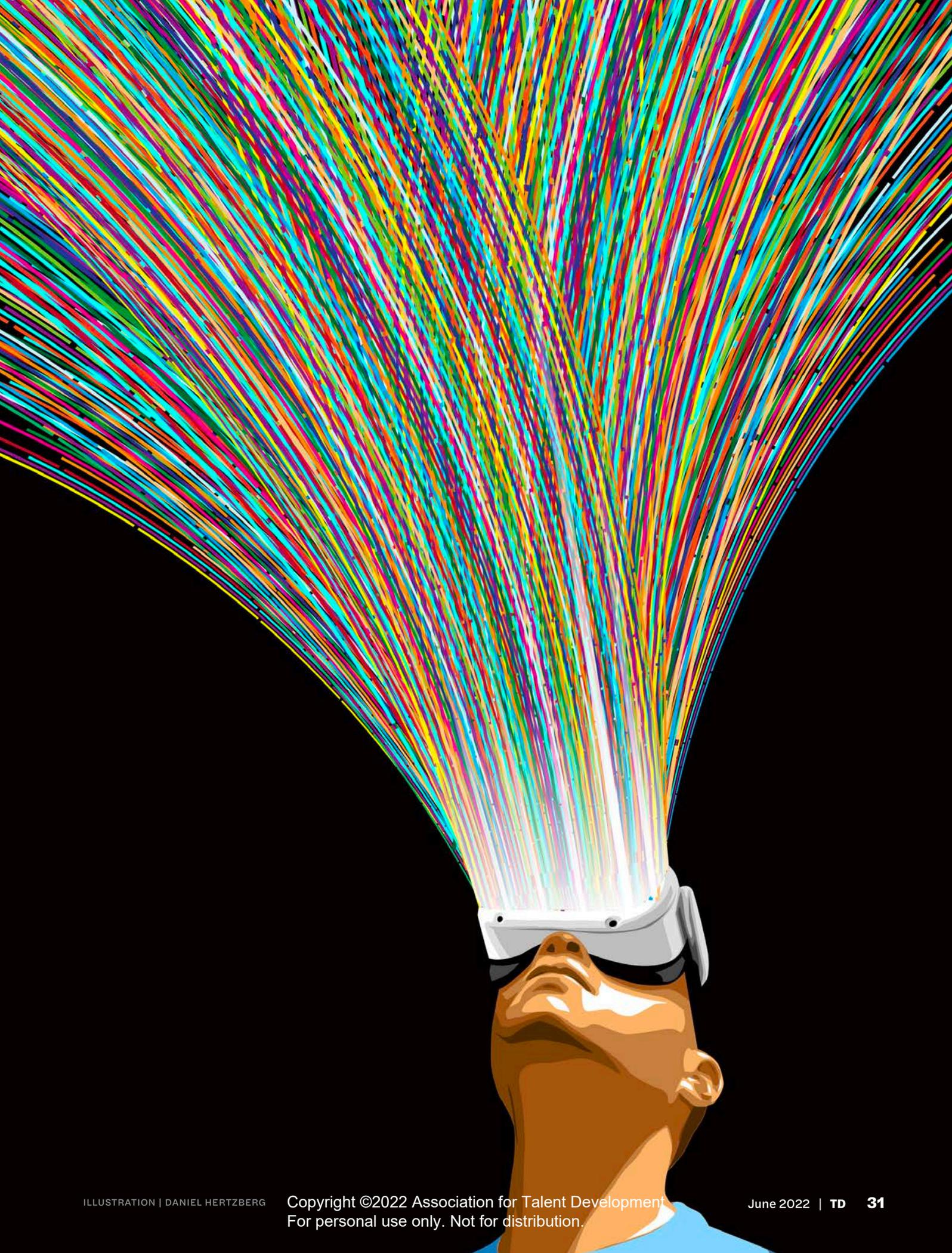


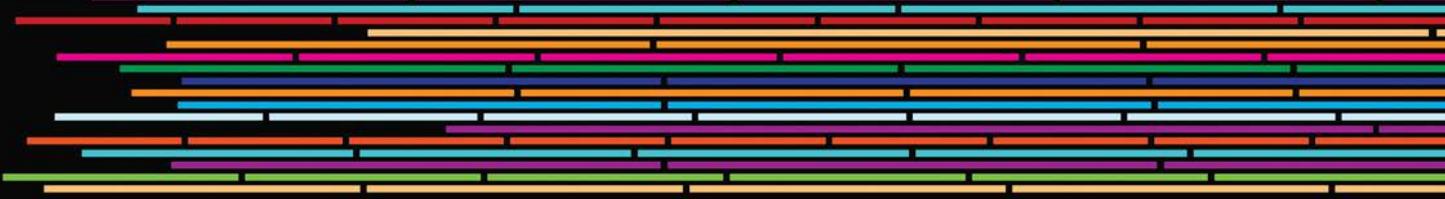


# THE DAWN OF METAVERSE LEARNING

The latest learning technologies enable learners to interact in photorealistic simulations that immerse them in experiences.

