The Impact of Virtual Reality as a Learning Tool

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Abstract

The potential of virtual reality (VR) in educational applications is still unknown, as the technology itself is still in its infancy stages. However, with the advent of reasonably priced, consumer-oriented devices, it is now easier than ever for the average person to experience the world of virtual reality. The purpose of this study was to gauge how people currently use virtual reality, and how open they would be to the idea of exploring new ways to utilize this technology in their lives, specifically in a learning capacity.

Data was collected via an online survey that gathered basic demographic information, existing experience with virtual reality, and the likelihood of using virtual reality for several different types of activities. It also attempted to describe users' expectations for current and future virtual reality iterations.

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Overview

Virtual reality (VR) has been steadily increasing in popularity as an entertainment tool over the past decade, with users now able to experience it from the comfort of their own homes. Along with its ability to immerse the player in the environment of their choosing, it uses spatial awareness to create an unforgettable interactive experience, far more intense than watching a screen. However, its potential to go beyond the scope of simple entertainment and into the educational world is still being determined.

Although virtual reality has been around for decades, it was only recently that the technology improved enough to make it widely accessible. The very first virtual reality machine was called the Sensorama Simulator, invented in 1957 by Morton Heilig (Brockwell 2020). It displayed movies in 3D that included surround sound and even scents sprayed during various parts of the film. Even then, Heilig lauded the device for its educational purposes, stating in his patent that “What the student learns in this manner he retains for a longer period of time” (Brockwell 2020). Although it was an advancement never seen before, the Sensorama Simulator “failed to secure sufficient investment or sales” and the difficulty of the maintenance for the machines was high—many of the parts it contained were custom made—so it quickly fell off consumers’ radar (Brockwell 2020). His next foray into immersive experience devices was the Telesphere Mask in 1960. This was much closer visually to modern VR headsets, yet still did not obtain any commercial success (Brockwell 2020). Also in 1960, Ivan Sutherland described an idea of a “kinetic depth effect” to give a user the illusion of three-dimensional space while wearing a device displaying two different two-dimensional images (Sutherland 1968).

It was not until the 1980s that virtual reality came back into the public eye, so to speak. Flight simulators for the military were among the early iterations of the technology (Cipresso, et al. 2018). Throughout the early 1990s, virtual reality was used within companies for employee training purposes. By the mid-1990s people began using virtual reality to create performances, games, and even location-based interactions with the user (Cipresso, et al. 2018). By the 2010s, companies like Google and Total Immersion were creating prototypes for consumer-level virtual reality headsets (Cipresso, et al. 2018).

In the past few years, the market for at-home virtual reality headsets has increased exponentially (Rogers 2019). Google, Oculus (owned by Facebook), Sony, and HTC are the frontrunners for the current trend of lightweight, easy to use headsets that cost about the same as a current-generation video game console. Virtual reality is more mainstream than ever, and as a result, more companies are willing to invest in its development (Rogers 2019).

Need for the Project

This study has been designed to measure how the general public currently feels about virtual reality, specifically their interest in its current offerings and any feelings they may have about future technologies that may evolve from those that already exist. The goal is to evaluate how virtual reality may be implemented into an educational experience.

Significance of the Project

The intention of this project is to discover and discuss how virtual reality can be applied in education, and its effect (whether positive or negative) on the classroom. It is also an attempt to gauge the public's interest in and attitudes about this field as it pertains to academics.

Statement of the Problem

Virtual reality at a consumer level has become quite popular among certain types of people. This study will attempt to explore what the audience enjoys about virtual reality, what it does not enjoy, and potential future applications that users are looking forward to experiencing.

Research and discovery will focus on the following:

1. Explain the history of virtual reality.
2. Discuss virtual reality's current uses and trends.
3. Identify the applications of virtual reality-based education.
4. Outline informed speculation about the future of virtual reality.

Limitations of the Project

Due to current events, this study will be limited to survey-based interviews with participants. Under ideal circumstances this study would also involve observing participants utilizing virtual reality in person, in a controlled environment, and recording their experience. Additionally, there is a time limitation, as the study must be completed within a certain timeframe—in this case, by early May 2020.

Assumptions

Before participants engage in the study it is assumed that they have at least minimal familiarity with virtual reality, that is, that they have experienced virtual reality in some form or another in the past ten years. Respondents who have not experienced any type of virtual reality will be, for the purposes of this study, included in order to gather information about their expectations for virtual reality applications in a hypothetical sense.

Summary

Virtual reality has become incredibly accessible to the average consumer over the past decade. This study intends to explore who uses virtual reality, what they use virtual reality to accomplish, and their attitudes about the educational potential of virtual reality systems. This research also includes a brief history of virtual reality, as well as defining key terms and ideas regarding virtual reality, its current applications, and its potential future developments. The next chapter details these major points in the field of virtual reality technology.

Literature Review

What is Virtual Reality?

According to Jason Jerald, virtual reality is “a computer-generated digital environment that can be experienced and interacted with as if that environment were real” (Jerald 2016 pp.9). A headset is typically required at minimum, with many current VR headsets also implementing handheld controllers to allow the user to interact within the virtual environment. Jerald posits that virtual reality is also “communication … between human and technology” (Jerald 2016 pp. 10). The VR headset itself contains two lenses that display an image from two slightly different angles, giving the user a three-dimensional experience that changes as they move their head and “move” through the space.

