

# DUALITY



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VR

# DUALITY



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# Table Of Contents

Pg 4-5 Into

Pg 6-11 Using virtual reality to overcome anxious social avoidance

Pg 12-13 Schenectady Police help create virtual reality de-escalation training program.

Pg 14-15 New Virtual Reality Tool Aims To Reduce Aviation Crashes

Pg 16-17 Researchers use VR to assess cognitive abilities in real world settings

Pg 18-19 Virtual Reality Could Play a Role in the Future of Our Health

Pg 20-29 Waiting for the Future of Virtual Reality

Pg 30-41 Interviews

Pg 42-55 Photo Essay

Pg 56-57 Credits



**The mission with this magazine is to express how virtual reality can benefit too many people and somewhat Society itself not only to Gamers but also to career jobs. Such as marketers .construction workers .mechanics. etc...**

**in virtual reality you can get the full aspect and a better idea of a subject or a product itself. Not only a better idea but also a better layout a better blueprint and a better understanding.**



Using virtual reality ...

# To overcome anxious social avoidance

By Chloe Kent

**U**niversity of Oxford spinout Oxford VR is utilising a novel virtual reality technique to help patients overcome anxious social avoidance. The company's platform translates cognitive behavioural therapy exercises into VR environments, allowing patients to face their fears in a virtual world. Chloe Kent investigates how Oxford VR is helping to treat mental health conditions.



**V**irtual reality (VR) has become increasingly prevalent across the healthcare market and is now used for a wide range of indications, from helping pregnant patients manage the pain of labour to immersive surgical training. But one area in which it could prove particularly advantageous is the treatment of mental health conditions, something one in four UK residents reportedly experience each year.



By carrying out virtual tasks, Oxford VR users can develop strategies to cope with their anxiety triggers when they experience them in the real world.

What makes VR so special is the immersive nature of the therapy – you're given a multisensorial experience that enhances the therapy and allows you to really elicit emotional and physiological responses identical to the responses you develop in a real-life situation.

Cognitive behavioural therapy (CBT) is one of the most popular and well-researched talking therapies for mental health conditions. It focuses on challenging and changing unhelpful thoughts, beliefs and attitudes by developing coping strategies that can improve a patient's related emotional regulation and behaviour. Through CBT, an anxious or phobic thought can be translated into a neutral or even positive one.

A key component of CBT is situation exposure, where patients are gradually exposed to situations that cause them distress until they lead to fewer negative feelings. A person who feels anxious about social situations may visit a busy supermarket

with their therapist, where they can work on accepting the belief that bad things won't necessarily happen to them whenever they enter a public space.

Anxious social avoidance is one of the mental health complaints targeted by Oxford VR (OVR), a spinout from the University of Oxford, through its 'OVR social engagement' platform. The company takes situation exposure and translates it into a virtual environment, where the patient is guided through an automated situation by a virtual coach, completing a series of graded tasks in different everyday environments, such as riding a bus or going to a shop. By carrying out these virtual

tasks, users can develop strategies to cope with their anxiety triggers when they experience them in the real world.

## How can VR help implement CBT?

Anxious social avoidance needs to be managed in different ways depending on the condition from which it arises. Somebody with generalised anxiety disorder, who might feel maladaptively

nervous about going to a party, will need very different treatment to someone with psychosis, who feels scared to go into a public space in case they become overwhelmed and experience a delusion. OVR social engagement is geared up to treat anxious social avoidance in people with psychosis, who experience it as a symptom of schizophrenia, bipolar or major depression disorder. OVR then has a separate

Of course, there's a case to be made that VR therapy simply cannot be as effective as real-life situation exposure – no matter how fine-tuned it is – because the patient will always know that the situation they're in isn't real. But for people with severe anxious social avoidance, carrying out situation exposure exercises in VR can be a crucial first step. Tewari says: "For individuals with psychosis, taking them into social situations to walk them through CBT therapy can be impossible,

## Improving access and assessment

Tewari says that delivering mental health care through VR allows the firm to solve a number of drawbacks associated with traditional CBT, one of which is simply accessing the treatment. Many patients find that there simply aren't enough mental health professionals available to treat them, particularly in the US where OVR is currently looking to expand. While OVR's platform

The idea it is it will deliver superior results relative to speaking therapy, because it's incredibly engaging."

product that is derived from OVR social engagement but is ultimately targeted towards severe social anxiety in people that don't experience psychosis. "The non-clinician eye will interpret some overlap between the psychosis product that we've got and the social anxiety product that we've got, but clinically they're very different," says Tewari. "People suffering from psychosis are crippled with fear about going into social situations because they are very worried that they will see more hallucinations, think through more delusions and they're also terrified about how people will react to them reacting to their own hallucinations."

impractical or totally unsafe. But VR creates the same physiological and psychological responses as being in a real-world scenario. "People do know it's not real, but your instinct reacts quicker than the logical parts of your brain. If you have a fear of heights and we simulate that environment in VR, you get stressed before your brain can logically say 'hang on, this is just a VR headset, this isn't real'. It's also important for some people to know that it's not real – if they didn't know there was a degree of fantasy then they just wouldn't do it, it would be too scary for them."

could be used alongside standard CBT with a human therapist, it's designed to function as a standalone product too. "The alarming fact I always say is that 50% of counties in the US don't have a single psychologist or psychiatrist, which is astounding when you think of how many people in the US will suffer from a mental health disorder each year," says Tewari.

