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IMMERSIVE TECHNOLOGIES AS A MODERN EDUCATIONAL STRATEGY FOR TRAINING FUTURE SPECIALISTS

Immersive technologies, such as virtual reality (VR), augmented reality (AR), and mixed reality (MR), are revolutionizing modern education by providing interactive, experiential learning environments. This paper examines the impact of these technologies in training specialists across various fields, including healthcare, engineering, pedagogical and vocational education. Immersive tools enhance students' engagement, practical skills, and critical thinking by simulating real-world scenarios in a safe and controlled environment. Furthermore, they offer personalized learning experiences, promote collaboration, and bridge the gap between theoretical knowledge and practical application. Universities worldwide are increasingly adopting immersive technologies to modernize teaching and enhance learning outcomes. These tools provide dynamic, engaging experiences that enable students to interact with complex material beyond the limits of traditional classroom methods. Interactive learning improves focus and increases knowledge retention. The main principles of building an immersive educational environment are highlighted. With the rapid advancement of digital tools, integrating immersive technologies enhances experiential learning, fosters engagement, and bridges theoretical knowledge with practical skills. The study identifies key tasks, including analysing the pedagogical impact, evaluating the effectiveness of these tools, and identifying challenges. Research findings highlight improved learning outcomes, motivation, and critical thinking among students. The article concludes that immersive technologies are essential for modern education, preparing specialists for dynamic, technology-driven work environments. In the context of rapid technological development, these tools offer new educational possibilities by promoting interactive, experiential learning and bridging the gap between theoretical knowledge and practical application. The purpose of the study is to evaluate the effectiveness of immersive technologies in improving student engagement, retention, and skill acquisition. Key tasks include identifying pedagogical advantages, assessing challenges, and exploring their practical integration. Research findings demonstrate that immersive environments enhance motivation, problem-solving abilities, and critical thinking. The study concludes that immersive technologies represent an essential component of modern educational strategies, equipping future specialists with the competencies needed in evolving, technology-driven industries.

Keywords*: augmented reality (AR), critical thinking, experiential learning, immersive technologies, mixed reality (MR), motivation, problem-solving, student engagement, virtual reality (VR).*

Introduction

The rapid advancement of digital tools and the increasing role of technology in all aspects of society have necessitated shifts in educational strategies. Traditional teaching methods often struggle to meet the needs of modern learners, particularly in fields requiring hands-on experience, problem-solving, and critical thinking skills. In response, immersive technologies — such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) — are gaining attention as promising educational tools. These technologies enable interactive and experiential learning by immersing students in simulated environments, thereby enhancing engagement and bridging the gap between theoretical knowledge and practical application.

Immersive technologies are highly relevant to modern education, as they align with the demands of dynamic, technology-driven industries. The labor market increasingly values

individuals with practical skills, adaptability, and critical thinking abilities. In this context, educational institutions must adopt strategies that effectively prepare students for professional challenges. By providing realistic, interactive environments, immersive technologies allow students to practice skills safely and develop competencies through experience, making them essential for the future of professional training.

The pedagogical benefits of immersive technologies have been explored in recent studies, namely Bosa V. P. (2020), Chemerys H. (2021), Dymova I. (2022), Palamar S. P, Bielienka G. V., Ponomarenko T. O., Kozak L. V., Nezhyva L. L., Voznyak A. V. (2021), Popova L. M. (2021) and others. Researchers such as Yaremchuk N., Nazar S. (2021) and Kolmakova E. O. (2022) highlight that immersive environments promote active learning and improve student engagement and retention. Khmelnytska, O (2023) found that virtual reality fosters better understanding of complex concepts, while augmented reality enhances collaborative learning through real-time interaction with digital content. However, some studies, including Lege, R., Bonner E. (2020), caution that the implementation of immersive tools faces challenges, such as cost, technological barriers, and the need for teacher training. Despite these challenges, the literature suggests that the use of immersive technologies can significantly improve problem-solving skills, motivation, and critical thinking, particularly in STEM fields, medical education, and technical training. Yet, more research is needed to establish best practices for large-scale adoption and to assess the long-term impact on students' learning outcomes and career readiness.

This study aims to analyze the potential of immersive technologies as an effective educational strategy for training future specialists, identify challenges, and propose ways to integrate these tools into educational systems to meet the evolving demands of the workforce.

