Virtual Reality

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Introduction

What is Virtual Reality (VR)? Virtual Reality is a computer generated simulation which uses 3 dimensional images and objects to build an environment. The importance of knowing the definition itself is vital because it is currently use today for simulation from gaming to the medical field. Even though it is currently used today, it is an old idea that has been revived by new technology that has potential to expand and further research is required in order to see the capabilities virtual reality has to offer to society. The purpose of this paper is to view the current and new discoveries of virtual reality to get a better understanding of how an old idea became reality. The ethical, social, and security issues it has to face which hinder its progress due to society's concerns and morals. The current and future use of VR to see which areas need improvement for it to be successful and perfect it.

Background Information

Virtual reality dates back to the 1960s according to Schroeder (1993), "but the origin of VR technologies can be traced back to Ivan Sutherland's work on interactive computing and head-mounted displays in the mid-1960s" (p. 964). Also Sutherland and his team were the first to build an operational head mounted display in the 1970s (Schroeder, 1993, p. 964). Brey (2005) mentions how VR emerges due to advancement in technology, "Virtual reality technology emerged in the 1980s, with the development and marketing of systems consisting of a head mounted display (HMD) and *datasuit* or *dataglove* attached to a computer" (p. 2034). The datasuit and dataglove were used as controllers. Over the years, technology has improved significantly which caused VR to make advancements in the 21st century. VR takes simulations to whole new level because simulations are done in third-person which does not give users the full experience of the simulation due to limited motion and limited interactions; VR uses first-

person view which makes a difference in terms of making users believe they are part of the simulations with immersion.

Current Use

Virtual reality is currently used for simulations in gaming, military, education, medical, entertainment and etc. Each simulation is programmed differently depending on how it is used and where it is used. Since simulations are programmed differently from one another, the VR would have to use different applications/programs in order for it to operate. For example, VR is being tested in education to determine if students can work independently without needing any support from the teacher. VR allows the students to interact more in classrooms which may increase the attention span of students which is a better alternative than sitting still in a desk. This idea is still being tested though because of the expense of VR HMD and requiring further data and results.

People would mostly relate VR technology to gaming because of its popularity in the gaming industry. VR in gaming gives players a first person view of the game which gives them the impression that they are part of the game. The Virtual Boy was an attempt by Nintendo to popularize VR, but ended in failure. There exists a couple of VR headsets listed by Lamkin (2016) for gaming like the Oculus Rifts, Sony PlayStation VR, and the HTC live. The difference between each headset is the compatibility of games which affect the gaming markets in terms of which exclusives is superior to others. This opens a competitive market which relies on costs and quality of the games and the cost of the HMD itself. The headsets require a controller in order for players to interact with the 3D environments since the headset displays it.

There are multiple simulations in the military involving VR from flight simulation to combat training. The flight simulation would help pilots in an air force be familiar with the

aircraft and the different procedures require for any situation. VR is used to practice driving land based vehicles like a tank and jeeps without wasting resources. Most surprisingly, they have VR for practicing how to use the parachute by "tugging on two cords to steer" while wearing the Oculus Rift, but the solider needed to be suspended first on a ceiling which is safer compare to jumping out of plane to practice parachuting (Parkin, 2015).

VR is used in the medical field to help doctors, nurses, and trainees practice and gain knowledge on procedures, treatments, and finding symptoms for diseases and injuries. It gives them more "hands on" experience with a virtual patient which is important because all that experience will one day save a life if they know what they are doing. Palter (2010) said "Two randomized unblended trials showed that, compared with participants with no training, those trained using virtual-reality tools showed significantly improved learning…" (p. 1194). VR also had potential to help people with mild cognitive impairment and/or Alzheimer's disease "The technology has the potential to create training tasks with a higher degree of verisimilitude: with VR, training task can be performed an immersive and interactive system resembling real-life experience" (Shuchat, 2012, p. 40).

Security Issues

Privacy is a security issue throughout the advancement of technology due to websites requiring personal information for their services. With VR it would not be any different because there are websites, programs, and services that are compatible with VR, but requires the individual's credentials to access them. The problem is the individual's information is not always secure or is used by other companies to gather data. Browsing around the internet using VR may result in companies spamming ads using the individual's search history which is common in smartphones and computers. If VR becomes popular then companies would try adding ads on

everything to make a profit from minor inconveniences. There is potential for malware to appear in VR application which can cause issues with cloud or other programming to either be corrupted or lost. Hacking is another security risk because hackers can record important conversations that are private or steal credentials.

Concerns with Virtual Reality

There are ethical issues with VR which will hinder its progress. The main concern is if individuals are unable to tell the difference between reality and virtual. There exists a difference between reality and virtual which people argue humanity can tell the difference while others believe people will be lost to it. Brey (2005) mentions how people would "worry that the idealized, vacuous and consequenceless worlds of VR come to serve as a model by which people comprehend the real world" (p. 2035). It is a problem because individuals may forget what is deemed appropriate and inappropriate in reality which can be different for virtual. An example could be an individual committing crimes in the virtual world for an extended periods of time then committing crimes in reality without knowing.

Social issues also occur in the advancement of VR which ties in with ethical issues which prevents it from being accepted into society easily. Multiple concerns would be an individual may become isolated, antisocial, and/or delusional. An individual may spend most of their time on virtual reality because it is simpler, less restrictive, easier, and makes him/her happy compare to reality which has more responsibilities, causes stress, and has more rules. It may prevent people from interacting with others in person because they feel more comfortable staying at home using VR. Since VR is a form of entertainment, some people will give it more propriety than things they considered boring. People are worried individuals can be addicted to VR which may ruin their social skills, relationships, and work.

