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Virtual Reality and Video Game Gatekeeping

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VIRTUAL REALITY AND VIDEO GAME GATEKEEPING

by

Autumn Franke

Submitted in Partial Fulfillment of the Requirements
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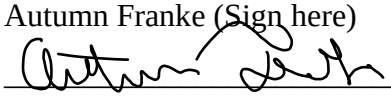

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VIRTUAL REALITY AND VIDEO GAME GATEKEEPING

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By

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ABSTRACT

Title of Thesis: Virtual Reality and Video Game Gatekeeping

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This thesis focuses on the effects of the video game industry being the only influence on the development of virtual reality technology and the hindrance caused by it. The aim of this thesis is to discuss this flaw and recommend a different route to develop the technology through the education and medical fields instead of the video game industry.

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Introduction

Virtual Reality (VR) technology has been in development for a few decades now but when comparing the current state of the technology to the media we have produced displaying the potential of VR there is an obvious gap between the two. The reasoning behind this is that the industry that has been working to develop the technology has gatekept it so well that they have not gotten the support they need to fix the issues that VR faces. The video game industry has long worked to develop VR into the technology we have seen in movies like *Ready Player One* and anime's like *Sword Art Online* but have not been successful in doing so because there is a lack of financial and intellectual support in doing so as many consumers have given up on the technology. Consumers have been long promised the revolutionary technology that will change their world but when you look at places like the upcoming Metaverse and compare the graphics to other console-based games it leaves quite a lot to be desired of the technology. Alongside that issue the technology as a whole still has some vital issues that need to be resolved like the motion sickness that user may encounter when using VR. If the technology doesn't live up to the promises made and the standards that consumers have for it, and it cause physical issues like motion sickness its unrealistic to expect them to adopt the technology more widely. What the technology needs is an industry that can garner more support than video games can as they just don't have the reach to a larger pool of everyday consumers as well as the intellectual support to solve these issues. This is why the medical and educational fields are more suited for the development of the technology. Not only does the medical field have a better understanding of motion sickness and therefore a better chance at solving the issue, but if everyday consumers saw that VR could help them more directly, they would develop far more of an interest in the technology than if its only used for recreational purposes. Marketing VR to consumers and

developers alike through the lens of medicine and education will not only bring the financial support the technology needs but the intellectual support and the drive to develop a technology that can improve and save lives. Changing consumer interest form a VR as a technology of recreation to a technology that saves and improves the lives of all is vital to the future development and success of VR.

Video Game Marketing the Consequences of Gatekeeping

The marketing for Virtual Reality as it stands is mostly video game based, with the exclusion of the new advertisements for the Metaverse that recently started although it can be argued that it's a glorified chatroom and still falls into the video game category. As stated by Roettl in their research on the consumer views of 2D, 3D and VR games, video games do better as they develop so by that standard there should be a lot of interest in Virtual Reality for video games and there is not. When searching around YouTube looking at the major companies that own and create VR headsets, their advertisements for Virtual Reality and video games is old most of it dating back years, although this could be changing here in the next few months/years as we get closer to the release of the Metaverse, and renewed interest into VR technology. Some of these companies may decide to revisit the technology and their marketing of it. As it stands however, there is not a lot of current marketing for Virtual Reality outside of Meta, although as this paper progresses, I assume that will change, none of what was found was or could be considered mainstream at the start of the research. Virtual Reality is not a popular tag or search on either YouTube or Tik Tok which are the best platforms to market new technology on currently, there is no conversation actively going on despite/outside of the announcement of the Metaverse. There is no "hype" around the technology. There should be more hype and

excitement around this technology, we have seen the excitement a new PlayStation or Xbox can create so why is not Virtual Reality doing the same.

There are a few factors that lay into this lack of "hype" or excitement. Meta owns the current largest and most popular VR headset, and currently does not get the same excitement that we see in other areas of technology and gaming, an example would be the PS5. The PS5 is currently completely sold out everywhere, it has been since its release, and impossible to get a decent price on when you do find one online. But the recent VR headset the Meta Quest 2 you can purchase today for either $299 or $399. Why is it not doing well, for starters when searching it on YouTube you see a lot of reviews and advertisements for the device by the brand from 2 years ago. But since then, their videos marketing the product have done poorly on YouTube most barely can hit the 20k view mark, let alone hit the millions of views other consoles and games can get, outside of a few popular games like Among us and Ghost Busters which only hit around the 100k views. Most of them do very poorly and have little engagement. So therefore, the first reason it is not doing well is it is not marketing games that are interesting to consumers.

This is not limited to Meta Quest either many of the videos on these headsets are years old and the games get little to no attention online. So, on top of Virtual Reality mostly marketing through video games its marketing through video games itself is not doing very well, which could explain why the technology is not being more widely adapted to by consumers. Its marketing through one consumer market and it is doing poorly in that market. This is factor number two the technology is only being seen by consumers through an incredibly small lens, and the lens isn't very good. The reason for these doubles back to a lack of consumer interest in the technology and the fact it does not have major games of its own like Mario, Legend of Zelda, NBA and FIFA sports games, or God of War to carry it and draw interest to the other more

minor games, and it is only marketed through video games has caused it to struggle significantly more than it needs to. It is also starting from nothing in an already heavily saturated and loyal consumer base. Many gamers have a preferred console that they play, here is where the issue with input devices becomes a major problem these headsets are not compatible with multiple consoles, they are extremely limited. If Meta Quest could be used with PlayStation, Xbox, Nintendo, Steam, and a smartphone it would do better than trying to create its own games and trying to compete with these already established consoles and platforms that have very loyal fan bases, and an already saturated game market. Instead, it could use those consoles and games to its advantage, and profit off of their momentum, but they don't they are determined to do this alone in this market, factor number three.

This issue ties in with another issue Virtual Reality faces versus other forms of gaming, streaming. A great amount of interest in video games comes from streamers who livestream on YouTube and Twitch, allowing viewers to see the game and technology in use before purchasing it themselves. This shows another lost opportunity for VR, they could have gifted VR headsets to larger streamers and made influencer style deals with them to generate interest, but they have not. Currently, there is not nearly as much interest in watching VR streaming games as there is with non-Virtual Reality games. This is reason number three, the major and most popular games and consoles are not compatible with VR technology, they cannot or will not use VR. This has ended up creating a cycle that Virtual Reality has been in for quite some time now, with streamers. Smaller and lesser-known games are compatible but the games that draw the bulk of viewers are not using VR, and most do not plan to without proof of interest. It takes much more time and money to develop a game that is VR compatible. As Virtual Reality currently stands there is not enough interest to justify the cost and time it would take for major games to make the

transition and in all honestly develop the technology as a whole, since it has a few major issues technically. When you add that to the fact that streamers are not going to stream these lesser-known games because it will not draw as much interest to their streams, since popular games bring more viewers, there is not much interest being created for Virtual Reality for streamers to use the technology. Also, and arguably equally as important as having interesting games, gamers do not use faulty technology. VR has to many technical issues when it comes to prolonged use that make it an overall unappealing technology. These streamers may be using the technology anywhere from 2 to 12 hours at a time sometimes even longer, there are streamers that will on occasions to 24-hour streams. VR cannot be used for that long without cause migraines and eyestrain. This means they cannot play VR games for as long as they play other games, which is not as exciting for them and their viewers especially if that is what is expected and promised. We have seen this issue arise most recently with Pokémon Scarlet and Violet. The games are well developed they contain a lot of the improvements in graphics, storyline, and game mechanics that Pokémon fans have been asking for, for years now. But players cannot get passed how poorly it plays. The conversation around both versions is not about what Gamefreak developed and provided in Pokémon Scarlet and Violet that has been asked for by consumers and provided, but the fact that the console itself cannot handle the graphics and causes major glitches, slowdowns, and occasional crashes of the software. This shows that one flaw like poor graphics, incompatibility, or issues with hardware creates a nightmare in the video game world, and consumers are willing to forgo a well-made game that has everything they want because of one issue. VR has similar performance issues to Pokémon Scarlet and Violet they struggle to render properly and have a tendency to be incredibly glitchy, on top of that these issues then create migraines and eye strain, the graphics issue in this instance is no longer just annoying and

disappointing but painful. It all creates this cycle: if popular games are not VR compatible and properly functioning whether it be a console issue or a games issue, then streamers are not streaming with VR. Therefore, there is not any interest being created through streaming for the technology, this then means there is not enough incentive for games to transition to VR because there clearly is not an interest for it with consumer. Leaving extraordinarily little interest in Virtual Reality on both ends, the streamers/viewers interest in playing the games and the game developers in taking on the cost to integrate VR into the games and fix the issues it still has.

