

Application of Virtual reality for mindfulness practices

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Abstract. Virtual reality is an immersive technology that has a lot of applications in the modern world. Currently, there are many applications for virtual reality technology but most of that lies in the field of entertainment. Having a technology that can immerse the user in a hand-crafted environment can have a lot of positive impacts in many other fields. The purpose of this essay is to explore the application of this technology in the field of mindfulness and other alternatives. Furthermore, exploring the current proven effectiveness of this technology in the current stress epidemic where many people can benefit from widespread use. Lastly, looking at the software side of things and seeing how designing a compelling environment in the virtual world can contribute to the experience of mindfulness practices. In conclusion, this essay will cover the reasons why virtual reality can be used for mindfulness practices in the world today and what the pros and cons of this technology are.

Keywords: Immersive virtual reality, wearable meditation technology, mental health software and devices, Stress.

1. Introduction

Virtual reality (VR) is a human-computer interface where the user is put into a different environment in the virtual world. The first virtual reality headset that is like what we know now was created in 1968 by American computer scientist Ivan Sutherland and his student, Bob Sproul. Similar technology has been experimented with even earlier than that, as far back as 1957. Over the last 50 years, the form of virtual reality we know has somewhat stayed the same. We still have a head-mounted display with 2 separate screens displaying pictures or videos [1]. Currently, there are only a few commercially available applications of virtual reality, the most prominent being entertainment, and most research currently done with virtual reality does not focus on mindfulness. Fig 1. There are other applications of virtual reality and this essay will investigate some other uses. There are many aspects of the technology used for virtual reality that are used to improve the overall immersion, the quality of the display, the audio, and the device that the user uses to interact with the virtual world. There are benefits to using virtual reality for certain situations, using virtual reality to view a film is more immersive than viewing it traditionally on a screen. Some games are designed for virtual reality and make the player more immersed than on a flat 2D screen. But virtual reality can be used for purposes other than entertainment, for example, the topic that this essay is about is exploring the use of immersive technology to guide people with their meditation and practice mindfulness. An example of how a user interacts with a game environment below. Fig 2.

Regular mindfulness practice can benefit your physical and mental health, but it is challenging to incorporate it into your daily routine. Many people can benefit greatly from mindfulness in the current world who do not practise it due to schedules or feeling the lack of need for meditation [2]. Using virtual reality technology to aid in mindfulness practices can solve many problems that cause people to not have these practices regularly. Some people are too busy, and other people might be too distracted by their environment. But with technology that can change the environment and block out any distractions, there is a lot of merit to using it for this reason. Virtual reality creates an immersive environment where it is specifically designed for this purpose. But there are still a lot of pieces to put together to make an effective environment and experience. This essay will continue to explore the use of virtual reality in mindfulness from many perspectives.

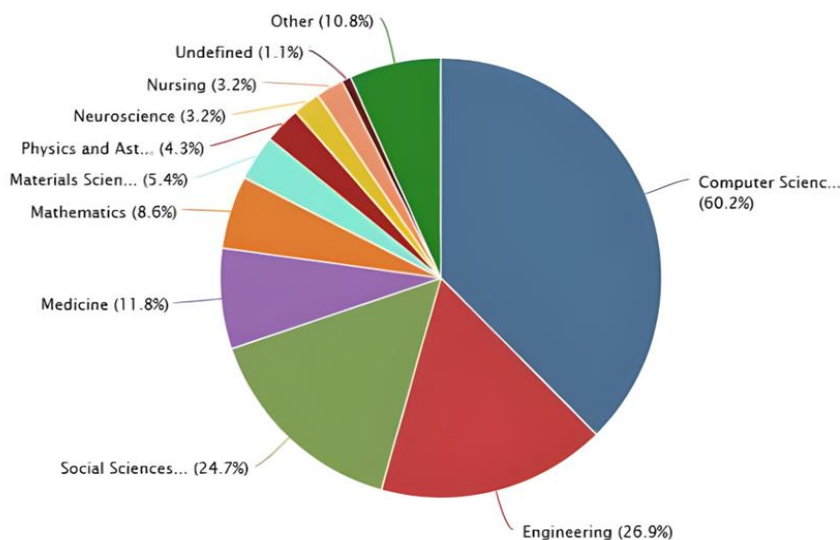


Figure 1. The number of papers per subject area shows that virtual reality is being researched in many subjects but the most common ones are still computer sciences and engineering.