BY ANDERS GRONSTEDT





he history of learning technology is an evolution of flat pages. The real world was flattened to book pages and blackboards, which gave way to white screens and televisions in the classroom. The 1990s internet boom ushered in the era of e-learning on the computer screen. The mobile computing boom of the past 15 years miniaturized instructional content to a phone screen. Microlearning made the lessons shorter and more video-based. But learners are still left in their own minds to reconstruct instructional content on glowing rectangular screens into lifelike scenes.

Now we're at an inflection point. Shared, traversable 3D immersive spaces are replacing flat pages. The next major technology shift is widely predicted to be the metaverse, which Gartner defines as "a collective virtual shared space, created by the convergence of virtually enhanced physical and digital reality."

The enterprise metaverse is about extending the physical world to photorealistic "digital twins" of building constructions, patients, cars, and more, animated by live data from their real-life counterparts. Moving seamlessly from the real to digital realms, we will interact with colleagues from all over the world as lifelike human avatars. Imagine a learner practicing product repair work on a 3D replica alongside an expert before touching the real thing. That convergence of the digital and the physical has profound learning implications—and it's already happening.

As iconic author William Gibson may say were he in the training game, "The metaverse for learning has arrived. It's just unevenly distributed."

One digital twin that has been around for almost a century is the flight simulator. Typically, commercial pilots spend two days in a full-motion simulator every six months practicing emergency procedures. It's no coincidence there hasn't been a fatal US airline crash in the past 13 years. The Miracle on the Hudson was no miracle—Captain Chesley Sullenberger had spent significant time rehearsing simulated water

landings that prepared him to famously glide a powerless jetliner into New York's Hudson River, saving all 155 lives onboard.

Pilots of the ill-fated Ethiopian and Indonesian crashes in 2018 and 2019, respectively, weren't so lucky. They were trained on the Boeing airliner with a one-hour iPad course and had no reflexes from flight simulation training to make the necessary split-second decisions to disable the software system that caused the nose-dives. The crashes claimed 346 lives, and the only person criminally charged was Boeing's head of pilot training. He faced decades behind bars for trying to save money with an e-learning class instead of simulation training.

That raises the question: Why wouldn't companies use a "flight sim" for all their technical training? Industry-leading organizations are already boosting performance at scale with digital practice spaces that mirror their real-life workplaces. In navigating 3D simulators of products, manufacturing plants, stores, and labs, students learn by doing right now, building muscle memory and mastery in an emerging metaverse of learning. Instead of crowding a real-life copilot and instructor in a \$12 million sawed-off cockpit on hydraulics, learners can sit in their living rooms with a \$299 virtual reality headset and interact with instructors and other students from all over the world. That's less than the cost of an iPad.

## VR: A portal to the metaverse

A new generation of reality-bending VR headsets is your portal to the metaverse. VR is to the metaverse what phones were to mobile computing and PCs were to the early internet. But instead of users looking at a touch screen and pinching, swiping, and zooming, the head-mounted VR displays take users through the frame. Learners can look in any direction, talk, walk around, gesture, and manipulate objects with their hands. VR completely engulfs the senses, offering a visceral sense of presence, a feeling of going to another place.

Priced below manufacturing cost, the market-leading Oculus/Meta Quest VR headset has recently reached the sales threshold of 10 million units, which is considered to be the critical mass necessary to kick off a virtuous cycle of new content and new users. Gartner thinks VR technology is mature enough that it's no longer part of its *Hype Cycle* reports on emerging technology.

When mass-market augmented reality headsets arrive, the digital and physical workplaces will blend seamlessly. VR takes users anywhere; AR brings anything to users. AR headsets such as Microsoft's HoloLens offer a prototype of a future where digital performance support overlays the real world. Developing comfortable, affordable, and useful AR headsets has been described as the biggest technical challenge of the next decade.

Users can also access the metaverse in "pancake mode" through the convenience of mobile phones, tablets, and laptops. For example, instructors at Alarm.com can simply open their laptops to enter a virtual construction site, where installers wearing VR headsets practice wiring alarm systems. Trainers can watch over students' shoulders, correcting, demonstrating, and debriefing.