Although virtual reality was once only available to private companies, it is quickly becoming accessible to consumers as a form of entertainment, with home consoles growing in popularity. However, many virtual reality developers are expanding into using the technology to educate and rehabilitate (Jerald 2016 pp. 12).

Immersion vs. Detriment

Virtual reality has been lauded as the next evolution of home entertainment, mostly due to its high degree of immersion. According to Cipresso et al., the levels of immersion provided by VR fall under the following three basic categories:

- Non-immersive systems are the simplest and cheapest type of VR applications that use desktops to reproduce images of the world.
- Immersive systems provide a complete simulated experience due to the support of several sensory outputs [sic] devices such as head mounted displays (HMDs) for enhancing the stereoscopic view of the environment through the movement of the user’s head, as well as audio and haptic devices.
- Semi-immersive systems … provide a stereo image of a three-dimensional scene viewed on a monitor using a perspective projection coupled to the head position of the observer. (Cipresso et al. 2018)

This study will primarily base its research and findings on the immersive system. This system provides the user with more of a sense of presence than the other types of virtual reality, although this does have a few shortcomings. Some users complain of headaches and/or nausea after using a virtual reality headset, similar to motion sickness. Additionally, users may become so immersed in the virtual environment that they negatively impact the real world, injuring themselves or causing damage to elements of their surroundings. Many popular applications and games within the console systems require the user to stand for extended periods of time, use both hands to complete a task, and potentially even move their body in some ways that can cause accessibility issues, impacting their ability to successfully use the product.

Major Breakthroughs in VR Development

As discussed briefly in Chapter One, Morton Heilig is considered the father of virtual reality. However, many new developments and technological advancements have been made since the first patent, fifty years ago. “In 1961, Philco Corporation engineers built the first actual working tracked HMD (head mounted display) that included head tracking” (Jerald 2016 pp.21). The first glove device—meant to provide an “alternative to keyboard entry” was patented the following year by IBM (Jerald 2016 pp. 21). In the mid-sixties, engineers in the military began to design virtual systems for training purposes (Jerald 2016 pp. 21-22). This was also when Ivan Sutherland was creating a head-mounted display as well.

“In 1982, Atari Research … was formed to explore the future of entertainment,” and its team “brainstormed novel ways of interacting with computers and designed technologies that would soon be essential for commercializing VR systems” (Jerald 2016 pp. 23). Two members of this team, Thomas Zimmerman and Jaron Lanier, went on to form VPL Research, “where they built commercial VR gloves, head-mounted displays, and software” (Jerald 2016 pp. 26). Throughout the 1990s, the popularity of virtual reality “exploded,” but unfortunately, the technology at the time could not keep up with it (Jerald 2016 pp. 27).

It was not until 2012 that virtual reality began to make a comeback (Jerald 2016 pp. 27). Technology had advanced enough to give users the immersive experience that was deemed necessary for a virtual reality experience. In large part due to crowdfunding and the “hacker community,” helping to

fund and create the Oculus Rift—a home virtual reality console— “the new era of VR was born” (Jerald 2016 pp. 27).

Virtual Reality as an Educational Tool

Although virtual reality is widely regarded for its entertainment purposes, there is a growing trend of the technology being used as an educational tool. According to Li et al. via Muratore et al., “the VR label contains multiple technological solutions with different characteristics that can comply with specific research and clinical practice requirements” (Li et al. 2017 via Muratore et al. 2019). This technology can be implemented in order to provide patients with neurological or developmental disorders—such as autism and PTSD—to learn how to interact in given environments as a form of therapy. Studies done regarding this concept have shown that using virtual reality when diagnosing and treating patients “allows a more accurate evaluation and to plan a more targeted rehabilitation” (Muratore et al. 2019).

In 2018, Devon Allcoat and Adrian von Mühlenen of the Department of Psychology at the University of Warwick conducted a study on the effect of virtual reality on students’ ability to retain information. The study was conducted with ninety-nine participants who were randomly presented with different learning materials, either video, textbook, or VR (Allcoat & von Mühlenen 2018). The results concluded that those given study materials via virtual reality performed noticeably better on the post-test they were given and completed the post-test with more positive emotions about the experience (Allcoat & von Mühlenen 2018). When asked for their feedback about the learning style they experienced, virtual reality received the fewest negative responses by far (three, as opposed to thirteen for the video learners and fifteen for the textbook learners) (Allcoat & von Mühlenen 2018). Their conclusion for the study was that it “demonstrated how VR can replicate or complement traditional learning methods” (Allcoat & von Mühlenen 2018) and asks the audience to “consider how VR technology allows for learning beyond the classroom” (Allcoat & von Mühlenen 2018).

Methodology

In order to properly examine attitudes and ideas about current and future developments in virtual reality, it is best to survey a wide range of different people from different backgrounds and varying levels of experience on the subject. The research methodology that has been implemented for the purposes of this study is mixed method with the majority of data collected being qualitative.

Data Collection

There are six steps that were used to complete the study: create a survey, disburse the survey to random participants found across several websites (including Facebook, imgur, and Reddit), review data collected to remove any disqualified participants (underaged, inexperienced, or otherwise irrelevant respondents), compile and analyze data collected, report findings, and draw conclusions based on findings.

Create a Survey

Creation of the survey was done using SurveyMonkey, a website that does not require the participants to create an account in order to respond to the survey. It included basic demographic questions-- such as age range, country of residence, and level of education-- as well as questions directly related to the users' experiences and attitudes toward virtual reality. No other personal information (such as the respondent's name, contact information, etc.) has been gathered or recorded.