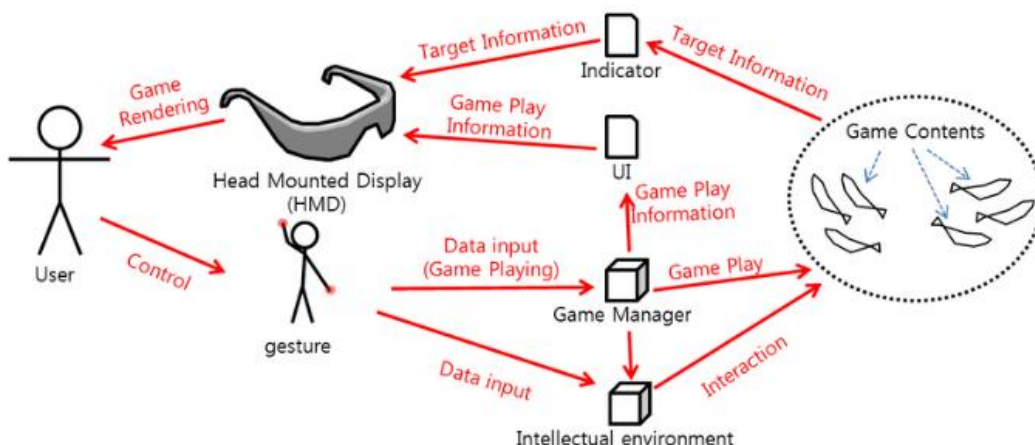


Figure 2. Immersive Virtual Reality Flow Chart

Looking at the technological side of how to implement the technology into mindfulness practices. Also, the current benefits of virtual reality in a society that is becoming more stressed out. Lastly, how the software side of virtual reality can create environments that are specifically created with meditation in mind.

2. Immersive Technology for Mindfulness Practices.

First, there are some misconceptions of what virtual reality actually is, there are some fake “virtual reality” devices that are just two screens, and are neither immersive nor interactive. Having true immersive virtual reality is what would be beneficial for mindfulness practice and that is what the essay is going to cover. This topic is going to discuss how to define immersive virtual reality and how it can be different from the common conception [3]. Next, covering how practising mindfulness is important and how to incorporate virtual reality technology. Lastly, how currently virtual reality is used for mindfulness practices and the positive effects it has on the users. Overall, this topic will explain what categorises as real virtual reality and its application in mindfulness practices [4].

Practising mindfulness is very important since in the world today many people have problems with their mental health and dealing with stress, and many people do not have the time or space to do these practices or think that they are not important. Currently, immersive technology is mostly used for

entertainment and other forms of media but is rarely used for things like this. Having a device that can put you into another world can help with mindfulness a lot since people have trouble sitting down and doing meditation without being distracted. There are many devices with technology that are designed to create a good immersive experience, there must be good visual and auditory inputs and there also must be scenes that are created by software that matches the experience. There are games and other programs that currently exist that claim they can help with mindfulness but there is very little data to back up the actual effectiveness of the platform [5].

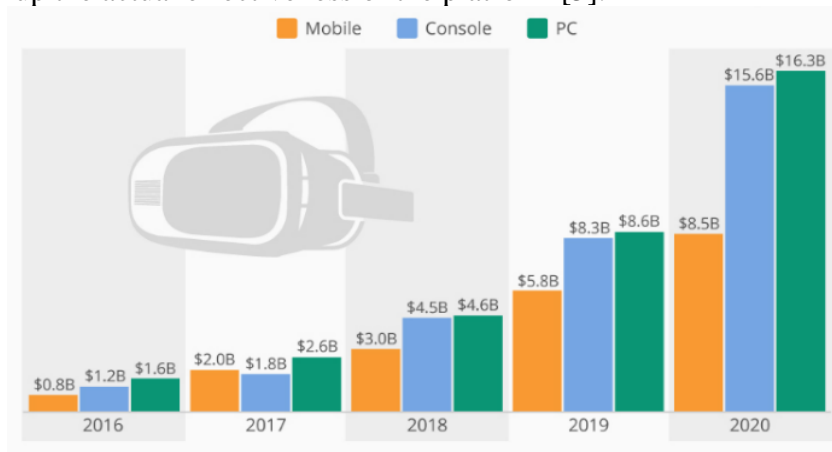


Figure 3. Forecasted virtual reality hardware market size

Since regular meditation and mindfulness practice can benefit many people greatly. There is room for the use of immersive technology to help people who do not have the right time and condition to perform traditional mindfulness practices. The simplest way to use immersive media to help with meditation is using a virtual reality headset to put the user into another environment that is designed to be relaxing and not distracting. The technology is used to provide a visual simulation that is not present in the real world. Using immersive technology people can be put in environments that did not exist before putting the device on [6]. The virtual reality headset provides visual and auditory stimulation to provide a convincing immersive experience. Currently, the most effective way to help with meditation with immersive technology is to create an immersive environment that makes the user feel immersed. The user needs to be convinced that they are in that world or else the experience will be nothing but a distraction. The main concern of immersive media not being effective for meditation is if the user is not convinced by the environment and the immersion breaks. There are many factors to this problem and there is technology trying to solve each of them.

