HOW VR AND AR ARE CHANGING EDUCATION IN 2025

Dilnozaxon Saidkarimxonova

Lecturer at the Department of Information Technologies and Systems, National Pedagogical University of Uzbekistan.
E-mail: dsaidkarimxonova@gmail.com

Annotation: *The article discusses the rapid development of Virtual Reality (VR) and Augmented Reality (AR) technologies in education as of 2025. It highlights how these tools are transforming teaching and learning by providing immersive, interactive, and cost-effective experiences. The text explains that schools, universities, and training centers are increasingly adopting AR/VR to make complex or abstract subjects easier to understand through virtual laboratories, simulations, field trips, and practical exercises in safe digital environments. The article also reviews several of the most effective and popular AR/VR educational platforms of 2025, emphasizing their unique features, benefits, and ways they enhance modern education.*

Keywords*: AR, VR, AI-assistant, EdTech, blending IT and pedagogy, cloud + library model, Interactive Learning Environments, STEM and Data-Driven Education, Project-based learning (PBL)*

Introduction. In 2025, VR (Virtual Reality) and AR (Augmented Reality) technologies continue to evolve quickly, bringing more immersive, interactive, and affordable educational experiences. Schools, universities, and training programs are using them to make abstract or hard-to-visualize concepts more accessible, to give virtual labs, simulations, field trips, and hands-on practice in safe virtual environments. Below are some of the top platforms making waves in AR/VR education in 2025, what makes them stand out, and how they can be used. Below are some of the best and most popular VR and AR educational platforms in 2025.

Analysis and Results

1. zSpace. zspace.com zSpace is one of the most famous AR/VR platforms used in schools. It allows students to interact with 3D objects on a screen using a special pen or stylus — no headset is required. Students can explore human anatomy, physics, chemistry, and engineering models. For example, a biology student can rotate and explore a human heart in 3D and see how it works.

Here are what zSpace offers that connect strongly with EdTech trends:

Headset-Free AR/VR Laptops & Devices. zSpace launched the Imagine Learning Solution in 2025, a headset-free AR/VR laptop tailored for younger students / elementary education. This device uses special displays (zView tech) so students can see 3D content without 3D glasses or headsets. Also, their "Inspire" laptops or

earlier hardware allow similar AR/VR content with head-tracking and stylus interaction.

AR/VR Learning Content Aligned with Curriculum. They provide a library of lessons / apps / simulations in science, math, engineering etc., which are aligned with educational standards. Examples: "Math Island," "Scholarlab," and "Career Connection Lessons" in their Studio A3 product line. These help students explore abstract mathematical concepts, perform virtual experiments, etc.

AI Integration

zSpace has introduced zSpace AI tools. One is the Career Coach AI that helps students explore career paths through simulations, advice, localized information etc. Another is zKnow, an AI-assistant for educators that helps with finding lesson plans, technical resources, aligning content, etc. This saves teachers time.

Hands-On / Experiential Learning.Students can manipulate 3D models via a stylus, observe virtual objects from different angles, experiment safely (e.g. lab simulations). This gives them an experience closer to real, physical interaction, which aids understanding of complex, spatial, or abstract concepts.

2. EON Reality (EON-XR) eon-xr.com EON Reality offers a huge library of VR and AR lessons. Teachers can also create their own interactive experiences. This platform helps schools and universities bring virtual lessons to students all over the world. It works on computers, tablets, and VR headsets. EON-XR is great for hybrid or online classes because it's easy to share and use. EON Reality is an established company (founded in 1999) that focuses on augmented reality (AR), virtual reality (VR), and mixed reality (XR) solutions for both education and industry. Their flagship platform is EON-XR, a device-agnostic XR environment where educators, trainers, and content creators can build, share, and use immersive AR/VR lessons. One core goal is making AR/VR content creation accessible without requiring coding skills for teachers and subject matter experts. EON-XR is a strong case of how immersive technologies intersect with educational IT (EdTech) in several ways:

Blending IT and pedagogy: It embeds interactive technology (3D, AR, VR) into

courses, turning passive learning into active exploration.

Scalable content management: The cloud + library model allows schools to manage, distribute, and update XR content centrally.