Survey Disbursement

The survey was posted across various social media websites to be taken by any willing participant and was made available to take for five days. The purpose of this was to receive data from users of many different areas and backgrounds. The survey included a disclaimer informing them that their identity will remain anonymous throughout the entire process of data collection. Their basic demographic information has been the only personal data gathered about them.

Data Review

After five days of collection, the survey was closed to participants and data review began. Data has been analyzed and organized based on the basic demographic information recorded in the survey, as well as an analyzation of current virtual reality experience and interest in potential future applications of virtual reality.

Report Findings and Draw Conclusions

Findings and conclusions have been documented later in this research report. This data provides a correlation between demographic, VR experience, and attitude about potential future educational virtual reality applications.

Target Population

The target population of this study was a sample of individuals who consider themselves moderately experienced in current technology, whether in the realm of academics, entertainment, or something else entirely. This was done to gauge interest in virtual reality technology from a wide variety of people to try to get a general idea of attitudes and opinions.

Summary

This chapter has outlined the six steps that were taken to obtain and report data provided by participants for the purposes of this research report, as well as the type of participants being targeted. The survey was created using knowledge gained during research about the past and present of virtual reality and its possible uses for educational purposes. The survey was then made available to the general public for five days, with a disclaimer that no personal information beyond basic demographics would be obtained or recorded. Once the five days transpired, the survey was closed, and data review began. The report findings will be discussed in the Results section of this document, after which conclusions that have been drawn based on the findings of this survey will be discussed.

Results

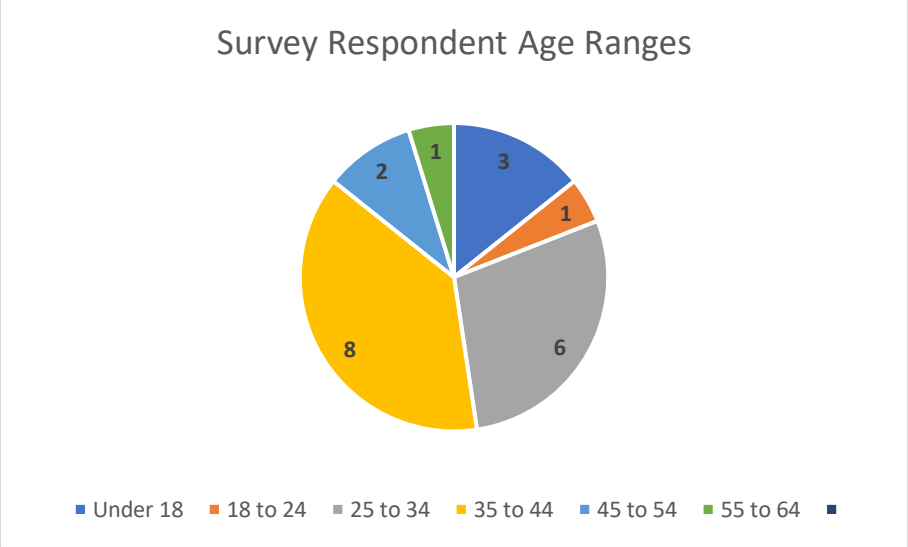
The survey received twenty-one responses in the five days it was made available on social media platforms. The original intention of this research was to remove results regarding minors and those without prior virtual reality experience, but it was decided to include individuals who fall into these categories in order to minimize bias. Results of the survey and any additional comments from respondents can be found below. The survey itself can be referred to in Appendix A. Conclusions and recommendations based on the results of this study can be found later in this document.

Question One: Age

Question one asked respondents to select their current age range from a list. Their responses can be found in Figure 1.

Figure 1.

Age ranges of respondents.



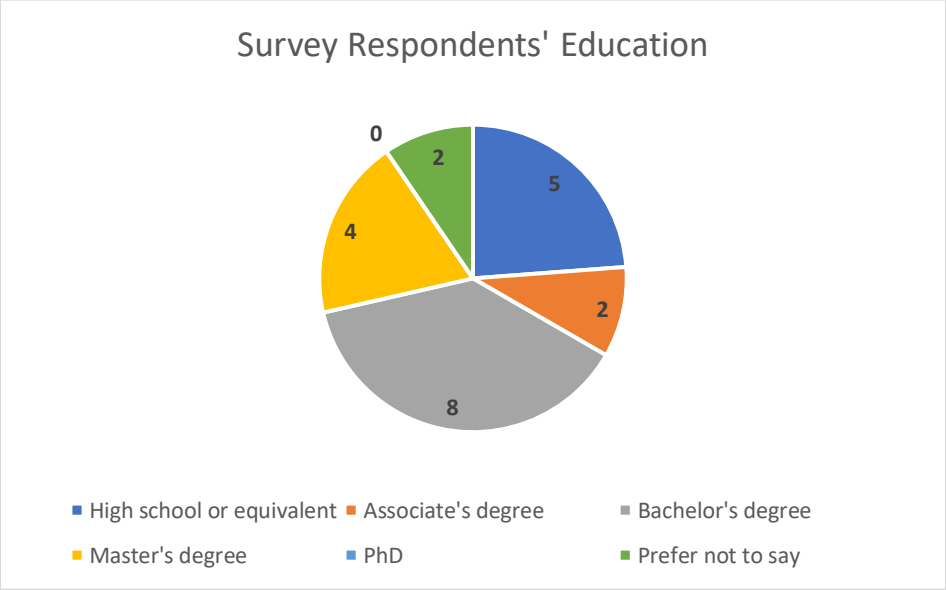
The majority of survey respondents were between the ages of twenty-five and forty-four. Only two respondents reported being under the age of eighteen, and as noted above, their responses were included in these results in order to minimize bias and include their opinions and attitudes toward the possibility of virtual reality learning.