Providing a way to access CBT without necessarily having to work with a therapist could prove to be a lifeline for patients who are unable to access traditional care pathways.

VR therapy does come with its own, fairly obvious, barrier, in that patients will need to purchase a VR headset. But a course of CBT can often wind-up costing even more than a VR headset in the long run, meaning



OVR's platform actually may be a better investment for some patients.

Delivering CBT via VR also helps to standardise the treatment across patient pools. While interpersonal nuances mean that individual therapists will deliver a different quality of experience for each patient, OVR leaves every patient speaking to the same virtual coach. This gives the company a baseline of quality on which the condition of a patient can be assessed.

In fact, OVR is also looking to personalise its therapies further by collecting data on patient's reactions while they're working with the VR platform. It is currently working on a functionality which will allow it

to measure data about platform users' heart and breathing rate through a wearable, in order to provide a qualitative measurement of the VR's efficacy.

While the progress of a patient undergoing talking therapy is typically assessed through a patient health questionnaire, being able to measure physiological parameters could give OVR a more objective assessment of how their product is performing.

## Trials ahead

OVR social engagement is currently being run through a randomised control trial as part of the UK NHS' gameChange project. Meanwhile OVR's non-

psychosis social anxiety product is being trialled in Hong Kong. The company also has a third product in the works, again based in the principles of CBT, this time to treat anxiety and depression.

"We're very much in the trial phase of testing our product," says Tewari. "We have a couple of partners in the NHS that are already using it as part of their usual treatment pathways. Once the Hong Kong trial is done, we'll make that available in Hong Kong, and we're stepping up some partners in the US as well."

Of course, OVR – and other platforms like it – are unlikely to eliminate the need for human therapists anytime soon. But as



they become more prevalent, they could help to expand the way we think of therapies like CBT, providing a flexible and interactive way for patients to receive mental health support.





## Schenectady Police help create virtual reality de-escalation training program. By Leanne DeRosa

Catapult Games is creating virtual reality training focused on de-escalation tactics. The Schenectady Police Department will help them create and will test different scenarios to make it as realistic as possible. The company also plans to get community feedback about police-community relations. Schenectady Police Chief Eric Clifford says de-escalation is something he's often asked about. "A common question asked, is why didn't the police de-escalate that situation? .and

what does that actually mean?" Chief Clifford said. "De-escalation is something police have been doing for years, and it's a daily, sometimes hourly task that we're involved in." The Chief says experience is the best way to experience de-escalation techniques. "But we don't have the luxury of time, to rely on time to be the experience factor, in order to improve our de-escalation techniques. That's why I'm excited to partner with Catapult Games and help them test and refine their virtual reality training application," he said. CBS6's Leanne DeRosa got to try the

training for herself. You are immersed into a scenario where you and your partner stop a driver who could be responsible for a robbery. You are given different response choices and tools to use. "Each option takes you down a different road- either escalating or de-escalating and causing different issues or resolutions to previous problems that are there." Catapult Games' Lead developer Gabriel Langlois said. "This is able to truly put them to the test and let them know where they went right and where they went

wrong." Chief Clifford says he knows the emotions won't be the same, but it can open up a dialogue for officers to discuss techniques and learn from scenarios. "They're going to be able to practice something they just trained for in real-life training, or evaluate a call that they were on, so we can learn, almost like reviewing game film if you will." Chief Clifford said. Chief Clifford says they'll discuss different tough situations to include in the training and will discuss possibly using real body-cam footage. He said they're considering creating a scenario similar to the department's July arrest that gained attention, when body cam footage appeared to show an officer kneeling on a

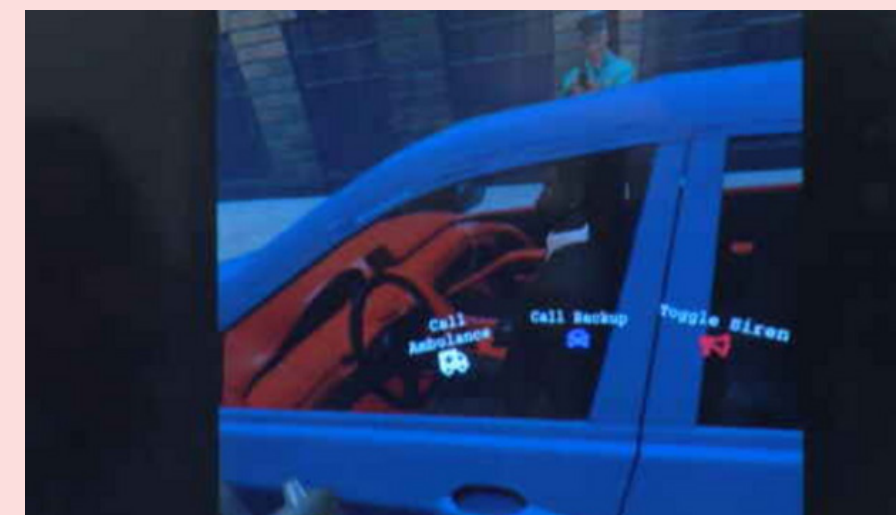
that it has a commitment to change and innovation, and I'm really excited to see the outcomes of this project and how the community can interact with this." William Rivas, the director of COCOA House and the co-founder of the Save Our Streets initiative, said. Catapult Games says after testing with Schenectady Police, they hope to share the Virtual Reality training with police across the country.

