Virtual reality technology expands to a blitz of uses, including football

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You slip a smartphone into a pair of clunky goggles and place them on your head. The room around you dissolves and you're standing on a grassy field behind a lineup of football players. You hear the crowd's cheers.

It's time to play football.

Sure, the football players look more like video game characters than real people. And you're not physically running on a field, nor do you have a football in your hand. Those goggles, a lightweight virtual headset, are your only equipment. You control the play with your eyes, deciding when to snap and where to throw.

This virtual reality program - which some call VR - is not a video game. It's a football training tool.

"With this technology, you can do four plays in a minute. Cool!" said Brendan Reilly, CEO of Eon Sports, a Kansas City startup company that produces the training program.

Because players work on mental reps in this simulation rather than engaging in physical play, this simulation could also lower the rate of injuries, including concussions.

Reilly's football software is among a tidal wave of VR programs being developed for introduction to consumers in the next year. The military

already uses VR in some training exercises, but the technology has potential uses in other areas, such as entertainment and home improvement. Architects, for instance, can create life-size virtual models of buildings rather than relying on traditional physical models.

Several companies gathered at the recent Electronic Entertainment Expo, or E3, in Los Angeles to show off their products. A few are being sold already, such as the $200 Samsung Gear VR headset, compatible only with Samsung smartphones. Other devices and programs are still in production as developers put on the final touches.

HTC will begin selling its virtual reality headset, Vive by Valve, by the end of this year, and Oculus will follow suit with the Oculus Rift in early 2016. Sony is expected to release its own headset, Project Morpheus for PlayStation 4, around the same time. Prices have not been announced for these devices, but analysts predict they'll be more than a few hundred dollars.

THE RISE OF VIRTUAL REALITY

When Reilly was a graduate assistant in 2010 to then Illinois State University basketball coach Tim Jankovich, the coach joked that he would fire him if he didn't turn his idea for a VR sports training system into reality. Reilly graduated with a master's degree, headed to California and became the CEO of a joint venture of Eon Reality and Eon Sports.

Now Reilly, who grew up in the Kansas City area, is back in town. Eon has created Sidekiq software that trains football teams with programs ranging in price from $39 to $999. He delivered his first product last year and has sold programs to almost 1,000 consumers, high school teams and college teams such as UCLA and Ole Miss.

"I had no idea how scalable this was going to become," Reilly said. "Five

years in virtual reality land is like 50 in the real world - it's like dog years. It's been crazy to watch this industry evolve and grow."

Over the past few years, increasing numbers of established companies and startups have turned to VR. At the E3 conference, companies touted virtual reality as the imminent next step in gaming technology. Whether it catches on with consumers, though, is unclear.

"Not everyone's going to want one," said Brian Blau, a research director in personal technologies at Gartner.

Not everyone will want one immediately, at least.

Virtual reality programs are now directed toward hard-core gamers, a demographic that skews heavily toward millennial males. In addition, more sophisticated VR programs require a game console, which not everyone has.

This isn't the first time virtual reality has caused ripples of excitement in the tech community, nor is it the first time doubts have surrounded its success. Twenty years ago, scientists and gamers were overflowing with the hype surrounding virtual reality, but that anticipation eventually ebbed. The technology simply hadn't caught up with the grand ideas.

This time around, developers feel optimistic that technological development has finally aligned with the ambition of the 1990s.

When Facebook reeled in Oculus, one of the biggest fish in VR, with a $2 billion acquisition in March 2014, the deal sounded a "bugle call" for the industry, said Skip Rizzo, a research professor at the Institute for Creative Technologies at the University of Southern California. Oculus had humble beginnings, raising money from donors online. But under the ownership of Facebook, Oculus now hopes to push VR into the

mainstream marketplace.

After the Oculus-Facebook deal, "companies and devices began popping up everywhere," Rizzo said. "It was like the Wild West."

Those startups will continue to appear in the next two years, which Rizzo predicts will yield both wreckage and survivors.

Device prices start high, but Rizzo is convinced that costs will drop in the next few years, especially with virtual reality applications that rely on mobile devices rather than expensive, bulky consoles.

"Everyone will have a headset in their home," Rizzo said. "They'll be like toasters."

VR IN THE MARKETPLACE: THE DESERT OF THE REAL?

