VIEWING THE FUTURE? VIRTUAL REALITY IN JOURNALISM

Knight Foundation

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A Key Moment

Journalism underwent a flurry of virtual reality content creation, production and distribution starting in the final months of 2015.

The New York Times distributed more than 1 million cardboard virtual reality viewers and released an app showing a spherical video short about displaced refugees. The Los Angeles Times landed people next to a crater on Mars. USA TODAY took visitors on a ride-along in the "Back to the Future" car on the Universal Studios lot and on a spin through Old Havana in a bright pink '57 Ford. ABC News went to North Korea for a spherical view of a military parade and to Syria to see artifacts threatened by war. The Emblematic Group, a company that creates virtual reality content, followed a woman navigating a gauntlet of anti-abortion demonstrators at a family planning clinic and allowed people to witness a murder-suicide stemming from domestic violence.

In short, the period from October 2015 through February 2016 was one of significant experimentation with virtual reality (VR) storytelling. These efforts are part of an initial foray into determining whether VR is a feasible way to present news. The year 2016 is shaping up as a period of further testing and careful monitoring of

Razer OSVR Open-Source Virtual Reality for Gaming. Photograph © Maurizio Pesce.

potential growth in the use of virtual reality among consumers.

At the moment, virtual reality and immersive storytelling comes in several forms: "virtual reality," which, properly defined, creates environments that allow people to be "present" in an alternative environment; "augmented reality," which starts with the real world and overlays virtual objects and information; and "spherical" or "360-degree" video, which captures an entire scene in which the viewer can look up, down and around. This report will refer to all such experiences as VR storytelling.

While there is general optimism among current VR content creators that use of the medium in journalism will expand, many concerns and open questions remain. They are primarily focused on the burden of production, accessibility of headsets and quality of content. They also include whether people's news consumption habits will embrace immersive behavior and how to track ad metrics. To explore these questions, Knight Foundation collaborated with the USA TODAY NETWORK to get a better understanding of what VR journalism is today, to look at which news organizations are working in VR, what the investment and financial forecasting is around VR technology, and what this medium's potential could be for news organizations.

What new perspectives might be discovered with virtual reality? Photograph © K.rol2007, https://www.flickr.com/photos/21086912@N06/4627305766

KEY FINDINGS: THE STATE OF VIRTUAL REALITY IN JOURNALISM TODAY

Through a survey of news organizations and industry analysis, several key themes are beginning to emerge about where VR in journalism stands today, where it may be headed and what questions remain to be answered:

STORYTELLING POTENTIAL

News organizations have produced powerful journalistic storytelling that aims to use VR to create a deeper connection between subject and viewer that can give people the sense that they are being brought to places where they otherwise would not be able to go.

ETHICS QUESTIONS

An ongoing debate questions the ethics of showing a fully spherical view of a scene without the ability for a journalist to focus an audience on a particular view, and whether action in spherical video is unnaturally staged in a manner that changes the authenticity of the story.

As more content is produced and headsets get into the hands of consumers, it may become more clear by the end of the year whether VR storytelling will emerge as a new medium the public is willing to embrace for news—or whether it will go the way of 3-D TV.

WHERE DOES HYPE MEET REALITY?
Perhaps the biggest question facing the nascent industry is what will happen when the novelty of VR wears off, and whether the quality of the storytelling and the VR experience will bring people back to look at the content on a regular basis.

GROWING MARKET OVERALL
The number of new investors in the technology, content creation and distribution of VR experiences increased 27 percent in 2015 over 2014 and was projected to continue to increase in 2016, according to analysts.

SIGNIFICANT MONETIZATION QUESTIONS
No current advertising standards govern the way brand messaging can or should be associated with VR viewing. While some branded content and sponsorships emerged in 2015, whether VR storytelling can be monetized by news organizations remains unknown.

ADOPTION POTENTIAL UNCHARTED
Facebook 360 and YouTube 360 are leading the way in providing simple ways to upload and use basic viewers to look at spherical video in VR. Headsets from HTC and Facebook's Oculus were expected to be released during the first half of 2016, albeit at higher-end price points that may make them unaffordable to many who want to try VR.

EXPENSIVE TO PRODUCE
Technology is rapidly evolving in terms of cameras, postproduction tools and viewers, but the time and effort of telling stories in VR remains prohibitive for many small and medium-sized news organizations.

Virtual Reality News

WHERE IT STARTED, WHERE IT'S HEADED

In January 2012, journalist Nonny de la Peña arrived in Park City, Utah, with the goal of introducing her latest project: a virtual reality experience called "Hunger in Los Angeles." Compared to the polished movies being shown for the Sundance Film Festival, de la Peña's setup was decidedly modest: a pair of headphones and a set of goggles that had been designed and duct-taped together by her intern, a 19-year-old California State University student named Palmer Luckey.

It was a moment that de la Peña, a former Newsweek reporter, had been dreaming about for years. She had poured so much time and money into the project, in fact, that she was nearly broke. The screening went exceptionally well. Viewers left the experience intrigued by "Hunger," which placed them in line at a Los Angeles food bank, watching as a man collapses from a diabetic attack. Some users were shaken; others were crying; many reported feeling empathy for the subjects. By immersing the user into another world, "Hunger," it was clear, went beyond a traditional documentary.