Question Two: Education

The second demographic question of the survey asked about the respondents' level of education. This question was asked in lieu of gender, because gender did not seem relevant for the purposes of this study. Inquiring about educational level seemed more important in a study related to education. The responses regarding highest level of education completed can be found in Figure 2.

Figure 2.

Educational levels of respondents.



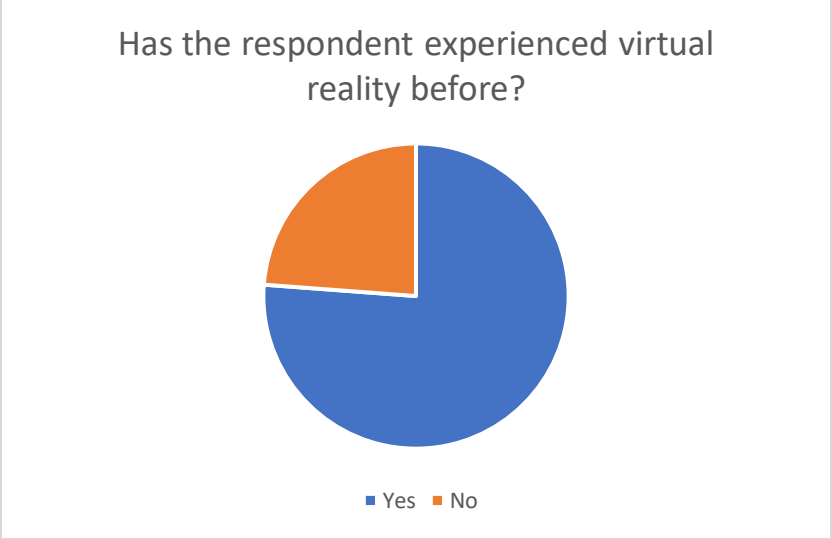
The majority of respondents have completed some level of higher education. Having a wide array of educational experience will prove useful for the purposes of this study, as the diversity of these experiences can make respondents approach the application of educational virtual reality from different perspectives.

Question Three: Experience With VR

Question three simply asked respondents if they had experienced virtual reality before. Figure 3 illustrates their responses.

Figure 3.

Respondents' existing experiences with VR.



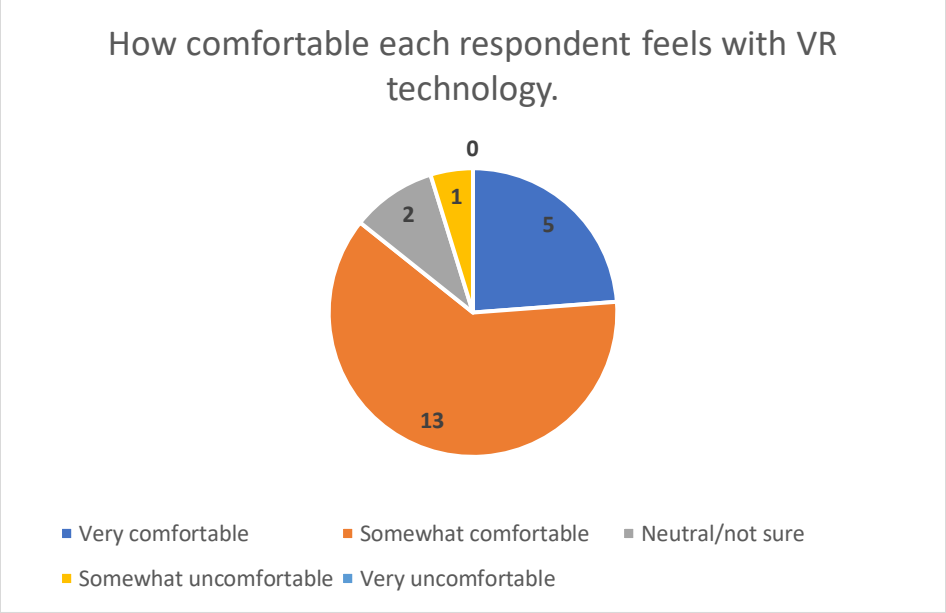
Once again, the original intention was to remove surveys that included a negative response to this question, but it was later decided to keep the results of every survey in order to study attitudes about both experienced and inexperienced participants.

Question Four: VR Comfort Levels

Question four was an attempt to gauge how comfortable with virtual reality technology each respondent was. Answers can be observed in Figure 4.

Figure 4.

Virtual reality technology comfortability levels.