The only way this cycle breaks is if someone else develops the technology and fixes its issues. The video game industry is an amazing place to market and grow if you do it correctly and currently Virtual Reality is struggling because there is not any interest for it in the gaming industry and the cost to develop the technology to then generate that interest is just too high for them. If Virtual Reality as a technology wants to grow and develop it needs to do so where there is interest in the technology and the support it needs to grow, not in a field that has been at a standstill with it for decades now. Virtual Reality has the potential to do well in the video game industry, but not right now. When the technology has developed further and worked out some of its technical issues it will do exponentially better but new technology integration in the video game industry does not work. Gamers and streamers will not play something that is not fully developed and ready, VR is not fully developed or ready for this industry. It is too picky and has incredibly high standards. It is time for VR to move to an industry that will help it develop and grow not expect it to be perfect already.

Issues with Consumer Interest Other than Video Games

Current Consumer View of VR:

The current viability and interest in Virtual Reality technology is relatively low despite the teasing of platforms like the Metaverse and VR video games. The reasoning behind this is consumers have lost interest for two reasons. First, they have only seen Virtual Reality as an extension of video games. In movies and tv we have only seen it in the lens of an entertainment device not a device that can improve our everyday lives, the technology itself is not actually capable of doing what sci-fi movies show it could do either meaning it not only doesn't live up to expectations set by the media, but it has not given itself another avenue to generate interest in consumers. That is the second issue Virtual Reality has promised for decades that it would be capable of doing a wide variety of things across the board and yet it has not ventured outside of video games until now with the Metaverse which is still to many a video game of sorts, it is just another chatroom just in VR, although it is teasing more in its marketing about entering the medical field, it does not detail what that would look like. However, when looking at beta testers and reviews it does not look like Meta will meet the standards it has set for itself either and many consumers are not holding their breath. There is also something to be said about whether the company will even survive that long Facebook is declining in users and consumers are not all that excited about the Metaverse, they also recently laid off 11,000 employees outside of the Metaverse team, and they have supposedly lost a significant amount of profit and value due to their determination to make the Metaverse work despite the critiques, so they may not survive long enough to even release anything.

However, there is some consumer interest in Meta's Metaverse outside of the U.S. although there are many issues it faces in getting widespread adoption by consumers and it will

be an uphill battle for them, as stated previously its reviews are not great and the company's perception is not great either here in the Western part of the world. However overseas in the Eastern part of the world, Asia, and India specifically, there is much more interest and excitement surrounding the platform. The main issue they will face here in the West outside of their perception as a company not being the best, will be getting consumers to buy a VR headset. In 2016 63% of American households had little to no understanding of the technology (Tribbey, 2016), that also means they have no idea how to use it or what to use it for. It is safe to assume with the announcement of Meta and the Metaverse that knowledge of the existence of the technology has improved but without access to the technology it is doubtful that the understanding of the applications of the technology and how to use it has not decreased all that much. Much of the current marketing also does not fill in this gap, it centers around the video game industry and the Metaverse but does not show how it can be integrated into our lives in a way that improves it enough to convince consumers to spend the money on not only the headset, but the other devices needed and the software to participate. This is made even more prominent as we see the economy as it currently stands decline and the cost-of-living rise, consumers have less disposable income than they did a few years ago.

Besides the issues Meta faces, for decades Virtual Reality has made promises and has kept none of them. The graphics leave a lot to be desired, it still causes migraines and eyestrain when used for extended periods of time, and it is still a bulky technology, it is not travel friendly. But consumers' minds can be changed if these aspects of the technology are improved upon. It has been shown that a games perception increases as it evolves. So, a 3D game does better than a 2D game and a VR game does better than a 3D game (Roettl et al, 2018) That means as long as the game is developed properly in Virtual Reality it has the potential to do well on the market.

More importantly consumers will enjoy it and prefer it over 2D and 3D games, they want to play VR video games they just are not up to the standard graphically in comparison to the graphics we see in 3D games which have made drastic improvements over the last decade alone.

The better option for Virtual Reality technology, for gaining consumer interest, is to not start with the everyday consumer but to start with larger businesses, to first gain the funding and support to fix some of the larger issues with the technology itself. This could then also give consumers direct access to the technology without them having to buy it themselves after the improvements have been made, giving them a trial period with the technology without commitment and showing how it can improve their lives in a real-life setting. This is where Education and the Medical field come into play. If students learned with Virtual Reality and Doctors used it to develop and hone their skills it would make the technology more appealing to developers and consumers alike. Shifting the current marketing strategy of Virtual Reality from video games to include education and medicine would draw new minds to the technology and encourage its development, while sparking interest in the average consumer. There has been quite a bit of research done on the possibilities Virtual Reality is now starting to be studied in the medical field and in education, and even more specifically medical school itself. If medical schools and doctors were given the opportunity to use this technology, critique it and give feedback on what they need then the companies creating the technology would have a better idea of who they need to bring in to develop the technology to suit their needs, as well as encouraging students to adapt the technology early on in their education will improve the likelihood they will continue to use it even after they graduate. This will also give insight into where new minds and support are needed designers and programmers for video games versus the technology developers in the medical field have different skill sets, and both are needed to accomplish what

Virtual Reality is striving to do but its currently lacking in the former so allowing the field to experiment and give feedback will make it much easier for companies to bring in the right people. The video game designers can focus on the visuals and graphics and the medical technology designers work on fixing the migraine issues and the eyestrain issues with the designers and turning it into a useful technology for the doctors themselves, and how to integrate it into hospitals and schools alike.

The bringing in of new minds and skillsets is vital to the development of this technology and a lot of it is already out there ready to be tested and implemented but they do not have access to the technology to do so and that is the first thing that needs to change to increase consumer interest. The gatekeeping of Virtual Reality by video game companies and developers needs to end and the doors need to be opened to others and new ideas. In research done by Holly Michaels she has laid out the expectations of educators and students for Virtual Reality and what that looks like, others like Christian Pawassar have researched the application of Virtual Reality in healthcare, Natasha Angelova took a look at Virtual Realities application in Psychology and overcoming fears, and many more that will be examined in depth later on. The research is out there, the minds are out there, what is not out there is the access and support necessary to actually take these ideas further.

Technical Issues:

But to get here the technology needs to improve greatly as stated previously on multiple occasions, the technology is painful to use long-term. This must be fixed before anything else can be done to help the technology and for that we need to gain the interest of the developer

minds necessary to do so. There is no reason to remarket the technology if its unviable and the technology is currently not viable and unusable long-term. Steve Bryson discusses at length many of the issues outside of just visuals and migraines that need to be fixed in Virtual Reality in his research "Virtual reality in scientific visualization". He states that on top of developments for the user there are some back-end areas that need development; the data management, rapid prototyping, networks, architectures, and input devices are also in need of improvement. The major one in that list that needs focus is input devices. If VR headsets could be connected to a smart phone it would be much more intriguing to the consumer than having to buy an Xbox or a high-end PC to use it, it is one less purchase necessary for it to be accessible to the average consumers, especially when you also add on the cost of the headset itself. This is also discussed in *High Visual-Quality Scenes in Low-Cost Virtual Reality with Collisions and Irregular Surfaces (Selzer, 2021)*, which specifically considers smartphones as an input device making it more accessible to the average consumer as it is something many consumers already have and therefore would only need to purchase the headset for. It also does discuss the issues that comes with using mobile devices such as the size of the device and its graphic capabilities but considering how rapidly smartphones are developing their graphic capabilities if this became a viable option, there is little doubt that the smartphone industry would do everything they could to adapt and integrate.

Outside of costs the technical issues Virtual Reality faces are complicated. Many are discussed and outlined in *An Evaluation for VR Glasses System User Experience: The Influence Factors of Interactive Operation and Motion Sickness (Yu, 2019).* What Virtual Reality is in need of is software and hardware improvements specifically motion sickness and graphics improvements. The hardware needs to be more comfortable for users to wear long term and also

may play a key role in fixing the issues with VR/motion sickness. This issue is a key problem that has to be fixed for consumers to adapt and purchase this technology if it causes headaches and motion sickness due to prolonged use, they will not buy it. A possible solution is discussed in the article *Virtual Reality Sickness: A review of Cause and Measurements (Chang, 2020)* it is proposed that if they alter the field of vision (FOV) it may help reduce VR sickness. It was however, found to help in some circumstance but not all so although it may not end up being the key to solving the issue it may be a part of the solution when combined with other adjustments.

