ІМЕРСИВНІ ТЕХНОЛОГІЇ В ОСВІТІ

ЗБІРНИК МАТЕРІАЛІВ

КИЇВ-2023

НАЦІОНАЛЬНА АКАДЕМІЯ ПЕДАГОГІЧНИХ НАУК УКРАЇНИ
ІНСТИТУТ ЦИФРОВІЗАЦІЇ ОСВІТИ НАПН УКРАЇНИ
НАЦІОНАЛЬНА АКАДЕМІЯ ОСВІТИ ІМ. І. АЛТИНСАРІНА
МІНІСТЕРСТВА ОСВІТИ І НАУКИ РЕСПУБЛІКИ КАЗАХСТАН
КРАКІВСЬКИЙ ПЕДАГОГІЧНИЙ УНІВЕРСИТЕТ ІМЕНІ КОМІСІЇ
НАРОДНОЇ ОСВІТИ
UIT АРКТИЧНИЙ УНІВЕРСИТЕТ НОРВЕГІЇ

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Збірник містить матеріали доповідей, що були представлені на науково-практичній конференції «Імерсивні технології в освіті». В доповідях розглянуті наукові та методичні питання цифровізації суспільства і освіти, визначені сутність та інноваційність імерсивних технологій для розвитку освіти на всіх її рівнях, розкрито аспекти використання віртуальної та доповненої реальності в освітній практиці педагогів. Особлива увага приділена моделюванню, проєктуванню та використанню освітніх середовищ з використанням технологій віртуальної та доповненої реальності, а також впливу середовища віртуальної реальності на здоров'я, поведінку та когнітивну діяльність учнів і студентів.

Представлені матеріали можуть бути використані вченими, науково-педагогічними та педагогічними працівникам, аспірантами, докторантами, вчителями закладів згальної середньої освіти.

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INSTITUTE FOR DIGITALISATION OF EDUCATION OF THE
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OF THE REPUBLIC OF KAZAKHSTAN
NATIONAL ACADEMY OF EDUCATIONAL SCIENCES OF UKRAINE
INSTITUTE FOR DIGITALISATION OF EDUCATION OF NAES OF
UKRAINE
NATIONAL ACADEMY OF EDUCATION NAMED AFTER I.
ALTYNSARIN, NUR-SULTAN, KAZAKHSTAN
THE PEDAGOGICAL UNIVERSITY OF KRAKOW NAMED AFTER
THE COMMISSION OF NATIONAL EDUCATION
DEPARTMENT OF EDUCATION OF THE ARCTIC UNIVERSITY OF
NORWAY

IMMERSIVE
TECHNOLOGIES
IN EDUCATION

COLLECTION OF MATERIALS

Kyiv – 2023

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The collection includes materials of presentations that were featured at the scientific and practical conference "Immersive Technologies in Education." The presentations delve into scientific and methodological aspects of the digitization of society and education, defining the essence and innovativeness of immersive technologies for educational development at all levels. They explore the aspects of using virtual and augmented reality in the educational practices of educators. Special attention is directed towards the modeling, designing, and utilization of educational environments through virtual and augmented reality technologies, along with an examination of the impact of virtual reality environments on the health, behavior, and cognitive activities of students.

The presented materials can be utilized by scientists, educational and pedagogical professionals, graduate and doctoral students, as well as teachers in general education institutions.

ЗМІСТ

S. V. Vasylenko, Kyiv, Ukraine

DESIGN OF THE TRAINING COURSE "INTEGRATION OF IMMERSIVE TECHNOLOGIES IN HIGHER EDUCATION" FOR PEDAGOGICAL UNIVERSITIES ACADEMIC STAFF IN THE CONDITIONS OF EUROINTEGRATION

Taking into account that the process of European integration in education in general and in universities in particular includes cooperation in international scientific projects, mobility of students and academic staff to exchange ideas on the use of best teaching practices using modern technologies, both pedagogical and technical, the integration of immersive technologies is relevant. It requires the development of digital competencies of academic staffs for the effective implementation of innovations, in particular the use of virtual and augmented reality applications and equipment in the educational process, the impact of the virtual reality environment on the cognitive activity of students.

Ukrainian higher education is guided by standards in particular DigCompEdu (2017) [1]. Digital Competence Framework for Educators (DigCompEdu), Standard for the group of professions "Academic staffs of higher education institutions", etc. in the field of the development of digital competence of academic staffs (MES of Ukraine, n.d.) [2].