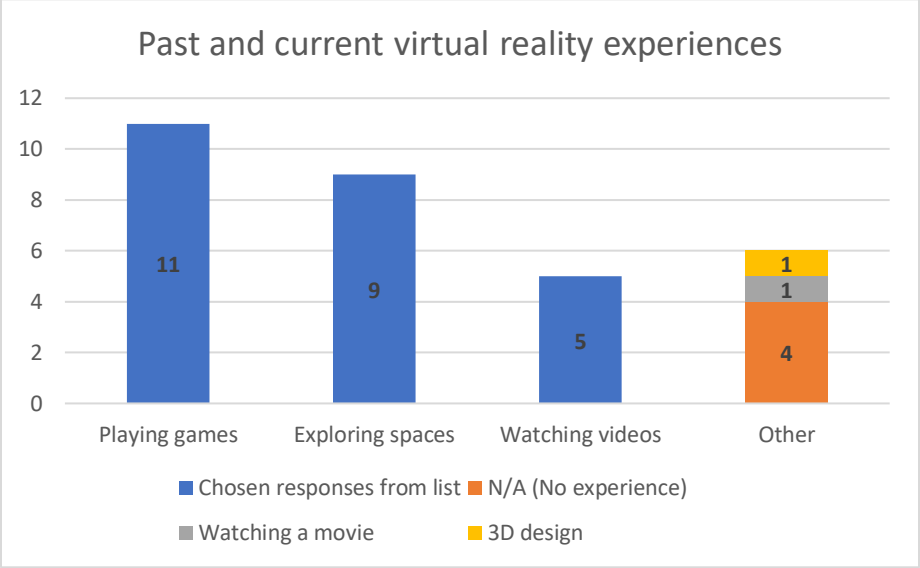


Question Five: Virtual Reality Experiences

In question five, respondents were asked to select the ways in which they have previously experienced virtual reality. Their options were playing games, exploring spaces, watching videos, or to respond with something not listed. Their answers can be found in Figure 5.

Figure 5.

Past and current VR experiences.



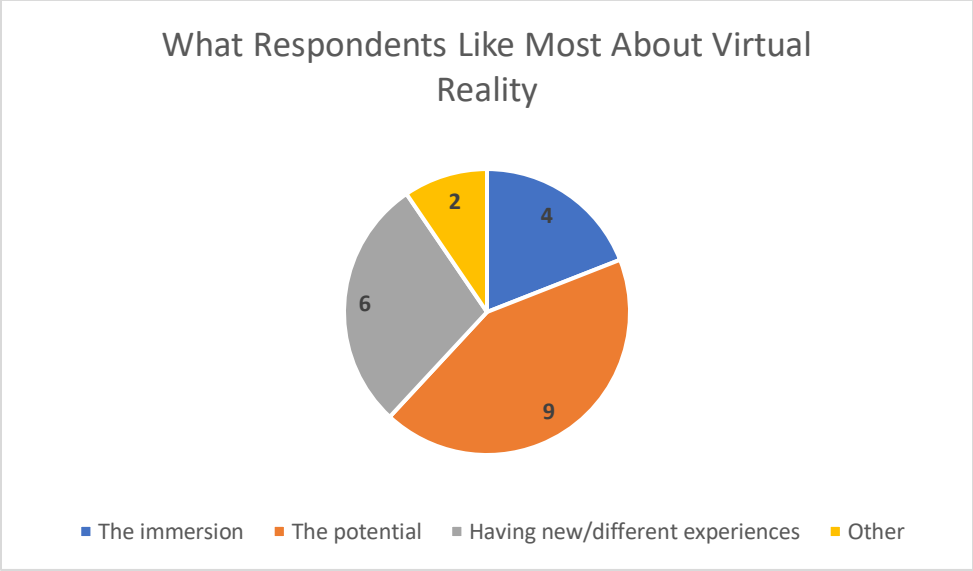
In retrospect, this question should have included a N/A (No experience) as an additional selection choice for respondents who answered “No” to question three.

Question Six: What Participants Like Most About Virtual Reality

Question six was another multiple-choice question, where respondents were asked to select the single thing that stood out to them the most about virtual reality. The options were: the immersion, the potential, having new/different experiences, or another reason that they were to provide. These options were chosen based on responses gathered in an earlier survey covering the same topic. Their responses can be observed in Figure 6.

Figure 6.

What respondents like most about virtual reality.



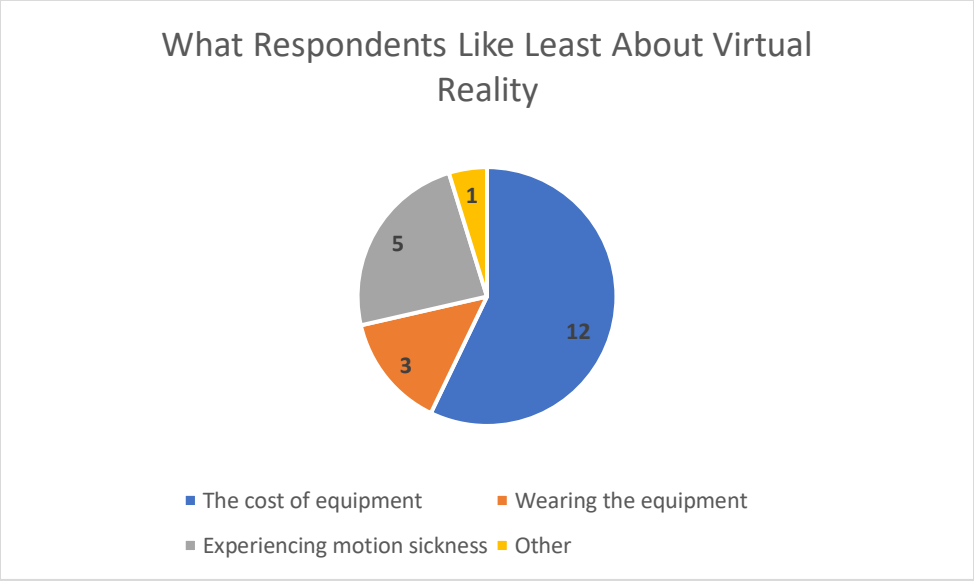
Out of the respondents who selected “Other,” one indicated that they were “curious to see how it is used in the future,” and the other said they could not choose between the three supplied choices.