Another issue may be with Latency which is how the bodies movements are translated into the VR space, specifically the delay between the two. This has been shown to play a direct role in VR sickness due to how our brain is wired visually. When we move our head there is not a noticeable delay in what we see, so when in a virtual setting, and there is a visible delay our brain is not used to, it can cause motion sickness the more intense the delay and the more frequently it happens the worse the symptoms get. The article *Missing depth cues in virtual reality limit performance and quality of three dimensional reaching movements (Gerig, 2018)* also touches on possible solutions for VR performance issues this one discussing depth rendering and how its created in Virtual Reality. Creating a proper depth field in VR has been difficult and can affect performance in game so they discuss what solutions may be most beneficial but like many of the studies on performance improvement it is not conclusive but they did find that "Movement artifacts due to limited depth perception or immersion prevent even healthy young adults from reaching expected theoretical limits" Depth perception does effect performance, how that problem is fixed is still undecided. Other visual issues like color management in *Spectral Color Management in Virtual Reality Scenes (Diaz-Barrancas, 2020),* 2D lines and 3D terrain on performance *Rendering 2D Lines on 3D Terrain Model with Optimization in Visual Quality and*

Running Performance (She, 2017), come to similar conclusions that these are important issues in need of fixing but the best way to do so is still difficult to find an all-encompassing solution for. These are just a few of the issues in graphics and, VR sickness, eye strain and more that Virtual Reality still needs to find solutions for before it can be expected that consumers would be interest in the technology let alone purchase it for themselves. As long as the graphics are poorer in comparison to 2D, and 3D games gamers will not be interest as they have incredibly high standards for graphics. Alongside that if the technology itself makes you sick or causes you discomfort or pain gamers will not use it and your average consumer will not go near it.

Augmented Reality - How the Right Industry Can Properly Grow a Technology:

Augmented reality (AR) is a similar technology to Virtual Reality, the difference being that Virtual Reality is a completely digital space whereas AR is a digital space overlapping our physical space. It is a combination of our reality and a digital one. This allows the technology to be more applicable in the physical world. It can be used through a smartphone, tablet, or a headset, also allowing more access to the technology. This then allows it to apply to a multitude of fields including medicine, engineering, video games, archeology, museum tours and more. It can be integrated to most sectors of our world from business to leisure. This ability to adapt itself anywhere has allowed it to grow, develop, and improve much faster than Virtual Reality as most of the interest in VR is in the video game industry. AR however has seen interest everywhere, one of the most interesting being in archeology. This interest combined with a company like National Geographic has created the space for the technology to flourish into what we see today. National Geographic is a STEM focused company focusing on the education of the public through magazines, docuseries, short documentaries, and full feature documentaries. To show

what influence they have had on AR as a technology the focus will be on a few of their docuseries and short documentaries that use AR in combination with a few other technologies that when combined make 3D models of everything from the ocean floor to what ancient cities, temples, and ancient wonders would have looked like when built. It is also now seen as an option for archiving the remaining wonders of the world as well as archeological finds made across the world.

The first series, *Lost Cities with Albert Lin,* uses a combination of AR and technologies known as LiDAR and GPR to locate hidden cities in dense jungles or long lost to nature across the world. LiDAR is a laser-based technology, that through thousands of laser pulses and measuring how the light reflects back. GPR or Ground Penetrating Radar is used to see beneath the surface of the earth for underground signs of settlements and cities. These technologies can be combined with AR to create a 3D map of terrain regardless of whether it is covered by grasses, dense forests, or layers of earth. Using drones carrying these technologies, they allow you to create a map of the ground underneath, the remains of settlements and cities, and what may still remain there from ancient civilizations long lost and forgotten. LiDAR helped them find ancient cities from civilizations in Brazil thought to be the source of the El Dorado legends myths and GPR and LiDAR helped find early cities built by the Incas in the mountain ranges before Machu Picchu that show the development and honing of their skills and what these places may have been use and intended for.

Another use of AR by National Geographic used in *Flooded Tombs of the Nile,* in this series along with the article *"Dive beneath the pyramids of Sudan's black pharaohs"* they explore the flooded tomb of the Nubian/Kushite Pharaoh Nastasen one of the last of Egypt's "Black Pharaohs", in Nuri Sudan. Many of the pyramids and tombs from this era of history are

flooded by the groundwater supplied by the Nile River making them nearly impossible to explore let alone excavate. These tombs require professional divers, underwater archeologists, and the technology to map them out. There is no light outside of their flashlights, and the flashlights are not enough once the sediment is kicked up and visibility drops, and it is too dangerous to drain them to be able to bring in larger light sources. Due to the fragility of the tombs themselves if they were to be drained, they would collapse in on themselves and destroy everything inside (Romey, 2019). Instead, they use AR and sonar-based technology, they do not specify what they used but the rendering of the tomb is AR, to map the inside of the tomb and get a layout of what is inside. From there they can excavate based of the map they create of the inside and remove what remains inside. In this case they found gold foil, shabtis, which are figurines in the likeness of the pharaoh, and other small treasures. The body of the Pharoah is believed to still be inside but due to the size of the stones surrounding where they believe it to be it was not found during this show, needing heavier equipment if they want to move the large stones covering where the body should be. If it were not for the use of AR and underwater technologies the tombs of this era of Pharaohs would remain unexcavated and unexplored due to the difficulties, they present. AR creates a map for explorers to find not only the treasures of the Pharaohs, but even the remains of the Pharaohs themselves.

Similar combination of technology is also used in *Drain the Oceans* here they use any combination of AR, sonar, and LiDAR to explore caves, the ocean floor, and many other underwater locations of interest. They have used it to map shipwrecks like the titanic, explore the phenomena and wrecks of the Bermuda Triangle, WWII shipwrecks and planes, the Great Lakes and riverbeds, Spanish shipwrecks, pirate ships, and sunken cities, anything and everything of interest in a body of water can be mapped, and metaphorically and digitally the water is

removed, and you can see the entirety of some of the most fascinating finds in the world. The ancient pirate port city of Port Royal in Jamaica and what is believed to be Blackbeard's ship the Queen Ann's Revenge of the coast of North Carolina. In these cases, we cannot remove the ocean from ancient sunken cities and the attempt to remove shipwrecks would most likely destroy what remains and they would not survive long outside of the water and quickly disintegrate or rust when exposed to the air. This is an issue not just for shipwrecks and plane wrecks but also the finds in the underwater tombs as well which have to be carefully preserved when removed usually with resin or other preservatives. Leaving the best way to "preserve" these larger finds and locations that cannot be removed through a 3D rendering of what exists so that archeologist can revisit the findings and future generations can see what once existed. AR allows people to see a digital but accurate version of what once existed and in some of these cases they are overlayed where they once stood for instance the Knights Templar Fortress in Acre, Israel (Slee, 2019). An AR 3D rendering was created that allowed it to be display where it once stood and show not only what it looked like but also the size in comparison to what remains stand there today.

There are a multitude of applications of this technology in archaeology outside of just what National Geographic shows, Monika Stobiecka discusses in here article *Farewell to Tradition? Presenting Archaeology after the Digital Turn* the use of AR in "multimedia museums" in Poland and exhibits they have used this technology in. In the exhibit *Treasures of Peru: The Royal Tomb at Castillo de Huarmey* this exhibit used a combination of physical artifacts and emersion and digitally created emersion to create a four room display of the archeological finds from the site and the tomb itself. Stobiecka stated that the "Technology that was used to engage visitors was not the latest and most innovative, but rather an attractive,

digitally supported display with a coherent vision resulting from a fusion of different perspectives." Showing that when used properly and with direction AR can create a unique display within museums and hopefully draw the interest of younger generations to archeology and history through a new medium. Another examination of AR in the display of archaeological artifacts by Călin Neamţu discusses the quality of these "digital/virtual artifacts". This would be an option for preservation of more delicate artifacts that need more care and would do better off display, while the digital version could be used in the museum, the real artifact can stay safely preserved elsewhere. The article *Augmented reality visualization of scene depth for aiding ROV pilots in underwater manipulation* also uses a combination of AR and ROV (Remote Operated Vehicles) similarly to how the archeologists used it with sonar, to work underwater in construction and engineering. The ROV use sensers to send back the depth between it and what is in front of it and those are then used to create a 3D map using AR for the pilots above, giving them a more accurate visual regardless of visibility underwater.

There are limitless options for the use of AR in archaeology from finding new sites to archiving old sites and artifacts. Archeology has provided a space for AR to develop and grow and show all of its uses then if you add in combination to that its' applications in engineering, education, medicine, and other fields, AR has then proven its versatility. This is one reason; AR has been far more successful in developing than Virtual Reality has. Because Virtual Reality has been gatekept in video games for the last few years it has not had the influence of minds and money from other industries. AR prospered because of the minds from the industries it is used in and the companies that invested in it like National Geographic, that spent years developing AR to work for them, and in turn undoubtedly, influenced the other industries that also used the

technology with its developments and finds. This is another factor that AR has that Virtual Reality does not, it is in desperate need of other influences.

Another comparison to be made when examining the success of AR to Virtual Reality is Pokémon Go. An AR based video game that did extraordinarily well thanks to a few key differences in issues previously discussed about VR. First the technology was ready for the video game industry, it does not have the glitches and issues that VR has making it much more likely gamers will use it as its functioning properly. AR developed as a technology through other industries before it entered video games. Virtual Reality as previously stated still has to many issues with the technology as a whole for gamers to take an interest, and without the influence of other industries its growth has entirely stalled. Secondly it is easily accessible, Pokémon Go is available on a smart phone which allows anyone to access it without having to buy a new console. They just use a device they already have, whereas Virtual Reality needs a gaming console and the headset to be able to use it and there is minimal crossover between companies and consoles so certain headsets only work with certain consoles, and that is a cost that many consumers will not make for a technology that still has so many issues.