While de la Peña would go on to create other experiences—including ones on domestic violence and the conflict over abortion rights that would be among more than 30 VR experiences exhibited at the 2016 Sundance festival—her intern, Luckey, was refining his virtual reality headset. In August 2012, he started a Kickstarter campaign for Oculus Rift, hoping to raise $250,000. It easily topped that goal,

pulling in nearly $2.5 million and more than 9,500 backers. A year and a half later, before he had even brought a consumer version to the market, Luckey sold the company to Facebook for $2 billion.

Today, Google, Samsung, HTC, Sony and other companies have been working on their own headsets. Industry analysts are predicting that up to 34 million headsets will be sold in 2020. By 2020, Digi-Capital predicts that the augmented and virtual reality market may reach $150 billion in sales. One small company, Quantum Bakery, had a successful Kickstarter campaign for a mobile phone case that pops up into a VR viewer; it plans to release the device in 2016.

Figment VR. Photograph © Quantum Bakery

Traditional news outlets, some keen to avoid repeating their slow adoptions of the Internet and mobile devices, have begun experiments in virtual reality and 360-degree videos. In September 2014, The Des Moines Register (a property of USA TODAY NETWORK, a collaborator on this report) launched "Harvest of Change," which immersed the viewer in the world of an Iowa farming family, and later streamed live spherical video of 19 presidential candidates speaking at the Iowa State Fair. That combined work by the Register and USA TODAY NETWORK'S Product Division was recognized by the National Press Foundation in 2016 with its first award for best use of technology in journalism.

In April 2015, The Wall Street Journal debuted a virtual reality "roller coaster" following the ups and downs of the Nasdaq; in June 2015, the BBC created a 360- degree video showing life in a Syrian migrant camp in northern France; and in September 2015, PBS's "Frontline" shared "Ebola Outbreak" at the Online News Association conference. The Los Angeles Times followed with its VR visit to Mars, and Vrse, a virtual reality company founded by filmmaker Chris Milk, partnered with The New York Times and the United Nations for VR features. In November 2015, the Times distributed 1.3 million Google Cardboard viewers so its subscribers could download an app and watch "The Displaced," a spherical video about three refugee children.

Newer and smaller journalism outlets have tackled VR in their own ways. Fusion, a company formed by Univision and Disney-ABC Television Group, released an innovative video that allowed users to swim with whales. RYOT, a new media outlet that seeks to motivate readers to become involved with various causes, built virtual reality experiences around prisons, the United States-Mexico border and the April 2015 Nepal earthquake.

Despite the experimentation, it's clear that virtual reality is merely in the beginning stages. Immense challenges remain: The consumer market remains incredibly small, with manufacturers still working on creating headsets that are high-quality, reasonably priced and do not give users motion sickness. Without market penetration, of course, revenue for content producers will remain elusive.

Production of top-flight content is also expensive; the cost of cameras, computer processing power and software can easily price out small outlets.

Filmmakers, meanwhile, are exploring new rules and methods when it comes to virtual reality and 360-degree videos: Should the camera operator and the director be in the shot? How do you get viewers to explore the virtual space and provide a meaningful narrative?

When it comes to the potential of virtual reality, media outlets range from skeptical to bullish. "I think VR will eventually be a major platform provided the public adopts it at a steady rate," said Emilio Garcia-Ruiz, the managing editor of digital at The Washington Post. "But as we have seen with 3-D TV and Google Glass, this is hardly a given." Or, as Jessica Yu, deputy managing editor and global head of visuals at The Wall Street Journal, put it: "I wouldn't go so far as to say VR is the future of journalism just as I wouldn't have said that TV, radio or photography was ever the 'future of journalism' in their early days. Undoubtedly, they were revolutionary and allowed additional facets of stories to suddenly become more real to audiences, but it's not like they ever wiped out one form of journalism or another as a whole."

After the release of "The Displaced" by The New York Times, Michael Oreskes, the senior vice president of news and editorial director of NPR, wrote a memo to his staff stressing the need to balance innovation with fundamental journalistic practices. "In this V.R. experiment we should applaud, and even emulate, the effort while also studying the details of execution," Oreskes wrote. ". . . As we experiment with these new forms we must take care that our excitement with what new technology lets us do doesn't cause us to lose sight of good standards we bring with us from the old forms."

The believers, though, think that the public will adopt virtual reality and that news outlets would be wise to get on board. "This is the dawn of a new medium that will have a profound effect on news and journalism," said Niko Chauls, the director of applied technology at USA TODAY NETWORK. "We will be able to put our consumers on the frontlines of wars, in refugee camps, or on the red carpet at the Oscars. They can experience being racially profiled, sitting in the State of the Union, or attending political conventions."

Aleppo, Syria. Photograph © Basma

Molly Swenson, the chief operating officer of RYOT, agrees. "Virtual reality affords us the opportunity to see the world through a fresh pair of eyes," she said. "You are seeing, hearing and sensationally stepping inside a moment, a place, a community other than your own. It breaks down barriers like nothing else."

Photograph © Sean Brown

VIRTUAL REALTY TIMELINE

JANUARY 2012

Nonny de la Peña debuts "Hunger in Los Angeles" at the Sundance Film Festival, with technology help from intern Palmer Luckey.

AUGUST 2012

Luckey launches a Kickstarter campaign for the Oculus Rift VR headset, raising almost $2.5 million.

MARCH 2014

Facebook announces that it is buying Oculus Rift for $2 billion.

JULY 2014

Google debuts "Cardboard," a low-cost VR viewer.