Question Seven: What Respondents Like Least About Virtual Reality

Question seven queried the opposite of question six and sought to learn what respondents like the *least* about virtual reality. The answers provided were the cost of equipment, wearing the equipment, experiencing motion sickness, and an "other" answer, to be supplied by the respondent. As with question six, the available answers were chosen based on an earlier survey regarding current attitudes in virtual reality. The results can be found in Figure 7.

Figure 7.

What respondents like least about virtual reality.



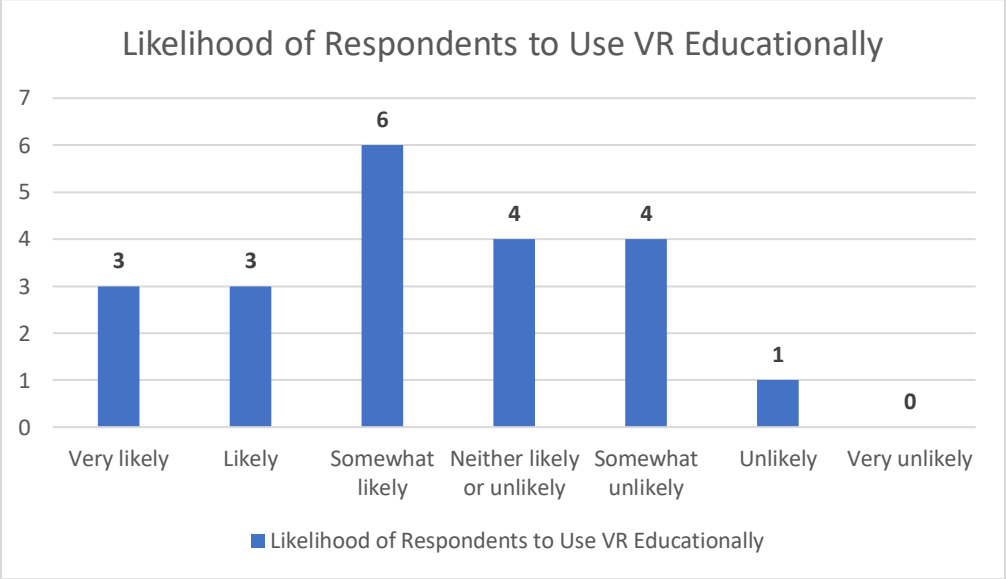
The one participant who selected "other" responded that the last time they attempted to use a virtual reality headset, they experienced technical difficulties.

Question Eight: Attitudes About Personal Educational Experiences in VR

Question eight attempted to understand how likely respondents would be to use virtual reality technology in educational ways, such as learning robotics, physics, yoga, or geography, and to rate this likelihood on a scale of “very likely” to “very unlikely.” Their responses may be found in Figure 8.

Figure 8.

Likelihood of respondents to use VR educationally.

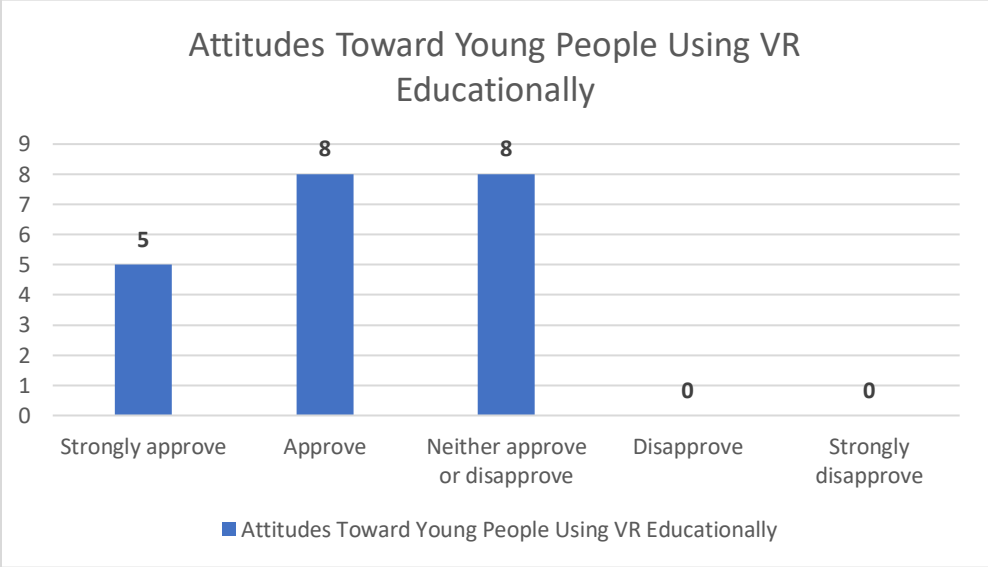


Question Nine: Attitudes Regarding Young People Using VR Educationally

As a follow-up to question eight, question nine asked respondents how they would feel about virtual reality being implemented in a classroom setting for a younger person (under the age of eighteen), and to rate their approval of the idea on a scale of "strongly approve" to "strongly disapprove." The results can be observed in Figure 9.