**"When you think about quitting, remember why you started."**



man's neck. "We'll go through scenarios and ask them to be developed based on real-life situations, and say 'what would you have done?'" Chief Clifford said.

"We believe that police officers will be better prepared to resolve conflicts without the use of force. Sometimes it is necessary to use force, but it should always be the last resort." Dan Jennings, the Co-founder & CEO Catapult Games, said. "With improved training, we believe there will be more trust between police and the communities they serve." The developers will also work with the Center for Community Justice to host public forums. They want people to share about their experiences with police, hoping that feedback will improve the training, and police-community relations. "The City of Schenectady and SPD have kind of shown in the last few months





## New Virtual Reality Tool Aims To Reduce Aviation Crashes

Aviation has a problem that has vexed the industry for decades: when pilots unintentionally fly into clouds, lose control and crash. From the dawn of aviation until now, it's caused thousands of accidents. It happens to student pilots and some of the most experienced aviators. Just in the last month, that's believed to be what happened in two fatal National Guard helicopter crashes in Idaho and

New York that killed six people. And, last week, the National Transportation Safety Board determined that's why a helicopter crashed in 2020, killing basketball star Kobe Bryant and eight others.

"In this situation, this weather did not sneak up on the pilot very quickly," said NTSB lead investigator Bill English about the Bryant crash. "Good people can make a bad decision and we really want to get at the bottom of why." The pilot of that flight pressed on even as the weather in southern California

worsened. He kept talking to air traffic controllers and bypassing airports where he could have landed. Eventually he flew into clouds and lost control.

Now, new virtual reality technology rolling out this month aims to help pilots make better decisions. On a recent overcast afternoon near Birmingham, Ala., a helicopter of the Jefferson County Sheriff's Office prepared for take off. Pilots Jonathan Johnson and Jerry Griffin scanned the instruments and looked for other aircraft before lifting off from the Bessemer Airport.

By Russlle Lewis

**"We pretty much know what happened. We have a very good idea of why it happened. And we absolutely know how to prevent these kinds of crashes."**

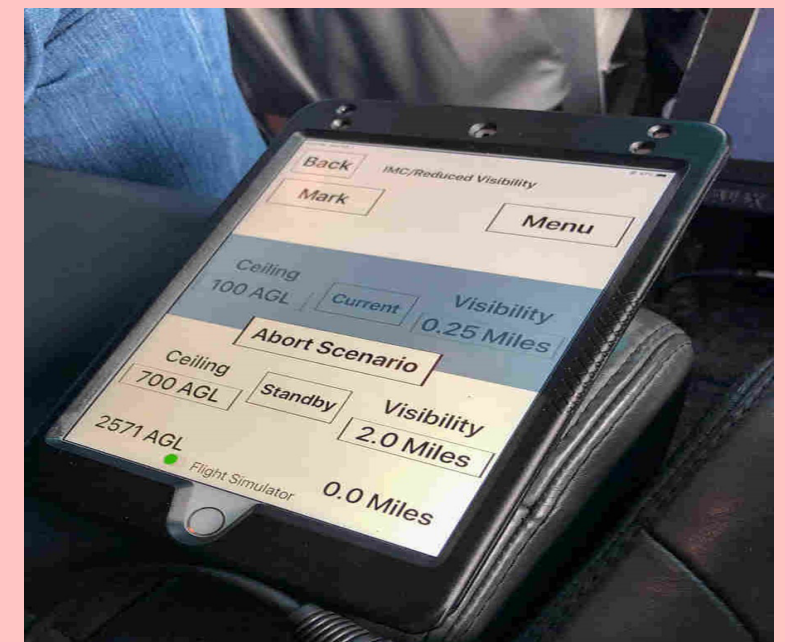
It wasn't a typical training flight. For the first time, Johnson was trying out a new virtual reality system that can simulate all sorts of weather as he flies along. Normally, when pilots train for cloudy conditions, they slip on a view-limiting device that prevents them from seeing anything outside. This system is different. Strapped to the front of Johnson's helmet is a clear plastic film. He could see inside and outside the cockpit. But, with a tap on an iPad, what the pilot sees can change quickly. As the system initialized, Johnson remarked, "The visibility is reduced a little bit. But I still got the horizon. I can see it's a little more foggy."

monitors the flight and is ready to take over if needed. With this technology, it is that 'backup' pilot who would control the software and training scenario. But on this particular flight, there was a backseat observer operating the iPad so there were no distractions.) Full-motion flight simulators have been around for decades. But, on the ground, they can't mimic certain types of in-flight dangers such as spatial disorientation. That's a confusing phenomenon where the mind and body feel one thing — but the cockpit instruments show another. That's what investigators say happened in the Kobe Bryant crash.



The virtual reality system uses a clear plastic film strapped to the pilot's helmet. Seen here, Jonathan Johnson's view is obscured by "clouds." What the pilot "sees" is controlled by an iPad. Russell Lewis/NPR

As Johnson flew on, the program kept making the weather worse. The clouds got lower. The visibility degraded. And it was all happening as he looked through the windshield. What he saw was very different to what's actually outside. This is what might happen on an actual flight in bad weather. The situation was challenging the pilot whether to press on into what would be uncertain conditions or divert and land short of his destination. (There is always a second pilot in a training scenario like this one who





# Researchers use VR to assess cognitive abilities in real world settings

By Emily Henderson

Virtual reality isn't just for gaming. Researchers can use virtual reality, or VR, to assess participants' attention, memory and problem-solving abilities in real world settings. By using VR technology to examine how folks complete daily tasks, like making a grocery list, researchers can better help clinical populations that struggle with executive functioning to manage their everyday lives.