This also helps bridge the gap between the digital divide and technology use. If someone already has a smartphone and is comfortable using it. They are much more likely to download this game there are no fancy controls they need to learn, the game itself is straight forward and easy to play and it encourages them to get out and go places. This makes it a great game for those that are intimidated by gaming consoles and video games in general or even those that don't consider themselves "gamers". This game caters to everyone regardless of gaming experience or technology skills. If you can use a smartphone, you can play this game. It is that simple, and that makes it a great introduction of the technology to the average everyday

consumer and a great marketing opportunity to garner interest from the everyday consumer in the technology's development, growth and integration.

Next Pokémon Go was based on an already successful game series. Pokémon has been around for decades even before it was a video game it was a card-based tabletop/collector's game. This means that it already had a long-standing audience of fans (regardless of age) that would love a mobile game they could play with their friends. Nintendo also does an incredible job marketing their games in comparison to others. They have what they call "Nintendo Directs" which are long detailed videos showing graphics and gameplay of upcoming releases of major and smaller games. For major games they will do dedicated directs like with the upcoming Pokémon Violet and Scarlet games. They also post teasers of directs gameplay and images of upcoming games on all their platforms. Their Instagram is currently full of Pokémon content with the games release date set in early November, all of it garnering a lot of attention and excitement for the upcoming game. Other games that did really well was Animal Crossing: New Horizons, the game was released in the middle of the pandemic and millions of people tuned in for the live direct for this game and even more downloaded and played it. To this day there is a large following of Animal Crossing content online showing that a properly made and marketed game not only can do well on release day but years after. It has been 3 years since its release and it is one of Nintendo's top grossing games, and also created a massive increase in sales for their consoles as well. Virtual Reality does not, at the moment, have a popular game series to use to build an audience for the technology through, let alone do the companies like Xbox and oculus have the marketing skills online that Nintendo has created. although there was an attempt through a Star Wars VR capable game *Vader Immortal* that was released on the Oculus Quest and Rift in 2019 and then on PlayStation in 2020. However, this did not garner as much interest

into VR as you would think a Franchise like Star Wars is capable of, but there also was not a lot of marketing about it outside of YouTube teasers, so if you were not looking for it you would not have found it. Whereas when we see new Star Wars series released on Disney+ they heavily market and advertise, which makes you wonder why they did not market this game in the same fashion. There is also talk going around about Minecraft which is a highly popular and discussed game, and similar games getting a Virtual Reality version, but until this happens it does not mean much, but still could be a game changer for VR if marketed better than the Vader game was. Without a highly interesting game for VR that is properly pushed to gamers, it will continue to struggle to garner interest from gamers, and everyday consumers. The best way to do that is to develop a VR version of a game with a devoted fan base already in place, many fans will play a game due to nostalgia, we see this in games like the upcoming Hogwarts Mystery game. Despite all of the discussions around J.K Rowling and her views online there is still a large audience of people that intend to buy and play the game despite everything due to their nostalgia and love for the Harry Potter series. This game would be great in VR as well, but the technology is not there yet but a game similar to it that has a devoted fan base behind it, maybe revisiting a certain Star Wars game and properly promoting it, would be just what VR needs when its ready to re-enter the video game industry.

Lastly outside of video games and its success there, AR has shown how adaptable it is across industries, it has proven it is applicable to not just one area. This makes gaining funding from larger companies like National Geographic that are willing to put in the time, money, and effort to develop it into something they can use, and other industries can build off much easier to do. VR has not made an effort to show not only how it can be applied to other industries but that it is possible to do so. The media surrounding Virtual Reality has mostly been about video games

or recreational uses, up until recently when Meta teased and suggested its applications in medicine and other fields, without showing how that would work, was there much of a public discussion about it. Now considering how the interest in the Metaverse has plummeted due to its horrific looking graphics, concerns about regulation and online safety in these spaces, and the views of the company as a whole. The conversation around Virtual Reality has shifted from these ideas of its applications elsewhere, to how it will not be successful because Meta is not prepared to deliver what it has promised. Therefore, it is just another failure that shows Virtual Reality is unrealistic and not a worthwhile investment of time, energy, or money. AR hasn't made the mistakes that VR has it has allowed for outside influence and took advantage of the opportunities presented to it allowing it to develop and grow, therefore when it did enter into the video game industry with Pokémon Go it was ready to do so and much more successful.

Virtual Reality's Possibilities and Potential in Medicine

Outside of video games virtual reality has many other applications and untapped potential. It's application in the medical field is one of many other opportunities and areas in which major developments in the technology could be made. Arguably many of the technical issues that virtual reality faces like motion sickness and eye strain, would best be handled in the medical field. In fact, that is exactly why VR needs the medical field, and why it needs to start in the medical field before it attempts to convince the average everyday consumers to give it another chance. The medical fields can solve its technical issues and develop it into a viable technology which it currently is not. However, the applications of virtual reality in medicine are also not pursued to the fullest either and could potentially change the minds of consumers on the viability and worth of virtual reality as a technology not just by making the technology viable but

by making it useful to them and improving their lives. Pawassar and Tiberius discussed this at length in their paper *Virtual Reality in Health Care: Bibliometric Analysis.* They themselves concluded that virtual reality is in the proper stage for it to begin its journey in progressing and developing in the medical field and that in the next few years there should be a noticeable increase and spread of the technology globally in medicine as it develops and becomes more accessible. There are plenty of areas that we are seeing this increase of interest and adoption of virtual reality as a potential treatment for many medical issues, as well as a tool for doctors themselves. Therefore, there is hope that in the next few years with the right push and support from the companies that own VR currently that we could see drastic improvements in the technology, the gatekeeping has to end, allowing the technology to enter into new markets that have the potential to and the capabilities to improve the technology making it viable and integrating it where it can be its most beneficial.

There are many places within the medical field that the technology can be integrated into. For patients there is research as virtual reality as part of treatment plans for diseases like Parkinson's and cerebral palsy. The first study on Parkinson's and virtual reality research *The effectiveness of virtual reality for rehabilitation of Parkinson disease: an overview of systematic reviews with meta-analyses* found that virtual reality therapy "increased benefits stride/step length, balance and neuropsychiatric symptoms" and "greater effects on gait speed, stride/step length, balance, activities of daily living, and postural control" (Lu, 2022). The study *Benefits of Virtual Reality Balance Training for Patients With Parkinson Disease: Systematic Review, Meta-analysis, and Meta-Regression of a Randomized Controlled Trial* this study is able to conclusively "confirm that VR balance training is a highly effective means to improve balance performance with large effects" (Jinlong Wu et al, 2022). As for cerebral palsy this study

specifically looks at gait rehabilitation and finds that there is also effectiveness with virtual reality here as well in improving gait (Lerma-Castaño et al, 2022) which may also reinforce the improvements seen in gait for the first study on Parkinson's as well showing that these issues need to be researched individually to get the best results. There is still a lot of research to be done in this area of application for patients but there is potential here for virtual reality to be applicable and life changing for patients with severe and life changing issues that affect their everyday life and could see potential improvement in those symptoms with the use of virtual reality as a part of their treatment plan. That is one other issue with the studies here that they just examine virtual reality as a treatment and do not combine it with other treatments which is unrealistic in medicine. Diseases like cerebral palsy and Parkinson's are complex and need a treatment plan that targets all their needs and symptoms, and virtual reality alone will not solve them but is a single tool that is available to be a part of that treatment plan. This is where the best results will come from where virtual reality is a part of an entire plan not the plan, until that is studied more in depth there is no way to know conclusively the extent of virtual realities potential as a tool for treatment.

Another application for patients comes from a mental health standpoint. There has be interest in using virtual reality to help patients overcome extreme fears allowing them to experience them in a safe setting, something similar to a fear of heights can be simulated in a safe and protected setting allowing patients to face their fears without risk. Natasha Angelova discusses two other applications for virtual reality in mental health settings. First is diagnostics, it can be used to display potential triggers to the patients, again from a safe environment without having to directly expose them, and then the doctor can study their reactions. Second is integrating it into the treatment plan, this is where mental health has done better examining VR

than the physical health sector has. Virtual Reality is one tool of many as part of a much large plan to help patients not the sole tool used. This may be why it has better and more conclusive results in mental health because they are not reliant on solely VR. Mental health takes into account how a patient process and manages change Angelova also touches on this. There are those that have a top-down experience "processing of the issue the change is related to the study of concepts and beliefs, which leads them to consider their emotional reactions and plan an alternative and more adaptive behavioral response." And those that have a bottom-up experience "the specific unlocking moment begins with an emotional experience and leads to changes in behavior and concepts." Regardless of which experience the patient goes through Virtual Reality is only one part of diagnostics and treatment and doesn't solely rely on the technology. The mental health sector of medicine realizes that patients are complicated and therefore their treatment will also be complicated and unique to them. Virtual Reality for them is just another tool at their disposal not the only tool at their disposal. That's where other areas of medicine have lacked in researching of VR, they solely study it, when in actual application they will not be able to only use VR. It will be one part of the treatment plan not the treatment plan. This may be why many studies around Virtua Reality in medicine are inconclusive because they do not take into consideration that the needs of the patients may be more complex than Virtual Reality alone can fix.