Figure 9.

Attitudes regarding young people using VR educationally.



Question Ten: The Perceived Benefits and Detriments of Virtual Reality Regarding Education

The tenth and final question in the survey asked respondents for their opinions about the application of virtual reality technology in education. This was posed as an open-ended question in order to give the respondents an opportunity to explain their feelings as much or as little as they felt necessary to get their point across.

The benefits of virtual reality in education, as provided by respondents, include the following:

- "[Virtual reality] might be more helpful for some students to have a visualization of the work they are doing, because everyone learns differently."
- "[Virtual reality] can allow us to remove the limits of the classroom."

- “[Virtual reality] could allow teachers to engage their students more.”
- Virtual reality could improve “the practical and interactive aspects of lessons and overall education.”
- VR “could provide access to ‘experience’ places and things that might otherwise be inaccessible.”

Several detriments of virtual reality being used for educational purposes were provided by the respondents as well, including:

- “The time used getting [sic] students accustomed to the tech [sic] and the problems therein.”
- “Might lessen human to human interaction.”
- Virtual reality “may distract students from education.”
- “Availability of equipment and space to use it.”
- “Students … might be epileptic or have other potential health concerns.”

The full list of responses to this question can be found in Appendix B.

Summary

The survey was comprised of ten questions including demographic information, general experiences and attitudes about virtual reality, and attitudes and opinions about the potential of using virtual reality technology in an educational environment. Twenty-one respondents, the majority of whom were over the age of eighteen and had prior experience with virtual reality, provided useful data that will now be discussed.

Conclusions and Recommendations

Based on the results of the survey, the sample of the general population included in the respondent pool has responded positively to the notion of implementing virtual reality in an academic environment. Although many foreseeable issues have been discovered during the research and study phases, the benefits may outweigh the insufficiencies for the general public.

The History of Virtual Reality

Virtual reality has come a long way from its humble beginnings in the early 1960s. It has been used for military training, staff training, and (with the advent of proper technology) entertainment over the past several decades. However, it was not until compact home versions of the equipment became widely available (and fairly affordable) that the idea of virtual reality moved into the forefront of current technology trends.

The Current Uses and Trends of Virtual Reality

As of 2020, several major companies are involved in the development and manufacture of virtual reality headsets, including Oculus (owned by Facebook), Google, and HTC. The Oculus Quest is the most recent release to be introduced, and is entirely self-contained, meaning it does not require a computer or television in order to function. Upon set-up, the user sets a “Guardian,” which creates a barrier around the play area, and a warning system activates if the user gets too close to this barrier (Oculus 2020).

Based on the survey results, the majority of the sample population have experienced virtual reality, most with positive opinions about said experience. Some downsides include motion sickness and discomfort in wearing the headset, but they lauded the levels of immersion and various new experiences that were made possible with the technology.

VR-Based Education

Educational applications are already available for every major virtual reality headset currently on the market, but virtual reality has yet to be implemented as a common learning tool in the classroom. Respondents to the survey indicated that they would be open to the possibility of VR-based education. However, they pointed out several issues that may arise, such as the time it takes to teach students to use the equipment and possible health issues, like epilepsy.

Another factor that may be a detriment to the advent of virtual reality in the classroom is the cost. The equipment is still fairly expensive and difficult to maintain (especially around younger children), which can cause a barrier to entry. However, based on past technological trends that gathered traction in educational capacities (such as computers and tablets), it may be possible for virtual reality headsets to decrease in price in the coming years, making them more accessible.

The Future of Virtual Reality

As mentioned above, a major inhibitor to the accessibility of virtual reality is the cost of the equipment and its maintenance. As technology continues to progress, the cost to develop and manufacture virtual reality headsets will decrease, causing them to become more widely available. Based on the findings in the survey, implementing virtual reality in a classroom setting would help students experience learning in new and exciting ways, increasing their immersion and providing a nearly inconsequential learning environment to explore.

Conclusions

The respondents of the survey provided incredible insight to the general population's attitudes toward virtual reality, and more specifically, how it could be applied to the classroom. Overall, respondents reacted positively to the idea of VR in academia but were realistic about potential issues and barriers involved in its implementation. This research was an attempt to discover and understand different concerns contained within the perception of various people toward virtual reality and the future potential of virtual reality in the classroom.

Recommendations

Based on existing research and the conclusions made regarding data collected in the survey, the possibility of virtual reality becoming used in an educational capacity does exist. However, several key standards need to be in place before this can happen. Most importantly, the price of the technology itself needs to decrease in order to make it more accessible. Additionally, both students and teachers should be able to “opt-in” to using it, on an individual basis, based on personal attitudes or potential health concerns. Upon providing permission, they also need to be properly trained on the use and maintenance of the equipment, to minimize user error and maximize safety.

Future research would delve deeper into the experience of participants with virtual reality directly, such as having them use a headset for different activities and scenarios to observe their reactions in real time. Unfortunately, due to current circumstances, this was not a possibility.

Summary

Virtual reality has grown in popularity over the past decade for its entertainment value, but the technology involved still needs to progress farther in order to consider applying it in a classroom setting or curriculum. Because virtual reality has roots in technical training, it may only be a matter of time before a myriad of uses for the technology become readily available for the average consumer or student.