Future Use and Further Study Requirements

One of the future use of virtual reality is the advancement of communication. VR has the potential to generate a full 3D image of human being for long distance communication. Fitzsimmons (2014) wrote about what Oculus CEO said, "I want to have this conversation with you face-to-face…my brain would say we're really in whatever space we wanted to be in" (Virtual reality 'can fundamentally change communication,' says Oculus CEO, para. 5). An example would be an overseas meeting which can cost a fortune in transportation and board, but VR would cut those costs by having two or more individuals can have a discussion without even leaving their office. With further study VR can be used by society without worrying about the risks involved with it and VR technology can be easily access be the public. Education would need further studying and testing to determine if VR can improve student's comprehension of the material of the course.

Conclusion

Even though VR may seem like a new technology in today's time, it is an old idea in the 1960s that has advanced to the 21st century as technology improved. The most common use of VR is in gaming, but they are also used in other fields from military to entertainment. Despite having security risks, ethical issues, and social issues, as long as technology is still improving so does VR which will learn from its past mistakes and correct it in order to reach its full potential to society. Further study is required for VR in order for it to be truly successful and making advancements for new technology in the future.

References

Brey, P. (2005). Virtual Reality. In C. Mitcham (Ed.), *Encyclopedia of Science, Technology, and Ethics* (Vol. 4, pp. 2034-2036). Detroit: Macmillan Reference USA. Retrieved from http://go.galegroup.com.lcpl.idm.oclc.org/ps/i.do?p=GVRL&sw=w&u=loudoun_main&v=2.1&it=r&id=GALE%7CCX3434900715&asid=f43824045b1ca9a5c9a66f61eca2d339

This article, written by Brey, explains what is Virtual Reality and how it emerged during the 1980s. It also explains the ethical and social concerns society have on VR which makes it difficult being accepted by society. It also explains the difference between single use and multiplayer use. This source is reliable due to all the references and citations it provides and it also gives background information for the introduction and issues with VR. It is also unbiased due to having two different viewpoints on virtual reality.

Fitzsimmons, M. (2014, March 25). Virtual reality 'can fundamentally change communication,' says Oculus CEO. Retrieved October 04, 2016, from http://www.techradar.com/news/world-of-tech/oculus-ceo-on-vr-it-can-fundamentally-change-communication--1237133

Fitzsimmons provides information about how Oculus is planning on advancing VR in terms of communications. Their goal is to create a long distance “call” that creates an image of an individual appearing in front another wearing an HMD. It is to simulate a face-to-face conversation for long distance which sounds interesting the brain may think that the individual is somewhere else when wearing the HMD. This article is useful in giving more information for the future use of VR. This source could possibly be unreliable because they are looking at the pros of VR instead of future risks that may occur.

Lamkin, B. P. (2016, September 27). The best VR headsets: The virtual reality race is on. Retrieved October 04, 2016, from http://www.wareable.com/headgear/the-best-ar-and-vr-headsets

This website provides information about the current and future HMD and their prices like the HTC Vive and the Oculus Rifts. It provides links to the manufactures to get more in-depth information for each one. It makes it easier to compare and contrast each one in terms of which program/console it is compatible with and which one has better benefits in terms of price and quality. This source is reliable because it is reference by publishers in the newspaper/news industry.

Palter, V. N., M.D., & Grantcharov, Teodor P,M.D., PhD. (2010). Simulation in surgical education. *Canadian Medical Association.Journal, 182*(11), 1191-6. Retrieved from http://search.proquest.com.mutex.gmu.edu/docview/746782467?accountid=14541

This journal provides information about how VR in medical education and how it is tested to see if there were any improvements. The results were there was a difference between those who had VR training performing better than those who did not receive training. It explains the benefits of VR training in terms of experience for individuals in the medical field which will help them with a real patient.

Parkin, B. S. (2015, December 31). How VR is training the perfect soldier. Retrieved October 04, 2016, from http://www.wareable.com/vr/how-vr-is-training-the-perfect-soldier-1757

Parkin provides information about how VR simulations were used in the military. How the military used VR (using Oculus Rifts) for piloting aircrafts in an air force and for driving land base vehicles. It mentions how they set up soldiers in order for them to

practice parachuting with VR which is interesting. It also mentions how soldiers can see firsthand how much damage a bomb does using an image of a solider on VR.

Schroeder, R. (1993, November). Virtual reality in the real world: History, applications and projections. *Futures, 25*(9), 963-973. doi:10.1016/0016-3287(93)90062-x. Retrieved from http://www.sciencedirect.com.mutex.gmu.edu/science/article/pii/001632879390062X

Schroeder explains the history of VR before it emerges in the 1980s. The idea of VR existed since the 1960s and the first HMD was made in 1970. He also explains how VR was tested in education, but due to the lack of technology it did not get much results. He also explains how VR would expand in entertainment in terms of media and gaming using a HMD and a joystick for players to interact with the environment.

Shuchat, J., Ouellet, E., Moffat, N., & Belleville, S. (2012). OPPORTUNITIES FOR VIRTUALREALITY INCOGNITIVE TRAINING WITH PERSONS WITH MILD COGNITIVE IMPAIRMENT OR ALZHEIMER'S DISEASE. *Non-Pharmacological Therapies in Dementia, 3*(1), 35-54. Retrieved from http://search.proquest.com.mutex.gmu.edu/docview/1626374747?accountid=14541

Using VR in cognitive training for patients with Alzheimer's disease and cognitive impairment is the main focus of this article. It is believed that by using VR for everyday things like walking and eating would help individuals with Alzheimer's "remember" those actions using VR. Research is limited though which did not give much results, but it is slowly improving which means further testing is required in order to determine if VR has the potential for those in need.