SEPTEMBER 2014

The Des Moines Register launches "Harvest of Change," a virtual reality experience showing the life of an Iowa farming family.

Samsung announces the Samsung Gear VR, a headset that uses a Samsung Galaxy smartphone as a viewer.

APRIL 2015

The Wall Street Journal releases a virtual reality "roller coaster" that follows the ups and downs of the Nasdaq.

In partnership with Vrse, The New York Times Magazine debuts a virtual reality cover showing street art in Manhattan.

RYOT debuts "Confinement," a short VR film covering solitary confinement at American prisons, at the Tribeca Film Festival.

APRIL 2015

The Washington Post shares a virtual reality experience of the Oval Office at the White House Correspondents' Association Dinner.

JUNE 2015

BBC creates a 360-degree video immersing users into a Syrian migrant camp in northern France.

Fusion launches a virtual reality experience that allows users to swim alongside—and peer inside—a blue whale.

AUGUST 2015

Discovery releases nine 360-degree videos, which include skateboarding in San Francisco and surfing.

SEPTEMBER 2015

ABC launches virtual reality coverage of Syria.

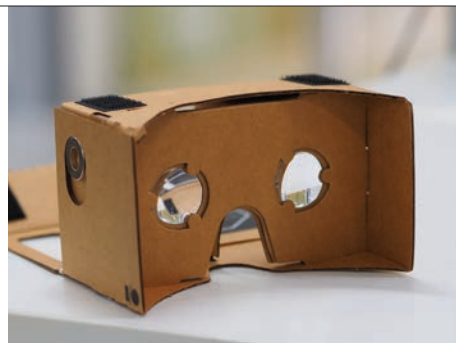
"Frontline" debuts "Ebola Outbreak," a 360-degree video documentary of the disease's spread in West Africa.

OCTOBER 2015

CNN live-streams the first 2016 Democratic presidential debate in virtual reality.

NOVEMBER 2015

The New York Times distributes 1.3 million cardboard VR viewers and releases a short spherical video piece called "The Displaced."



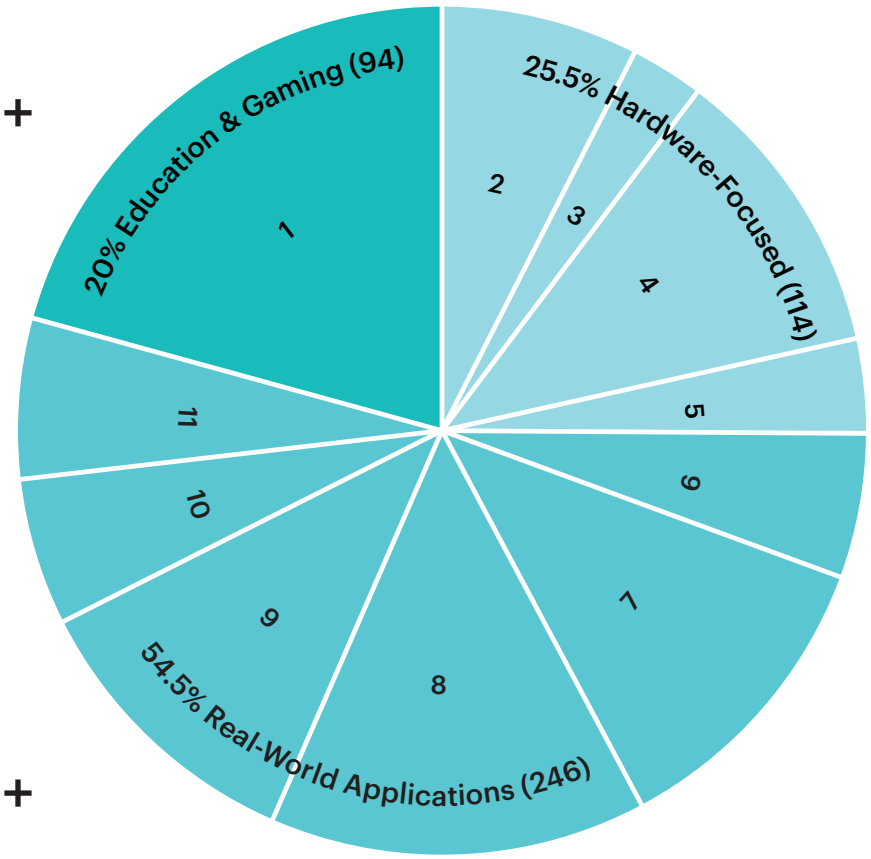
The Context

KEY TRENDS IN THE MARKETPLACE

Hundreds of companies are focusing on virtual and augmented reality across an array of industries, from traditional technology to retail to health care. Products range from prototypical virtual reality headsets, to augmented reality mobile platforms, to interactive photography applications.

To better understand the virtual and augmented reality market landscape, and how journalism and news fits into it, Knight Foundation commissioned data analysis firm Quid Inc. to study investment and intellectual property trends in virtual reality, with a complementary analysis of the media conversation. Knight also asked Quid to look specifically at what status, if any, journalism occupied within the market as well as what emerging technology applications could be relevant to the news industry. The analysis showed that accelerating investment in immersive experiences has become a growing topic in multiple industries, including journalism.

