

Despite some challenges, the benefits of artificial intelligence far outweigh the difficulties. Businesses that embrace artificial intelligence in warehouse logistics will be able to optimize their operations, stay competitive, and grow in the digital age.

References

1. McKinsey & Company. (2022). Automation in logistics: Big opportunity, bigger uncertainty. <https://www.mckinsey.com>
2. Deloitte. (2021). AI and the future of work in logistics. <https://www2.deloitte.com>
3. Statista. (2023). Warehouse automation market size worldwide from 2017 to 2025. <https://www.statista.com/>
4. IBM. (2020). How AI is transforming supply chains. <https://www.ibm.com/us-en>
5. Amazon Robotics. (2023). How AI-powered robots support fulfillment centers. <https://www.aboutamazon.com>
6. PwC. (2022). AI in logistics: Benefits, use cases, and implementation strategies. <https://www.pwc.com>

THE ROLE OF VIRTUAL REALITY IN EDUCATION

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The role of Virtual Reality(VR) in education is expanding rapidly, with teachers increasingly integrating this technology to enhance students' skills and facilitate virtual explorations of the world, making it possible to discover the environment and modern technologies for common disciples sitting in the classroom. By simulating real life and scenarios, VR has the potential to revolutionize how students learn and understand complex subjects.

Many students have uncommon specialty, for their studying they can require expensive equipment, and VR provides comfortable conditions for practicing their skills. For example VR creates radical stimulating experiences that can be manipulated to practice scenarios or duplicate situations, this is extremely useful for clinicians, and can be proved by a huge count of sources and universities and schools of nursing.

The benefits of adopting VR in medical training are innumerable: Medical training costs are often difficult to assess. The price of implementing simulating systems varies. Regardless, VR works at a reduced cost with fewer resources.

Traditional healthcare training requires the involvement of expensive equipment, such as high-fidelity mannequins. VR eradicates the need for such expensive equipment. Furthermore, VR training can occur anywhere and at any time. This removes the expense of travel and accommodation. VR-based medical training can reduce costs without disturbing the quality of education. Learning is best established when it is done at one's own pace. This applies more to medical training. VR allows trainees to practice at their own pace and use whatever materials they need. The ability to repeat training sessions helps learners perfect their lessons.

Repeated virtual reality (VR) simulations allow learners to progressively sharpen their practical abilities, the more practice participants make the more skills they get, so they develop muscle memory and enhance confidence. VR stands out for delivering fully immersive experiences, and when integrated into healthcare training, it has transformative potential. The result is a rich, multisensory learning environment that deepens retention and accelerates skill acquisition. VR helps bridge the gap between knowledge and real world application, because it blends theoretical instruction with hands-on virtual practice that is why VR is so appreciated. It allows learners to understand complex medical procedures and concepts better. There is an example of an educational institution in which VR is used. The Johns Hopkins School of Nursing has adopted VR training across all educational tiers. Healthcare professionals utilize VR platforms to study diverse topics – from surgical techniques to everyday nursing tasks. Their training encompasses everything from emergency resuscitation to post operative care. The standard VR setup used in these programs includes an Oculus headset paired with an Alienware computer, it also uses handheld controllers to enhance cognitive processing and decision making during simulations.

VR provides a wide range of advantages in medicine. Medical and traumatic emergencies are often overwhelming, particularly for novice healthcare professionals. Preparing young doctors to handle these complex situations before they face them in real life remains a significant challenge. Other training methods have more drawbacks than VR. For example artificial methods don't provide emotional intensity and realism, and other methods are too expensive. Immersive virtual reality (IVR) presents a

promising and innovative solution. Trainees who experience VR based medical instruction consistently report enhanced understanding of anatomical structures, decreased surgery times in real life scenarios, improved safety for both healthcare providers and patients, and a boost in psychological confidence. Moreover, VR training helps lower costs and training time. Notably, 68% of nursing learners and 58% of medical interns note that VR based training substantially reduced their anxiety surrounding the prevention of occupational injuries. Beyond practitioner training, VR also serves as an educational tool for patients. It can help them better comprehend their diagnoses and treatment plans. Clinical professionals can use virtual environments to demonstrate the long term effects of unhealthy behaviors. Such unhealthy behaviors are substance abuse, metabolic disorders, tumor progression, and the damage caused by smoking or alcohol to vital organs like the lungs and life. VR is really useful for hospitalized or chronically ill patients, it provides a valuable emotional connection. Patients can use headsets or other devices, to visit their homes and interact with family members in real time. With the installation of a 360 degree camera in the patient's home, the immersive experience closely replicates the feeling of physically being there. During the COVID pandemic, VR played a critical role in remote healthcare delivery. It was widely used to support telemedicine, limit the spread of infection, plan treatment strategies, and raise public awareness about the virus and its prevention.

For improving interaction between lecturer and student VR can be used, for example there are enormous counts of experiences in Physics, or ancient artifacts that have not copies or cannot be displayed alive. This is extremely helpful when the student and the teacher are in different places, but for full understanding the learning process requires illustrating the teacher's actions.