For the doctors themselves there is the potential to use the technology to learn new techniques and practice and hone their skills before actually performing them on patients using virtual reality, as well as using it to practice and hone their skills in techniques they already know and have. Here there is a potential crossover between the medical field and the education system to both integrate virtual reality. Learning with virtual reality and applying it to patients care as a

professional. This crossover is a sweet spot for virtual reality that will be revisited later. There is also research done on head mounted devices in medical education as well that could also carry over to professional use (Barteit et al, 2021). In this study they looked at a multitude of other studies using virtual reality in a wide range of fields and compared their results to see the application to a wide range of fields within medicine including surgery, dentistry, urology, emergency medicine, ophthalmology, pathology, and gynecology looking at virtual reality as an educational tool allowing students to learn and practice the skills they will need. But states that " if the VR training was conducted right before the actual surgery, it may have a positive impact on technical abilities and acknowledged that the impact of VR for surgery would significantly increase in the years to come" showing that within what was being examined there was already the idea that the technology would be useful beyond just education in school but also practical application as a medical professional in the field. However, the most important thing to note from all of this is that medicine has the potential to fix two of the factors that are withholding VR from being successful. First it can fix what the video game industry has failed to fix technically, and secondly it can show to consumers other applications of the technology that is beneficial to them and therefore prove to them that the technology should be given another chance, something both the developers of VR and the marketing of the Metaverse failed to do, but AR successfully did with the use of the Engineering field did it made AR a viable technology that others could use and integrate. This would pave the way for companies like National Geographic to use AR and combine it with other technologies, here is where compatibility becomes important, and use it in conjunction with drones, LiDAR, Sonar, and make the technology integral to the field of Archaeology and more. VR needs the medical field to do the same for it that engineers did for AR, fix its technical issues, and make it compatible and easily integrated.

Virtual Reality's Possibilities and Potential in Education

In the previously discussed study on head mounted devices the results found that students were more confident and increased their self-esteem by giving them as close to hands on experience as possible. It also allowed for a more practical and helpful evaluation of students and their skill performance as their movements, timing, and application of skills were all tracked and could be reviewed as part of their assessments (Barteit et al, 2021). More specifically surgery could learn and practice surgical knots and inserting catheters. Dentistry practiced placements of dental implants, urology practiced catheterization, gynecology practiced hysterectomy training, emergency medicine used it to practice needle chest compressions and it goes on with other fields. All of these studies showed improvement in at least one of the following: skills, knowledge of anatomy, confidence or self-esteem in the students. Showing that virtual reality has a potential to change how students learn and improve their skills and abilities before they touch a living patient. Another study that looked at the applications of VR for medical students was *Using a 360° Virtual Reality or 2D Video to Learn History Taking and Physical Examination Skills for Undergraduate Medical Students* this study looked at learning outcomes based on how the material was presented either through a 2D video or Virtual Reality. The results found that Virtual Reality learning resulted in a higher performance in history taking and physical examination, students seemed to retain more through Virtual Reality, and they concluded that in this application Virtual Reality had a potential to improve the learning of students. These two studies are great examples of the niche of medical students that Virtual Reality could tap into similarly to how Augmented Reality tapped into archaeology.

There are other applications of Virtual Reality in education that are outside of medical students Holly Michael discussed the application of Virtual Reality in teaching and learning and

how best we could apply this in classrooms. She found that “Our core findings were that an immersive experience motivates students and encourages them to learn more.” While she also noted that currently the difficulty facing the integration of Virtual Reality is cost and accessibility. More specifically noting “Future research should consider the potential of mobile VR devices such as smartphones or standalone devices and explore how we can integrate them into classrooms.” This would allow for a cheaper means for students and schools to access the technology without the cost that usually is attached to it. Actual application within the classroom is also an interesting topic a few applications that come to mind in the standard classroom is within history, physics, and biology classes. History classes could us VR to show locations like the Colosseum in Greece and the Pyramids in Egypt in a virtual space giving a better representation of the size and magnitude of these places instead of a tiny picture in a textbook. Biology classrooms could use VR similarly to medical students when examining the human body, giving students the opportunity to interact with the nervous system and understanding the circulation of blood in the body and how digestion works. It could also replace and be an alternative to dissection and human cadavers for students that do not feel comfortable with those activities but still allows them to learn and participate in a similar means to their peers. This could also make for a future potential study on the capabilities of VR versus similar hands-on activities in the classroom and how they compare with each other. Physics could also use this technology similarly to biology in allowing safe visual representations of the subject that is fun and interactive for students. These subjects are also some of the more difficult subjects that students face and the interactivity that VR brings to these subjects could have a significant positive impact on students’ performance in the classroom.

The education field would be step two following the medical field in the reintegration of VR into the lives of everyday consumers by taking advantage of the opportunities presented to it. Therefore, doing what video games could not and garner the interest of consumers by using a similar tactic to influencer marketing. VR could be donated to schools and students alike in medical schools and public primary and secondary schools, this would allow students who are of the right age demographic to adopt a new technology like VR to get their hands on the technology and try it for themselves. At this point VR would have fixed its technical issues with the help of the medical field and therefore be perfect for a classroom setting. It would also then be showing another application of VR in consumers everyday life and proving its viability, while also creating a market for itself with the demographic most likely to adopt it in the first place Generation Z and Millennials. This is something the video game industry failed to do, it failed to get the technology into the hands of the people that are most likely to use it and it had every opportunity to do so through video game streamers, and yet it did not take proper advantage of that opportunity. This would also be taking a tactic from AR by finding a field that gets the technology into the hands of the people that will use it and benefit from it the most, similar to what National Geographic and the Archaeology field was for AR, education can do the same for VR. National Geographic took a viable technology ready to be integrated and compatible with other technology and made it their own and education can do the same with VR. They can take the improvements that the medical field has made for the technology making it viable and compatible and integrate it into what they need which for them would be practice for medica students and a new way to learn subjects like History, Biology, and Physics for primary and secondary education.

Virtual Reality's Possibilities and Potential in Sports, Concerts and Other Entertainment

There is one other opportunity for VR as a means to get direct consumer interest into the technology instead of using a smaller group to generate larger interest. Sports and entertainment, during Covid the NBA used a form of virtual seats for fans to still participate in the games despite not being able to see them in person and this was also seen in concerts as well. You could pay for virtual seats essential to watch and support your favorite team or your favorite artist from the comfort of your own home. Sports teams that support VR companies could also make collaborative headsets in team colors that would be a hit with sports fans. With the use of properly positioned cameras and drones you could do something even more immersive with VR creating a VR sports experience or a VR concert experience. In fact, Travis Scott did a concert in Fortnite if taken a step further it could be done in virtual reality either through cameras and drones for a live experience or through a VR space like the Metaverse, or video games like Fortnite. Either way, would make for a unique experience that many fans would be willing and excited to participate in. This could be a way of using the fans and support of sports teams, or musicians to generate interest in VR platforms and the technology and these two are always looking for new ways to engage fans. Entertainers like Travis Scott are always looking for new unique ways to engage fans like he did with Astroworld and hosting his own festival, although the last one was absolutely tragic and horrifying. VR could potentially give a new way to host these more unique, high-energy events in a much safer way while still being exciting and fun. Younger people that are popular fans of musicians like Travis Scott also enjoy new technology and would happily buy a headset to watch a concert that was only hosted in a VR space. Travis Scott himself having hosted a concert in Fortnight previously would make a lot of sense for him to headline an opportunity for him, his aesthetic has always been futuristic in nature and would

make a lot of sense for his personal branding to adopt such a technology and use it for his concerts. This format of performance would also allow performers like Travis Scott to create a more unique experience through sets it would be more like a live music video than just a concert which would be incredibly exciting and new and allow for much more creativity on the artists part, which is something the music industry, has been looking for, for quite some time now. Other artist like Taylor Swift who recently crashed Ticketmaster's website when her tickets went on sale is another opportunity for VR. By bringing in an incredibly popular artist that gets fans excited and willing to wait hours for the chance to buy tickets for, VR could gain a lot of interest and support. This would be even more exciting for these more popular artists like Taylor Swift, Doja Cat and others whose concerts tend to sellout within minutes of tickets going up. VR has a larger capacity than any stadium in the world does and would allow for all of an artist's fans to watch one concert together. It would be the first time an artist could do a live concert globally where their fans were still completely immersed into it as if they were physically there, while also allowing for creativity of sets and performances in a completely new way combing essentially a live in person concert with a live TV performance.