"Our partners thought it was very cool and gave a sense of having a teacher with them helping them through the exercise," says Ian McConnell, manager of digital learning at Alarm.com. "This will elevate our educational offering and will support our partners in a new way," adds Katie Bernal, senior director. Alarm.com students need VR headsets to learn hands-on installation skills, but instructors can access the simulator cross-platform via a PC.

For *Spark City*, Walmart's *Sims*-inspired 3D game, users play it straight from a phone or tablet. Players are in control of their in-game avatars and are challenged to manage the dry grocery department on a quiet morning. As the fictitious day progresses, the store becomes more crowded with customers who need assistance. When the inventory, customer service, and sales scores hit their targets, players level up

to the lawn and garden department, where they manage a team of four associates. In the final assistant store manager level, they practice getting ready for the Black Friday customer rush.

What 3D experiences on the mobile phone lack in immersion, they make up in reach. *Spark City* has been downloaded more than a half million times.

Those and other visionary organizations are already harnessing the unlimited flexibility of the virtual world to upend enterprise training and human performance as we know it with embodied learning, deliberate practice, analytics, and storytelling.

## Trade unions offer embodied cognition

The International Finishing Trades Institute (iFTI), the training arm of the International Union of Painters and Allied Trades, uses VR for training and recruitment. Recruits and students step into a virtual construction site and drag a virtual tape bazoooka to tape a drywall seam from floor to ceiling. The simulation suspends disbelief, lending a sense of actually being a drywall finisher.

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"How many times can you try out a job before you select a profession?" asks Simon Hazelwood, apprenticeship training representative for the iFTI's Canadian region. "Now you can experience exactly what it's like to have a career in the finishing trades."

The iFTI will offer such experiences during expositions and recruitment drives, and they will be publicly available on VR app stores. "We are appealing to a generation of recruits who've grown up in 3D virtual environments. This might be new to us, but it's commonplace for them," says Tom Pfundstein, director of curriculum and instruction at the iFTI. The embodied cognition of walking around and manipulating objects with our hands in VR while we see, hear, and touch helps commit skills to memory, aiding in retention and application.

### Deliberate practice

Immersive simulations can break skills down into small, achievable, well-defined steps with immediate feedback. Students at Pfizer, Novartis, and Bristol Myers Squibb learn to conduct lab experiments and compound drugs with step-by-step video tutorials, feedback, and guided practice. Next, they move to the “professional level,” which mimics the real-life working experience without hand-holding. Multiuser simulations elevate the learning experience by providing the sensation of working shoulder to shoulder with colleagues, just like in real life. For instance, students can conduct collaborative tasks, handing each other equipment and inspecting each other’s work.

Succeeding and failing together, the cohort builds trust with one another. Learners can also interact naturally with instructors. “An instructor can demonstrate how to seal PVC tubing and hand the sealer to a student standing to the right, who can grab it and rehearse the same task,” explains Humberto Vega, senior director at Bristol Myers Squibb. His VR simulations build virtuosity by offering deliberate practice at the edge of users’ comfort zones. When they get it wrong, the sim resets. There are unlimited redos in the metaverse.

### Analytics

Every digital footprint is measurable in VR. The analytics gleaned from headsets and hand controllers can track where learners walk and look, where they move their hands and bodies, and what they

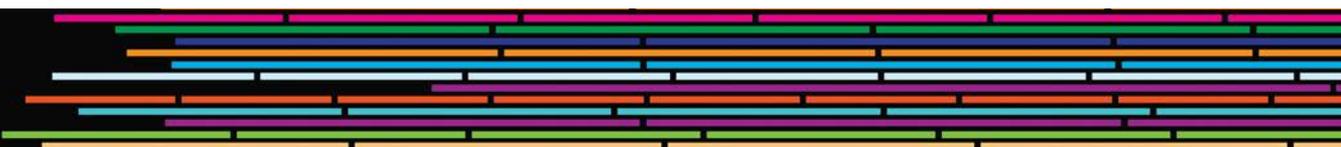
say. For example, if users cross their hands or angle them the wrong way under the biosafety cabinet, sims immediately provide feedback and start over. Reporting such data through Experience API to a learning record store and learning management system is standard practice.

Subtle head movements get tracked in real time in the American Automobile Association’s VR driving safety simulation, including how frequently and for how long users glance in the rearview mirror. For instance, if users look in the mirror for more than two seconds when a crosswalk approaches, they get feedback about it. If they fail to identify an emergency vehicle in the mirror or don’t turn their head to look at a bicyclist behind a truck, they will get an earful from the virtual instructor as well. The analytics will get even richer with the new VR headsets coming to market, which measure eye movement, facial expressions, heart rates, pupil size, and brain wave patterns.