Lead author Zhengsi Chang is a PhD student that works in the lab of Daniel Krawczyk, PhD, deputy director of the Center for BrainHealth®. Along with Brandon Pires, a researcher at

Texas Tech University Health Sciences Center, the team investigated whether VR can be used to effectively test a participant's executive functional load, or how much information a person can process to achieve a goal. Their findings were recently published in *Computers in Human Behavior Reports*. The researchers adapted the Virtual Reality Functional Capacity Assessment Tool's (VRFCAT) "kitchen test", where participants plan a trip to the grocery store by comparing ingredients in kitchen cabinets to a list of recipes. Making a grocery list is an everyday task and should therefore accurately capture participants' daily working memory and performance.

"Function-led tasks using VR technology allow us to maintain a balance between ecological validity and experimental control," said Chang. In the virtual kitchen, 42 healthy adult college students memorized a slew of ingredients from a recipe list. The participants then navigated the kitchen to check for ingredients and tried to remember which ingredients they found. They returned to their recipe list, crossing off all the ingredients they didn't need at the store. Once they finished checking their grocery list, participants picked up their wallet and left the virtual kitchen.

To test their executive functional load, the researchers increased the number of ingredients and recipes to be memorized. Participants took longer to complete their grocery lists when they had to memorize more ingredients. This aligns with the researchers' prediction that participants' task performance would decrease as functional load increases, which suggests that this VR assessment can effectively test executive functional load.

*Computers in Human Behavior Reports* Volume 2, August-December 2020, 100035  
Researchers were surprised to find that participants' working memories were not related to how well they performed the task. "People might spend the same amount of time on the task, and make the same number of errors, but they could have totally different working memory capacities," said Chang. Upon further analysis, the

This study indicates that our strategies have a dramatic effect on our capacity. If you enter into a task prepared with a plan, you will get the most out of your brain and see much better performance. Participants' performance reflects their executive function and supports the idea that the researchers' VR assessment can effectively test participants' executive function load."



**“People might spend the same amount of time on the task, and make the same number of errors, but they could have totally different working memory capacities.”**

**said Chang.**

researchers realized that participants were actually switching up their strategies as executive functional load increased. Some participants tried to memorize as many ingredients as possible before looking at the recipe while others frequently switched between rummaging through the kitchen cabinets and examining the recipe list. This strategy-switching explains why the researchers did not see a relationship between performance and participants' working memory.



# Virtual Reality Could Play a Role in the Future of Our Health

By Jessie Ace

This week, I went to Tokyo, saw elephants up close in Africa, flew over New York, and watched a stage show, all in one day. How was it possible? Virtual reality (VR), of course! Being unable to play badminton in lockdown has forced my husband to seek competitiveness elsewhere. I grew tired of him constantly asking if we could get a ping pong table in place of our dining table, so because he loves gadgets, we compromised on a VR headset.

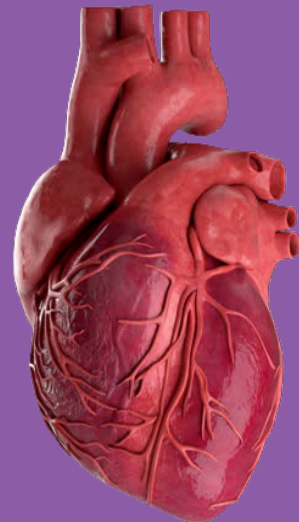
He purchased an Oculus Quest VR headset device, and I must admit I find it fascinating.

I hate being unable to be with the people I love right now, as I'm sure we all do. I also miss doing fun things like going to the zoo, the cinema, or the mall. Escaping with virtual reality is a great alternative. Visiting elephants, seeing a stage musical up close, and playing virtual sports are the perfect form of escapism. Initially, I found it challenging to use the virtual "hands" that come with the set, and to move around in a virtual environment, but once I got used to it, it was delightful.

Users can do so many things in VR, including swimming with sharks, riding roller coasters, seeing musicians, meditating, hanging out at a nightclub, or

even floating around in space if you wanted to. Some studies are looking into whether VR could help people with MS. For example, it's currently being tested for motor rehabilitation to see if it can lead to improvements in upper limb function, although that study's data seem to be inconclusive for now.

Until we see a proven connection



between VR and improvements in MS symptoms, let's think about how we might one day use this technology in other ways. Imagine in the future that we could do video calls on a VR headset to feel like we're with the people we love. I've been unable to hug my mum since March of last year, and I'm sure many others are in the same situation. Imagine if VR could provide that human connection in a safe environment, free of germs and

illness. It would be great to use it when we can't go outdoors or when we are hospitalized for long periods.

What if we could use VR to go to neurology appointments without having to be there in person, surrounded by germs and potential viruses? That would be taking telehealth to the next level. Maybe one day, VR will be used as a form of physical therapy with trained professionals showing us how to effectively move our bodies.

Or, imagine doing a VR yoga class where we feel like we're really in a classroom of people, but in reality, our downward-facing dog is in the comfort of our own homes.

The biopharmaceutical firm EMD Serono studied the use of VR to teach others about MS. Improving MS education is vital, as there is still too little understanding of the disease. The company's VR program, "MS from the Inside Out," mimics MS symptoms to provide a sensory-rich immersive environment and to show what happens to the nerve cells of people with MS.