In assessing the state of the virtual reality market, Quid found the market is diverse and growing, with hundreds of companies, from traditional technology firms, including Google, Microsoft and Facebook, to retail, education, sports and health care, focusing on these experiences. While Oculus VR and other hardware companies have received the most funding and attention, companies focusing on business applications are also receiving significant investment.



1. 20% Education & Gaming (94)
2. 7.5% Wearable & VR in Health care (34)
3. 2.8% AR Interactive Technology for Wearables (13)
4. 11.2% VR Devices, Technologies & Content (51)
5. 3.5% Eyewear Display & Visual Components for VR (16)
6. 5.5% AR & Navigation Systems (25)
7. 11.6% 3-D Simulation, Imaging & Recognition (53)
8. 14.3% AR Tools for Mobile (65)
9. 11% AR & Physical World (Retail, Tourism, Reviews) (50)
10. 5.5% Real-Time Walk-Through & Visualization (25)
11. 6.1% VR Business Applications (Simulations, Collaboration, Training) (28)

Specifically, Quid identified 11 major communities around the new technologies. These communities were distributed across three major themes: "Education & Gaming" (20 percent of network), "Hardware" (25.5 percent), and "Real-World Applications" (54.5 percent). The companies most related to journalism primarily fall into the "Real-World Applications" theme, according to the report, and concentrate on interactive content, 3-D content development and augmented photography. The VR devices, technologies and content community is younger and more consistently funded than other areas, such as business applications, 3-D simulation and gaming, which provided the foundational ground that the new real-world use cases are built upon.

Quid's analysis found that investors across the board are increasingly active in the space, and much of the activity is trending toward hardware. While investment in many real-world applications of VR has increased in recent years, the most significant investments have followed companies investing in virtual reality hardware. In fact, hardware-related investments have jumped from 14 percent of investment on average in 2012-2014 to 68 percent on average in 2013-2015.

In July 2015, Gartner underscored this trend when it predicted the sale of more than 25 million head-mounted displays as immersive devices by 2018 and also predicted that virtual worlds, now on the fringe, will have transitioned to the mainstream. A December story by Re/code reported that

some market researchers estimate that the total hardware and software value of the virtual reality market will reach $70 billion by 2020. That would represent a tenfold increase from the $6.7 billion that some have predicted the industry will generate in 2016.

Other market studies show a range of projections that differ both in the projected scope of market penetration for VR content and hardware and in the amount of time that growth is likely to take. Still, there are similarities in the various findings. Close to $4 billion of capital was invested in the space between 2010 and 2015, with more than half of it occurring in the past two years, according to an analysis of virtual reality by PitchBook Data Inc. "There's also a diverse range of investor types deploying capital. VCs [venture capitalists] have led the way, but strategic capital has followed and we've even seen private equity players became involved," the analysis said.

Since the beginning of 2010, the report identified 348 completed deals in the VR space, including $602 million invested across 119 deals during most of 2015 (the report was released before the end of the year and indicated that a few more deals might still be completed). Augmented reality-focused Magic Leap, live-streaming company NextVR, and entertainment-focused Jaunt were among the leaders, with Rothenberg Ventures, Google Ventures and Intel Capital, along with Andreessen Horowitz, among the most active investors. The PitchBook report said that 229 investors had closed deals in the VR space in 2015, a 27 percent increase over all of 2014, and the year was not yet over. Of those, 170 were new investors; in 2014, there were 156 new investors.

In explaining the steady flow of investment, the report cited forecasts from UBS and Piper Jaffray predicting significant increases in annual sales of VR devices. In an analysis released in May 2015, UBS predicted annual device sales would reach roughly 34 million units by 2020, amounting to a VR hardware market of $6.7 billion with VR software sales growing to around $3.3 billion. In the Piper Jaffray report, also released in May 2015, the company estimated that the VR software market will reach $5.4 billion by 2025, while the hardware market will grow to $63 billion and estimating that close to 500 million headsets will be sold during the same period.

The adoption will, in large part, be driven by various target audiences, PitchBook predicted, "who will view VR as a necessary complement to enjoy their existing passions and interests."

In a presentation in December 2015, Piers Harding-Rolls, director of games research at IHS, which provides information and analysis on key issues affecting business, asked whether virtual reality is a "Bubble or the Next Big Thing?" Recognizing that virtual reality "has a history of unfilled potential," he identified factors that create market conditions today that are different from those in past waves of virtual reality excitement. Among them: more advanced technology, large investment, new VR video content and lower-cost headsets.

That said, there remain weaknesses in the emerging consumer experience. Bulky headsets, limited mobile battery life and intermittent sensor tracking are still areas that must be overcome to enable mass adoption. But Harding-Rolls anticipates a convergence to high-end, slim, light and cheap mobile devices that will make 2016 the start of an expansion of the mobile virtual reality platform. He anticipates that the early market will break down to 65 percent of its share in mobile headsets, with personal computer and console use comprising the rest of the early ecosystem.

Samsung's Gear VR Headset. Photograph © Maurizio Pesce.

News coverage seems to follow these trends, with early-stage product launches alongside hardware advances dominating the landscape. While major technology players such as Google, Facebook and Samsung command the lion's share of media attention, a long tail of diverse, consumer-facing brands are exploring virtual reality, including Ricoh, Valve, Ikea, Nokia and Marriott.

Journalism in Virtual Reality

EMERGING PRACTICES: A NEW PERSPECTIVE ON STORYTELLING

WHAT VIRTUAL REALITY IS

What is it like to experience a story in VR?

