Trend 2

EXTENDED REALITY

The End of Distance

Extended reality technologies provide a bridge that connects people, places and information.

And as the technology evolves, it has greater potential to close the gaps of distance, addressing significant pain points in health and healthcare, transforming the ways people work and live.

Virtual and augmented reality technologies comprise "extended reality" or XR—which blurs the lines across physical and simulated worlds. XR technology makes immersive experiences commonplace, it solves for distance, minimizing its relevance. In healthcare, this has important implications.

Imagine an elderly patient in a rural setting has a consult with a world-class expert without ever leaving his or her own home. A surgical resident practices surgery in a virtual setting at home, rather than operating on cadavers in a medical facility. A nurse uses a vein finder to insert an IV on the first try. A war veteran rebounds from PTSD through cognitive therapy in a virtual environment.

Virtual Reality (VR)
VR visually takes the user out of their real-world environment and into a virtual environment, typically using a headset for viewing coupled with hand-held controllers to navigate virtual space.

Augmented Reality (AR)
AR overlays digital objects (information, graphics, sounds) on the real world, allowing the user to experience the relationship between digital and physical worlds.

Extended Reality (XR)
XR refers to the spectrum of experiences that blurs the line between real world and the simulated world. The technology immerses the user through visuals, audio, and potentially olfactory and haptic cues. The two major types of XR are virtual reality and augmented reality.

Physical actions in healthcare require quick access to information. XR brings it all closer together, such as overlaying digital information during a physical task like surgery. In fact, 82 percent of health executives agree that extended reality is removing the hurdle of distance in access to people, information and experiences.

Distance to people

XR has tremendous potential to close gaps between employees, patients and providers. For employees, XR allows training scenarios to be set up anywhere, run, replicated and adjusted to give a firsthand experience of a variety of situations. To close distance for patients, Florida Hospital Tampa is using virtual reality models to allow neurosurgeons, patients and their families to see inside the anatomy of a patient's brain tumor or aneurysm. Patients can better understand their situation and make more informed medical decisions, and doctors can create detailed surgical plans and share those models so that other clinicians may learn these complex procedures.[1]

[1]"Florida Hospital Tampa Integrates Virtual Reality Into Surgical Planning and Patient Education," Florida Hospital website, October 25, 2016

XR can close the distance between concept and practice for healthcare providers and their students. For instance, a world-renowned sub-specialist can be training a medical resident in another country on a new technique. XR will also help businesses address the largest workforce challenge they face: the distance between themselves and the talent they need to grow. XR allows access to an on-demand workforce, which enables healthcare organizations to tap expertise in thousands of skills from anywhere in the world.

With the help of XR, patients can enjoy the removal of distance when it comes to their care. Most health executives (82 percent) agree that extended reality solutions enable organizations to close the distance gap in offering services to customers. For instance, distance may make it such that a patient can only see a non-specialist to treat a condition. XR can bring a specialized physician right to the patient in an immersive experience.

Distance to information

XR is helping to eliminate the distance between consumers and clinicians—and also the information providers need to get work done. It places a rich level of detail at a clinician's fingertips, removing potential barriers to decisions. For instance, a surgeon can wear XR glasses to see real-time digital content overlaid on the physical world without their attention being drawn away from the patient on the operating table. When information is superimposed on top of a physical action, doctors may have better precision and achieve outcomes that weren't possible in the past.

XR is not only closing the distance to information, but also the distance to new insights. Emerging XR tools express data in 3D environments, closer to the way humans actually see and imagine scenarios. This clears the way for new types of visualizations—and new discoveries in healthcare.

For instance, surgeons in Texas are using 3D mapping and imagery as a "GPS system" to better navigate complex anatomy, making surgical procedures more precise. Doctors recently used the technology to perform a minimally invasive sinus procedure. The system records the surgery and the surgical planning, which can be used to train other surgeons on this complex procedure.[2] The Body VR creates interactive 3D builds of traditionally 2D medical imaging, like CT scans and MRIs, to provide a more intuitive view of medical conditions.[3] Similarly, Oxford researchers have created VR models of genetic data to better visualize what happens within living cells.[4]

[2]"Texas surgeons perform first sinus surgery using AR," MobiHealthNews, March 14, 2018

[3]The Body VR website: http://thebodyvr.com/anatomy-viewer/

[4]"Virtual reality headsets might help cure genetic diseases," Futurism, September 22,2017

