

Into A Different World: Virtual Reality (VR)

Brian Doan

George Mason University

IT 104 DL5

Randolph Terlecki

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Introduction/Background

In October of 1958, what is widely considered to be the world's first video game, was created by physicist William Higinbotham. It was extremely simple, a tennis-like game, with just a small ball being bounced back and forth from each side of the screen. Now, a little more than sixty years later, there are now realistic three-dimensional immersive and interactive simulations in the form of virtual reality, or "VR" for short. Artists, entertainers, and people in general have always been looking for ways to enhance their viewing experiences and creating out-of-world settings. This led to the development and use of early forms of VR with panoramas, 3-D effects in cinema, and "Vitarama" (Lowood, 2021). Fred Waller Vitarama in 1939 had the goal of duplicating the entire human field of vision. To generate the illusion of immersion in the space perceived by a viewer, the Vitarama approach utilized many cameras and projectors as well as an arc-shaped screen. Even though the term "virtual reality" wasn't coined until 1987 by Jaron Lanier, this was VR in its earliest of form and was even used in military training, something that it is still used for today (Lowood, 2021). VR has come a long way since then, being the latest groundbreaking technology that can be applied in just about anything.

How It Works

VR uses computer modeling to create an artificial three-dimensional simulated sensory environment that users can communicate with using interactive devices in the forms of headsets, goggles, gloves, and body suits that send and receive information (Lowood, 2021). These devices pick up the users' movements and actions in real time and can even provide the sensation of touch, allowing for the user to move around and interact with the generated environment around them and "feel like they're there".

Current Use

A part of the reason why VR is a topic of conversation in this modern age is because of its wide range of current uses: gaming, entertainment, medical training, military training, space training, medical therapy, and even sports. Gaming is currently the most well-known and popular use of VR. Players commonly use a headset and a pair of joysticks to move around and interact with their environment. Some more advanced VR systems include a treadmill-like machine that equips users with leg movement in all directions, allowing the player to walk and run, further enhancing the emersion. Players can be put into worlds they will never experience in real life, go on adventures with their friends, and go to battle against dragons or other players. For entertainment, VR provides interactive cinematic experiences. Similar to 4-D movies, VR places the watcher in the movie, enhancing the view experience. VR also allows new recruits in the medical, military, and space fields to be trained under safe and controlled environments. Upcoming nurses, doctors, and surgeons can practice interacting with and operating on people without the risk of harming them. New soldiers will be able to combat train in dangerous conditions without endangering their lives. Unexperienced astronauts can learn about space conditions and operate expensive machinery without ever having to go to space or the need of a physical machine or tool, drastically saving money. VR has even been used to provide medical therapy to stroke victims as well as assist in other clinical practices (Schmid, Glässel, & Schuster-Amft, 2016). Although those results have been positive and shone promise, further advancement and research in this realm of VR is needed. In sports, VR is used to aid in training in sports such as golf, cycling, and skiing. It's used to help assess technique and measuring athletic performance. When compared to control conditions, VR has also been proven to improve exercise adherence, aid in training race pacing techniques, boost effort, improve mood and enjoyment, and better cognitive functioning (Neumann, 2016).

Security/Privacy Aspects

As VR advances so do the potential risks with security and privacy, many being unique to VR. Depending on the software used to power certain virtual reality environments, users' personal information, passwords, and chat logs might not be well protected or encrypted. This issue isn't as much of a problem in larger VR companies and enterprises that make information security a high priority. Other than information security, there is the risk of identity theft and impersonation in VR worlds. This is because users can actively change what their avatars look like and in doing so, impersonate another user. Companies so far have come up with a couple solutions to this issue, such as requiring an actual picture of the user or an active webcam while the user is playing, not allowing users to change their names, or limiting the extent of how much users can change their avatars. Another security risk that only applies to VR is the risk of users changing the environment itself. This can potentially cause disruptions in training, meetings, and the workplace. In terms of privacy, VR opens a whole new world of concerns because every single action, message, movement, and interaction in a VR environment can be tracked and monitored. Companies can then use this information for their benefit like data in experiments. This has sparked public outcry in the past with Facebook and Oculus where they kept changing privacy policies and it was leaked that Facebook had been putting their users under psychological experiments. All these issues pose real threats to the future of VR and need to be addressed for VR to be used to its fullest.