One leading content creator described VR as "hacking your brain" to make you believe you are someplace that you are not. The illusion of being in that place, known as "presence," can be all the more convincing when the virtual world responds to your eye or hand movements or commands from a game controller.

Virtual reality is hardly a new technology. It's been with us since 1985, when former Atari programmer Jaron Lanier experimented with some of the first VR headsets. There have been several failed attempts to commercialize VR, most famously Nintendo's Virtual Boy in 1994, which is best known for making people feel motion sickness after playing Mario Tennis for a few minutes.

So, what is different with VR 2.0? In short, the speed with which technology can display images may be catching up to the vision.

The Oculus Rift Photograph © Sebastian Stabinger - Own work, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=30068955

In an article about the rapid rise of Oculus from startup to a company worth billions of dollars, Wired magazine's Peter Rubin explored the current generation of technology used to trick the human brain. Rubin's piece and other coverage, including articles in The Economist and Time magazine, report that the technology used in a headset include a gyroscope, accelerometer, magnetometer and a small external camera. These technologies were initially developed for smartphones but have been reconfigured for virtual reality. The head-mounted display—also referred to as a headset or goggles— through which people view virtual reality content includes a tracker that samples motion data as fast as 1,000 times per second, so quickly that it can predict a person's head movements and pre-render images. This reduces latency in the scene reacting to a person's movement.

With the images refreshing at least 90 frames per second (a television, by contrast, refreshes about 30 frames per second), and the user having a wide field of view through lenses that magnify high-definition AMOLED screens (as in active matrix organic light-emitting diode, a display technology characterized by fast pixel response time) that can refresh within milliseconds, the image does not blur even if you whip your head around.

That response time is key to keep a user from feeling motion sickness, which is still a hurdle that technology companies know they need to overcome prior to any mass adoption of VR hardware. Time magazine described the motion sickness that can be caused by latency as "the inverse of car sickness: Your eyes see motion but your middle ear feels nothing." The faster processing and reduced latency of the newest headsets has made motion sickness the exception in today's VR world; as recently as the beginning of 2014, motion sickness was generally the rule.

Once inside a scene, the person can look all around, and if a full spherical video is being viewed, can look up and down as well. Navigation is accomplished most commonly through the use of head movements, a mouse, tappable trackpad, touch screen, game controller, computer keyboard, eye tracking or hand gestures. The experience envelops the person in the virtual location and allows the person to move around choosing a path or following preset narrative flow. In some implementations, it's also possible to move through a scene on a horizontal plane, either by using a typical game controller, or, in some cases, by walking around a room.

HOW VIRTUAL REALITY COULD CONTRIBUTE TO STORYTELLING: A TECHNOLOGY SNAPSHOT

News organizations are now producing new kinds of immersive stories using virtual reality technology. Last year, approximately 12 news organizations produced around 60 such projects using 360-degree video or animated 3-D models in computer-generated scenes to tell stories that can be experienced in virtual reality.

While there are high-end companies that use expensive equipment to create cinematic-quality virtual reality, there are also some simple and, now, relatively low-cost approaches to creating VR content.

At the most basic level, a journalist needs a 360-degree camera or a rig that uses between two and six GoPro cameras. Once the multiple videos are captured, they are stitched together using readily available software, then uploaded to an app or a website such as YouTube 360 that has a built-in player that displays the video in its spherical form. Finally, that app is opened in either a head-mounted display connected to a computer or in a cardboard viewer that can use a cellphone as a monitor.

In late 2015, Ricoh released the Theta S, a handheld camera that is smaller than a cellphone and can shoot impressive 360-degree still photos and passable 360-degree video with the click of a button. It uses two wide-angle lenses to capture a spherical environment. This device—which some news organizations, including USA TODAY NETWORK, are distributing to properties and bureaus around the world—make it possible to quickly and easily capture breaking and developing news for quick-turn VR coverage. The Ricoh Theta S, which does not require any postproduction stitching, retails for less than $400.

Image captured with the Ricoh Theta S.
Photograph © Sebastiaan ter Burg

More ambitious efforts that set a scene in a video game-like environment can also be created using a standard video game rendering engine such as Unity or Unreal. And more expensive cameras, such as Nokia's Ozo, which uses eight lenses and eight microphones, can capture directional sound and can be used to provide a good-quality live stream in VR.

A basic kit, containing a camera, viewer and stitching software, can be assembled to deliver a VR story for less than $5,000 (although a computer with a powerful graphics card is also required for video processing).

With the entry-level technology for content gathering, data capture, postproduction stitching and viewing rapidly evolving, more immersive experiences are being created. Data capture and modeling hardware and software are also becoming cheaper, better and easier to use. So are the headsets.

While little more than a year ago the only headset people talked about was the Oculus Rift, multiple platforms are now poised to launch. Samsung's Gear VR (in partnership with Oculus) is already available as a $99 upgrade to any Samsung Galaxy S6 or Note 5 phone.

HTC's The Vive, launching in 2016, will make it possible to walk through scenes in your living room, using laser-like barrier displays to reduce the chances of bumping into a wall or tripping over a coffee table. The Vive uses scanners to track a person's movements and provides hand controllers so people can interact with their virtual environments. It can provide an immersive experience that uses visual data capture to place people—either actors or people in a real-life experience—inside a photo-realistic environment that surrounds the person wearing The Vive headset.