Although the current international documents and Ukrainian legislation do not declare the use of immersive technologies, professional development programs should include these issues.

In the Concept of Digital Transformation of Education and Science for the period until 2026, among the list of strategic goals of digital transformation, it is stated that the digital educational environment is accessible and modern, employees in the field of education have digital competencies, and the content

of education in the field of ICT meets modern requirements, which are constantly changing such keeping track of modern requirements is the task of the leaders of the educational industry [3].

In the publications of Valeriy Yu. Bykov gives a description of the immersive environment of educational, educational, pedagogical, scientific activity as an artificially constructed computer a computer-oriented environment of virtual activity, where, thanks to special means of computer simulation, a feeling of quasi-real presence in this environment is created, immersive means and technologies allow you to immerse yourself in the virtual world [4].

So, according to Svitlana H. Litvynova youth that currently studies in addition to paper textbooks or their electronic versions, needs additional resources and means for learning [5].

Olexander Yu. Burov notes the fact of the rapid spread of immersive technologies in all spheres of life of the average citizen. Therefore, he emphasizes the need to create conditions for preparing the younger generation for their effective and safe use [6], needs new concepts [7] and training tools [8]. I will add that the digital generation of young people generally prefers the use of gadgets, and accordingly, academic staffs face the problem of providing and presenting the content of any discipline in the form of visualized material, for example through augmented/virtual reality. It is better to delve into the subject by practicing research skills using mixed reality, viewing holograms of researched objects or processes. In order for students to be able to monitor their own progress independently, academic staffs create diagnostic tests using artificial intelligence and communicate through appropriate testing platforms that store test attempt data and build visualized analytics.

Academic staffs of pedagogical universities need help in building a methodology for integrating immersive technologies into the educational process. A Digital hub of innovative solutions for education has been created at

Grinchenko University, on the basis of which training classes have been introduced. The hub was opened in June 2023 at the initiative of the NDL for digitalization of education and with the support of the rectorate of Grinchenko University. This initiative is implemented within the framework of the project, which was recognized as the winner in the competition of Kyiv City Hall "Civic Budget of Kyiv – 2021". The purchase of innovative equipment, made at the expense of Grinchenko University, is extremely valuable in the context of the digital transformation of society and in connection with the process of Ukraine's integration into the European educational space. This contributes to the constant improvement of the level of digital competence of city educators and University academic staffs, which is one of the key priority tasks.

The digital hub combines four spaces: a space for mobile learning, a multimedia space, a space for robotics and holography, and an integrated space for virtual and augmented reality.

- Interactive panel DonView 75
- Tablet Lenovo Tab
- Graphic tablet HUION

- Kit for VR (PC, glasses, manipulators) + software
- iBoard Ib FT6 surface activator

A space for mobile learning

An integrated space for VR/AR

A space for robotics and holography

A multimedia space

- Flipchart Smart Technologies Smart Kapp
- Conference camera
- Blackmagic ATEM Mini Pro mixer
- Saramonic radio system

- Robotics programmable educational module
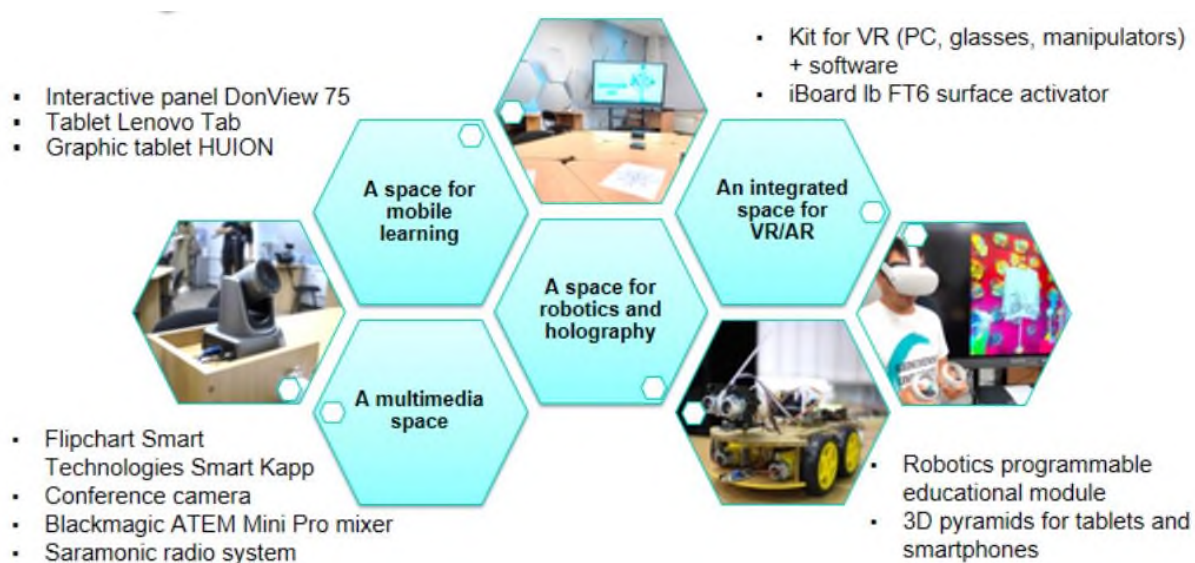- 3D pyramids for tablets and smartphones