There have been studies and experiments conducted on people's experience with mindfulness practice in a virtual environment. Many participants found that a virtual environment caused them to feel calmer and more relaxed which is the result user would want from regular mindfulness practices. From simply placing someone in a different environment to having a guided meditation experience these are all possible with the current technology. Experiments also show that virtual reality technology was able to make people feel calm and relaxed when they are placed in an environment designed to do so, compared to feeling sick when they were placed in an environment where it would simulate sickness. Even with current virtual reality technology, we can amplify these positive emotions and with technology getting better everything is only going to get more immersive.

To conclude, the effectiveness of using virtual reality for mindfulness practice has been proven with evidence. Using real immersive technology for the user to connect with the environment at a deeper level will improve their meditation experience. Using this technology is becoming more feasible because of the growing demand for virtual reality, and the growing need for meditation. Furthermore, there are many positive reactions from a user when meditation in a virtual environment. Overall, this technology can be more widely adopted soon if the current trends of the need for virtual reality and mindfulness practices keeps up.

3. VR and the Stress Epidemic

Second, in the world today there is currently a growing need for managing stress, and mindfulness practices are a good way to help with that. There are many ways virtual reality can help people in the current world [7]. With the rise in popularity of virtual reality and the current stress epidemic there are a lot of ways having accessible and quality meditation can help many people. Furthermore, virtual reality can connect with people's minds in a different way than many other traditional methods of mindfulness practices, having a virtual environment is a huge advantage over other platforms. On the contrary, there are some side effects to using this technology, due to current limitations there will still be people who are uncomfortable with using virtual reality. In conclusion, virtual reality is a technology that can be useful for many people, but it is not a solution for everyone.

When VR first became more popular in recent years it was viewed more as a gimmick and it somewhat still is. Although the main use for virtual reality is still entertainment, one of the faster-growing practical uses for this technology is meditation and related applications [8]. There also are millions of people who encounter stress in every country and in some countries, most of the population has experienced stress almost every day (Fig 4). Stress not only impacts the productivity, mood, and other aspects of the individual but having a stressed population also impacts many nations' economies. Virtual reality could be adapted to help many people with the current stress epidemic. The technology has an extreme amount of potential to help people with mental health problems since it is not like any other form of media. Not only can virtual reality be used to help those who have mental health problems it can also be used to identify them. Since the environment can be catered to anyone it can be used to determine the issue.

Leading countries worldwide based on stress experienced in the previous day in 2020

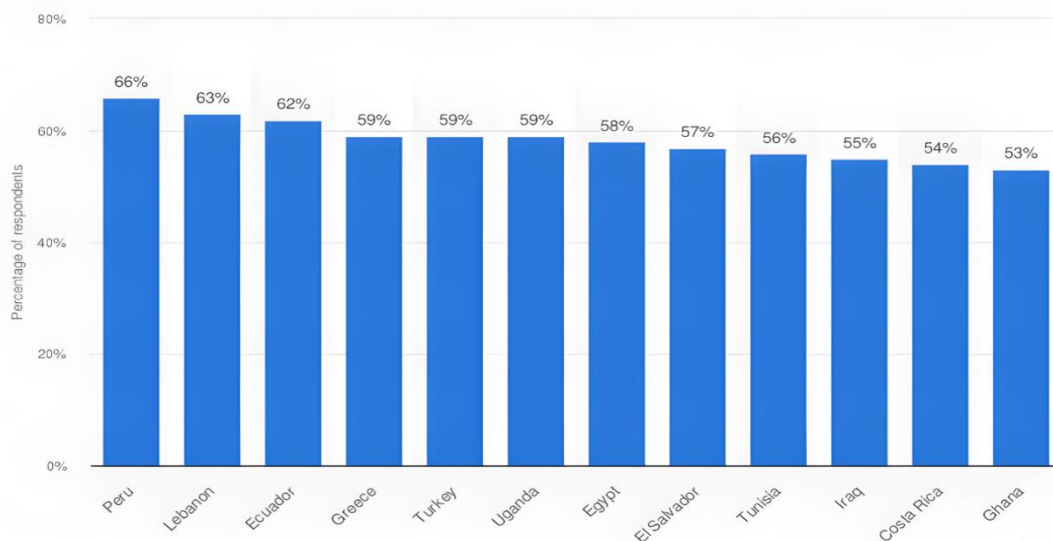


Figure 4. In many countries over half the population experience stress in the previous day