This would be the last industry to influence VR and prove to consumers that its usable for them, reintegrating it back into entertainment. Concerts and Sports will be to VR what Pokémon Go was to AR. Pokémon Go was successful because the technology was ready for it and it took a game and a franchise that is already beloved by many consumers and made a well-functioning, fun and easy, new game for them. It allowed people to go out and enjoy something they already loved and made it more interactive and interesting. VR can do something similar with concerts instead of going out it would allow users to stay in their homes and enjoy something that is normally expensive and packed with people. Giving them an alternative way to enjoy something

that they already enjoy in a new way. No longer having to travel and find parking and pay for expensive front row tickets that are unobtainable for most people and giving them that access in a new and fun way that will generate excitement not only for the entertainers or athletes but for the spectators as well. No packed venue, free parking in your driveway, access to all the food and snacks you could want while still being court side or front row. This would do for VR what Pokémon Go did for AR it would give consumers direct access to the technology in a fun and entertaining way showing them how they can enjoy the technology not just use it to improve their lives. Although it is necessary for consumers to see that VR can improve their lives, those functions may not always correlate with daily use that would convince them to buy a headset. Entertainment is more capable of that, also concerts and sports are more popular than video games are and more widely participated in, therefore giving a broader audience to market to and purchase the product. This would be the final industry needed to change the perceptive of VR by this point the technology is viable thanks to the medical field, it has been shown to be adaptable and easily integrated through the education field, and now the entertainment industry can make it fun for everyday use.

What Else Can Virtual Reality Can Do to Improve Consumer Interest

There are still a few areas that virtual reality can improve upon outside of solving its technological issues and garnering the support of the proper industries, that would help to improve consumer interest. The digital divide and bridging the gap between those comfortable with new technologies and are willing to buy and adapt new technologies and those who are not. Taking advantage of the sweet spot between medicine and education and pushing for integration in that area specifically. If students use it in school, they are more likely as professionals to

continue using it. Finally revisiting the video game industry later on after it has had more time to mature and work out its issues as a technology, this industry still has a lot of potential, the technology just is not ready for it yet not jest technologically but in the eyes of the consumers it has failed to live up to its promises and needs to prove itself.

Digital Divide:

Digital Divide is a term used to describe and discuss the gap between those with and without access to new technology. For the purposes of VR though it important to address what is known as the Second Level Digital Divide (Tsai, 2015). Which is the divide technology skills. In this case the generations that grew up with, have a better understanding of, and use technology more often, and those who do not. The generations that are the most comfortable and have the higher use are Millennials and Generation Z. Those that are generally most affected by this divide are Baby Boomers and Generation X. The importance of this term in terms of VR is that there is already a divide between these generations as consumers of technology but economically speaking there is more purchasing power with Boomers and Gen X'ers but on the other hand more influence on technology from Millennials and Gen Z. This creates an issue for VR as the younger generations are more comfortable with technology and more likely to adopt new technology, but do not have the disposable income to do so. While the older generations are less comfortable with technology and less likely to purchase and adopt new technologies but have the disposable income to do so.

If you look at smartphones and the adoption of that amongst these generations, you will see that it took much longer for older generations to adopt and feel comfortable with a new

technology. It has only been in the last few years that we see this comfort come into play. This creates an added difficulty to VR. As it stands these generations will have to learn two different technologies if they want to use VR. They would have to learn to use the console and its controls as well as the VR headset and its controls. This is a lot to ask of a generation that did not have the benefit of growing with technology like Millennials or born into it like Generation Z. This is why making VR more widely accessible through device compatibilities is so crucial. If they only had to learn the VR headset and could use it on the devices that they have just gotten comfortable with smartphones, tablets, computers, then they are much more likely to purchase and adopt VR.

It still would be an uphill battle to get these generations to use these technologies but making it more accessible to them would be integral to get them as consumers interested and willing to purchase another new technology. Many in these generations feel overwhelmed as it is with smartphones, computers, and tablets. Asking them to then on top of those learn to use an Xbox and a VR headset which both have different controls is asking way too much of generations that already feel overwhelmed, intimidated, and lost in the technology world. This makes this market one of the most difficult for VR to penetrate into, but it is not impossible. Previously, it was discussed how it is necessary for VR to be compatible, adaptable, and easily integrated into other technologies. This is another reason why that is necessary, yes it will also make it easier to sell to the vast majority of consumers if it is compatible with the devices they already have, and for industries like medicine and education to use to improve their fields, but it is also necessary in bridging the digital divide as well. If VR was useable with a tablet, it would be much easier to convince those that experience the digital divide to adapt the technology, as previously stated tablets are incredibly easy to use and make people feel comfortable and

confident. If VR was compatible with tablets, it would help easy some of the fear and stress of using the technology if its was through something they were already comfortable with.

Apple - Making Technology with Everyone in Mind:

Apple has done what many technologies have tried and failed to do, they have garnered the interest and purchasing power of older generations that technology has left behind. As previously discussed, the digital divide has created an issue with tapping into the purchasing power of older generations due to their lack of technological skills. Apple is one of the few and the most successful that has managed to get the attention and money of these generations left behind and the reason is two-fold. First, they made their technology easy to use intentionally to target those with less technological skills, and secondly, they offer classes in house after purchasing to teach the buyer how to use their new device, while also setting up their new device in house with them. These two reasons are why they have penetrated a market that most of the technology industry fails to. They kept the digital divide in mind and included those people affected by it in their practices in store and devices they release.

Apple has created a line of products including the iPhone, iPad, iMac/MacBook's that are easily integrated and used. The products are considered some of the highest quality and their prices reflect that. However, many consumers consider it worth the price they pay for the benefits of the devices. The ease of communication between Apple devices that not only you own but also those around you make it worth the investment into their products. These devices were intentionally made to be easy to use, while still being high quality. It is no surprise that these devices have become incredibly popular with Baby Boomers and Generation X. The ease

of use is what has allowed Apple to find a market with generations that normally have little to no interest in the industry at all. You can see this best when looking at all the generations of the iPhone. Despite the smartphones getting higher tech internally the overall functionality of the phone has not changed very much. Most of the improvements made over the years have been either cosmetic to the shape or internal effecting mostly performance and the camera. This means that even when you upgrade your phone it functions relatively the same as the one you previously had. This is integral to keeping people effected by the second level of the digital divide using the phones as they have been allowed the time to get comfortable with how the phones functions. This applies to all of their products including the iPad and their computers. On top of that the iPhone and the iPad function identically, therefore if you can use one you can use the other, you can even get cell service for your iPad making it essentially a large phone. This has been amazing for older generations that need larger screens to be able to see but still want to be able to connect with their family and friends. The iPad has undoubtedly been a game changer when bringing Gen X and Boomers to the technology market, have a device that is easy to use, does not change drastically with every generation, and is highly compatible with other devices of the same brand, has brought a sense of comfort that the tech industry has not considered before. A study done by Sandy Tsai examined how the iPad has helped change the landscape of technology for these people. The study found that 62% "said the design of the iPad or Kindle was so intuitive that it was easy to use. This was true even among those who discussed that they had struggled with self-efficacy in learning how to use computers." This is the functionality that Apple has created across their devices and the lack of change in overall functionality has allowed people that have struggled to learn in this high-tech landscape to not only learn but feel comfortable and confident with themselves in an area that once intimidated them. The study

specifically found that 62% felt that the iPad specifically was “easy to use and not intimidating” (Tsai, 2015). This is a major accomplishment for any tech company and in this case, it was entirely intentional that is why it has been so successful in not only garnering the interest of those who love technology but also those that normally fear it.

Apple offers a service in store where their techs will not only help you set up your new device, but you can also take classes on how to use it. Although not many people know of these classes and many people are instead taught by family members instead, the fact is for those who do need them and take them, they are a game changer. You can take a variety of classes in the stores from basic device use to photo editing courses. Regardless of skill level there is something there for you. Offering classes to teach a new technology or device is usually only seen in an educational setting, high schools and colleges. Having access to a class outside of these places that are affordable and catered to the demographic is unique and something VR should really consider. Usually if you want to learn a new device or software you would either take a course in an academic setting or if your more tech savvy, find a tutorial on YouTube. However, for those that want a more personal and hands on approach these classes at Apple are great there one time course, inexpensive, and there are techs all around you that can answer your questions or sit with you and help. If this was more widespread the digital divide would undoubtedly shrink.