Fig. 1. Structure of the Digital Hub of Borys Grinchenko Kyiv University.

All spaces of the Digital Hub of the Borys Grinchenko Kyiv University are interconnected and complement each other, allow you to immerse yourself in the virtual world, master immersive technologies for the high-quality organization

of blended learning, the format of which is currently relevant for our country, synchronously conduct classes in the classroom and with the participation of students outside the city and country.
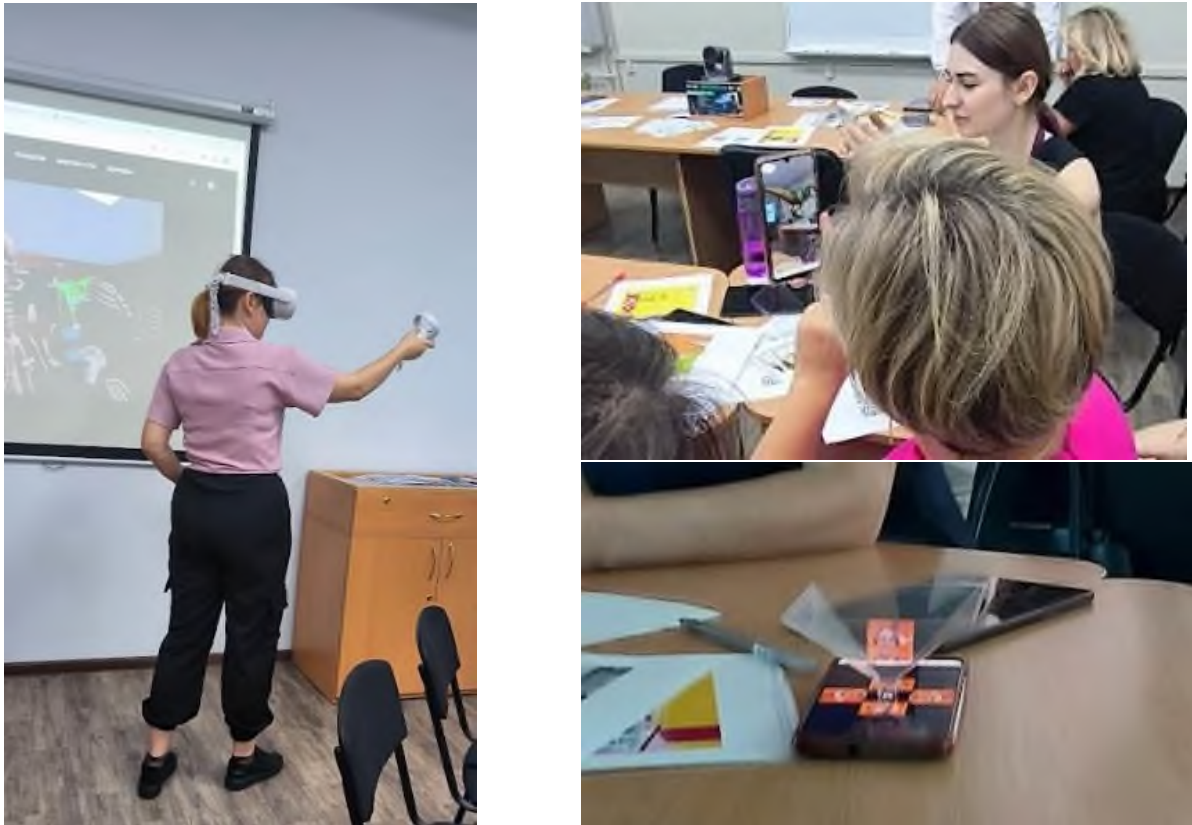
Fig. 2. Photo collage during training classes "Integration of immersive technologies in higher education".