The power of VR technology is increasing daily, and I believe it will significantly impact our lives in the future.

VR makes it feel as if we're in a completely different place, and we can almost forget it's not real when the headset is on. Taking the headset off and returning to reality is even stranger.

**VR makes it feel as if we're in a completely different place, and we can almost forget it's not real when the headset is on. Taking the headset off and returning to reality is even stranger.**

**-Jessie Ace**



Waiting for the Future

Waiting for the Future

# Of Virtual Reality

# Of Virtual Reality

By Ben Lindbergh

Despite advancements in the past four years, VR as a means of mass entertainment still seems a ways off. What will it take to change that?



sensorama

3-D MOVIES  
WITH STEREO SOUND  
VIBRATIONS  
AROMAS  
WIND

MOVIES OF THE FUTURE

- 3-D
- STEREO SOUND
- AROMAS
- WIND
- VIBRATIONS

1960-1965

**“The problem with VR was that four years ago it was way overhyped.”**



**“It was doomed to underperform by a large margin.”**

In the fictional future world of *Cyberpunk 2077*, one of the first major video games released for the latest generation of consoles, denizens of Night City turn to “braindancing” to distract themselves from their dystopian surroundings. Like SQUID recordings from *Strange Days*, braindances allow users to immerse themselves in the experiences and sensations of others by donning virtual reality headsets and re-living recorded memories preserved and transmitted via all five senses.

In *Cyberpunk* lore, the technology behind braindancing was pioneered in the late 2000s and almost immediately adapted for entertainment purposes (not

all of which were porn). In the real world, we’re well behind that timeline. Not only do we lack the tech to bring braindancing to the masses, but even the on-screen representation of braindancing in *Cyberpunk* gave epileptic gamers seizures until the buggy game was patched. *Cyberpunk 2077* itself shipped with no native VR support, preventing VR-equipped players from pretending they were taking an authentic braindancing trip.

The latest depiction of a future in which VR entertainment is ubiquitous arrived at the dawn of a new hardware generation that thus far seems like a setback for VR gaming. The last generation was a watershed for widespread access to VR. As of last January,

Sony had sold more than 5 million units of its PSVR headset for the PlayStation 4, which launched in October 2016. That figure fell far short of the most optimistic estimates—one overexuberant analyst forecasted 6 million sales in 2016 alone—and it’s a pittance compared to the total number of PS4 systems sold (approximately 115 million). But the PSVR provided an important proof of concept, delivering quality, living-room VR in an easy-to-set-up accessory for a widely available gaming platform.

That tangible progress toward a utopian vision of VR makes the present state of the market more perplexing. For decades, VR was the stuff of science fiction, and either technologically impractical

**However, the devices and content have been improving**



**to make it start to look slightly interesting to a mass consumer base.”**

or effectively unaffordable. In the past five years, though, that has changed: The headsets are real and at least somewhat spectacular, if not fully refined. However, the future of VR as a means of mass entertainment remains almost as murky as ever.

Three prominent pieces of hardware—the Oculus Rift, the HTC Vive, and the PSVR—entered the VR arena within a space of roughly six months in 2016. There were plenty of problems with the PSVR. At launch, it cost as much (\$399) as the PS4 did when it launched in late 2013. In the early going, good software was scarce. The headset was wired, restricting players’ freedom of movement

by tethering them to the console, and its screen resolution and simplistic handheld controllers—repurposed PlayStation Move wands—were soon surpassed by state-of-the-art PC-based or stand-alone VR rigs.

Over time, though, the PSVR amassed a large library of games that convincingly demonstrated the potential of VR. Some of my most memorable gaming moments of a console generation packed with great games came courtesy of the system. The first time I played 2016 release *Star Wars Battlefront Rogue One: X-Wing VR Mission*—a mouthful of a title for a roughly 20-minute tech demo—I, like a lot of converts before me,

was convinced that VR would be a big part of the future of console gaming. The intervening years have only deepened that impression: *Star Wars: Squadrons* proved that the promise of *X-Wing VR Mission* would hold up in a full-length title, while VR-enabled ports added new dimensions to existing titles such as *Skyrim*, *Resident Evil 7*, *No Man’s Sky*, and *Superhot* and VR-exclusive titles like *Moss*, *Astro Bot: Rescue Mission*, *Beat Saber*, and *Blood & Truth* showed what developers could accomplish when they designed games around VR functionality.



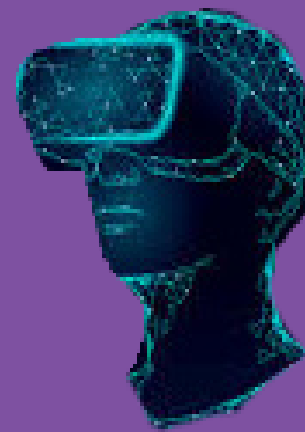
Yet the purportedly bright future of VR didn't come closer to arriving with the mid-November debuts of Microsoft's Xbox Series X/S and Sony's PlayStation 5. Microsoft's Xbox One never supported VR, and although the company—which has experimented with mixed reality on PC—promised that its souped-up Xbox One X would add VR capabilities, it later backtracked on those plans. In November 2019, Xbox brand head Phil Spencer discounted the possibility that Microsoft's next console would support VR, saying, "We're responding to what our customers are asking for, and ... nobody's asking for VR." Last February, Spencer confirmed that the Series X/S wouldn't launch with a VR device, although he added that he hoped that in the future, "it's something that's so important that it would be a no-brainer for us to go support it."