VR could take notes from both of these and use them to improve their interest with older generations. First making VR more accessible through device compatibility, if VR was compatible on an iPad there is a much higher probability that with the right marketing and accessibility these people would consider purchasing. However, as it stands, they would need to learn to use a gaming console and its controls as well as the VR headsets controls. With the intimidation that many of Generation X and Baby Boomers feel, they would not purchase VR it

is asking too much of them. Whereas if they could use it on their tablet and it was made to be easy to use like how Apple makes its devices and functionality, then there is a possibility VR could tap into this difficult market. If they also added online tutorials or someplace users could go to learn this technology that would no doubt encourage more people regardless of generation to purchase and enjoy this technology. As it stands learning how to use VR is complicated requiring an understanding of more than just one device and this is not only asking to much of those intimidated by technology but also the everyday consumer who may not want to put in that kind of time for a technology that still has significant issues with performance and user friendliness. Before any of these ideas can help with VR's marketability to all consumers the previous issues need to be addressed and then maybe it would stand a chance with non-gaming consumers and technologically intimidated consumers. Apple is also a far more trusted company over Meta, which means that if they were to create a VR headset consumers might also be more inclined to purchase it from them as they trust them far more than they currently trust Meta. This could also be a potential avenue for VR to also make a shift in brands developing the headsets not just the industries supporting and funding them.

It is also important to note that Apple has a benefit as a company that many companies currently developing VR, Meta specifically, don't have, consumer trust. Consumers trust Apple it is one of the reasons its so popular despite the associated price tag in comparison to other brands. This trust has also been heightened due to Apple having put restrictions on the data certain apps can have access to and giving users control over that. Regardless consumers trust Apple far more than they trust most tech companies giving them an advantage if they ever decided to develop a VR headset of their own, and they should. They would need to reconsider their past practices of Apple devices being compatible with other Apple devices and not much

else if they wanted all the benefits and profits of VR, but they would have a significant advantage over other companies. They could create classes like they do for other devices and teach new users how to set it up and use the technology. They would be the perfect company for VR to consumer sales, and for education due to their safety precautions built into their devices limiting access to parts of the operating system and other aspects of the device. Making it the "safest" form of VR to consumers just like the iMac and other devices have been considered the safest form of their device type. They hold the highest regard in the minds of the average consumer in the tech industry, and because of that if they created their own device, it would most likely do incredibly well due to the views of consumers that they have already established. They could very well be VR's version of National Geographic for its development, they have the influence, financial capabilities, technological development capabilities and consumer trust to do amazing things with the technology.

Metaverse:

Another opportunity that needs to be discussed is the most obvious one; Meta's Metaverse. As it currently stands the interest in the Metaverse has been horrific here in the west due to how horrific the Metaverse is, however there is some interest in the east for this platform. Regardless, the graphics are terrifying for a multi-billion-dollar company who has the means to hire the best graphic designers in the industry it honestly at the moment looks like a poor rip-off of IMVU from the 2000's. Outside of that the goal of that the Metaverse is actually unique and has potential if executed properly. The goal is to be applicable in business as a place to host meetings, hold events in a digital space, and be a hub for ecommerce. This is entirely different in comparison to what VR currently is intended for, video games. Instead, this could be a

fascinating technology that creates the consumer interest that VR currently lacks by giving it a practical everyday application for the average consumer not just gamers and outside of the entertainment industry. This could become a new way of life in the workplace, a new way to shop online, and an interesting place to be.

There are some other issues that the Metaverse faces that need to be delt with before any of this can happen, mainly with Meta itself. The current consumer view of Meta as a company is horrible in comparison to what it was a few years ago. Following the release of the effects of Instagram on teenage girls' mental health and the outing that they have known for years the poor effect that they are having on the mental health of young girls and people in general and they did nothing about it. Even worse all of this came out through a public congressional hearing made what was at the time Facebook look terrible as a company. They also have come under a lot of scrutiny about the information they sell to advertisers about their users, prompting Apple to allow users to protect themselves from some of that through new settings in the recent iPhones. Back to the Instagram debacle though, it also makes the announcement of their name change to Meta, and announcing the development of the Metaverse, which was clearly not ready to be announced yet considering how far in the development process they were at the time, very suspicious. This suspicion was not lost on the average consumer even if they weren't technologically savvy or concerned with these things. It was obvious they were distancing themselves from the bad press around Facebook by changing their name and attempting to distract consumers and users alike from the issues presented about their platform by announcing an exciting new one with the Metaverse. However, it only kind of worked, changing their name does not separate them from their past like they hoped it would, but the announcement of the Metaverse did change the discussion from their lack of concern for their users to how unprepared

and terrifying the Metaverse looked and that it clearly isn't ready for launch anytime soon and was not ready to be announced either. It was not lost on people that they announced it too soon as a distraction and it kind of worked. It was noticed that it was a distraction and overtime it was a successful one. We don't still talk about their lack of care for their users, except for a brief conversation on the safety of women in the Metaverse and the lack of regulations that happens/is possible in a VR space, and it has successfully shifted the narrative from their lack of concern for young women online to trash talking how horrible the Metaverse looks. In more recent times the conversation has shifted again to how much money Meta has lost in an attempt to make the Metaverse work despite its poor reviews from the public, and in turn neglected its other platform Facebook/Meta and made some bad decisions in regard to Instagram. Specifically attempting to make it more similar to Tic Tok by pushing their reels feature more than the images posted which is what Instagram built their platform on, drawing scrutiny and criticism from even the Kardashians on the subject.

In turn Meta is struggling to make money and has been losing a lot of it. Which could spell doom for the potential that could be the Metaverse for saving both Meta, their other platforms, and the most popular VR device on the market currently. They also own what was previously called Oculus and renamed their Oculus Quest to Meta Quest. This could however give an opening to other companies that are developing VR like Microsoft, Google, or Apple if they decided too. However, if the Metaverse is successful, the view of VR could improve if it looks good and is able to show consumers that it is worthwhile to integrate into their lives and not just a VR Zoom space. Also, since Meta owns both the software/platform and the headset they have the potential to dominate a new market that is struggling and make something out of it.

This seems to be the goal here to stay ahead of the trends and create something new and interesting, which could in turn, save them from their own financial destruction.

Creating Interest:

This also touches on how Virtual Reality could improve to make it more accessible in classrooms. The biggest issue facing the integration of VR in classrooms is accessibility and cost. If Virtual Reality was more easily accessible through a singular device like a smartphone or tablet not only, would it help to bridge the digital divide, but it would make it more marketable to schools and teachers. Most students have a smartphone/tablet if they could access Virtual Reality with that device they already have, it cuts the cost on the school to only the headsets, or better yet VR companies could donate headsets to schools and cutting the cost out completely. Therefore, encouraging schools to integrate this tool into their curriculum and considering the previous study by Holly Michael states that students were more motivated to learn when using virtual reality this could be the perfect way to gain more interest into the technology. Students are already struggling as it is returning to school after the pandemic if they are more motivated to learn with Virtual Reality this could be a way to not only improve the outlook and interest of the technology but also help students catch up to where they need to be academically. Which would be a massive step in garnering interest in the development of VR.

Another opportunity would be for Virtual Reality to market directly to medical students. This niche that has been noted previously is the best of both worlds. It allows access not only into higher education which could encourage primary schools to participate and integrate VR, but it also gives access to the medical field as well. This bypasses one of the main issues of

virtual reality in medicine at the moment which is virtual reality alone can fix complicated medical issues. This would instead allow for medicine to dip their toes into Virtual Reality through their students and see how doctors can learn with it and later on integrate it into their daily practices. Once doctors have a better understanding of Virtual Realities capabilities, they will have a better understanding of how it can help their patients and how to integrate it into their treatment plans. Students are key to this strategy since they will learn with the technology, they will be far more comfortable with integrating it than doctors who are already practicing and comfortable with how they approach medicine. This also is important for VR's development as a technology. If anyone is going to find a solution for the eye strain and motion sickness caused by Virtual Reality, it will be doctors. They are a vital voice and mind to have help develop the technology and fix its issues as they understand the human body better than anyone else. This would be the ideal place for VR to start improving and developing in comparison to the video game industry. There is much more incentive and more to gain for the average consumer and the doctors that use the technology if it is improved and available for them to use in the medical field than the video game industry. They are also more financially capable of supporting the technology through its issues and growing pains than the video game industry is. As previously stated, gamers do not like unfinished and glitchy technology or games and virtual reality is still very glitchy making it harder for it to gain the support it needs to grow. However, the medical field is no stranger to glitchy technology that needs improvement. Most medical technology has gone through large amounts of growing pains and if it were not for the persistence of the doctors and developers that believed in its possibilities, we would not have a fraction of the advances we have today. This makes the medical field an ideal place for a new technology to develop if it can and virtual reality has great potential in medicine and therefore with the right doctors and

developers behind it could make drastic improvements that the video game industry never could due to its lack of support from its community.