Data-driven insights: Because it includes analytics and assessment inside XR modules, it aligns with trends in learning analytics and adaptive learning.

Interoperability: At institutions like Carleton University, EON-XR is integrated into existing LMS (via LTI), so that XR content is part of regular course modules.

Bridging theory and practice: Students can do virtual practice in safe environments before doing real tasks (e.g. labs, surgery, technical training).
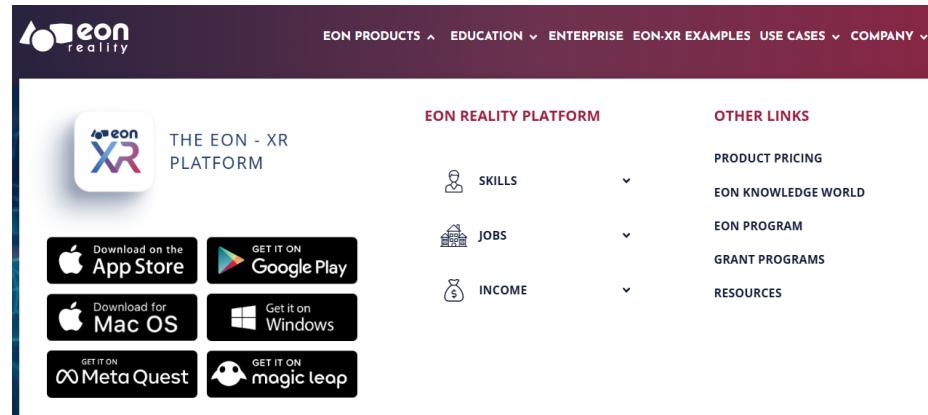
3. Merge EDU and Merge Cube mergeedu.com Merge EDU lets students "hold" digital 3D objects in their hands using a phone or tablet. With Merge Cube, students can study planets, molecules, or the human skeleton. It is simple to use and affordable, which makes it perfect for primary and middle school students. For example, in a space lesson, students can hold a spinning planet in their palm and explore it from all sides. Merge EDU is a modern educational technology platform that combines augmented reality (AR) and digital learning tools to create interactive and engaging classroom experiences. It stands at the intersection of education, information technology, and immersive learning — helping students learn complex scientific concepts through 3D visualization and simulation. Merge EDU is a strong example of how information technology is transforming education. It integrates several key IT concepts: a) Interactive Learning Environments. Traditional learning often depends on static images or text. Merge EDU introduces interactive 3D models that students can manipulate. For example, they can rotate a model of the human brain, zoom into its parts, or simulate how blood flows through the heart. This kind of interactive multimedia system enhances cognitive engagement and helps students learn through exploration — a core principle of educational informatics. b) Cloud-Based and Mobile Technology. Merge EDU uses cloud technology to store educational content and 3D models, making them accessible anywhere. Teachers can manage classes, assign lessons, and monitor progress through the Merge Dashboard. Because the system works on mobile devices and tablets, it supports ubiquitous learning — students can continue lessons outside the classroom, at home, or even in
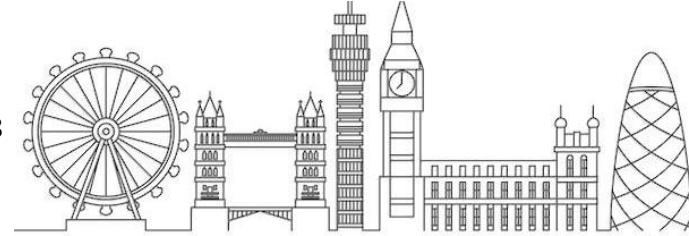
virtual group projects. c) STEM and Data-Driven Education. Merge EDU aligns with the goals of STEM (Science, Technology, Engineering, and Mathematics) education. It offers simulations for physical science, life science, and earth science. Teachers can collect and analyze student performance data, supporting evidence-based teaching — a key trend in educational IT. d) Integration with Other Digital Tools. Merge EDU connects with other educational IT systems like: Learning Management Systems (LMS) such as Google Classroom. 3D modeling software like Tinkercad and Sketchfab. These integrations make Merge EDU part of a larger digital learning ecosystem that blends different technologies into one educational process. As a part of the broader field of educational information technologies, Merge EDU supports data-driven, interactive, and visual learning, which are key components of 21st-century education.