The more demoralizing development for VR enthusiasts is Sony's seeming lack of interest

in a successor to the PSVR. Although the PS5 is backward compatible with the PSVR, it requires a free camera adapter to connect to the device. PS5 games released to this point haven't supported PSVR, which means that even new VR-capable games—such as the forthcoming *Hitman 3*—must be played via their graphically inferior PS4 versions to take advantage of VR. Those PS4-era PSVR games are at most modestly enhanced when played on PS5, which means there's little reason for a PS4 owner to upgrade for VR-related reasons alone. As if to hammer home the PS5's aversion to VR, one of the system's best-received launch games—the pre-installed, Sony-published *Astro's Playroom*—didn't support VR despite being a sequel of sorts to celebrated PSVR platformer *Astro Bot: Rescue Mission*. Instead, *Astro's Playroom* served as a playable demo for the PS5's DualSense controller, which boasts adaptive triggers and

precise haptic feedback.

That's not to say that Sony has permanently turned its back on VR. In 2019, Sony SVP of R&D Dominic Mallinson laid out the improvements in store for next-gen VR technology, including higher resolutions, wider fields of view, wireless headsets, and gaze tracking that would identify exactly where the player's eyes are focused. Last year, the company closed a Manchester studio that was founded to create VR games, but it also filed patents that pointed to the possibility of a more immersive, motion-sickness-resistant headset and more sensitive controllers. Bloomberg reported that the company intended to manufacture a follow-up to the PSVR, which one Sony



job listing seemed to support.

Yet last September, PlayStation CEO Jim Ryan referred to VR as an "unproven space." In an interview with *The Washington Post* that was published the following month, he added, "I think we're more than a few minutes from the future of VR." Although Ryan reaffirmed the company's commitment to the credo that VR would one day "represent a meaningful component of interactive entertainment," he acknowledged that that day would not arrive until after 2021, adding, "Will it be this year? No. Will it be next

year? No. But will it come at some stage? We believe that."

It's hard to dispute that the VR market was somewhat stagnant in 2020, a boom time for interactive entertainment. Although gaming growth was expected to be lackluster in 2020 as software releases and hardware sales slowed in advance of the new console launches, the pandemic prompted players to spend more money and time on indoor, socially distanced pursuits. Anyone who'd read *Snow Crash* or *Ready Player One*

percent compared to 2019, even as the games and interactive media industry grew 12 percent year-over-year (up from 4 percent from 2018 to 2019). In December, SuperData principal analyst Carter Rogers told me that the company was projecting a 14 percent decrease in overall VR revenue in 2020, largely because of the closure of location-based entertainment venues such as VR arcades and VR attractions in theme parks.

Not all of the news was negative. Although SuperData noted that the premium mobile segment of the VR market had "effectively died" as platforms phased out support for the Samsung Gear VR and Google Daydream, sales of stand-alone

would have anticipated that VR would provide the perfect escape for players who were unable to enjoy real-life outdoor adventures, and for those who were already on board, it did: According to a year-in-review report published by gaming-centric Nielsen subsidiary SuperData, 71 percent of VR headset owners used their devices more last spring than they had previously.

Yet due in part to a slowdown in PSVR sales, VR headset shipments dropped by 15

VR rigs such as the Valve Index (which came out in 2019) and the Facebook-funded Oculus Quest 2 (which launched last October) increased 19 percent, even though they were often out of stock thanks to pandemic-induced production delays. And as digital game revenue jumped by 12 percent—14 percent after February—VR game revenue rose 25 percent, almost keeping pace with the 28 percent spike in premium console earnings.



Much of the boost to VR software revenue was attributable to the March release of Valve's *Half-Life: Alyx*, a highly acclaimed, VR-exclusive entry in the storied series that sold nearly 2 million units in its first six months and generated more revenue than all PC VR titles in 2019 combined. Numerous reviewers praised *Alyx* as a killer app that could influence future titles and boost the fledgling VR modding community. Rogers says it "rejuvenated interest in the tech among many hardcore gamers." *Alyx's* length and production values stood out in a market crowded with smaller-scale experiences, but a larger install base could make it more viable for major developers to work on bigger-budget VR-only titles, such as Respawn's *Medal of Honor: Above and Beyond* (which came out in December) and Ubisoft's upcoming installments in the *Assassin's Creed* and *Splinter Cell* series. More must-play games by big-name studios—like *Grand Theft Auto* developer Rockstar, which has dabbled in VR but has left *GTA VR* support to the modders, possibly because of its parent company's long-standing skepticism about VR's broad appeal—could, in turn, encourage more people to pick up headsets.

It's tough to say how many non-PSVR players already have. "Facebook made a decision years ago, it seems, to be nonspecific when discussing how many VR headsets were shipped," says Ian Hamilton, managing editor of VR/AR news site Upload VR. "That's made it exceedingly difficult for anyone to measure the scale of adoption." Based on

the subset of Steam users with VR headsets—1.7 percent in December, down slightly from the immediate aftermath of *Alyx*—Hamilton estimates (based on announced Steam user totals) that there are "likely a couple million VR headsets in regular use on PCs," in addition to an unknown number (also "likely in the millions") of stand-alone headsets that aren't connected to a PC.