Not everyone is convinced of the toaster theory.

"With virtual reality, developers are making a very big leap," Blau said. "Developers may make killer apps that draw people in, or they might not."

Raymond Wong, a product analyst for Mashable, said: "I'm not sure if people want to put these goggles on at home. It's a very isolating experience."

Indeed, total immersion in a world that occupies most of the users' senses could lend itself to previously unseen consequences.

Regis Kopper, director of the Duke Immersive Virtual Environment at Duke University, is concerned with how people make sense of their physical surroundings in a virtual space.

"When you wear a head-mounted display, you don't have your own body," he said. "In the physical world, your body is an anchor, and you lose that in virtual reality. How do you re-create touching your leg in virtual reality?"

It's one of many big questions VR researchers must confront. Simulation sickness is another. While many users' senses are occupied by the virtual world, other senses are left behind in the physical world. This discrepancy can cause a motion sickness similar to the feeling of reading a book on a bumpy train.

Researchers are investigating sometimes unexpected ways to combat simulation sickness. Scientists at Purdue, for instance, found that adding a 3-D nose to VR programs reduced symptoms of sickness.

SIMULACRA AND SIMULATIONS

Wong sees more potential for VR in commercial industries such as marketing or engineering.

Research has already pointed to VR's advantages in the medical field, Rizzo said. Once interactive intelligent agents - virtual characters - are advanced enough to respond like people, surgeons in training may be able to practice procedures with these characters. VR simulations could also be used as a way to distract patients from painful procedures, possibly becoming an alternative to pain medicine.

Education may also benefit from advances in virtual reality.

If a student struggles with conceptualizing the atomic structure, for instance, he could plop on the headset and be immersed within a virtual atom.

As companies sell, developers invent and gamers play, one philosophical uncertainty looms over the industry: How will virtual reality alter human interaction?

It's a tricky question.

"Social interaction in virtual reality is a double-edged sword," said Jeremy Bailenson, director of Stanford University's Virtual Human Interaction Lab. "On the one hand, networked avatars allow us to 'be with' anyone, anywhere, anytime. ... On the other hand, as we rely more and more on virtual interactions, the very nature of what it means to be social changes."

Different media powered by wireless connections have already transformed certain types of communication. Several researchers say virtual reality is just another medium.

"But since it will engage more human senses, there is the potential for more problems," Kopper said. "People might not be inclined to socialize as much. They might get drawn into the VR simulation."

David Whittinghill, an assistant professor at Purdue, isn't convinced. He predicts that simulation sickness will limit how long one person can stay within a virtual world. In that sense, real life is still more appealing than virtual life.

For many virtual reality developers, though, the utility of VR technologies outweighs the risk of uncertain circumstances.

Back in Kansas City, Reilly had trouble containing his excitement for the possibilities of his company's future.

"The dream is that I'm a kid in Seattle and I'm playing against a kid in

Kansas City. And we're on our own physical fields playing these holographic guys," he said. "That gets my geek juices going. And it's becoming more and more realistic."

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VIRTUAL REALITY VS. AUGMENTED REALITY

Many companies are also playing with augmented reality, which, although similar to virtual reality, has its differences.

-Virtual reality immerses users into an entirely reconstructed world. Further, users have the ability to interact with that world.

-Augmented reality blends virtual life and real life. Developers can create digital images - something like holograms - that blend in with the physical world. Users can interact with these digital objects.

The biggest name in augmented reality is Microsoft HoloLens, which shows users holograms within the real world. HoloLens is still very much in its prototype phase, though, and consumers won't see it on the market for a while.

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VIRTUAL REALITY AS SEEN THROUGH ... CARDBOARD?

Google has already introduced its own virtual reality headset that won't burn a console-size hole in your pocket. The headset is called Google Cardboard, and it's just that - a device that connects some of the most advanced technology with one of the world's most basic materials.

The headset is delivered to you as a sheet of cardboard, which you then

fold up like a piece of origami. Strap in your smartphone and voila! You have a fully operational VR headset ranging in price from $15 to $32.

The only problem?

"It's the worst VR experience you can try," said Raymond Wong, product analyst for Mashable.

It certainly doesn't reach up to the technological heights of Oculus Rift or even the Samsung Gear. But for the curious and impatient who don't have a ton of cash, it's a start.

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