Ethical and Social Implications

VR, despite being so advanced, still hasn't been perfected. This has led to issues that have made people question the safety of VR. It might be surprising, but VR poses great risk physically. Being imperfect, some VR headsets can't track its user's movements correctly in real time, as in

there would be a slight delay from when the user moves in real life and in the virtual reality (Korolov, 2014). Even though the delay is short, any discrepancies or inaccuracies in the registering of movement can lead to motion sickness and nausea. This was such a concern that the US military was uncertain about the use of VR in their training. They decided to opt out of using the standard VR headsets for higher-end models, over ten times the price of the standard models out of worry for their soldiers. Another risk of VR is its potential to induce dizziness, blackouts, or epileptic seizures. This has led to many sites of entertainment such as Chuck E. Cheeses to recall their VR machines and for warnings to be explicitly mentioned in the terms and conditions of VR products (Korolov, 2014). At its current state, VR isn't even remotely close to being indistinguishable from real life however, it is powerful enough to fool the user's subconscious mind into believing that they are in a specific environment. This poses the risk of triggering phobias in users, such as the fear of cramped areas, heights, or spiders (Korolov, 2014). Other than physical harm, VR also presents a behavioral risk as well. Similar to social media or cyber bullying, VR creates an environment where users can essentially hide behind a virtual mask. They can't cause any physical harm, but under that virtual mask, users will feel that they can say comments that are deemed offensive that they usually wouldn't say in person. With VR, there is the possibility for bullying, stalking, or harassment, except the VR environment makes these negative interactions feel even more real and personal (Korolov, 2014). This is an issue in jobs that use VR that companies warn their employees about. In all, VR has its problems but these issues are being worked on every day to perfect the VR experience, and these issues still don't even come close to invalidating the positive uses of VR and its potential.

Future Use

Although VR seems very advanced to us right now, experts say that in the times to come, we will look at present day VR like how we view the previously mentioned tennis game. Currently, modern day VR only excels at taking control of two out of our five main senses, sight and hearing. But in the near future, VR is expected to be able to enable us to feel, smell, and even taste in the computer-generated virtual world (Marr, 2020). All these advancements will allow for all current fields that VR is being used for to be further improved and made more effective. For instance, with education and training, the latest innovation with VR, the “Teslasuit”, a full-body suit that offers haptic feedback in the sense of touch, as well as measuring heartbeat, respiration, and other stress indicators, offering limitless applications. One of these being allowing people to safely train under simulated hazardous situations. For example, Walmart put their employees through a virtual simulation of Black Friday conditions in order to teach them how to deal with busy shop environments and long lines of customers (Marr, 2020). Other than in stores, hazardous from the medical field such as surgeries or mechanical work in engineering can be simulated. An added benefit is the fact that the financial risk of allowing inexperienced workers or novice students to use expensive and complex machinery and tools is reduced immensely using VR. With industry and work, VR is expected to completely take over the work environment. Ericsson, a VR distributing company, predicts that by 2030, there will be VR environments that will appear completely real to all five senses simultaneously (Marr, 2020). This would lead to what is called the “dematerialized office” in the workplace. The “dematerialized office implies that the physical work environment is completely taken away, and an interactive and working VR environment is available wherever the user is. With socialization, VR will expand the options in which people can interact with their friends and family. Close ones that live far away or family that can be seen because of complications will be able to meet

in the virtual world. VR will allow people to hang out, spend time, play games, and stay connected. In the field of entertainment and gaming, VR will greatly enhance user experience. Full body suits that provide all five senses to be experienced will enable users to feel like they are truly in the game they are playing or the movie they are watching.

Conclusion

Currently, VR is already used in many different aspects of life, including in-training, gaming, and in the medical field. Although VR doesn't come without its problems, this being in security and other ethical implications. This being in areas such as nonprotected private information or VR induced motion sickness. However, VR is constantly being tweaked and these issues are being worked on every day for VR to be used to its fullest potential. It is predicted that VR will reach that full potential soon, with it enabling for users to feel all five senses. This will dramatically change the way people interact with others, train in jobs, and go to work in the future. In conclusion, VR is the becoming more and more advanced every day, its possible applications increasing rapidly, showing how it will soon take over the future.