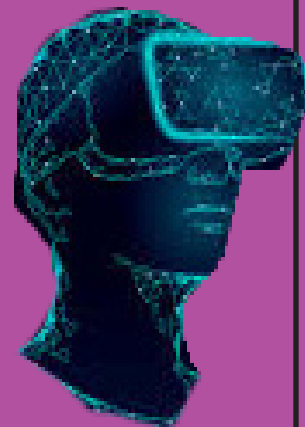
In October, consulting firm Activate Inc. projected an eightfold increase by 2024 in "spending by U.S. consumers and businesses on virtual and

augmented-reality products." Although there are many non-gaming-related applications of VR technology, analysts predict that gaming will be the biggest driver of revenue growth, with recent estimates of global gaming-related VR revenue projecting totals of nearly \$50 billion (or more) by 2026 or 2027. For now, though, VR is still a niche entertainment market, accounting for only \$589 million of the \$126.6 billion spent on digital games last year.

Rogers reports that stand-alone headsets like the Quest 2—which, with a little technical legwork, can play any PC VR

game without wires—will spur most of the coming VR uptake among mainstream consumers. "In the past, the main barriers to growth for VR were the price and complexity of 'tethered' headsets, and the fact that consumers weren't very willing to pay for content on phone-based headsets (e.g., Samsung Gear VR)," he says. "Stand-alone devices have sidestepped both of these issues, and we expect steady growth going forward."

Hamilton agrees that wireless headsets have been a boon to VR gaming, saying, "Wires are terrible for VR—you get tangled and twisted up and never forget the wire is there. The wires need



to go away across the board for PC VR (and console-based VR) to grow significantly."

Even without wires, though, the mechanics and convenience of VR remain much more onerous than those of regular gaming. Hamilton has called the \$299 Quest 2 an "uncomfortable facebrick," and he adds that "this bulk is a massive barrier to enjoying VR." Hamilton isn't the only reviewer to critique how the Quest 2 feels, and that's the state of the art. Others have taken Oculus to task for forcing owners to log in to the device via Facebook accounts and for tracking and storing user data.

Currently, no company is investing the resources to compete with Oculus, which controls more than 51 percent of the PC VR market per the latest Steam survey. "I really think a company more focused on a consumer electronics product and infrastructure needs to come along to drive growth," Cole says. "Sony and Microsoft have their own areas of focus, and VR doesn't push the needle much for them. The challenge with going against Oculus is Facebook has focused on getting the price way down. They are going with a 'make it cheap and they will come' strategy."

I think there needs to be a large company with a 'make it fun and they will come' strategy. Right now there are just not many companies willing to make that effort or take that risk."



Cole still sees Sony as the most likely to step up, despite the console maker's silence about its road map for the PSVR. Rogers concurs. "VR really doesn't fit with Microsoft's gaming strategy of everything being cross-platform on console, PC and streamed via the cloud, so they're unlikely to focus on hardware that requires very distinct gameplay and controls," Rogers says. "For PlayStation, we're projecting that a successor to the PSVR won't arrive until at least 2022, as Sony likely wants to keep the focus on the PS5 itself in the near future. However, this is poised to be a major force in the market based on the early success

movement tracking is a standard part of an affordable VR headset, we should see social connection via virtual reality become a far more compelling and common thing than it is today. Any and all of these improvements will expand the addressable market for VR." They might also decrease the risk of accidentally whacking one's dog with a Move controller, a mistake I once made during a heated Beat Saber session. (She was fine, but I still felt bad about it.)

wrote last year. Those eight years have spanned three generations of consoles. Maybe the breakthrough will come before a fourth arrives.

**become a far more compelling and common thing than it is today**



of the original hardware."

Whichever manufacturer ultimately grabs the most market share, gamifying fitness in VR could become another lucrative route to consumer spending. "A \$300 Quest 2 headset and a \$20 per month subscription to Supernatural is a legitimately fun way to exercise," Hamilton says. "I believe we'll see Facebook and possibly others, like Apple, focus more on this use for VR in the next couple years."

The prospect of sweating in a VR environment may be more appealing when advances in technology enable hardware with a smaller, lighter, glasses-shaped form factor, like the theoretical Cyberpunk-style design Facebook's VR research division presented last year. Hamilton continues, "When full-body

For all its virtues, VR is still expensive, still cumbersome, still space-intensive, still isolating, and still evolving too rapidly to be comfortable buying now. It's also still so impressive in person that it seems certain to stick around and fulfill its promise—someday. "VR has been five minutes away from some kind of breakthrough for about eight years," Polygon's Ben Kuchera

**"When full-body movement tracking is a standard part of an affordable VR headset, we should see social connection via virtual reality**



# INTERVIEWS

In this part of the magazine we will receive feedback from people who have experience VR but not only experience VR but also see the benefits of VR as well such as VR roles in the future and also interview of those who have never tried VR but are hoping to get into it.