4.CoSpaces Edu https://www.delightex.com/edu CoSpaces Edu (cospaces.io/edu) is an innovative educational platform that combines 3D design, coding, augmented reality (AR), and virtual reality (VR) to help students learn creatively and interactively. It is widely used in STEM, computer science, art, and social studies classes around the world. CoSpaces Edu allows teachers and students to create their own virtual 3D worlds, animate scenes, and code interactions using simple programming tools like CoBlocks (block-based coding) or JavaScript. Students can then explore their creations in VR or AR, bringing digital content to life. CoSpaces Edu supports 21st-century learning skills such as creativity, collaboration, problem-solving, and digital literacy. It can be integrated into:

Project-based learning (PBL): Students build 3D models for science, history, or storytelling projects.

STEM and coding education: Helps learners understand programming logic and spatial design.

Language and art education: Students design virtual stories, exhibitions, or language-learning games.
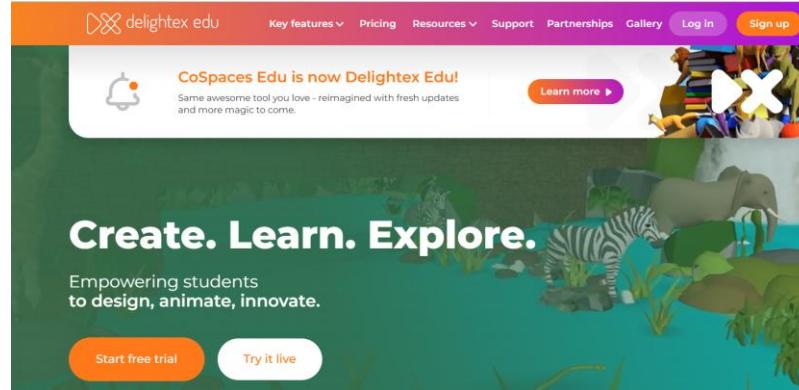
Teachers can assign students to create a 3D historical city, simulate scientific experiments, or design virtual museums. Students can explore and interact with these creations in VR, deepening understanding and engagement.

5. ClassVR classvr.com ClassVR is a complete classroom VR solution. It
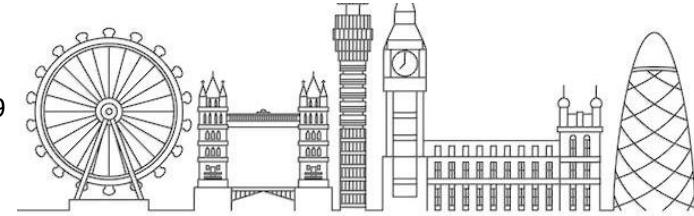
includes headsets, a teacher control system, and a big library of ready-to-use lessons. Teachers can guide students through virtual field trips — like visiting ancient Egypt or exploring the solar system. ClassVR helps schools use VR easily without needing complex setup or technical skills.
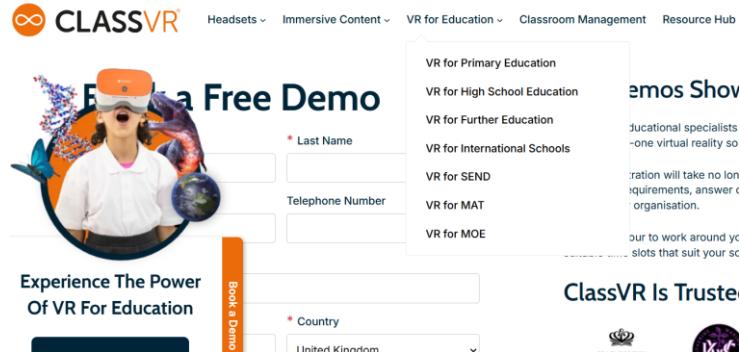
6. Virti virti.com Virti is designed for realistic training and soft-skills development. It allows learners to experience real-life scenarios in VR and get feedback powered by artificial intelligence. For example, medical students can practice talking to patients, or business students can improve their communication skills. It is used in many universities and companies.