The Aim and Tasks of the Article

The primary aim of this article is *to explore the potential of immersive technologies* — including virtual reality (VR), augmented reality (AR), and mixed reality (MR) — as a *modern educational strategy* for the effective training of future specialists. The study seeks to evaluate how these technologies enhance learning outcomes, bridge the gap between theory and practice, and prepare students for evolving professional environments. In order to realize the set goal, we defined the following tasks, namely:

1. To analyze the pedagogical potential of immersive technologies in fostering engagement, critical thinking, and hands-on skills;

2. To examine the effectiveness of VR, AR, and MR in different educational contexts and disciplines;

3. To identify challenges related to the integration of immersive technologies, such as financial, technical, or training-related barriers; to evaluate the impact of immersive learning on students' academic performance, motivation, and future readiness;

4. To develop recommendations for the practical adoption and large-scale use of immersive technologies in higher education and professional training programs.

1. Relevance of Immersive Technologies in Modern Education

The rapid evolution of digital technologies has transformed how knowledge is acquired and applied, pushing educational institutions to adopt innovative strategies that align with modern learners' needs. Immersive technologies, including virtual reality (VR), augmented reality (AR), and mixed reality (MR), offer new ways to engage students by providing interactive, experience-based learning environments. These tools have proven especially relevant in bridging the gap between theory and practice, which is essential for professions requiring hands-on skills, such as medicine, engineering, and technical fields.

In today's labor market, practical experience, problem-solving abilities, and critical thinking are highly valued, making immersive technologies a key component of preparing future specialists. By simulating real-world scenarios, these technologies allow students to apply knowledge in safe, controlled environments, which improves learning outcomes and reduces the risks associated with traditional training in high-stakes fields. Furthermore, immersive learning promotes student engagement and motivation, addressing challenges related to student retention and participation in traditional classroom settings.

The relevance of these technologies also extends to lifelong learning and professional development, where continuous upskilling is necessary in rapidly changing industries. As the demand for technology-literate specialists grows, the integration of immersive technologies into educational programs ensures that students gain the competencies needed to thrive in dynamic, technology-driven workplaces. Thus, immersive technologies are not only relevant but

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essential for modernizing education and future-proofing learners in the evolving professional landscape.

Immersive technologies (IT), such as *virtual reality* (VR), *augmented reality (AR), mixed reality (MR), and simulators,* have gained traction as powerful tools in educational environments. These technologies create engaging, interactive experiences, allowing future specialists to practice skills in lifelike conditions. Visible benefits of immersive learning in training specialists can be presented in different fields of human activities, such as:

experiential learning (immersive environments offer hands-on experience through virtual simulations; medical students, for example, can perform surgeries in VR, gaining confidence without real-life risks);

enhanced engagement and retention (immersive tools stimulate multiple senses, fostering deeper engagement; studies show that learning retention increases when learners actively participate rather than passively absorb content);

safe environment for error (trainees can practice and make mistakes without real-world consequences; for instance, pilots use flight simulators to train under challenging conditions without endangering lives);

development of complex skills (fields such as engineering and healthcare require mastery of complex tasks; immersive technologies allow trainees to repeatedly practice, refining motor skills and critical thinking);

global and remote learning access (with immersive platforms, students from any location can collaborate in the same virtual environment, facilitating remote training programs).

It should be noted that technological progress is so rapidly expanding the possibilities of using virtual reality in the modern educational process that it will become obsolete by the time it is introduced into the training programs of the future specialist.

"Virtual Reality (VR) has made significant inroads into both the consumer and professional sectors. As VR has matured as a technology, its overall practicality for use in education has also increased. However, due to the rapid evolution of the technology, the educational field struggles to stay informed of the latest advancements, changing affordances, and pedagogical applications. Even the authors' own 2018 work that categorized VR technology for different educational applications, is no longer completely applicable to the current educational landscape…. (Herrera, F., Bailenson, J., Weisz, E., Ogle, E., & Zak, J. 2018)".

2. Overview of Virtual, Augmented, and Mixed Reality Tools

Immersive technologies, encompassing virtual reality (VR), augmented reality (AR), and mixed reality (MR), offer innovative ways to enhance education by merging digital content with learning environments. Each of these tools provides unique capabilities that support interactive and experiential learning, enabling students to engage deeply with educational material.

1. Virtual Reality (VR): VR immerses users in a completely digital environment, isolating them from the physical world. Through headsets and motion-tracking devices, students can explore simulated spaces, perform virtual experiments, or participate in interactive scenarios. VR is widely used in medicine, engineering, and architecture, allowing learners to practice procedures and operations in risk-free settings (Example: Medical students using VR to simulate surgeries).