# Robin

Source: Dicord

**“Better problem solve without  
the need to expend”**

I like it! I've been looking to get a vr headset for myself  
Probably an oculus quest

Definitely has high potential for great things in lots of  
fields if put into the correct hands

I think its helpful when it comes to online relationships  
with other people, as it allows a more personal experience  
than just texting or calling

Creating 3d virtual spaces to test out schematics and ideas,  
especially when it comes to engineering and such, to better  
problem solve without the need to expend excessive time  
and financial resources on materials and test runs

Say, if a software was created to make realistic simulations

With how fast we have already advanced technology in the past  
20 years, it's hard to really say where itll go from here

I'm guessing a lot more automated processes, I know apple is  
in the process of making glasses that work like an augmented  
reality headset

I'm sure there will be scandals too, people using headsets to  
illegally gain biometric information from unsuspecting people  
for example

# Megan

Source: College

better General understanding

but will be difficult for some who are used to the old ways



I think virtual reality is nice and all especially with the investment in technology and in some way shape or form I only see it as a form of entertainment for now at least

As far as virtual reality helping someone mentally I believe it really wouldn't help them mentally aura improve their mental health I feel as if it was somewhat decrease it, if anything I feel as if it would handicap them just a little bit more effect of becoming attached to that reality and starting to lose a little bit of reality itself a little bit. virtual reality is nothing more but a hobby. Like for example when you go to the gym to decrease depression it actually increases depression

When it comes to the careerforce virtual reality can help but it will also be somewhat of a handicap for someone who are used to the old ways of doing things what I mean by this is with technology advancing so far some people will have to get around and learning about it that are not used to it. Some people are just used to drawing out the blueprints and going from there but once you evolve from that to going to virtual reality and start making 3D prints that will start to become too bothersome for some. Of course it will give a better General understanding but it will also become a little bit difficult for some who are used to the old ways of doing things.



# Kennedy

Source: Dicord

In my opinion, virtual reality is not great. I say this because people will get so hooked onto it , it'll change people's realities . This isn't for all but it'll make people think differently depending on what kinds of things people do in the virtual world.

It's really a 50/50 it could benefit or not benefit. To help the depression and anxiety it could probably help them get used to the VR and learn about the real world but what would it really teach. Because what if the person does the VR and go out in the world then it didn't teach a thing. But if we are going the positive direction it could be the complete opposite, they may build up social skills, new friends maybe, learn things everyday about the world , and how to interact with things and how to handle them, though when it comes to career wise and blueprint structure I feel like it'd make their jobs somewhat easier and like you said could be demonstrated better, easier to make (the blueprints) , and easier to really layout overall .

I will get into VR one day. I feel like it'd only benefit me by entertaining me and help me on my communicating skills. I see it as a thing everybody is going to use. I feel like once everybody on the internet, out in the world , and over the world are just going to take advantage of the fact VR is a thing. We'll just see how it goes. Hopefully my opinion will change on this topic.

**“They could probably help them get used to the VR and learn about the real world ...**

**but what would it really teach...?”**

# Jay

Source: Dicord

Virtual reality is not that bad, do I feel as if now in this day and age it could do some more Improvement such as like maybe expanding The Horizon just from video games.

When it comes to mental health I think you can at the same time they can't help due to the fact that the song they will become addicted to virtuality so much that they will lose sight but also there are some who benefit from this and can take a lot from this and actually can take it to reality itself. To me it depends on the person.

It will definitely benefit the future other word for it because it will give a better understanding to something especially when it comes to Mechanical vehicles and building structures. You have more of a benefit and visual when it comes to VR in virtuality like you can actually visualize and see the inside and out of something unlike looking at a sheet.



# Bryan

Source: family

Adding virtuality is pretty nice it can help and benefit a lot of people especially when it comes to our predicament now in covid-19

People can use Virtual Reality as somewhat of an escape you have people out here who are suffering from depression anxiety and a lot of issues they are experiencing in reality. In virtual reality you can use as an escape and you can be something that you not in reality, you also can you see a different aspect of things and creativity that is in virtual reality itself it's like jumping into a new world and all of that especially when it comes to people with anxiety, they can use this opportunity to work on their cooperation skills or social skills and maybe make friends in virtuality and maybe someday meet them in real life. And actually there are actually many people who made more friends via virtual reality or online then friends in reality.

Vr definitely benefited the workforce because it gives a better General aspect of something you can actually see the inside and out of an idea and get a better understanding especially when it comes to cars and buildings and even fashion itself. like anything else when it comes to Evolution in Technology it means a decrease in philosophy. For example what are we restored to 3D models and use 3D models for fashion advertisements to the point where they actually look realistic enough that there is no need for Real Models.

Virtual Reality as somewhat of an escape



# PHOTO ESSAY

In this section, will display photos of VR progression and people experiencing VR.





LIFE











IN-GAME FOOTAGE



IN-GAME FOOTAGE





# Credits

Waiting For VR

Using virtual reality to overcome  
anxious social avoidance

Virtual Reality Could Play a Role  
in the Future of Our Health

Schenectady Police help create  
virtual reality de-escalation  
training program.

Researchers use VR to assess

New Virtual Reality Tool Aims  
To Reduce Aviation Crashes

cognitive abilities in real  
world settings

Designs

Photography

Magazine

Interview #1

Interview #2

Interview #3

Interview #4

Interview #5

Ben Lindbergh

Chloe Kent

JESSIE ACE

Leanne DeRosa

Emily Henderson

Russle Lewis

Marcus Bounds Jr

Marcus Bounds Jr

Marcus Bounds Jr...

Robin

Megan

Kennedy

Jay

Bryan

## Colophon

*this magazine takes place in modern times of today and how fast technology has evolved, technology has advanced so far that it has made almost anything easier and so much simpler but also more creative. This magazine explains the properties and benefits of virtual reality not only the benefits but also career-wise, virtual reality could be the new future of social media, professional interactions, career building, and possibly the education aspects.*