VR does not just enhance content delivery – it transforms the collaborative dynamics of education, because it creates borderless, interactive, and culturally enriched group learning spaces. Therefore, VR is a powerful ability to improve meaningful collaboration among learners. Unlike traditional classroom setups, VR environments are still actual regardless of geographical barriers and allow students from different parts of the world to interact in shared, immersive spaces. Through these

virtual platforms, students can work on group projects, participate in brainstorming sessions, and take part in real time discussions – regardless of their physical location or state. This creates a unique setting where teamwork becomes more dynamic, this allows students to exchange ideas and explore diverse problem solving strategies from a global perspective. This approach is much better than video calls or chat based tools can offer. Students are not just talking – they are co-existing in simulated environments where they can manipulate 3D objects, visualize abstract concepts, and respond to body language through their avatars. This multi sensory participation builds stronger interpersonal connections, increases engagement, and cultivates 21st century skills like digital communication, cross cultural literacy, and creative thinking. A compelling real world example of this is the collaboration between Harvard University and Zhejiang University in China. In a groundbreaking cross continental lesson, students from both institutions used the Rumii social VR platform to conduct a joint anthropology class. Half of the students were physically based in Harvard, the other half in Zhejiang – but inside the virtual classroom, they were fully present as avatars. Together, they explored and analyzed ancient Egyptian hieroglyphs discovered in a tomb, using virtual tools to interact with digital artifacts and contextual environments. This setup allowed not only knowledge exchange, but also cultural immersion and peer learning that would be difficult to replicate in traditional formats.

Every part of learning develops different things; they describe what Virtual Reality advances are: VR technology makes it possible for learners to "learn by doing" as it provides an environment for them to experiment, practice, and simulate real life scenarios. By creating unforgettable experiences, learners are involved with interactive objects that improve their understanding of complex ideas.

In addition, VR systems offer real time feedback and assessments within the virtual environment. VR tracks the student's actions, responses, and performance, VR can provide immediate feedback on their progress, identify areas of strength and weakness, and offer appropriate guidance. Adaptive feedback helps students self assess their understanding and make adjustments in real time to improve their learning outcomes.

VR field trips put an end to traditional barriers to experiential learning, allowing students to explore distant, historical, or even fictional locations without leaving the classroom, enriching education across all subjects and levels. One of the most transformative contributions of Virtual Reality to modern education is the advent of virtual field trips. These experiences allow students to explore global destinations, historical sites, or environments without ever leaving their classroom. With just a headset and a controller device students can access rich any place they want, interactive experiences that previously required significant logistical and financial planning and investment. To reveal traditional barriers we can just mention budget constraints, safety concerns, administrative hurdles, and so on, the list of requirements for ordinary trip travelling can grow bigger and bigger. As a result, many educators avoid planning such trips altogether, despite their known educational value. VR simulates powerful field trips and makes experiential learning accessible, affordable, and scalable. With VR, geographical boundaries become irrelevant. A classroom in Massachusetts can explore the Amazon rainforest, the Great Wall of China, or the surface of Mars – all in one week. Even more compelling, temporal boundaries disappear as well. Students can “visit” ancient Rome during the height of the empire, or explore cities as they existed before major historical events like wars or natural disasters. Additionally, teachers can design fictional journeys – bringing students inside the world of a novel, myth, or sci-fi setting, turning literature into a lived experience. This not only enhances comprehension but makes it possible to feel deeper emotional and cognitive connections to the subject matter. For example, students can investigate any subject, they can explore inside a cell, tour the human body, or walk through virtual galleries and study brushwork. Learners can observe cultural rituals or simulate physics experiments or engineering design challenges. This makes VR adaptable across all areas and grade levels – from primary education to university lectures.

Virtual field trips provide versatile inclusive learning opportunities. Students who face barriers due to physical disabilities, chronic illness, or other challenges gain equal access to learning experiences. It also allows schools in remote areas to offer the same opportunities as traditional educational institutions.

Virtual Reality (VR) is gradually transforming education by enhancing learner engagement, developing interactive learning experiences, and allowing experiential skill development. Teachers increasingly apply VR so that learners can access new concepts and technologies within the classroom.

One of the largest advantages of VR is that it can provide cost effective training for students in medicine. Realistic simulations make it possible for them to practice procedures without the need for expensive equipment. Studies have shown that VR based medical training enhances learning, reduces costs, and increases confidence among healthcare professionals. Additionally, VR will help patients acquire information about their diseases and treatments and aid remote healthcare deployments, particularly in the event of epidemics like the COVID 19 pandemic. Aside from medicine, VR allows collaborative learning in different parts of the world. It provides virtual platforms for students to work together on, for example Harvard University and Zhejiang University. Further, VR gives access to education for physically challenged students or students with geographical limitations.

Another significant benefit of VR, it offers virtual field trips, eliminating the barriers of cost and logistics. Students can travel to historical sites, other countries, or even imaginary worlds, enhancing their understanding of various subjects.

Overall, VR bridges the gap between theory and practice, making learning more interactive, accessible, and effective in a host of fields.

References

1. VR in Medical Training: Top Benefits and Use Cases
2. How Virtual Reality Improves the Standards of Medical Education and Training
3. VR in Higher Education: with Examples
4. The Reality of VR Field Trips