### Storytelling

Immersive learning takes narratives to new levels. Users are not just watching a story unfold from a third-person perspective; they are the protagonist of an immersive, multisensory, and interactive first-person tale.

Team members at healthcare provider DaVita experience a virtual dialysis clinic through their patients’ eyes, eavesdropping on conversations between patients and caregivers and responding to concerns. The visceral sense of embodying another



## THE BUSINESS VALUE OF IMMERSIVE LEARNING

The business impact of this new generation of learning is real, even if the high-fidelity simulation environments aren’t. The metaverse learning return on investment is measurable in terms of reduced training cost:

- Speed—VR doesn’t just collapse space; it collapses time, reducing training by five or 10 times
- On-demand training
- Lower instructor, facility, and travel cost
- Fewer operational disruptions

ROI is also measurable in terms of improved job performance and higher engagement:

- Better efficiency, quality, and value
- Lower accident rate
- Reduced turnover
- Improved talent acquisition

person is why TED Talk speaker Chris Milk hailed VR as “the ultimate empathy machine.”

Numerous studies have validated the Proteus effect, in which an individual’s behavior in a virtual world is changed by their avatar’s appearance. It takes about four minutes in front of a virtual mirror, where learners watch themselves—perhaps as a person of a different gender, age, or ethnicity—to experience a body transfer illusion.

### Cross-functional business case

Finding the investment dollars to build this new generation of embodied and experiential simulations requires a strong business case. Most of the business training value comes in the form of cost reduction, improved job performance, and elevated engagement. It doesn’t stop with learning and human performance, though. Almost every business function will benefit. Companies can use the same 3D environments to design new products, wow customers, and meet and collaborate with colleagues.

Training leaders at global HVAC company Daikin Applied built their business case with sales and marketing. “Our VR program is a venue for sales meetings, a customer education tool, and a platform for field training,” says Laura Masica, senior director of the Daikin Learning Institute. Sales representatives can meet with customers from all over the world and give them X-ray vision inside of their giant industrial chillers, exploding them into constituent parts, and untangling their flow of water and refrigerant to visualize competitive differentiators.

“We’re leveraging the investment for recruitment as well,” adds Brian Dewhirst, a senior manager at Daikin Applied, “bringing VR headsets to high school recruitment fairs to reach the next generation of HVAC talent.”

Daikin Applied is treating VR development as a capital expenditure. “We are looking at our VR development as an investment rather than an expenditure. Capitalizing the expense is a huge recognition of the long-term viability of VR as a sales enablement tool,” says Masica. The company is recognizing that immersive learning is an infinitely malleable and scalable investment that can be amortized over many years and numerous applications.

### Reinvent learning

Daikin Applied offers an example of how the wide coinage of the metaverse has elevated the immersive learning conversation from the training function to the sales function and ultimately the C-suite. This is a time to reinvent learning. Instead of creating a better rectangular screen for instruction,

## BEST USE CASES FOR THE METAVERSE

Start your metaverse journey with a business problem that has a measurable outcome and plays to technology’s unique capabilities. The sweet spot is spatial training involving hands and body for tasks that are too dangerous, expensive, inconvenient, or simply impossible to practice or visualize in real life. Good use cases include safety, equipment operations and service, logistics, operations, manufacturing, emergency response, and healthcare training.

Soft skills training in virtual reality is harder. Some organizations use 360 video with e-learning–style branched conversations. Watching a spherical video in a VR headset and clicking on hotspots from a static camera position offers photorealism but not presence. Taking advantage of the hand and room presence of the latest VR headsets requires a computer-generated environment. The digital worlds developed in a real-time game engine enables users to move freely through the 3D scene, interact with the world around them, use their hands, and feel a complete sense of presence. Today’s VR lends itself particularly well for procedural hands-on training in purpose-built 3D computer-generated environments.

we can now bring learners inside the experience where they can learn by doing in the presence of peers, mentors, and experts.

It’s still early, however. Metaverse ambitions tend to get ahead of technical limitations. The Silicon Valley fantasy of interconnected virtual worlds where thousands of people interact in real time through avatars with transferable identities and digital augmentation of the real world is still years out.

Think back to the America Online days of the PC internet boom (or ask your parents about it), and the original iPhone 2G of the mobile internet. That’s where we are on the metaverse journey. If you were a learning leader back in those days, wouldn’t you prepare for the internet or mobile platforms? If the answer is yes, you need to prepare now for a future where the metaverse takes center stage.

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