Using technology more closely associated with gaming, companies like 8i in Los Angeles have built sample experiences using volumetric rendering that captures multiple points with multiple cameras to re-create scenes. Early work includes portraying a steelworker building a skyscraper, a gladiator awaiting the lion in the Colosseum and a mother archiving a message for her infant child. While nascent and complex to capture, this technology may have news applications when and if the new headsets become popular.

And Oculus, once the only game in town, plans to add its own controller, the Oculus Touch, to let users manipulate virtual objects. Oculus has also introduced a way for users to see other people's VR identities in the same virtual space even if they are many miles apart, notably making it possible to share virtual experiences.

Real-world applications for virtual reality are increasing every month. People have devised ways to use VR to enhance video games and tell stories, of course, but they have also found applications in medicine, surgery and treatment for phobias, in education, job training and architecture, in real estate and retail, and entertainment. Nurses have found that placing a burn victim in a virtually snow-covered polar environment can actually relieve pain; surgeons have modeled patients' hearts for viewing in cardboard devices; and football coaches are using applications that allow NFL quarterbacks to practice their reads against virtual defensive backs.

In terms of storytelling in journalism, Jake Silverstein, editor-in-chief of The New York Times Magazine, explained the potential power of VR in an interview with Consumer Reports:

"We first got interested in virtual reality when we saw a refugee camp film made for the U.N. We showed it to some people around the newsroom, and they were just blown away. Hardened editors on the international desk would take off the headset and say, 'Listen, I've edited hundreds of stories about refugees, and I've never had an experience like this one.'"

Key Challenges & Opportunities

THE LEARNING CURVE: FINDINGS FROM RECENT EXPERIMENTS IN NEWS ORGANIZATIONS

During September 2015, representatives of 10 news organizations replied to a questionnaire asking about their VR experiences: what they have done, what they have learned and what they need to explore further. The respondents were from The Wall Street Journal, The Washington Post, USA TODAY NETWORK, Fusion, RYOT, Vrse, BBC, Discovery, "Frontline" and Emblematic Group. Still, little to no rigorous audience testing has been conducted, immersive experiences are still nascent and the discussion points below are largely anecdotal and based on early impressions.

MORE ENGAGING

Early tests of experiences have yielded deeper, more immersive stories that people enjoy and stay with longer than a traditional video or article. Feedback is characterized by more visceral and emotional reactions. People say that VR brings them closer to the events and breaks down barriers inherently raised by a reporter or correspondent. Content creators are still experimenting with pacing and length of the stories.

"Everybody uses the 'empathy' word, and it's true. When I did 'Hunger in Los Angeles,' people were trying to hold the [diabetic's] head, and came out bawling. People commented on the intensity of their emotional connection and feeling."

— Nonny de la Peña, Emblematic Group

"Anecdotally, people are amazed by the VR experiences we have produced, whether it is landing on a farm in a helicopter or walking the streets of Old Havana. But in terms of more empirical metrics, we have learned that the current metrics used for video are not applicable—and that a new range of reporting will be needed."

— Niko Chauls, director of applied technology, USA TODAY NETWORK

CUMBERSOME PRODUCTION

The production time and cost, including cumbersome postproduction and the stitching process, can be laborious, time consuming and costly. For VR to be more prevalent, tools that reduce this burden will need to be created and become readily available. It is also difficult today to preview shots, which reduces the certainty that the 360-degree video will accurately capture the shooter's intent.

"The technology is not yet production-ready, and postproduction is too slow, but we can start to understand where this approach will offer value. It is very early days for this type of technology."

— Cyrus Saihan, head of business development, BBC Future Media

LIMITED ACCESSIBILITY

Accessibility to VR viewers is still very limited. Some organizations have used community events in shopping malls or town halls to bring people together to see the stories and try out the new gear. Greater effort to build a VR ecosystem have been made by news organizations and marketing agencies for major brands by giving away cardboard viewers to encourage people to download mobile apps and look at the VR storytelling at home.

"We think people will continue to consume journalism in the fastest, most efficient, most accessible (which often means cheapest) way possible. Until there is live VR reporting from the front lines that can be accessed easily on a device while on the go, VR has a long way to go to replace what is there."

— Corey Key, vice president of digital, corporate marketing and research, Discovery Communications

ETHICS CONSIDERATIONS

Journalists are thinking about the unintended consequences of providing 360-degree coverage. What happens when a whole scene is depicted and there is no way to exclude potentially graphic aspects? How does one protect privacy or get consent in a spectrum that makes it difficult to isolate coverage? Can the immersion, at times, be too realistic or manipulative and create frightening, uncomfortable or misleading experiences? What kinds of warnings need to be given to potentially sensitive users? What happens when a war veteran suffering from post-traumatic stress disorder experiences a 360-degree video of a car bomb exploding in Aleppo?

"The projects we've taken on that deal with real people, places or events are definitely sensitive. Even though we are storytellers and we're crafting VR experiences, we hold ourselves to a self-imposed standard to hold sacred the truth of the moment."

— Dan Coplon, Vrse

PROVIDING A NARRATIVE STRUCTURE

Journalists note that they are still learning how to preserve a narrative thread in VR storytelling. VR can allow users to explore scenes and discover characters and information at their own pace, similar to how one navigates through a video game, which can provide a challenge to journalistic storytellers more familiar with taking the audience along a single narrative ride.