Consumers can be more closely connected to information through XR to help improve their lives. Accenture has developed an AI-powered solution, called Drishti, to help the visually impaired improve the way they experience the world around them and enhance their productivity in the workplace. Via a smartphone, the solution tells the user about the number of people in a room, their ages, genders and even emotions based on facial expressions. It can also be used to narrate text from books and documents, and identify obstructions, such as glass doors, to help with safety.[5]

Distance to experiences

Perhaps the greatest potential for XR-based disruption is through delivering shared and collaborative healthcare experiences. Clinicians cannot live the experiences of their patients, but they can try to better understand conditions—even gain empathy—through XR. For instance, Embodied Labs creates virtual reality labs that allow workforce training for aging services. The "We Are Alfred" lab shows young medical students how it feels to be a 74-year-old with audio and visual impairments. "The Beatriz" lab takes users on a journey of progressive Alzheimer's disease.[6]

XR allows clinicians to understand the struggle of diseases such as mental illness, and also allows those struggling to get the care they need. For instance, researchers have seen compelling results using VR therapy to address post-traumatic stress disorder in military veterans, letting patients confront triggering stressors while talking through their responses with therapists in real time.

In collaboration with the US government, the Institute for Creative Technologies at the University of Southern California created Bravemind, a virtual reality-based exposure therapy tool that puts psychologically scarred veterans in environments that allow them to face the triggers, or cues, that cause trauma. They found that stress symptoms, including depression, decreased by as much as 80 percent after the treatments.[7]

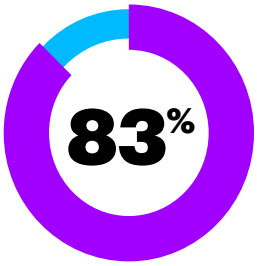
[5]"Accenture Develops Artificial Intelligence-Powered Solution to Help Improve How Visually Impaired People Live and Work;" Accenture press release; July 28, 2017

[6]Embodied Labs website: http://www.embodiedlabs.com/labs

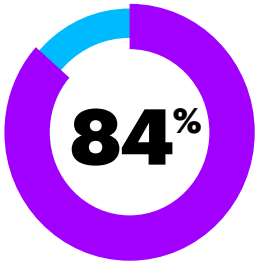
[7]USC Institute for Creative Technologies website; Medical Virtual Reality

Extended reality technologies can also help even the youngest of patients. Hospitals are using XR to distract kids from painful experiences, such as injections or dressing changes. The young child about to have an IV inserted can leave the sterile hospital room and head underwater to a virtual ocean.[8] Nicklaus Children's Hospital in Miami developed immersive VR content to train medical professionals on proper CPR techniques.[9]

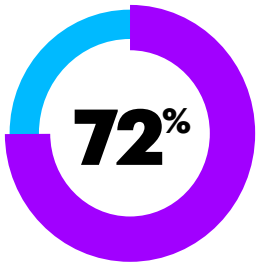
XR is pushing industry leaders to not only think differently about what is possible, but also to create new solutions that bypass the distance-based challenges they face today—a clear advantage for those that embrace it. Many (79 percent) health executives believe it's important for their organization to be a pioneer in extended reality solutions.



of health executives agree that extended reality will create a new foundation for interaction, communication and information.



of health executives believe it's important for their organization to leverage extended reality solutions to close the gap of physical distance when engaging with employees or customers.



of health executives agree that extended reality will be widespread and impact virtually every industry over the next five years.

[8] "VR could be your next painkiller," CNET, March 13, 2018

[9] "Next Galaxy to Develop Virtual Reality Applications for Miami Children's Hospital," March 2015

IMMERSIVE MEDICAL EDUCATION

The Cleveland Clinic is transitioning its current traditional, cadaver-based anatomy curriculum to a multi-platform digital experience that allows healthcare students worldwide to learn human anatomy concepts in an interactive virtual digital environment.

The multi-platform digital solution features anatomy content based on Cleveland Clinic's own medical school syllabus of clinically based learning modules. The organization is partnering with Zygote, a company that brings digital skills and insights, along with 360-degree views of 3D models of human anatomy that can be shared globally via the cloud for accessible group learning. The intellectual property, clinical skills and technical skills of these two organizations combined is setting a new standard in digital medical education.

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