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Current CITE-ings from the popular and trade computing literature: Google Cardboard – virtual reality for everyone

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Current CITE-ings from the popular and trade computing literature: Google Cardboard – virtual reality for everyone

Martin Kesselman

Google Cardboard has brought virtual reality experiences to anyone with a smartphone and low-cost glasses, the first ones provided by Google made of Cardboard! Due to its extremely low cost, many applications are burgeoning the field, and the technology has created new opportunities for libraries in creating virtual immersive experiences for their users. Low-cost virtual reality cameras are coming on the scene too that will allow libraries to develop documentaries of community information, tours and educational/information experiences. The purpose of this column is to provide current citations and information that run the gamut of what Google Cardboard is all about, new applications, new viewers based on Google's offerings and opportunities on the horizon. This is definitely a technology that is taking everyone by storm!

Google Cardboard – introduction

Up to the past year, virtual reality experiences were limited to those that could afford products such as the Oculus Rift priced well over US$500. All of a sudden this year Google Cardboard has come on the scene at a price that is often free as a give-away. Goggles and specialized lenses, along with your smartphone, create images that are split into two screens to create and virtual reality experience. Cardboard was originally introduced in 2014 for use with Android phones but is now also available for iPhones. Some low-cost devices have built on the technology creating goggles that are more substantial but still with a low price (under US$50). Some are clunky with phones of different sizes particularly new larger-sized smartphones like the iPhone 6 plus series. Google also provides the option to create your own goggles

(www.googl.com/get/cardboard/get-card board).

As a low-cost product that is within reach of so many users, Google Cardboard will create for many their first virtual reality experience. Legitimacy of the technology and the device is assured. Even view-master, a toy that has been around for years, has gotten into the game and has teamed up with Google to develop a new product (Dashevsky, E. (2015), "Why Google Cardboard is the only virtual reality (VR) headset you need", *PC Magazine Digital Edition*, March).

The New York Times gave out millions of viewer for free for subscribers and many were bundled with the new Star Wars movie. Now, more than 5 million Google Cardboard devices are on the market [Hayword, A. (2016), "How to experience VR on your iPhone with Google Cardboard", *Macworld*, available at: www.macworld.com/article/3036828/ios/how-to-exprience-vr (accessed 24 February 2016)]. For more on the *New York Times* rollout, see the following article: Weiss, T. (2015), "*NY Times* teams up with Google on virtual-reality promote", *eWeek*, 21 October, p. 1.

More on kits to create your own VR set as well as step-by-step experiences are provided by UK's PC Advisor. All one needs is a jigsaw, velcro, magnets, cardboard and the lenses; many kits including the ingredients are available. You also need to download the Cardboard App from the Google play store for your smartphone [Breis, M. (2016), "How to make Google Cardboard. Turn any Android phone or iPhone into a virtual reality headset ...", *PC Advisor*, 1 March, www.pcadvisor.co.uk/how-to/gadget/how-to-make-google-cardboard].

An *eWeek* article demonstrates how one can build Google Cardboard glasses from a pizza box! But on a more serious note, this article describes how the product uses sensors already present in Android phones, such as an accelerometer, gyroscope, compass and camera. Google hopes that other developers will build the next generation of immersive experiences available to everyone [Weiss, T. (2014), "How to build Google Cardboard glasses from a pizza box", *eWeek*, 29 June, p. 2].

Google Cardboard with a smartphone was originally envisioned to work with particular applications such as Google Earth and YouTube. The Cardboard apps are available in 17 languages on Google Play. Cardboard is the brainchild of Google's David Coz and Damien Henry in 2014, at the Google Cultural Institute in Paris as part of a 20 per cent project (Google employees can use up to 20 per cent of work hours to engage in new projects of personal interest) [Webb, T. (2016), "Google Cardboard app gives virtual reality capabilities to smartphones", *eWeek*, 14 December, p. 1].

Tom Simonite notes that Mark Zuckerberg of Facebook fame thinks that virtual reality will change the world. Although Facebook spent US$2bn to purchase the much more expensive Oculus Rift, they were trumped by Google's free or low-cost device that uses ubiquitous smartphones. Although the Rift may provide a better VR experience when one considers costs and market penetration, it is likely that applications for Google Cardboard will improve [Simonite, T. (2016), "Google's great virtual reality experiment", *MIT Technology Review*, Vol. 119 No. 1, pp. 15-17]. Similar articles related to the high penetration of Google Scholar have been

published elsewhere [McCorvey, J. (2015), "A virtual-reality viewer for the people", *Fast Company*, Vol. 199, pp. 84-85] and in a video by *Fortune* magazine ("Google is bringing virtual reality to the masses", *Fortune.com*, 11 June, available at: http://fortune.com/video/2015/05/29/google-is-bring-virutal-reality-to-the-masses/).

Applications (some unusual)

PC World provides a description of a high-end 4K virtual-reality tour of Google's Oregon data center. The focus of the tour is for Google to attract more customers to their cloud services and hope that a tour of their advanced facility will do the trick. But this is a good high-end example of what is possible with the Google Cardboard technology [Williams, M. (2016), "Take a 4K VR tour around Google's Oregon data center", *IDG News Service*, 23 March, available at: www.pcworld.com/article/3047540/data-center-cloud/take].