References

Korolov, M. (2014). The real risks of virtual reality. *Risk Management*, 61(8), 20-23.

<http://mutex.gmu.edu/login?url=https://www-proquest-com.mutex.gmu.edu/scholarly-journals/real-risks-virtual-reality/docview/1610268054/se-2?accountid=14541>

I chose this source because of the wide variety of applications of VR that the paper describes. The paper even also discusses the risks of VR as well. The paper goes over the uses of VR for training, simulations, manufacturing prototypes, marketing, and military. The very real risks of VR include physical harm and information security. VR can cause dizziness/motion sickness and depending on the VR server, user information may not be well protected.

Lowood, H. E. (2021, May 13). *Virtual reality*. *Encyclopedia Britannica*.

<https://www.britannica.com/technology/virtual-reality>

I chose this source because it outlines the history and background of VR as well as giving a detailed description of how VR works. It started with humans wanted to enhance their viewing experiences, leading to things such as 3-D effects in movies. This fascination fueled the development of early versions of VR, the first being Vitarama. The paper also described VR as a three-dimensional virtual simulation created by computer modeling. VR often uses tools called interactive devices that allow the user to interact with their virtual environments by inputting their actions in real time.

Marr, B. (2020, December 18). *The future of virtual Reality (VR)*. Forbes. Retrieved September

12, 2021, from <https://www.forbes.com/sites/bernardmarr/2020/12/18/the-future-of-virtual-reality-vr/>.

I chose this source because it listed possible future uses of VR. The article stated how VR still has so much more room to grow and potential despite already being so advanced. VR currently

can only truly take control of the body's sight and hearing, but in the future could be capable of hijacking the senses of touch, smell, and taste as well. And on top of top new VR gear will be able to do more such as tracking heartbeat and other bodily functions while being lighter, easier to use, and cheaper. The possible applications are limitless. These include uses in the workplace, training, socially, and in entertainment.

Neumann, D. L. (2016). ON THE USE OF VIRTUAL REALITY IN SPORT AND EXERCISE:

APPLICATIONS AND RESEARCH FINDINGS. *International Journal of Computer Research*, 23(3), 273-293. <http://mutex.gmu.edu/login?url=https://www-proquest-com.mutex.gmu.edu/scholarly-journals/on-use-virtual-reality-sport-exercise/docview/1897745134/se-2?accountid=14541>

I chose this source because it discussed a new and interesting use of VR as well as challenges in the form of its application in sports and exercise. VR is said to help increase adherence to exercise and to also be improve mood, effort, and enjoyment. As of now, VR is only in sports such as golf, cycling, and skiing. VR analyzes and assesses performance and technique. The paper also talks about the future application of VR in sports and exercise.

October 1958: Physicist Invents first video game. American Physical Society. (n.d.). Retrieved September 12, 2021, from

<https://www.aps.org/publications/apsnews/200810/physicshistory.cfm>.

I chose this source because it provided interesting information for the starter to my introduction. The article describes what is considered to be the world's first video game and who made it. It was a simple tennis like game created by physicist William Higinbotham about 60 years ago. It became popular in the lab where Higinbotham worked, and the rest was history. This gives context to how far technology has come since then that now there exists VR.

Schmid, L., Glässel, A., & Schuster-Amft, C. (2016). Therapists' perspective on virtual reality training in patients after stroke: A qualitative study reporting focus group results from three hospitals. *Stroke Research and Treatment*, 2016

<http://dx.doi.org.mutex.gmu.edu/10.1155/2016/6210508>

I chose this source because it describes the possible uses of VR in the medical field. In this study specifically, VR is tested for its uses in treating patients after a stroke and in clinical practices in general. The results were positive, showing that VR was supportive for a general health service model. However, it was stated that further development and advancements are needed to be made for VR to be more effective. This shows how VR can still but improved on but also shows its wide range of future uses.