Once the technology has developed and gotten through its growing pains it will be ready for more direct consumer integration. Due to the promises made and not kept to the average consumer, they will need to know that Virtual Reality is useful and usable before they will integrate and purchase it for themselves. Seeing its application in the medical field and their own treatment would reinstate trust in consumers in the potential of VR. Then we could implement the technology in schools. It has to start with medical students there needs to be incentive to develop the technology, then we can integrate it in other places like high school classrooms. This is where VR has the opportunity to show its capable of making an impact on the average consumer. The study that was discussed previously about VR's potential in education focused on how the use of the technology in the classroom improved the students' interest and confidence in the classroom. This is the impact it can make, students' confidence in the classroom and their success has taken a significant hit following Covid-19 and using VR in the classroom could be an amazing solution to this. It would get students excited to go back to school, help motivate them to learn and improve their retention and confidence. VR should do what Apple did early on in their companies' history, donate to schools to garner support, trust, and interest into the products. This will show the world that the technology can make a genuine impact on the lives of people not just in the doctor's office but in the classroom and then inside your home. If students can use it in school, then they can also use it to learn at home alongside the other applications that VR has like video games. Once it has been in the hands of adults in a safe environment like the doctor's office and students' hands in the classroom. Then the real marketing push for virtual reality begins. The interest has been created in the target demographics and from there virtual

reality can revisit video games and metaverses (not the Metaverse but the overall concept of them). Creating a fun way to interact and use virtual reality at this point will give the best results especially on social media platforms like YouTube and Twitch where it will create a lot more consumer interest. Video games and virtual reality are not incompatible they just are not ready for each other yet. Virtual Reality needs to grow and develop a bit more and then it can revisit the video game industry when its less glitchy. It needs to do what Augmented Reality did. Start in a sector that is willing and capable of developing it; VR and Medicine/Education and AR and archaeology. Then integrate elsewhere, AR went into engineering and other tech-based occupations and VR can integrate into schools. Then lastly it can develop video games; AR and Pokémon Go and VR and whatever video game it chooses, preferably something that already has a large, dedicated audience, a franchise of some sort. This will give Virtual Reality its best chance at success and development.

Conclusion

This plan allows Virtual Reality to do what many technologies struggle to do. Be both a tool and a toy. Many technologies choose one or the other very few are able to do both. Augmented Reality, smartphones, computers, etc. have manage to be both a tool and a toy making them successful and popular amongst industries and consumers. Virtual Reality has that potential to be a tool for medicine and learning and a toy for consumers to connect with others and have fun. It has some issues to work out and desperately needs to change industries from video games to medicine to continue its development. Once it does and it works out its issues with motion sickness and develops its graphics better, it has unlimited potential in what it can do and become. We have seen possibilities in anime's like Sword Art Online where you can actually take the human consciousness and put it into the video game as your character and experience it

for yourself. It could revolutionize medicine and change the lives of those with Parkinson's, Cerebral Palsy, and extreme fears and deep-seated traumas allowing all of them to live a more normal life. It could help students catch up academically after the pandemic caused their life and education to come to a screeching halt causing many to fall behind. There are so many amazing improvements to our lives that it could make but it has to take that first step and walk away from an industry that isn't ready for it and doesn't have the means to develop it into all of these things. The future of VR is hard to pinpoint at the moment there are so many opportunities for VR to grow and flourish or crash and burn. I think the future will be decided by Meta although it should not be. Meta owns what was previously Oculus which is the most publicly popular and well know VR headset there are others as well but not as publicly discussed in comparison. Meta has fallen onto hard times having recently laid of over 11,000 employees following a year of financial difficulties and failures due to the failure that currently is the Metaverse. If Meta fails with the Metaverse and/or the VR headset isn't made more adaptable for the average consumer in some fashion VR will continue to be stagnant and fail to improve. However, if either Meta finds a way to get the Metaverse to do well, which is doubtful at the moment outside of its initial interest in a new, widely accessible VR platform. Or VR branches out from just video games and finds a new avenue to generate consumer interest then in a few years we could see a significant improvement in the popularity and adaptation of the technology. Either way however, it will be at least a few years if not another decade before we see these changes. A few years for Meta to make the change or a decade for the technology to integrate and improve in another field like medicine, education, or sports. VR cannot change and improve its image anytime soon major changes need to happen and those will take time, years to develop the Metaverse at least a decade to develop the technology to be useful in an entirely different field than what its currently

in. The last opportunity that VR has with consumers that is worth noting is consumers staying on top of and ahead of trends. VR will inevitably become a trend in technology the question is when and how long until the technology is viable. The industry however needs to make it a technology easy to adapt into everyday life that will help generate and drive the consumers desire to stay in front of emerging and developing technology and regardless of the path that it chooses whether it be the Metaverse or Medicine and Education making sure VR is exciting and that users want to be part of the trend and preferable ahead of it is an important marketing tool that VR needs to make better use of now. This is one of the few things it can do now convince people that VR will be popular because of what is planned and coming and therefore they should buy into it now to stay ahead of the trend.

The plan that is laid out here is one of many opportunities for VR to take, but there are some key issues that regardless of how they get solved they need to be solved. For starters VR needs to become viable, it technically has to many issues preventing it from being usable on a daily basis. It also needs to show to consumers that it is a necessary addition to their lives. The big issue for VR is everything that you do in VR you can do in real life so why do it in VR? VR needs to bring something new to the table that is exciting and/or needed in consumers everyday life. Once VR has accomplished these two major key points it will be much better off which is why the plan here is laid out the way it is to target these two key points. The medical field offers the intellectual needs of the technology to overcome its technical issues and make it usable for everyone. It also shows a need for the technology in our world, but it is not something that consumers can use every day, it is just proving that it is in some way needed. However, this step in VR's development could be solved without the medical field, Meta has announced that they will be releasing a new headset next year in 2023. Although based on previous experience there

is not much reason to believe that Meta can develop and overcome VR's issues technically there is always a possibility. In which case Meta would have a unique opportunity to alter their plans for the Metaverse slightly and step into the education field itself. Instead of developing Meta for work meetings it could develop it instead for classrooms fulfilling the needs to prove that VR can improve our lives in some way without the need of the medical field to do so. This would shorten how long it would take for us to see VR being adopted and integrated by consumers as the medical field would needs years to develop VR, and then still have to create and integrate it into the field. Meta could bypass some of that time as they already would have the technology viable, and the Metaverse is already in progress. Leaving them to only need to alter what they have with Meta which is still possible considering how early on in development it is. Meta could easily shift from workplace meetings to classrooms allowing VR to move onto the next step in gaining the support of consumers in the education field.

The education field shows how it can be used in an educational setting being used on a more regular basis and improving the everyday lives of students even if it is just making learning more fun or allowing them to retain and practice their field of study in a more hands on, realistic way. Education also allows VR to show that it is usable in multiple fields as previously discussed it can be used in a history classroom and a physics or biology classroom, showing how dynamic and adaptable the technology can be. This step would also be a great time for a brand like Apple to step in and take over the technology's development and integration. Apple creates products that consumers feel safe using and therefore would be a great company to integrate the technology into schools while still making the public feel safe allowing younger students access to the technology since that is something the brand has always prided itself on. This would also be the first step into making the technology more widely accessible to consumers which would

allow for the entertainment industry to step in and develop it into something that can be used on an everyday basis. Using VR to enjoy a sports event or a concert is a fun and new way that not only would bring renewed interest in consumers but also in the teams and performers. Sports teams would be more accessible and entertaining to watch while using VR, giving a more immersive experience without the price tag of courtside seats, while performers would be given a new platform with opportunities to make their performances more creative, entertaining, and immersive. Both showing how exciting the technology can be, therefore fulfilling the final key piece to renewing interest and garnering the support of consumers. The medical field makes it viable and proves its needed, education shows its usable on a daily basis in a beneficial way, and entertainment makes VR fun and exciting again.

None of this is possible however as long as VR is strictly developed and controlled by the video game industry, although VR video games would do incredibly well if created properly and are the most common depictions of VR's viability in the media, it has not been able to develop the technology into something viable and usable for the everyday consumer and it has had ample time to do so. The industry was chosen for a reason as a place to develop the technology and that most likely is because we have not considered VR to be useful anywhere else and it has only been shown in media representation as a video game like extension of reality. This has plagued VR for a long time and stunted its development and growth as a technology. However, VR is so much more than an extension of reality, it is a technology that can allow for medicine to develop and grow new techniques without the risk of human life, it can help students learn, be more engaged and excited to learn new topics in a wide variety of subjects from the pyramids of Egypt to the basic principles of physics. It can also be fun too, allowing us to enjoy an immersive experience with our favorite sports teams and music artists. This does not mean

that VR has no place in video games, just that it is not ready for them, and they are not capable of developing it so that it can be. It is time for the gatekeeping of VR to end and the accessibility to the technology by others to begin so that the technology can grow and develop into what it should be and could have been by now, life changing.

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