"I think there is a generation gap between the gamer and the non-gamer. It's really hard for the decision-makers in the journalism field to come to terms with that. But the gamer generation is growing up, and they want to be informed global citizens."

— Nonny de la Peña, Emblematic Group

BAD CONTENT

As displays get smaller and more comfortable, bad content remains among hardware manufacturers' greatest fears. They are concerned that bad content will skew first impressions and turn people off, slowing or eroding the pace of adoption.

"It's one thing to impress people with a demo. It's another to keep them coming back. And you have to have compelling content to do that."

— Palmer Luckey, co-founder, Oculus, in Fast Company

PART OF THE FUTURE OF NEWS

There is a consensus among editors and producers that VR storytelling will add to the range of media used to report and distribute news. They believe that it will complement existing media types similar to how television augmented but has not replaced radio.

"I see it being part of journalism, the same way video is, and photography, text and interactives. Not every story is worth or requires being told in VR—so it is a question of choosing wisely."

— Mariana Santos, director of interactive and animation, Fusion

"This is the type of irresponsible, crazy exercise that we as a company should do more of."

— New York Times President and CEO Mark Thompson when showing off the Times' first virtual reality experiences.

TECHNOLOGY PLANNING

Because the technology is changing and improving rapidly, it is very difficult to plan around what equipment to purchase over the next three months, let alone the next few years. Innovative journalists, who did not have lavish budgets in even the best times, are having to find creative ways to purchase hardware and software knowing that it will be out of date in as little as a year. Some are renting out their equipment even as they use it as a way to justify the inevitable churn.

"As the technology moves forward, the process will become more and more nimble."

— Raney Aronson-Roth, executive producer, "Frontline"

MONETIZATION

Few virtual reality news experiences have attracted advertising. For the most part, the current reach does not provide the scale that brands and agencies are looking for, and existing metrics for reporting are in early stages. That said, testing ways to include brand messaging in virtual reality content are ongoing. While digital ad experts do not expect VR to include banners and boxes, they believe more creative and custom integrations are likely. These could include immersive pre-role, native VR and advertorial features, product placement, and deep linking to contextual marketing and brand experiences elsewhere in the ecosystem.

"Monetization is part of the conversation, but as a company and industry we're still at the very early stages of exploring what that might be, how it would be best produced and how it should be presented."

— Jessica Yu, deputy managing editor and global head of visuals, The Wall Street Journal

"We need to monetize VR well enough just to cover the high production costs. No newsroom has the resources to simply add all the slots and equipment needed to start a VR team. Unless we achieve mass scale quickly, which seems unlikely, monetization as a 'revenue stream' will be years away."

— Emilio Garcia-Ruiz, managing editor of digital, The Washington Post

THE EMPATHY OPPORTUNITY

When The New York Times started to produce its own VR stories, Silverstein says the newspaper ran into questions around how to tell the story. These challenges are consistent with what other news organizations have attempted to figure out as well.

"One of the bigger surprises for us was how challenging it can be to craft a narrative when you don't have any of the typical editing moves. There's no framing the shot. You can't zoom in or out. So we spent a lot of time in the editing suite trying to get it right. But you can imagine a scenario where

Critics have challenged the use of 360-degree storytelling for showing an entire scene without a director's selection of what to focus on to make a point or deliver a cogent narrative.

VR is simply part of our reporting when breaking news occurs," Silverstein told Consumer Reports.

Traditional news organizations, which have often been late to jump on an emerging technology, have been experimenting with virtual reality since the fall of 2014, when The Des Moines Register took people to a farm in the heartland to tell a story of the impact a changing America was having on the lives of a six-generation farm family.

Although it is not a meaningful part of the news diet today, experiential storytelling may be able to advance traditional journalistic practices. For example, one can hear an editor's voice barking at a cub reporter—"Show, don't tell!" "Details, details, details!" "Bring your reader into the story!"—and understand how spherical video and VR can enhance each of those staples in journalistic storytelling.

In "Virtual Reality Journalism," a research project by the Tow Center for Digital Journalism at Columbia University, the report's authors provided a case study of the "Frontline" VR project on Ebola. In the report, they noted that users are engaging VR to play video games and have expressed interest in sitting courtside at basketball games, "but what about watching the news or a documentary?"

In answering the question, the authors wrote: "Virtual reality journalism . . . offers a new window through which to study the relationship between consumers of media and the representation of subjects. Whereas newspapers, radio, television and social media each brought us closer to being immersed in the experience of others, virtual reality has the potential to go even farther." And they went on to raise questions of their own: Can VR journalism create what some have called a "co-presence" and, if so, can that "feeling that a user is there . . . engender far greater empathy for the subject than in other media representations?"

The report recognizes that new cameras "open up a tremendous opportunity for journalists to immerse audiences within their reporting" and places VR journalism in "a continuum of visual mediums that have long influenced journalism."

Critics have challenged the use of 360-degree storytelling for showing an entire scene without a director's selection of what to focus on to make a point or deliver a cogent narrative. That said, others have suggested that by making the user a "witness" to the scene, this immersive storytelling can remove bias and expose audience members to a variety of facts that allow them to reach their own conclusions. The Tow Center report points out the single frame dilemma Susan Sontag addressed in her book, "Regarding the Pain of Others," which "noted that there is always someone behind the camera deciding what to keep in its frame and what to exclude."