Because of its price-point, Google Cardboard has provided so many educational (and library) opportunities. Some examples are geographic tours of Machu Picchu or the Great Barrier Reef or a museum through an exciting immersive experience. Google is also in the process of creating educational content for the device [Hansman, H. (2016), "How can schools use virtual reality", *Smithsonian.com*, 3 February, available at: www.smithsonianmag.com/innovation/how-can-schools-use-virtual].

Some unusual applications are coming to market such as *Sports Illustrated*'s swimsuit edition that was announced by *Variety* [Spangler, T. (2016), "*Sports Illustrated*'s swimsuit edition straps on VR goggles", *Variety*, available at: http://variety.com/2016/digital/news/sports-illustrated-si-2016-swimsuit-vr-virtual]. How about wedding planning? This article notes that iPhones can also make use of the Optonaut app. Just like tours of education-related sites, this technology can also be used for tours of wedding reception halls [Beres, D. (2016), "One surprising tool every wedding planner should have", *The Huffington Post*, 17 March, available at: www.huffingtonpost.com/entry/google-cardboard-wedding_us_56e92dede/4b0860f9]. McDonalds

is also getting into the game with VR games added to Happy Meals and is experimenting in Sweden with a Happy Meals box that turns into Google Cardboard goggles [Wagner, D. (2016), "Mcdonalds is getting into VR and so should you", *Infoworld*, 24 March, available at: www.informationweek.com/it-life/mcdonalds-is-getting-into-vr-and-so-should-you/].

Other examples of applications, many hi-tech, include stereography (using panoramas), anaglyphy (3D color), 360-degree photography, stereoscopic 360-degree photography for high quality experiences, immersive video, stereoscopic video, immersive stereoscopic video, augmented reality, mixed reality (used in conjunction with other devices such as Microsoft's Hololens) and VR. VR is any immersive technology that is completed computer-generated but may not be based on reality, as we know it, whereas augmented reality is something that is actually real that is computer generated ["Google Cardboard" *Maximum PC*, July, Vol. 20 No. 7, p. 93].

New and on the horizon

PC Magazine provides an excellent current overview of the VR devices on the market based on Google Cardboard Technology. Reviews are provided for both mobile (using a smartphone and tethered) more expensive with integrated displays connected to a PC or game set). Included are the HTC Vive/Stream VR, the LG 360 VR, Oculus Rift, the Samsung Gear VR and the Sony Playstation VR [Greenwald, W. (2016), "The best virtual reality (VR) headsets", *PC Magazine*, 23 March, available at: www.pcmag.com/article/342537/the-best-virtual-reality-vr-headsets].

According to the *Wall Street Journal*, Google is developing an advanced version of their viewer that will not rely on a smartphone or PC [Nicas, J. and Barr, A. (2016), "Google developing stand-alone virtual-reality headset", *Wall Street Journal*, 11 January, available at: www.wsj.com/articles/google-developing-stand-alone-virtual-reality].

It seems that Google may be giving up cardboard and moving to more sturdy plastic that would include more sensors and higher-quality lenses.

Google sees this technology as a growth opportunity particularly in education, marketing, healthcare, manufacturing and tourism [Clapman, T. (2016), "Google's next cardboard could be plastic", *Information Week*, 8 February, available at: wwwinformationweek.com/mobile/mobile-devices/googles-next-cardboard-could-be].

A recent issue of CQ reviews several VR devices on the horizon that may compete with Google Cardboard but at a higher price point. Included are Tactical Haptics Reactive Grip, the Cyberith Virtualizer and the EchoPixel True 3D [Marshall, P. (2016), "Virtual-reality devices on the horizon", *CQ Researcher*, Vol. 26 No. 9, pp. 206-207].

Drones are getting into the VR space too. Zeiss, a company well-known for the manufacture of high-quality lenses, is developing a new Google Cardboard-compatible VR headset with a new Cloudlight FPV app. The app lets smartphone (currently for the iPhone) use a VR device to experience the drone's point of view. The app also displays telemetry data that includes battery power and signal strength [Frank, B. (2016), "Zeiss offer a drone's eye view with VR app and headset", *PC World*, 18 January, available at: www.pcworld.com/article/3020230/zeiss-offers-a-drones-eye-view-with-vr-app-and-headset.html].

According to Consumer Reports, movie directors are starting to experiment with virtual reality, and it is expected that the 2016 Sundance Film Festival will include at least 30 VR experiences and films. Not only will VR have applications in education, it will include opportunities in construction such as house remodeling, and Lowes is experimenting with the technology. Empathy and socialization are novel uses in which individuals can identify and interact with one another in this space. Other more common uses include sports, engineering, design and travel. Four devices are compared with Google Cardboard; the Samsung Gear VR, Oculus Rift, HTC Live and the PS VR from Playstation [Dail, M. (2015), "Reality as you know it is about to change", *Consumer Reports*, March, pp. 12-14].

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