2. Augmented Reality (AR): AR overlays digital content onto the physical world through smartphones, tablets, or AR glasses. Unlike VR, AR allows learners to remain connected to their surroundings while interacting with virtual objects or information in real-time. This technology is useful for science education, language learning, and fieldwork by providing contextual information or enhancing physical models with digital elements. (Example: AR apps that label anatomical structures on a 3D model of the human body).

3. Mixed Reality (MR): MR blends virtual and physical worlds so that digital elements not only appear in the real environment but can also interact with it. Using MR headsets, users can manipulate virtual objects as if they were real, making it ideal for technical training and collaborative work. MR is especially beneficial in fields like engineering and product design, where students need to visualize complex processes in an interactive environment. (Example: *Engineering students designing and testing prototypes with holographic tools*). These technologies are complementary, each offering unique advantages for various educational needs. Their use fosters **e**ngagement, practical skill development, and problem-solving — qualities essential for future specialists. As these tools become more accessible, their adoption in classrooms, labs, and training programs will continue to grow, reshaping the way knowledge is transferred and applied.

EXAMPLES OF APPLICATIONS IN VARIOUS FIELDS

Various Fields	Examples of Applications
Medicine	VR is used in surgical training, enabling students to perform complex procedures with virtual patients
Military and Defense	Simulations prepare soldiers for combat scenarios and disaster response, honing decision-making skills under stress
Aviation	Pilots undergo extensive training using flight simulators to master both routine procedures and emergency responses
Architecture and Design	AR and VR tools allow students to visualize structures in 3D, testing their designs in real-time environment
Business and Leadership	Immersive simulations help in leadership development by placing participants in high-pressure business scenarios, enhancing problem-solving skills
Ethical Considerations	Privacy and the psychological effects of virtual environments must be considered, especially in fields involving stressful scenarios

Immersive technologies are also transforming teacher education by creating experiential learning environments that go beyond traditional methods. They enable future educators to practice teaching strategies, manage classroom dynamics, and experience real-world scenarios in a controlled environment, enhancing both competence and confidence. Students can make mistakes and learn in risk-free environments and participate in immersive lessons from anywhere, promoting inclusive education. Virtual spaces allow students to collaborate on projects in real-time, even from different locations.

Immersive technologies will continue to evolve, integrating AI to provide more personalized learning experiences. VR classrooms and AR lesson planning tool**s** are expected to become more common, making teacher education increasingly dynamic. Continuous advancements will also help address the accessibility gap by offering portable VR solutions or cloud-based immersive tools. A virtual classroom environment, such as *TeachLivE*, can train future teachers to engage with simulated student avatars to practice classroom management and teaching strategies (Ferrante, D. 2017).

3. Immersive Technology in Teacher Training

The integration of immersive technologies— such as virtual reality (VR), augmented reality (AR), and mixed reality (MR) — into teacher training programs offers significant potential for enhancing educators' professional development.

IMMERSIVE TECHNOLOGY IN TEACHER TRAINING

Immersive Technology	Teacher Training
TeachLivE	A virtual classroom environment that allows future teachers to engage with simulated student avatars to practice classroom management and teaching strategies
ClassVR	An immersive platform used to create teaching scenarios where teachers explore how to integrate VR lessons into curricula
CoSpaces Edu	This tool allows teachers to create their own VR learning environments and experiment with immersive teaching practices

Teachers play a critical role in facilitating immersive learning experiences, and proper training ensures they can effectively implement these technologies in the classroom. Immersive tools provide both experiential learning opportunities for teachers and safe environments for practical skill-building and scenario-based training. These technologies are shaping a generation of educators equipped with both theoretical knowledge and practical skills, ensuring they are well-prepared to engage diverse classrooms effectively in the digital age. Looking forward, *AI-enhanced immersive tools*

are expected to offer adaptive learning experiences, tailoring scenarios to individual learners. With continuous advancements, immersive technologies will further transform education, making learning experiences more interactive, engaging, and effective. These technologies provide educators with opportunities to practice their teaching skills, engage in realistic classroom scenarios, and enhance their professional development in a safe and controlled environment.