The advantage of using virtual reality for subjects as complicated as mental health would be that the immersive nature of the technology is able to achieve a different level of connection with the user. The environment could be customised depending on the situation and the user, which can help in specific cases. The effectiveness of VR has been verified in the treatment of some different phobias which are some of the most common mental disorders. There are also some other disorders that the technology has success treating such as eating disorders and body image disorders. This is all due to the deeper level of connection this technology has with the user, and being able to provide a specific virtual environment for the treatment. Another application is treating PTSD (post-traumatic stress disorder), patients are exposed to scenes related to the source of the disorder, this is a prime example of the advantages of this immersive technology. Treating these mental health disorders is much more advanced than having a peaceful meditation in the virtual environment, but it shows that having a personalised virtual world can help with something as complicated as mental health [9].

Some side effects of prolonged use of virtual reality would be motion sickness, dizziness and eye strain are all side effects that will come with the technology. The cost is also one of the main concerns since getting the device just for mindfulness practices would be out of most people’s consideration. Although Virtual reality has proven to be effective in certain situations there are still downsides to the technology, currently a high level of immersion is achieved but for certain situations it is still far from enough. Currently virtual reality has some applications in regards to mental health and dealing with stress, but there are still many improvements to be made for it to be able to become more cost effective and have even better results. These are the barriers that the technology still has to overcome before it is adopted for more widespread use (Fig 5).

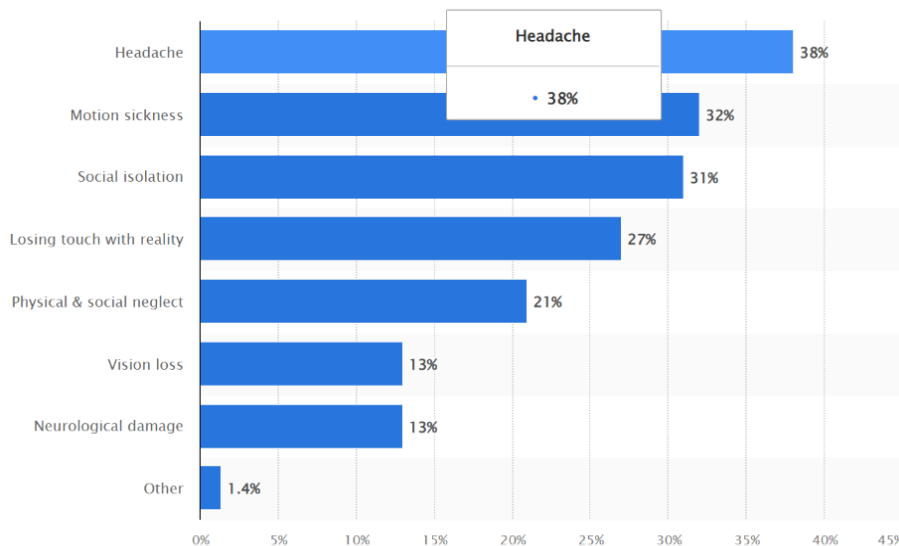


Figure 5. Common side effects of prolonged use of virtual reality.

4. Mindfulness and Immersive software

There are many ways to implement the software side of virtual reality, the different methods each have their pros and cons. First, there are the existing guided meditation applications, which are simple meditation environments with a voice guiding user through. Second there are 360° videos, which are pre-recorded videos that were found to be relaxing. Lastly, there are games that are relaxing that are not strictly made with mindfulness in mind, but also achieve some similar effects. Overall, there are many ways to implement mindfulness in virtual reality, but there is still yet to be a product that has utilised the full potential of the technology.

To begin, there are a few ways immersive technology can assist with mindfulness practices, one of the simplest yet effective ways is guided meditation. It is a simple yet effective way to utilise all the features of the technology, having a peaceful virtual environment and having a voice guiding user through meditation is what a lot of people need as an introduction to mindfulness. The benefit of guided meditation is that the platform is simple and is what many people need. Having something that helps with meditation and blocks out distractions is exactly what people are looking for. Most meditation apps currently still don’t use the interactive nature of virtual reality but it would be very difficult to incorporate that feature considering interactions with the world would be considered a distraction. In conclusion, these guided meditation applications are a simple yet effective way of utilising the immersive virtual reality technology. The downside is that it is not fully interactive and does not use the technology to its full potential [10].