There is a long history of writers and producers aiming "to place the journalism audience in the story," according to the Tow Center report. If this new approach comes closer to achieving that than even evocative, detailed writing or cameras embedded with subjects, the report's authors wonder if, perhaps, "barriers between self and the other begin to erode [and] virtual reality offers the promise of further breaking the 'fourth wall' of journalism, wherein those represented become individuals possessing agency."

3-D MODELING
Artistically rendering objects for computer-generated virtual reality scenes, similar to characters and scenes in Pixar movies or modern video games.

ARRAY
A group of single lens cameras (often GoPros) that allows for full spherical video capture.

AUGMENTED REALITY
An experience that starts with your real world and overlays virtual objects and information in a layer that adds features to actual reality.

BLIND SPOT
The part of spherical video directly under or above the camera which in some cases is left blank or blacked out due to the location of the camera. Also referred to as Nadir Point.

DIRECTIONAL SOUND
The ability to place sound in different locations in order to help the viewer know where to look in a 360-degree video presentation. Also referred to as binaural audio.

DONUT OR CYLINDRICAL VIDEO
360-degree video that is not fully spherical, but only captures a panorama with a horizontal field of vision. You can look around a donut, but not up and down. Requires no stitching and less post-production.

DUALITY OF PRESENCE
The ability of the brain to understand that it is in two places at once, one real, one virtual.

EYE TRACKING
Using the real-time focus and movement of the eyes of someone wearing a head mounted display as an interface to information.

GESTURE-BASED INTERACTION
Using your hands, modified game controller or a wand to physically interact with the virtual environment and the things in it.

HEAD-MOUNTED DISPLAY
A visor or pair of goggles that delivers visual imagery and tracks head movements to create the illusion in the brain of virtual or augmented reality. Also referred to as the Headset or Goggles.

HEAD TRACKING
Matching the visual experience of the user wearing a headset to the exact position of the headset in real time. Accurate, real-time head tracking is the most important feature for creating the illusion of presence and reducing simulation sickness.

LIVE 360
Streaming of live events that are accessible in 360-degree players or through VR headsets. Requires auto-stitching that can reduce quality.

MIXED REALITY
A type of augmented reality experience that pins objects into your real world, creating the illusion that they are interacting within the real world as opposed to simply being overlaid on top of it.

PARALLAX
Difference in the perceived position of an object when viewed along two separate lines of sight, creating an illusion of depth and adding to the immersion.

PHOTOGRAMMETRY
The science of making measurements from photographs, especially for recovering the exact positions of surface points. It can employ high-speed imaging and remote sensing measure and record complex 3-D motion fields.

PRESENCE
The sensation of being physically present in a virtual setting that is created by tricking the brain using stereoscopic imagery, head and hand tracking.

REALITY CAPTURE
Capturing 3-D models as structural data from the real world, as opposed to creating them. The two most common methods are infrared depth cameras and laser scanners.

RIG

The device that holds an array of cameras so that they shoot at complementary angles.

SIT-DOWN VR

VR experiences that require you to sit down, usually because the headset uses a wired connection to a high-end graphics computer. Navigation is typically performed using game controllers or by staring at waypoints for a certain number of seconds.

STEREOSCOPIC 3-D

This is an attempt to reproduce the process by which we see with our own eyes to produce a feeling of depth. When shooting a 3-D image, two cameras are used to capture separate images of the same object from slightly different angles, but from one fixed viewpoint.

STITCHING

Using software to arrange the video from individual cameras in a manner that creates the 360-degree view. Our brain "stitches" together what both of our eyes see to make one large picture. We have to do the same with the video from different cameras.

VIRTUAL REALITY

An experience that creates environments that give people a sense of presence that makes them believe that they are in a place that they are not.

VOLUMETRIC RENDERING

Using multiple cameras surrounding an object or a person to create a 3D image that can be viewed from all angles as someone explores a scene in walk-around VR.

VR SICKNESS

A queasy feeling that occurs if there is latency between a head or eye movement and the image that a person is viewing. Also referred to as Simulation Sickness.

WALK-AROUND VR

VR experiences that allow the user to actively walk around within a confined space to explore a scene more naturally.

WAYPOINTS

Visual markers that the user either moves toward or stares at to trigger something to happen. Examples include staring at a Play button for three seconds to start a video, or moving toward a floating token to go to a different scene.

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BENCHMARKS

Over time, monitoring the traction that VR storytelling is having in news distribution could look to four metrics:

CONTENT

The amount of spherical video content being created by news organizations, including whether daily content or periodic features are being presented. For example, in 2015, news media outlets produced around 60 stories for virtual reality viewing, for the most part periodic features.

HEADSETS

The number of headsets in the hands of consumers. During 2015, the two headsets in widest distribution were the Samsung Gear (the company did not report how many were shipped), and Google Cardboard, a foldable cardboard viewer that Google said shipped 500,000 in 2014 and 5 million in 2015.

APPS

The number of VR apps launched by journalism entities and the number of VR players integrated into the core mobile applications of news organizations. In 2015, six (Discovery, USA TODAY NETWORK, New York Times, Russia Today, RYOT and Vrse) launched their own apps for VR viewing on mobile phones, and one (The Wall Street Journal) added VR-capable players to their core news applications.

ADVERTISING

The interest expressed by brands and advertising agencies in developing creative content that can be incorporated into or programmed adjacent to news content. GE and Mini sponsored the distribution of cardboard viewers by The New York Times and included their own branded content in the application. But there was little direct advertising within the VR features produced by news companies.