Incorporating immersive technologies such into the professional training of future specialists requires a strategic selection of practical activities. These activities are designed to blend theoretical knowledge with practical, experiential learning, fostering competence, creativity, and adaptability, namely:

1. *Simulated Professional Environments* (a digitally or physically created setting that replicates real-world work scenarios to provide students or trainees with practical experience. These environments are designed to mimic actual job conditions in a safe, controlled space where learners can practice tasks, make mistakes, and learn from them without real-world consequences. They are used extensively in various fields such as medicine, engineering, aviation, business, and education);

2. *Case-Based Learning with AR/VR Tools* (an instructional approach where students learn by analyzing and solving real-world cases or scenarios. When combined with Augmented Reality (AR) and Virtual Reality (VR) tools, this method offers immersive, interactive experiences that enhance students' ability to apply theoretical knowledge in practical contexts.);

3. *Collaborative Virtual Projects and Workshops* (educational or professional activities conducted in online or virtual environments, where participants from different locations work together in real-time or asynchronously. These projects leverage digital platforms and often incorporate technologies such as Virtual Reality (VR), Augmented Reality (AR), Mixed Reality (MR), and other collaborative tools. They simulate real-world working conditions, allowing participants to develop skills in teamwork, communication, and problem-solving.);

4. *Gamification and Immersive Learning Games*. Gamification and immersive learning games are powerful tools that leverage the principles of gaming to enhance educational experiences. By incorporating elements of game design, such as challenges, rewards, and interactive narratives, these approaches promote engagement, motivation, and deeper learning. They create dynamic learning environments where students can actively participate in their education, making learning both enjoyable and effective.

5. *Interactive Labs and Virtual Field Trips*. Interactive labs and virtual field trips are innovative educational tools that utilize technology to enhance experiential learning. They provide students with opportunities to explore complex concepts and real-world environments in a controlled, engaging manner. By simulating hands-on experiences, these tools help overcome geographical and logistical barriers to education, fostering deeper understanding and engagement among learners.

6. *Practice in Safe, Simulated Environments*. Practice in safe, simulated environments is an educational approach that allows students to engage in realistic scenarios without the risks associated with real-world consequences. This method is particularly valuable in fields where practical skills are crucial, such as medicine, engineering, and aviation. By utilizing technology such as virtual reality (VR), augmented reality (AR), and computer simulations, educators can create immersive learning experiences that enhance skill acquisition, critical thinking, and decision-making abilities.

7. *Personalized Learning Through Adaptive Immersive Technologies*. Personalized learning aims to tailor educational experiences to meet individual students' needs, preferences, and learning styles. Adaptive immersive technologies play a crucial role in this process by leveraging data and user interactions to create dynamic, responsive learning environments. These technologies, including virtual reality (VR), augmented reality (AR), and artificial intelligence (AI), provide personalized pathways for learners, enhancing engagement and effectiveness.

8. Mixed Reality for Assessments and Competency-Based Training. Mixed reality (MR) combines elements of virtual reality (VR) and augmented reality (AR) to create immersive environments where digital and physical objects coexist and interact in real-time. This technology offers innovative approaches to assessments and competency-based training, allowing learners to demonstrate their skills in realistic scenarios while receiving immediate feedback. By integrating MR into educational and training programs, educators can enhance the assessment process, ensuring that it is more comprehensive, engaging, and reflective of real-world competencies. These practical activities enable students to apply theoretical knowledge in controlled, immersive settings, bridging the gap between academic learning and professional practice. Immersive technologies foster active learning, critical thinking, and real-world problem-solving skills-qualities essential for

future specialists. As immersive tools become more accessible, they will play an increasingly vital role in preparing students for the challenges of modern professional environments.

Table 3

BENEFITS OF IMMERSIVE TECHNOLOGIES IN TEACHER PREPARATION

Various Fields	Examples of Applications
Classroom Simulations for Real-World Practice	Platforms like *TeachLivE* simulate a virtual classroom where trainee teachers can practice handling various student behaviors and classr oom challenges. This builds confidence and helps improve decision-making before they encounter real students
Enhanced Pedagogical Skills	VR can simulate diverse teaching environments, such as inclusive classrooms or rural settings, preparing teachers to handle students from different cultural and socio-economic background
Development of Soft Skills and Empathy	*Augmented reality* (*AR scenarios*) allow teachers to experience life from the perspective of students with learning disabilities, such as dyslexia or *Attention-Deficit/Hyperactivity Disorder* (*ADHD*), fostering empathy and adaptive teaching strategies
Collaborative Learning and Peer Review	*Mixed reality* (*MR environments*) provide spaces for trainee teachers to collaborate, observe each other's teaching in virtual settings, and give peer feedback, enhancing reflective practices and cooperative skills
Gamified Learning for Teacher Motivation	Immersive environments leverage *game elements* to create engaging training modules, motivating future educators to explore various teaching techniques and assessments actively
Immediate Feedback and Analytics	Some immersive platforms offer real-time analytics and feedback on performance, helping trainee teachers track progress and identify areas for improvement

These technologies are shaping a generation of educators equipped with both theoretical knowledge and practical skills, ensuring they are well-prepared to engage diverse classrooms effectively in the digital age.