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Appendix A

Survey: Virtual Reality and its Educational Applications

1. What is your age range?

   Under 18

   18 to 24

   25 to 34

   35 to 44

   45 to 54

   55 to 64

   65+

   Prefer not to say

2. What is the highest level of education you have completed?

   High school or equivalent (GED)

   Associate degree

   Bachelor's degree

   Master's degree

   PhD

   Prefer not to say

3. Have you ever experienced virtual reality (VR)?

   Yes

   No

   Other (please specify)

4. How comfortable do you feel with virtual reality technology?

   Very comfortable

Somewhat comfortable

Neutral/not sure

Somewhat uncomfortable

Very uncomfortable

5. How have you used virtual reality? Check all that apply.

   Playing games (i.e., Superhot, No Man's Sky, Beat Saber, etc.)

   Exploring spaces (i.e., Rec Room, Google Earth, Wander, etc.)

   Watching videos (i.e., YouTube VR, National Geographic, etc.)

   Other (please specify)

6. In your opinion, what do you like most about virtual reality?

   The immersion

   The potential

   Having new/different experiences

   Other (please specify)

7. In your opinion, what do you like least about virtual reality?

   The cost of equipment

   Wearing the equipment

   Experiencing motion sickness

   Other (please specify)

8. How likely would you be to seek out an educational experience in VR (yoga, robotics, geography, physics, etc.)?

   Very likely

   Likely

   Somewhat likely

Neither likely nor unlikely

Somewhat unlikely

Unlikely

Very unlikely

9. How would you feel about virtual reality being implemented in a classroom setting for a young person (under 18) in your life?

    Strongly approve

    Approve

    Neither approve nor disapprove

    Disapprove

    Strongly disapprove

10. In your opinion, what benefit(s) and/or detriment(s) could virtual reality have on education, especially given current circumstances?

    (Respondents were provided with a comment box. Their responses are provided in Appendix B.)

Appendix B

Responses to Question Ten of the Survey, Regarding Benefit(s) and/or Detriment(s) Virtual Reality May Have on Education

All responses provided are directly quoted from survey results and may contain spelling and grammatical errors or the use of first person. They are not indicative of the personal opinions of the creator of the survey or this research paper.

Respondent 1: “I think it might be more helpful for some students to have a visualization of the work they're doing, because everyone learns differently.”

Respondent 2: “It can allow us to remove the limits the classroom has”

Respondent 3: “It could allow teachers to engage their students more, the only downsides I could forsee is that if it is used on children who are quite young it may make them not want to interact with the real world as much, since their brains are still developing.”

Respondent 4: “It could benefit by improving the practical and interactive aspects of lessons and overall education. And what with the present isolation, a simulacrum of human interaction could help with the social and mental aspects.”

Respondent 5: “Beneficially, it could provide access to "experience" places and things that might otherwise be inaccessible (think like Magic Schoolbus). However, the cost of equipment, maintenance, and programming makes VR in its current iterations likely to further privilege gaps between schools. Likewise, I am not positive that VR will be universally accessible, even disregarding price, for students who might be epileptic or have other potential health concerns.”

Respondent 6: “The possibilities around augmented reality are virtually limitless. Overlays on objects and guidance in 3D space are just the beginning.”

Respondent 7: “Access experiences from home, schooling from home, like work from home but beneficial in that it'll tailor to more sense and grasps the users attention more then a standard computer with a monitor.”

Respondent 8: “I think, if the tech were more accessible, more children would be able to experience situations and places they would not otherwise experience or understand in less rich or immersive environment.”

Respondent 9: “Aren’t most VR systems rated 18+ ? Something about effecting brains?”

Respondent 10: “I think that it can be beneficial to give students access to content and experiences that they will not have in a traditional classroom setting.”

Respondent 11: “There are many potential benefits, my concern is availability of equipment and space to use it.”

Respondent 12: “The immersion into a different setting can have a profound effect on a viewer. I think it is a more memorable experience for the viewer. It's an option for people who are not able to travel/be physically present but still feel they are actively participating with other people and the environment they are viewing.”

Respondent 13: “I think it would allow myself or my kids to experience things they obviously can't whether due to quarantine or general inaccessibility.”

Respondent 14: “It would be pretty beneficial, allowing students to experience experiences not previously experienceable due to lack of experience causing safety concerns, or simply location or funding issues. (This hurt to type) The only detriment I could see is if it would distract students from education, but I doubt it would do that a significant amount more than other forms of digital entertainment”

Respondent 15: “Too expensive for underfunded schools. Might lessen human to human interaction. But could be very useful for a number of reasons.”

Respondent 16: “it would let you experience things in real time, but it might also let you screw around.”

Respondent 17: “Immersion and new experiences, even within the home.”

Respondent 18: “As we see with teleteaching now, any benefits will have expenses attached, and thus, will be mostly experienced by educators rich enough to use them.”

Respondent 19: “VR for vocational skills like welding generally lacks the tactility and atmosphere to be effective. Some institutions look for the cheapest way to teach skills, at the detriment to those trying to learn.”

Respondent 20: “Like almost any technology, it is important to be sure the use is well thought out. In my classroom, I would weigh the time used getting students accustomed to the tech and the problems therein, with the learning objectives. Currently, I find it very rare that that balance comes in the favor of using cool new tech. Unfortunately.”

Respondent 21: “I think it would be a great way to bring the classroom (and more) to students. I think it also has practical application in adult and corporate education / training.”