of digital designers can be very useful for the development of the Metaverse, which is currently a key trend in digital technologies. After all, this process requires the creation of visual elements, which can include 2D and 3D graphics, animation, sound effects and other elements that help create an immersive environment.

Therefore, the professional training of digital designers can help create a more immersive and effective Metaverse that will provide users with an unparalleled experience and interaction with it.

Considering the above trends, future digital designers are trained at Bogdan Khmelnytsky Melitopol State Pedagogical University at the Department of Computer Science and Cybernetics. There is a STEAM laboratory at the university where we implement some modern design trends: 3D design, virtual and augmented reality, digital and virtual art.

To work with computer graphics successfully, students acquire traditional knowledge of fine arts and the ability to apply it to create digital products using computer software and digital technology. Training is aimed at forming the following skills: 1) knowledge of the basics of artistic art: composition, colours, perspective, proportions, chiaroscuro; 2) mastering the basic skills of freehand drawing: working with a line as an expressive means of graphics, sketches and hatching; 3) the ability to approach the subject creatively (searching and generating ideas, monitoring modern trends in fine arts), the specialist must be aware of all innovations in order to remain in demand; 4) fluency in graphic editors for creating raster and vector, 2D and 3D images; 5) the ability to use digital technologies to realize one's ideas: draw on a graphic tablet, use a personal computer, projection

equipment, a camera, devices for VR and AR reality, a scanner and printer, including 3D ones, etc.

On the basis of the analysis of the experience of scientists (Antón-Sancho, Vergara, Lamas-Álvarez, Fernández-Arias, 2021), (Gentile, Reina, De Nito, Bizjak, Canonico, 2020) and our own practice (Osadcha, Osadchyi, Kruglyk, Spirin, 2022), (Osadcha, Voloshinov, Kruglyk, Osadchyi, Symonenko, 2020) of using digital technologies, we have identified electronic learning technologies that allow us to ensure the quality of the educational process under the conditions of the coronavirus pandemic and Russia's military aggression in the territory of Ukraine.

In the process of organizing digital drawing training for future specialists in digital technologies, there are no problems with presenting theoretical material and setting practical tasks, also it is not difficult to organize mastering various graphic editors. These tasks are implemented thanks to the use of LMS Moodle, video materials, online services of gamification and 3D modeling (SketchUp Free), VR and AR, interactive learning technologies, video conferences, cloud services, etc.

After the start of Russia's military aggression in the territory of Ukraine, one of the obstacles to the implementation of the educational process was the low speed, and often the complete absence of Internet connection in the occupied territories.

The distance learning website on the Moodle platform, Discord VoIP software, e-mail, and instant messaging systems became the main places of work and communication of students. In addition, students began to use mobile learning technologies (mobile communications, mobile devices) more often for learning, so it has been found that the Moodle mobile application allows adapting e-learning courses to the mobile format in the easiest way. This is done thanks to the fact that it takes into account the requirements for the pedagogical design of mobile applications for learning, and the teacher only has to place and arrange the educational materials in compliance with the requirements for the font, the division of the text, the selection of graphics and videos, and the structuring of the text.

However, in the distance learning format, certain problems arise due to the issue of developing the skills of drawing from nature and speed drawing.

To solve these problems, self-learning services have turned out to be appropriate. In particular, the Line of action information resource offers training exercises for learning quick gesture drawing. These exercises help a person's brain train to see the «important» parts of a person's pose, gesture, facial

expression, scene, or environment and prevent them from going into the details. This warm-up is offered to students prior to the drawing practice used in digital drawing and painting courses to teach students good drawing habits and practices.

In the course of performing such a task, future specialists in digital technologies can use both traditional drawing tools (pencils and paper) and digital tools (graphics editors, tablets, pens).

After evaluating the learning task in the mode of blended learning, students send photos or scanned copies of paper drawings or files in digital format to the teacher by e-mail.

Sketching services turned out to be useful e-learning tools in the professional training of future digital designers. For example, the Characterdesigns service provides free photo images of various subjects that can be used as references for sketches for free use. A large database of references for drawing people can be found on the website of the Bodies in Motion photographic project. It contains high-resolution photos of athletes and dancers in motion. They help students deepen their understanding of shapes, functions, and anatomy of the human figure. The website features series of photos on the following topics: movements, 3D scanning, art, facial expressions, the collection of classical works by E. Muybridge. Using this service, students work on the skills of drawing the human figure using digital drawing tools.

Therefore, the availability of the wide range of software and Internet technologies, traditional means of training designers, can be implemented using digital technologies. This allows teachers and students not to stop the process of learning and researching new digital technologies in the field of digital design.

Actualizing the issue of the effective professional training of future digital designers in Ukraine, we have analyzed it in the scientific works of Ukrainian and foreign researchers. This has given grounds to claim that there are problems at higher educational institutions training digital designers. One of them is compliance with modern trends in digital design and the content of the professional training of future designers at higher education institutions of Ukraine.

**Conclusions.** As a result of the analysis of modern trends in digital design, the list of them has been determined (3D printing, 3D painting, artificial intelligence art, 2D animation, game design, pixel art, video game art, media art, virtual art, cybernetic art, space modeling for virtual simulators and for training programs, fractal graphics, digital painting, web design, illustrations in interfaces, character design, three-dimensional graphics). In addition,

taking into account the development of the Metaverse environment, the skills of digital designers that can be useful for its development have been emphasized (3D modeling, 2D graphics, animation, VR development, UX/UI design).

Under the conditions of the coronavirus pandemic, when higher education institutions used blended and distance learning technologies, and then under the conditions of the Russian invasion to Ukraine, when higher education institutions switched completely to distance learning, we have gained significant experience in adapting to changing conditions and identified and tested various e-learning means in the professional training of future digital designers. It has been concluded that, under the conditions of availability

of the high-speed Internet and electricity, powerful electronic means such as video conferences, video materials, gamification and 3D modeling services, VR and AR, interactive learning technologies, video conferences, cloud services etc. can be widely used. However, in the absence of the high-speed Internet and electricity, resources and software that can work at low Internet speed and under conditions of electricity saving are used. These are the Moodle platform, the Moodle mobile applications, Discord VoIP software, e-mail, and instant messaging systems. So, despite the unfavourable conditions for learning, we have found ways to use digital technologies for the purpose of the effective professional training of future specialists in the field of digital design.

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