Conclusions

The analysis of immersive technologies as an educational strategy leads to several key conclusions related to the tasks outlined in the article: *Pedagogical Potential* (Immersive technologies significantly enhance student engagement, motivation, and active learning by providing interactive and realistic environments. They promote critical thinking, problem-solving, and hands-on skills, which are essential for future professionals in various fields); *Effectiveness Across Disciplines* (VR, AR, and MR have demonstrated success in disciplines such as medicine, engineering, and STEM education, where experiential learning is crucial. These technologies provide opportunities for simulation-based learning, enabling students to practice complex tasks in a risk-free environment); *Challenges to Integration* (While immersive technologies offer many benefits, their adoption faces obstacles such as high implementation costs, technical barriers, and the need for specialized teacher training.

Overcoming these challenges requires institutional support, collaboration, and investments in infrastructure and training programs); *Impact on Student Outcomes* (Studies show that students exposed to immersive learning environments experience improved academic performance, increased motivation, and better skill retention. These technologies help bridge the gap between theoretical knowledge and practical application, fostering readiness for real-world challenges);

Recommendations for Adoption (To ensure the effective use of immersive technologies in education, institutions must develop strategic frameworks for their integration. This includes teacher training, curriculum adaptation, and funding models to make these tools accessible. Pilot programs and ongoing assessments are recommended to measure long-term impacts on student success).

In conclusion, immersive technologies represent a transformative strategy in modern education, equipping future specialists with the competencies needed for a dynamic, technology-driven workforce. Their effective implementation requires addressing current challenges while continuously evaluating their impact on learning outcomes.

REFERENCES

1. Bosa, V. P. (2020). The Use of Immersive Learning Methods and the Case Method in the Professional Training of Philologists. *Innovative Pedagogy*, Vol. 29, T. 1, pp. 43–48 [in Ukrainian].

2. Chemerys, H. et al (2021). Strategy for Implementing Immersive Technologies in the Professional Training Process of Future Designers. *Journal of Physics*: *Conference Series*. IOP Publishing, 1933 (2021) 012046 [in English].

3. Dymova, I. (2022). Immersive Approach in the System of University Education. *Current Issues of Humanitarian Sciences*, *48*(1), pp. 289–293 [in Ukrainian].

4. Elmqaddem, N. (2019). Augmented Reality and Virtual Reality in Education. Myth or Reality? *International Journal of Emerging Technologies in Learning, 14*(3), 234–242 [in English]. https://doi.org/10.3991/ijet.v14i03.9289

5. Ferrante, D. (2017). Kickin' It New School. A cutting-edge classroom simulator at UCF is helping educators become better teachers [in English]. https://www.ucf. edu/pegasus/kickin-new-school

6. Herrera, F., Bailenson, J., Weisz, E., Ogle, E., & Zak, J. (2018). Building Long-Term Empathy: A large-scale comparison of traditional and virtual reality perspective-taking. In *Plos One* (Vol. 13, Issue 10) [in English]. https://doi.org/10.1371/journal. pone.0204494

7. Lege, R., & Bonner, E. (2020). Virtual Reality in Education: The promise, progress, and challenge. [in English].

8. Palamar, S. P., Bielienka, G. V., Ponomarenko, T. O., Kozak, L. V., Nezhyva, L. L., & Voznyak, A. V. (2021). Formation of readiness of future teachers to use augmented reality in the educational process of preschool and primary education. *CEUR Workshop Proceedings* [in English].