The design of training course "Integration of immersive technologies in higher education" for academic staffs of pedagogical universities is organized according to the flipped class principle. In particular, the preparatory stage - before the start of the training, i.e. Pre Faze, involves installing applications on one's own gadgets, familiarization with theoretical material on flipped classroom technologies, blended learning, etc. At the F2F stage, participants master the tools: a set for VR (PC, glasses, manipulators), 3D display pyramids for tablets and smartphones. They discover a new dimension of learning through exciting immersive technologies: augmented, virtual and mixed reality in an integrated

space for AR/VR and get acquainted with the solutions of how to use these technologies for learning in the classroom.

They also acquire skills in creating holograms of objects of study in relevant disciplines, such as static holograms of portraits of writers or poets, videos of dance movements, etc.

Post Faze for academic staffs is completely personalized. Working in professional groups, they search for the necessary applications, resources, and developments in the field of the disciplines they teach. Thus, a structured resource and reference bank is accumulated.

Implementation of training course "Integration of immersive technologies in higher education" stimulates the wide introduction of immersive technologies in the educational process, scientific activity of the academic community. The Digital Hub provides access points to the latest digital capabilities, including immersive technologies, AI, cybersecurity and more. Short-term/long-term training of academic staffs and students in digital technologies, mainly immersive, it is planned to organize contests of pedagogical skill in developing methods of promoting immersive technologies with the involvement of independent external experts in the evaluation process, etc. are carried out in the Digital Hub.

There is definitely a need for further adaptation of the international experience of using digital opportunities, including immersive technologies, to ensure the quality of education and a high level of scientific research.

The design of the training course "Integration of immersive technologies in higher education" for academic staffs of pedagogical universities in the conditions of European integration is taken care of by the research laboratory of digitization of education. Employees, in accordance with K. D. Ushinsky's saying, "To have the right to teach others, you need to constantly learn

yourself", actively research new products on the technical market and adapt them to the needs of both university academic staffs and students.

At this stage, the program of training course "Integration of immersive technologies in higher education" includes the issue of the introduction of mobile learning, in particular, regarding the advantages of using mobile devices; the use of artificial intelligence: overviews of AI tools, AI tools for creating images and videos, the basics of forming queries for AI are offered. Most of the training time is dedicated to exploring the use of immersive technologies.

The lecturers of such departments of the University as journalism, fine arts and design can be actively involved first in the training program, and later in the development of unique materials, because as Svitlana H. Litvynova [9] claims, in the film industry ideas are born for the implementation of visualization technology and influencing the viewer with various innovative effects, as well as in business advertising, where the use of augmented reality is especially relevant now.

It should be noted that the design of training course "Integration of immersive technologies in higher education" for pedagogical universities academic staff as well as the functions of the Digital Hub, are limited by the available equipment, its technical characteristics and the availability of software applications or applications in open access that fully meet the demands of the educational process from the relevant direction.

At the moment, the issue of the possibility of carrying out high-performance HPC (High-Performance Computing) calculations, specializing in the use of supercomputers, clusters of computing nodes and other high-performance systems for solving complex problems that require large computing resources, is being solved. We are working on creating a team capable of developing digital applications and immersive technology resources. After all, due to the monetization of resources and applications, there is a need for access

to the simplest elements in the learning process, and in the future, the choice of professional developments on a commercial basis.

Conclusions. An ambitious specialists team is working on the design of training course "Integration of immersive technologies into higher education" for academic staffs of pedagogical universities in the context of European integration, who plan to further research and adapt existing methods, develop their own training products, as well as analyze the level of interest of academic staffs in the introduction of immersive technologies in educational process, assessment of the level of digital competence of academic staffs and readiness for the implementation of immersive technologies, the impact of their use on the quality of educational services and the level of understanding and involvement of students, whether immersive technologies help students and academic staffs to be ready for the requirements of European education standards and the needs of European integration. In general, further research will also concern the evaluation of the expediency of integrating immersive technologies into the educational process of universities.

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