Conclusion. In 2025, the newest AR and VR platforms are becoming easier to use and more affordable. Many of them can now run directly in a web browser, so students do not need expensive devices. Artificial intelligence (AI) is also being added to help teachers create content faster and analyze student progress. Another big trend is combining physical classrooms with digital overlays — so that students can see extra information or animations while looking at real objects. AR and VR are no longer just futuristic ideas — they are real tools that help students learn better today. These technologies make lessons more engaging, more visual, and more interactive. Whether it's exploring space, building a robot, or practicing surgery, VR and AR give every student a chance to learn by doing. The future of education will continue to blend the real and virtual worlds — and platforms like zSpace, EON Reality, Merge EDU, CoSpaces Edu, ClassVR, Virti, and MolecularWebXR are leading this exciting change.

REFERENCES

1. "Learning beyond realities: exploring virtual reality, augmented reality, and mixed reality in higher education — a systematic literature review." Discover Education, 2025. Analyzes how VR, AR, and MR are being used in higher education, what kinds of studies are being done, what challenges remain.
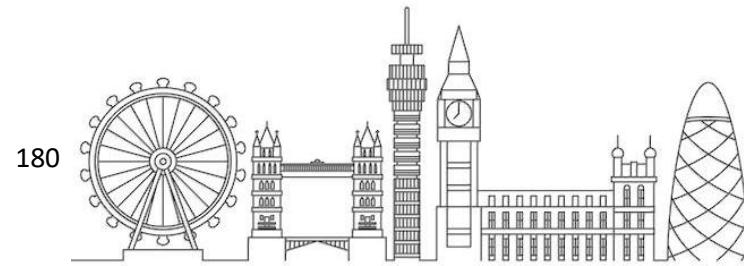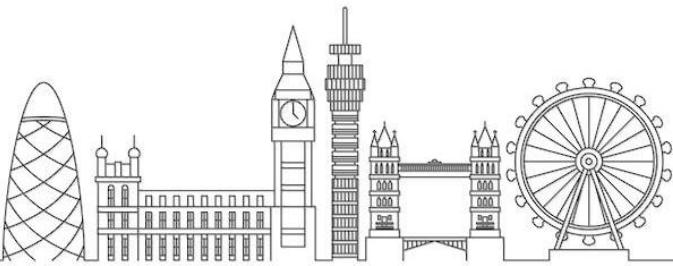
2. Yinkun Zhu & Yu-Sheng Su. "Virtual reality trends and challenges in teacher education: a systematic literature review." Interactive Learning Environments. 2025.

3. Belen Bermejo, Carlos Juiz, David Cortes, Jeroen Oskam, Teemu Moilanen, Jouko Loijas, Praneschen Govender, Jenniifer Hussey, Alexander Lennart Schmidt, Ralf Burbach, Daniel King, Colin O'Connor, David Dunlea Article: "AR/VR Teaching-Learning Experiences in Higher Education Institutions (HEI): A Systematic Literature Review" (2023) — University of Balearic Islands (Spain), Hotelschool The Hague (NL), Haaga-Helia (Finland), Technological University Dublin (Ireland), etc.

4. https://science-research.org.uz/index.php/UJTI/article/view/702

5. View Of INFORMATIKA VA AXBOROT TEXNOLOGIYALARI FANINI O'QITISHDA AR TEXNOLOGIYALARIDAN FOYDALANISH METODIKASI | FRANCE - SCIENTIFIC REVIEW OF THE PROBLEMS AND PROSPECTS OF MODERN SCIENCE AND EDUCATION

6. TO'LDIRILGAN BORLIQ ILOVALARINI YARATISH DASTURLARI BILAN ISHLASH | Journal of new century innovations

7. https://www.delightex.com/edu

8. https://www.classvr.com/resource-hub/blog/5-best-virtual-reality-in-education-examples/. By Brittany Allanach

9. 10 Best Examples Of VR And AR In Education. By Bernard Marr. https://bernardmarr.com/10-best-examples-of-vr-and-ar-in-education/