9. Popova, L. M. (2022). Formation of Media Literacy as an Actual Component of the Transversal Competence of the Future Teacher. *Educational Scientific Space,* National Pedagogical Dragomanov University, Vol. 3 (2–2022). Kyiv: Lira - K. Publishing House, pp. 91–99 [in English]. https://doi.org/10.31392/ONP.2786-6890.3(2).2022.10

10. Palamar, S., Brovko, K., & Semerikov, S. (2023). Enhancing Foreign Language Learning in Ukraine: Immersive Technologies as Catalysts for Cognitive Interest and Achievement Information. *Technology and Implementation* (IT&I-2023), November 20–21, 2023, Kyiv, pp. 69–81 [in English]. https://ceur-ws.org/

11. Yaremchuk, N., Nazar, S. (2021). Pedagogical Conditions for the Formation of Virtual Educational Space of a Higher Education Institution. *Youth & Market, 7–8* (193–194), pp. 54–61 [in Ukrainian].

12. Kolmakova, E. O. (2022). Immersive technologies as a modern educational strategy for training future specialists. *Ukrainian Studies in the European Context*, *5,* pp. 177–182 [in Ukrainian].

13. Tkach, Yu. (2017). VR-Technology as a Method and Means of Training. *Educational Discourse, 3–4* (17–18), pp. 309–322 [in Ukrainian]. https://od.kubg.edu.ua/index.php journal/article/download/444/392/1251

14. Khmelnytska, O. (2023). Application of Immersive Technologies as a Progressive Direction of Modernization of Professional Education. *Bulletin of the Cherkasy National University named after Bohdan Khmelnytskyi.* Series: Pedagogical Sciences, *(2),* 191–197 [in Ukrainian]. https://doi.org/10.31651/2524-2660-2023-2-191-197

Попова Л.

ІМЕРСИВНІ ТЕХНОЛОГІЇ ЯК СУЧАСНА ОСВІТНЯ СТРАТЕГІЯ ПІДГОТОВКИ МАЙБУТНІХ ФАХІВЦІВ

Імерсивні технології, такі як віртуальна реальність (VR), доповнена реальність (AR) і змішана реальність (MR), революціонізують сучасну освіту, забезпечуючи інтерактивне освітнє середовище, засноване на досвіді. У цій статті розглядається вплив цих технологій на підготовку фахівців у різних галузях, включаючи охорону здоров'я, інженерну, педагогічну та професійно-технічну освіту. Імерсивні інструменти покращують залученість студентів, практичні навички та критичне мислення, моделюючи сценарії реального світу в безпечному та контрольованому середовищі. Крім того, вони пропонують персоналізований досвід навчання, сприяють співпраці та долають розрив між теоретичними знаннями та практичним застосуванням. Університети в усьому світі все частіше застосовують технології занурення, щоб модернізувати викладання та покращити результати навчання. Ці інструменти забезпечують динамічний, захоплюючий досвід, який дозволяє студентам взаємодіяти зі складним матеріалом поза межами традиційних методів у класі. Інтерактивне навчання покращує концентрацію та запам'ятовування знань. Висвітлюються основні принципи побудови занурювального освітнього середовища. Зі швидким розвитком цифрових інструментів інтеграція занурювальних технологій покращує експериментальне навчання, сприяє взаємодії та поєднує теоретичні знан-

ня з практичними навичками. Дослідження визначає ключові завдання, зокрема аналіз педагогічного впливу, оцінку ефективності цих інструментів та визначення викликів. Результати дослідження підкреслюють покращення результатів навчання, мотивації та критичного мислення серед студентів. У статті робиться висновок про те, що технології занурення є важливими для сучасної освіти, готуючи спеціалістів до динамічного, орієнтованого на технології робочого середовища. У контексті стрімкого технологічного розвитку ці інструменти пропонують нові освітні можливості, сприяючи інтерактивному навчанню на досвіді та долаючи розрив між теоретичними знаннями та практичним застосуванням. Мета дослідження — оцінити ефективність імерсивних технологій у покращенні залученості студентів, утриманні та набутті навичок. Основні завдання включають визначення педагогічних переваг, оцінку проблем і дослідження їх практичної інтеграції. Результати досліджень показують, що захоплююче середовище покращує мотивацію, здатність вирішувати проблеми та критичне мислення. Дослідження робить висновок, що технології занурення є важливим компонентом сучасних освітніх стратегій, озброюючи майбутніх спеціалістів компетенціями, необхідними в галузях, що розвиваються, орієнтованих на технології.

Ключові слова: доповнена реальність (AR), критичне мислення, навчання на досвіді, імерсивні технології, змішана реальність (MR), мотивація, вирішення проблем, залучення студентів, віртуальна реальність (VR).