Next, some other popular virtual reality meditation/relaxation applications currently consist of simple environments and sometimes music, or 360° videos where the user is only able to look around in a pre-recorded environment but not interact with anything. There are aspects of immersive technology that most current applications in meditation are not using. Some environments are simply designed as a wall to block the outside world rather than specifically made for a more relaxing

meditation experience. Creating a 360° video is simple, all the creator needs is a specific type of camera to record the environment and it can be easily imported to virtual reality. Overall, 360° videos are easy to create, and have a low barrier for entry, therefore many people can create these videos and share them. But the non-interactive nature of videos makes this way of displaying content not desirable in immersive and interactive virtual reality.

Lastly, there are many games that are made for virtual reality that are designed to be calming. These games capitalise on the immersive aspect of the technology, being able to interact with the environment around user. Although these games are not designed specifically for mindfulness, they still achieve a similar effect. These games achieve what other software are not able to achieve but only a few are created (Fig 6). Most games are still focused on the traditional genres of video games such as shooter, action, or sport games, but virtual reality has a much higher potential for more interactive games or programs. Research has shown that through virtual reality games people were able to better express themselves, while being highly engaging and interactive. Studies also show that behaviours can be easily altered through the virtual game environment. These games are what the future of mindfulness in virtual reality should be like, having interactive environments that are designed to be calming while using all the advantages that this technology brings to the table [11].

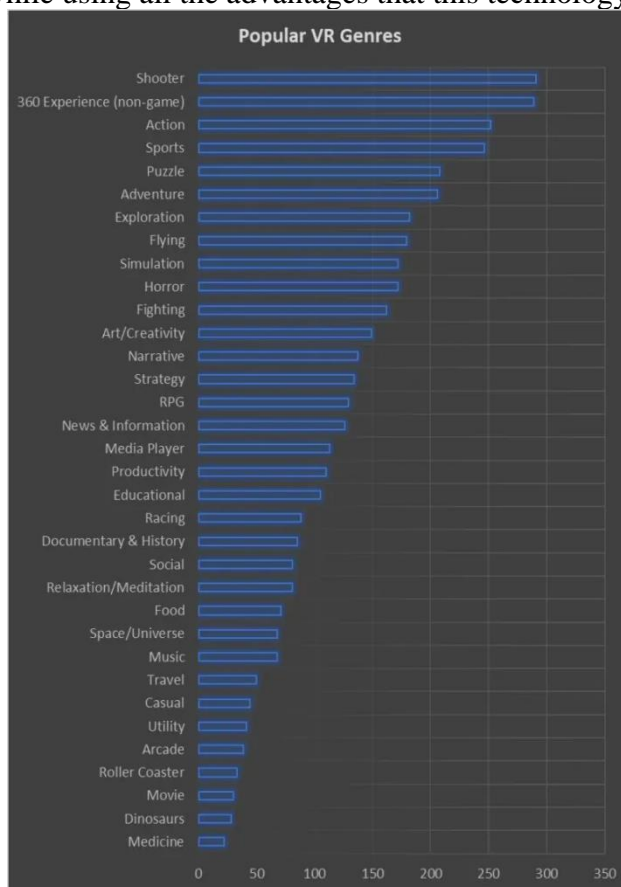


Figure 6. Number of virtual reality games by genre

In other words, there are a few ways to use virtual reality with different softwares. There is softwares specifically designed with meditation in mind, but lacks the interactive nature of the technology. There are also 360° videos that are simple to produce but lack results and interactivity. Lastly, there are games that were not specifically designed for mindfulness purposes but achieve the best results.

5. Conclusion

With virtual reality being an immersive technology that is vastly different from many other forms of media, with there being a virtual world that the user can interact with, it creates a gateway for

mindfulness practices. This essay has explored the application of this technology in the field of mindfulness and other alternatives, although little studies have been done on this subject some promising results were displayed. Next, In the current day and age many people are stressed and that is another reason to have mindfulness in something like virtual reality. Having a device that can block distractions while assisting with meditation can be useful to many people. There are downsides to the use of virtual reality, but those can be reduced as the technology advances. Lastly, many compelling environments can be made in virtual reality, with guided meditation and 360 videos alike. But the most effective use of virtual reality is interactive game-like systems, showing that using the technology to its full potential is the best way. In conclusion, virtual reality is something people should consider when thinking about mindfulness. Despite there being pros and cons, there are some promising results that using the technology could provide, and especially in a time where stress is a global problem. Based on all the points analysed above, there are many factors contributing to what makes a good immersive virtual reality experience, especially for mindfulness.

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